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Is the Environmental-Economic Performance Relationship Symbiotic? Evidence from Listed Non-Financial Firms in Nigeria

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Abstract: This study aims to examine whether environmental sustainability disclosure (ESD) connects symbiotically with the economic performance of non-financial listed firms in Nigeria. The study employed ex-post facto design by collecting secondary data on return on equity (ROE) and measures of ESD from annual financial reports of eighty-six (86) listed non-financial firms with environmentally significant operational impact in Nigeria. Descriptive statistics, including mean and standard deviation were used to describe the properties of the data while the Granger causality test was applied to test the stated hypothesis. The results indicate the existence of a bi-directional association between the measures of ESD and economic performance. Thus, it portrays the economic consequence of listed firms' operations. The study took a detour from examining mere relationships to delve into causality and thus, implies that commitment to ESD presage benefits to both the host communities and firms. The value of the study lies in the fact that it disentangled the question of causality between ESD and the economic performance of listed non-financial firms in Nigeria. Therefore, within the Nigerian context, the study is pioneer evidence of symbiotic relations between ESD and ROE and hence, improves sustainability discourse.

Keywords: economic performance, environmental sustainability disclosure, non-financial firms, symbiosis.

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INTRODUCTION

Today's reality is that companies are under tremendous pressure to monitor and communicate on more than just their economic performance. On an increasing basis, companies are expected to reveal how their hunt for economic performance and growth presage respect for environmental and social issues. Such reporting, according to Chang et.al. (2019) would align the long-term benefit of other stakeholders with that of shareholders, accrue gains and improve firm value. The idea is that, capturing efforts towards profitability is no longer sufficient for corporate growth and survival (Loh et al., 2017). The dominant orientation on the environmental-economic performance nexus is that improved economic performance is prompted by improved resource usage (Sharfman & Fernando, 2008). Three major problems concerning measurement, direction of relationship and causality, have been identified in the literature relating to the link between economic performance and environmental sustainability disclosure (ESD) (Preston & O'Bannon, 1997). Two approaches

have emerged in the literature for measuring ESD. The first approach used extent of environmental disclosure in companies' annual report (number of pages, sentences, and words) (Ingram & Frazier, 1980; Gray, et al., 1995; Deegan & Gordon, 1996; Owolabi, 2009). The second approach used some disclosure-scoring measure derived from content analysis (Barth et al., 1997, Cho et al., 2010; Adeyemi & Ayanlola, 2014).

While although various studies (Iredele & Akinlo, 2015; Jackson & Singh, 2015; Elshabasy, 2017) confirmed that some correlations exist, questions of causality are still difficult to disentangle. Although, positive relationship has critical consequence for the stakeholder theory (Preston & O'Bannon, 1997), discussing causality could point to the business angle of the ESD. Prior empirical evidence points to the fact that economic performance (such as higher liquidity) improves future environmental performance (Diantimala, 2018). On one hand, environmentally responsible companies could use available profit to participate in optional tasks; on the other hand, firms that are battling with liquidity constraint may limit investment in activities that directly or indirectly impact environmental performance (Yin, et al., 2019). Whether the reverse is also the case is still a subject of hot debate. Emerging evidence from literature revealed that ESD could signal improvement in economic performance. In this regard, Jackson & Singh (2015), Song et al. (2017) found that higher environmental rankings tended to perform better in financial success. However, Deswanto & Siregar's (2018) study observed that financial performance does not affect environmental disclosure. The outcomes of these works are however, indeterminate, inconsistent and often contradictory (Aggarwal, 2013; Ashafoke & Ilaboya, 2017). This is not unconnected to the fact that the nexus between ESD and economic performance is premised on confounding conjectural support that previous confirmable study has not been able to elucidate (see Al-Tuwaijri et al., 2004; Yeom, 2012). Also, these studies have largely focused on linear relationship model. Establishing causality (uni-or bi-directional) between environmental sustainability disclosure and organisations' performance appeared to be one of the areas of environmental accounting research that has not gained much attention from researchers.

Streams of empirical studies have considered disclosure of sustainability information either as part of the annual report or as a detached stand-alone sustainability report in Africa (Owolabi, 2009; Iredele & Akinlo, 2015; Mathuva et al., 2017a; Mathuva et al., 2017b) and in the developed countries (Cho et al., 2010). Similarly, Ajape et al. (2021) and Das et al. (2021) addressed industry-level contingent factors and corporate governance mechanisms pressuring disclosure of environmental information while Odoemelam & Okafor (2018) had examined how corporate governance could affect disclosure of environmental information.

Some studies (Al-Tuwaijri et al., 2004; Makori & Jagongo, 2013; Odia & Imagbe, 2015; Elshabasy, 2017; Bually, 2019) have found that ESD positively relates with economic performance.This implies simultaneous increase in both environmental sustainability disclosure and measures of economic performance especially, improved revenue and profit. Odia & Imagbe (2015) have reported an inverse relationship implying downward movement of environmental sustainability disclosure as economic performance improves; Ezejiofor et al. (2016) failed to establish any link between environmental sustainability disclosure and financial performance. Also while some empirical studies recorded statistically significant relationship (Al-Tuwaijri et al., 2004; Che-Ahmad et al., 2015; Odia & Imagbe, 2015; Ofoegbu & Megbuluba, 2016), many others could not record a statistically significant association between ESD and financial performance (Ali et al., 2004; Umoren et al., 2017). In another stream of research, evidence revealed that economic performance has no effect on ESD; and that ESD does not mediate the effect of financial performance and environmental performance on firm value (Deswanto & Siregar, 2018; Utomo et al., 2020).

A paradigm shift in research considers causality between ESD and performance. Preston & O'Bannon (1997) highlighted the uneasiness of documenting causality, they reported that social performance is driven by financial

performance i.e. firms indulge in socially oriented activities based on affordability. This provided not much aid for the business case (Maryanne, 2002). Hence, ascertaining the direction of causality is one of the weaknesses of the prior studies (Hart & Ahuja, 1996).

Extant literatures on linear relationship between environmental sustainability disclosure and organisational performance are valuable and instructive in their right but are also suggestive of the need for greater rigour and richness of detail in relation to causality discourse (Peteraf, 1993). Ogunleye et al. (2017) explored the causality between CSR and financial performance. Evidence from their study substantiated the assertion that previous financial performance provides incentives for indulging in CSR by listed companies in Nigeria and not otherwise. However, there is an anecdotal evidence, from the work of Soyemi et al. (2021), of reverse causality between value of firm and corporate environmental sensitivity.

Unravelling whether ESD symbiotically associates with economic performance would not only portray the economic consequence of listed firms' operations, it would also reflect the achievement of firms' goals without obstructing the serenity of the host community's environment- a situation described as "win-win" by Soyemi et al. (2021). This void in the literature is the major thrust of this paper. This paper contributes to the body of knowledge in the realm of environmental sustainability disclosure literature in Nigeria.

METHODS

Ex-post facto research design has been employed with the aid of content analysis of environmental sustainability information disclosed in the selected non-financial companies' annual report. Content analysis signals firms' claim which might be at variance with their economic reality (Cochran & Wood, 1984), albeit, it is a widely used technique in the accounting literature (Al-Tuwaijri et al., 2004; Owolabi, 2009; Okoye & Asika, 2013; Adeyemi & Ayanola, 2014; Nwobu, 2015; Mathuva et al., 2017b).

The population of this study is all the one-hundred and eighty (180) companies listed on the Nigerian stock Exchange as at 2016 (now Nigeria Exchange Group-NGX). These companies are divided into nine (9) sub-sectors comprising 61 financials and one-hundred and nineteen (119) non-financials. The non-financial sub-sectors are further sub-divided into 28 industrials, 30 Consumer Goods, 15 Oil & Gas, 12 Basic Materials, 11 Health Care, 14 Consumer Services, 8 Technology and 1 Telecommunications.

Companies that form part of this study were chosen via purposive sampling method with the purpose of obtaining representative samples in accordance with specified criteria. For inclusion in this study, a company had to fit into the criteria below: 1) the perceived impact of their activities/operations on the environment, 2) the availability of the required data on environmental sustainability information disclosure as specified in the Global Reporting Initiative (GRI) (2011) for the period 2007-2016 as well as the ROE, and 3) listed and currently active on the Nigerian Stock Exchange during the period covered in this study.

The period to year 2016 reflects the auspicious time when the Nigeria stock Exchange first took bold steps toward sustainability reporting by listed companies in Nigeria. Moreso, the content of the later released sustainability disclosure guidelines (effective from 2019) contains, in its section four, reporting requirements for performance indicators for economic, social, governance and environmental. The number of items required to be disclosed for environmental indicators are relatively more and comprehensive under the G4 GRI guidelines hence, the GRI 2011 version was used. A total of eighty-six (86) non-financial companies met all the three criteria and constitute the final sample. Data extracted from these firms' annual reports are deemed comprehensive and sufficient to permit robust analysis and useful inference.

The secondary data used in this study were adjudged valid and reliable as they were obtained from the sampled companies audited annual reports whose information content has been certified by an independent firm of chartered accountant (Ajape et al., 2016).

Variables used in this study include the outcome variable (environmental sustainability disclosure (ESD)) and predictor variable (economic performance (ROE)). ESD is measured in terms of occurrence (disclosed = 1 and not disclosed = 0) while performance is restricted to economic performance. In this study, the following metrics are employed as a means of capturing the identified variables:

Environmental Sustainability Disclosure (ESD): This study adopts the dichotomous scoring system based on the rating system proposed by Kinder Lydenberg Domini (KLD). Researchers appear to be unanimous on the use of Kinder, Lydenberg, Domini (KLD) data to measure CSP (Mattingly, 2017). Only the rating approach of KLD is used in this study. The rating system assigns a score "1" if the required environmental information is disclosed, otherwise, "0" is assigned. KLD rating scale has been widely used in environmental accounting research (Iredele & Akinlo, 2015). These metrics are applied to the Global Reporting Initiative (GRI, 2011) disclosure requirement indicators on ESD categorized into:

a. Material used and recycled.
b. Energy consumption and efforts to produce energy-efficient product to reduce consumption.
c. Water: sources, consumption level, volume recycled and reused.
d. Description of impact of activities, product or service on biodiversity.
e. Total direct and indirect greenhouse gas emission and initiatives to reduce the emission.
f. Efforts to palliate environmental impacts of products and services.
g. Monetary and non-monetary sanctions for non-compliance with environmental law.
h. Significant environmental impacts of transporting products, other goods and materials members of the workforce.
i. Total expenditures and investments on environmental protection by type.

Economic Performance: Prior studies (e.g., Nwobu, 2015; Al-Qudah, 2016; Worae & Ngwakwe, 2017) have used different proxies for economic performance such as return on total asset (ROTA), return on equity (ROE); return on assets (ROA) and profit margin. Alluding to the rational economic view of business whose main objective is shareholders' wealth maximization; this study employs ROE as proxy for economic performance. Return on equity (ROE) is a strong standard of measuring how well the management of a company creates value for its shareholders (Ahsan, 2012). Linking the income statement to the statement of financial position, ROE is most widely used to capture profitability or financial performance (Al-Qudah, 2016; Rosikah et al., 2018). ROE is considered as one of the accurate measure of profitability widely employed in the previous studies (Huang & Chen, 2015; Li et al., 2017a; Li et al., 2017b; Xu & Liu, 2018).

This study employed both descriptive and inferential statistics. The descriptive statistical tools include maximum value, minimum value, mean and standard deviation. The inferential statistical tools used were linear regression and granger causality models to test the stated hypothesis. Similar statistical tool has been employed by Worae & Ngwakwe (2017). The concept of causality, as espoused by Granger (1969), appeared to be broad and encompassed testing transmission effects between the whole distribution of random variables (Candelon & Tokpavi, 2016). Analysis was carried out with the aid of Econometric View (E-View) statistical software.

The following functional econometric models were designed to measure the association between the outcome and predictor variables of the study. For the models, ESD and ROE were interchangeably used as dependent and independent variables respectfully.

$$ESD_i = \sum_{i-1}^{n} \alpha_{it} ROE_{it-i} + \sum_{j-1}^{n} B_j ESD_{it-j} + U_{1it}$$

$$ROE_{it} = \sum_{i-1}^{n} \lambda_{it} ROE_{it-i} + \sum_{j-1}^{n} \delta_j ESD_{it-j} + U_{2it}$$

Where it is assumed that the disturbances U_{1it} and U_{2it} are uncorrelated
ESD = Environmental Sustainability Disclosure for each company at time t
ROE = Ratio of earnings after interest and tax to equity of the selected companies at time t
U = Error term.

RESULTS AND DISCUSSION

In the Table 1, the overview of the descriptive statistics is presented. The sample statistics include the mean, standard deviation, maximum and minimum values. The mean value of the return on equity (ROE) of the sampled firms is 6.25%. Minimum value is negative 8.15% and maximum value is 25.33%. The mean value of ESD is 0.386 with standard deviation of 0.487. The rate of dispersion of each series from its mean value as shown in the Table and it is high for ROE indicating that this variable is not stable during the sampled periods.

Table 1 Descriptive Statistics of the Data

	Mean	Standard deviation	Minimum	Maximum
ROE	6.250	5.031	-8.158	25.333
ESD	0.386	0.487	0.000	1.000

Source: Data Analysis, 2021

Ohiaeri & Ajape (2017) observed that unit root tests are essential in diagnosing the stationarity of time series. A series is said to be stationary if the mean, variance and covariance are unvarying with respect to time, otherwise, the series is non-stationary. Stationarity of the study variables was tested and the result of the panel unit root test is as shown in Table 2. Levin lut chut result was selected to reach a final conclusion on whether each of the variables is stationary or not. From the result, each variable is stationary at level.

Table 2 Unit Root-level, 1st difference, and second difference respectively

Variables	Level	1st difference	2nd difference
ROE	-3.04	-14.44	-22.74
	(0.00)	(0.00)	(0.00)
ESD	-19.75	-66.86	-51.77
	(0.00)	(0.00)	(0.00)

Note: Probability values are in bracket.
Source: Data Analysis, 2021

The relationship between ESD in the listed non-financial Nigerian companies and economic performance measured by return on equity (ROE) is examined using panel regression model. The decision on which to choose between fixed effect and random effect for estimation of the panel regression model was based on Hausman test analysis. The result suggests that fixed effect is appropriate for estimating the model (F-statistics = 18.95, p-value = 0.029 is less than 0.05).

The results as shown in Table 3 that ESD (β = .054, P < .05) has significant relationship with economic performance (ROE). The Coefficient of ESD has a positive and significant relationship (β = .054, t = 2.718) with ROE of listed firms in Nigeria. This result implies that the more committed listed firms are to environmental information disclosure, the more likely it will lead to an improvement in economic performance. Expectations are that firms with higher disclosure index are able to attract profitable investments which will consequently impact on return on their equity (ROE).

Table 3 Estimated relationship between ESD and Economic Performance

Variables	**Fixed Effect**		**Random Effect**	
	β	t -stat	β	t –stat
ESD	0.054	2.718**	0.121	0.288
Constant	0.214	0.39	-0.678	-0.284
R-squared	0.636		0.523	
Adjusted R-squared	0.631		0.505	
F –statistics	41.49		21.30	
Prob (F-statistic)	0.00		0.000	
Hausman – F Statistics	18.95(0.029)			

Source: Data Analysis, 2021

The direction of causality between ESD and economic performance is determined using Pairwise Granger Causality Test. Three dimensions of causality tests were conducted to determine the causal relationship. These are long-run causality, short-run causality and overall causality (strong exogeneity) as shown in the Table 4.

Table 4 Granger causality Test

Hypothesis	Long run	Short run	Strong exogeneity
Panel A: Causality from ESD to financial performance			
ESD → ROE		8.97212**	21.7743**
Panel B: Causality from ESD to financial performance			
ROE → ESD	8.67921**		28.7384**

→ indicates "Granger-causes"; **Significant at 5% level.

Source: Data Analysis, 2021

In the 'Panel A' of Table 4, the long-run causality reveals indication of bidirectional causality between ROE and ESD in the sampled quoted companies which is statistically significant at the 5% level. The strong exogeneity shows that the null hypothesis that ESD in the listed firm does not Granger cause ROE could not be retained at 1% level of significance. The short-run causality test outcome implies that ESD index in the listed firms Granger cause ROE and is statistically significant at 5% level. In the Panel B, the statistically significant result negates the notion that ROE does not Granger cause ESD at 5% level. This confirms the existence of bi-directional causality between ESD and economic performance of listed firms. This evidence of bidirectional relationship between ESD and ROE reiterates both the societal and business angles to environmental sustainability disclosure.

It has been asserted in the extant literature that cases involving upsurge of global environmental events clearly points to the causal relation between poor corporate environmental performance and sharp loss of shareholders' investment (Yeom, 2012). By extension, a nexus should exist between organisational outcomes and good environmental performance. From one angle, there is statistical evidence that economic performance drives disclosure of environmental sustainability information in the sampled companies. Therefore, directors of listed companies could bank on surplus economic resources to improve on ESD (Diantimala, 2018; Yin et al., 2019); as firms with higher values tend towards being environmentally responsive (Soyemi et al., 2021). It also implies that only profitable companies would likely engage in environmental sustainability disclosures. Thus, these prior empirical results from developed economy only posit that past profitability drives ES disclosures but could not establish any causation between environmental disclosures and profitability (Qiu, et al., 2014). Soyemi et al. (2021) had made a wake-up call for research into reciprocal relationship between environmental responsiveness and economic performance having discovered a reverse relationship between the variables. In response, findings of this study reveal a significant bidirectional causality between ESD and firms' financial results.

Thus, the outcome of this study provides sufficient evidence which established bi-directional relationship between ESD and ROE. This suggests that while financial performance (ROE) drives disclosure of environmental information, the ESD will also lead to improved ROE. In effect, business enterprises, by engaging in ESD, do not just fulfil their own side of social contract to the society but also stand a better chance of gaining improved financial performance. It is also in alignment with the notion that, corporate indulgence in ESD is premised on stakeholders' impression management (Preston & O'Bannon, 1997; Diouf & Boiral, 2017). Younis & Chaudhary's (2017) submission, that the tripod upon which sustainability rests are interdependent and should affect each other, seems to point to causality and is, in tandem with this result. After all, good environmental performance could lead to reduction of cost, and hence profit. This result, at least, in relation to listed non-financial companies in Nigeria, appears to be a pioneer evidence of causal relationship between environmental sustainability disclosure and economic performance.

CONCLUSION

This study has explored whether the interrelationship between environmental sustainability disclosure and economic performance (measured with return on equity) is symbiotic. On one hand, evidence from the study demonstrated a positive relation between the outcome and predictor variables while on the other hand, the outcome of the study's analysis revealed a bi-directional relationship. If positive relationship between the variables could signal that corporate involvement in environmental protection does not hamper shareholders'

value but rather ensures a levelled playing ground between corporate activities and physical environment (Soyemi et al., 2021), then, good environmental performance portends great benefits for both the listed firms and the society. The firms benefit from their commitment to ESD through reduced cost and attraction of more profitable investments which improve ROE. The improved economic performance leads to more commitment to ESD and the cycle continues. The study therefore recommends increased level of awareness about and improved level of environmental sustainability disclosure by the listed firms in Nigeria. The Nigeria Exchange Group should also step up regulatory requirements toward compelling compliance with ESD. The mere persuasive stance of the NGX's sustainability reporting guidelines diminishes the potentials of such approach toward the achievement of the tenets of sustainability. However, the study has focused mainly on the environmental section of sustainability reporting, further studies may explore whether other segments of the sustainability could granger cause economic performance. More so, the possible moderating effect of sectoral classification of organisations on the NGX on the environmental-economic performance nexus could constitute a rich avenue for future research.

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