

THE EFFECT OF ENVIRONMENTAL COST ON CORPORATE PERFORMANCE OF LISTED MANUFACTURING FIRMS IN NIGERIA

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ABSTRACT

This study was carried out with the broad objective of examining the effect of environmental cost on corporate performance of listed firms in Nigeria. The study adopts ex-post facto, content analysis and regression research design. The research adopts secondary source of data in obtaining all the data needed for the study, extracted from the audited financial statements of the sampled manufacturing firms, which is meticulously examined and relevant data extracted from the period of 2011-2018 for analysis. In line with the main objective of the study which is to examine the effect of environmental cost on corporate performance of listed manufacturing firms in Nigeria. The first specific objective was set to examine the effect of environmental cost on return on equity of listed manufacturing firms in Nigeria and to achieve this, hypothesis was tested and the results reviewed that environmental cost has a significant effect on return on equity of listed manufacturing firms in Nigeria. The second specific objective which was set to examine the effect of environmental cost on return on asset of listed manufacturing firms in Nigeria, hypothesis tested revealed that environmental cost has a significant effect on return on asset of listed manufacturing firms in Nigeria. In consonance with this study's findings, it is recommended that, Firms in Nigeria should invest reasonable amount on environmental issues and report same in their financial reports for the various stakeholders to see. This will create a good relationship with the host community which will enable growth in production and increase in turnover.

Keyword: corporate performance, turnover, environmental cost, component.

1. INTRODUCTION

Activities of business organizations especially those in the manufacturing sector have led to such environmental pollutions. Also, unsustainable use of natural resources by the firms has caused increase in the emission of greenhouse gases in our society. This consequently results in depletion of the ozone layer and global warming. As a result of this, the role of companies in addressing environmental and sustainability issues is deemed very vital (Adams & Busola, 2015).

The primary way companies can contribute to solutions is to reduce carbon dioxide and other greenhouse gas emissions in their own operations and supply chains. Consequently, corporate climate reporting on carbon emissions has become a major focus, as disclosure prompts corporate responsibility – in this instance, GHG emissions reduction (Beredugo & Mefor, 2012). Subsequently, firms have come under intense pressure to meet up with the requirements of the current generations without compromising the capacity of the subsequent generations by engaging in environmental engineering activities which has led to additional cost on them (Deegan, 2010). Hence, firms are expected to show accountability of their conducts and activities that took place in the society and the natural atmosphere. However, it is worth taking into consideration by organizations that being environmentally responsible will increase costs to the organization which in turn reduces the level of company's financial performance (Nadeem, 2012). As a prelude to international specifications, there have been increased demands by investors, consumers and other stakeholders as to how companies address risk and opportunity relating to social and environmental issues in line with the commonality of expectations by citizens of other countries (Ekpo, Okon & Beredugo, 2019).

Environmental costs have been expanded to account for product design for sustainability, recycling and disassembly; process design to reduce environmental impact of operations; worker training; research and development. The various government regulations, societal pressure groups and green consumer pressure are some of the current trends and recent developments reawakening corporate attention to the strategic and competitive role of a firm's environmental responsibility to corporate performance (Ifurueze, Lyndon & Bingilar, 2013). Although voluntary, financial reports of firms that are without adequate disclosure of environmental cost information may be seen to be incomplete. Commitment to the natural environment has become an important variable (Unamuno, 2016) and behaving in a socially responsible manner is increasingly seen as essential to the long term survival of companies (Adams and Zutshi, 2014). This is because failure to include environmental cost information in financial reports might affect the ability of various stakeholders of the firm to make sound decisions.

According to Bassey, Effiok and Eton (2013) environmental accounting is referred to the way and manner by which firms communicate the environmental effects of their activities and how they have tried to resolve it in the best interest of all relevant stakeholders. Deegan (2010) further stated that, firms through the process of communication of environmental accounting information may seek to influence the public's perception towards their operations and create a good image. Firms also incur environmental costs by contributing to both corporate public relations and media campaigns on environmental issues. Also, being environmentally responsible may direct firms to better resources and increase their employee's motivation which results in creation of unforeseen opportunity within the organization (Ness, 2012). When environmental costs are not adequately allocated by firms, cross-subsidization occurs between products (Nadeem, 2012). Most companies do not know the extent to which their environmental cost

information can influence their performance and thus tend to underestimate them. This means that if they are not assessing such information, it implies that they are not monitoring and reporting them. Manufacturing firms in Nigeria need to be fully accountable for the true cost of the impact of their activities on the environment which in so doing will put them in the good books of other stakeholders and will have an effect on their corporate performance.

Several studies have been carried out by different authors on environmental cost and corporate performance by developed economies and emerging economies but it seems a conclusion is yet to be reached. Susi (2019); While, De Viviers and Staden (2010); Galani (2011) all carried out their studies on environmental cost disclosure and corporate performance using content analysis and found out mixed results on environmental cost disclosure in the annual reports of firms and corporate performance. Uwalomwa, (2011); Ajibolade and Uwalomwa, (2013) used the mixture of both survey and regression research design to explain the effect of environmental cost disclosure on corporate performance of firms and they too found out mixed results. As a result of the methodology employed by past authors and their mixed results, this study will assess the effect of environmental cost on corporate performance of firms in Nigeria using both content analysis and regression research design to see if results now conforms with that of past authors.

1.1 Objective of the Study

The main objective of the study is to examine the effect of environmental cost on corporate performance of listed manufacturing firms in Nigeria. The specific objectives include to;

1. Examine the effect of environment cost on return on equity of listed manufacturing firms in Nigeria.
2. Determine the effect of environment cost on return on asset of listed manufacturing firms in Nigeria.

The following hypotheses are tested:

H_{01} : Environmental cost has no significant effect on return on equity of listed manufacturing firms in Nigeria.

H_{02} : Environmental cost has no significant effect on return on asset of listed manufacturing firms in Nigeria.

2. REVIEW OF RELATED LITERATURE

2.1 Concept of Environmental Disclosure

Environmental accounting is an innovative sustainability initiative that has been defined by Steele and Powell (2012) as that aspect of accounting which has to do with the identification, allocation and analysis, of material streams and their related money flows by using environmental accounting systems to provide insight into environmental impacts and associated financial effects. Pramanik (2017) refer to environmental disclosure as the process by which a corporation or an organization communicates its information regarding the range of its environmental activities to a variety of stakeholders. They went further to define environmental cost disclosure as the assessment of the impact of environmental issues on the company's financial performance and this requires changes to the way the company discloses environmental issues in their annual reports. The aim of environmental reporting is to fulfill accountability and transparency purposes while providing useful information for timely and appropriate decision making by interested parties.

Environmental accounting engenders transparency on how companies deal with the environment, and how they treat their communities. Since, organizations are central to the problem, they must be central to the solution (Beredugo, & Ekpo, 2019). Moreover, environmental reports are ways in which the company provides information to meet the financial markets requirement. Pramanik (2017) further expressed the environmental cost reporting as the company's way for the provision of information about environmental performance, and meeting financial markets and at the same time providing itself with a positive environmental image. In addition, environmental reporting is considered as a valuable evaluation tool for corporations and individuals, when making investment decisions (Adediran & Alade, 2013). While, Daferighe (2010) and Peskin (2019) viewed environmental accounting as a tool that can be used to determine less tangible and external costs for projects and activities, such as bio-diversity, human health and aesthetic values. It is also aimed at broader issues such as implementing sustainable business practice to conserve natural resources for future generations. Environmental accounting must, therefore, be designed such that it provides information enabling users' access to environmental behaviour of the company and its economic consequence. Therefore, parts of the system are both information in monetary units (financial information) and information in physical units (non-financial information). Furthermore, it is necessary to ensure that different information needs of various interested parties are filled. It also means that the conception of environmental accounting is based on the basic recognition influencing the development of accounting system in the 20th century.

The method of reflecting the business process should be differentiated according to the users of the accounting information and according to decision-making tasks for support of which the accounting information is used (Dechow & Dichev 2012). To include environmental information in the accounting system of a company is one way to start to include sustainable development in everyday business decisions. A very important function of environmental accounting is to bring environmental costs to the managers; therefore, motivating them to identify ways to reduce and avoid economic costs related to the environment and at the same time reduces the company's environmental impact. Daferighe, (2010) stated that Environmental Accounting can be broken down into three disciplines, namely: National Environmental Accounting (NEA); Global Environmental Accounting (GEA); and Corporate Environmental Accounting (CEA).

The Corporate Environmental Accounting is further sub-divided into Environmental Management Accounting (EMA) and Environmental Cost Reporting (Disclosure) (ECR). The focus of this study is on Environmental Cost Disclosure

aspect of Corporate Environmental Accounting, which Uwalomwa (2014) describes as the process that involves communicating the social and environmental effects of organisations' economic actions to particular interest groups within the society. Furthermore, Environmental Reporting Guidelines (2012) defines Environmental Disclosure as the systematic and holistic statements of environmental burden and environmental efforts in organisations' activities, such as environmental policies, objectives, programs and their outcomes, organisational structures and systems for the environmental activities, in accordance with general reporting principles of Environmental Disclosure, which is published and reported periodically to the general public. The source further revealed that Environmental Disclosure aims at promoting communication of organisations, fulfilling accountability regarding environmental efforts in their activities, and providing useful information to decision makers and interested parties. Srinivasa (2014) described Environmental Disclosure as the communication of environmental performance information by an organisation to its stakeholders.

2.2. Components of Environmental Cost Disclosure

Dragomir and Anghel-ilcu (2011) identified the basic components of environmental accounting information disclosure. Beredugo (2014) also added that environmental costs consist of environmental measures and environmental losses. They include clean-up costs, costs of recycling materials or conserving energy, closure costs, capital expenditure and development expenditure. These costs are incurred in preventing, reducing or repairing damage to the environment and conserving resources. However, there is no unique component of good environmental disclosures that can be adopted by all companies. Companies should design and implement strategies in the light of regulatory framework that will produce an efficient, qualitative and result-oriented outcome, for quality financial reporting in the interest of stakeholders. Effective environmental cost disclosure should be designed in line with the circumstance surrounding each entity and continuously reviewed according to the changing circumstance of the time. However, for companies which intend to compete internationally, the following are recommended by Dragomir (2011) as basic environmental cost disclosures components: Environmental Restoration, Environmental Fines and Penalties, Environmental Donations and Sponsorship & Environmental Waste Management.

2.2.1 Environmental Restoration Cost: Environmental Restoration cost provisions are recorded when the company has obligations to undertake restoration, rehabilitation and environmental work, especially, when environmental disturbance is caused by the development or on-going production at the companies' site (Price-water house coopers, 2014). **Environmental Fines and Penalties:** This category comprises current operating expenditures (immediately recognized in the income statement). These are costs borne by an organisation for the violation of the rule and regulation guiding specific environmental issues. Penalty and associated costs incurred as expense are expected to be fully disclosed in the organisations' financial statements (Dragomir 2011). **Environmental Donations and Sponsorship (EDS)** This category consists of voluntary environmental donations and sponsorship showing the companies commitments towards the community and the natural environment (Dragomir, 2011). **Environmental Waste Management Cost:** Environmental waste management involves sensing what is there, sorting, separating, transforming, returning to service what can be used and properly disposing what is left (Rose, 2017). According to Ghush, (2019) waste is inevitable human activities. They are either a by-product of initial production process or they arise when objects or materials are discarded after they have been used. Disposing of waste has a huge environmental impact and can cause serious environmental problems. Novick (2019) enumerated the accounting for waste management in any community, town or city as follows: associate cost on the reduction in the speed of sanitation related diseases, reduction on occurrence of non- communicable diseases and reduction on environmental pollution (degradation of land, water and air). All manufacturing firms are expected to make a report on the associated cost incurred in the management of waste. This is because stakeholders required this information to evaluate the organisation's responsibility to environmental matters and the activities the organisation must have engaged in, to circumvent environmental degradation.

It is no doubt that the above environmental related cost has relativeness with performance of an organization as underpinned on the stakeholders' theory. This theory established that the firm's success is dependent upon the successful management of all the relationships that a firm has with its stakeholders (Jensen & Meckling, 2016). The stakeholder theory asserts that corporation's continued existence requires the support of the stakeholders and their approval must be sought and the activities of the corporation adjusted to gain that approval (Chan, 2016). The more powerful the stakeholders, the more the company must adapt. Environmental reporting is thus seen as part of the dialogue between the company and its stakeholders (Gray, Kouhy & Lavers, 2015).

2.3 An Overview of Corporate Performance The definition of corporate performance and its measurement continues to challenge scholars due to its complexity. This study attempts to contribute to this effort by creating and testing a subjective scale of performance that covers the domain of business performance in the words of (Venkatraman & Ramanujam 2016). The conceptualization of performance in this study is based on the stakeholder theory, which allows distinguishing between performance antecedents and outcomes. It also provides a conceptual structure to define performance indicators and dimensions. The fact that profit and growth are relevant motives for the existence of a business firm and must be included in any attempt to measure performance is indisputable. The question is: what else is relevant and should be considered as well? In this case, stakeholder theory help by Measuring performance under this conceptualization which involves identifying the stakeholders and defining the set of performance outcomes that measure their satisfaction (winter, 2013). The stakeholder theory offers a social

perspective to the objectives of the firm and, to an extent it conflicts with the economic view of value maximization (George, 2015). Such ontological discussion is within the scope of this study. The stakeholder theory has found its way into the corporate and academic world. It is possible to see its influence in corporate annual reports. The use of stakeholders' satisfaction as firm performance was also adopted by a large number of different authors like (Venkatraman & Ramanujam, 2016; Varadejan & Ramanujam, 2019;). Besides offering a way to decide what performance is in a comprehensive way, the use of this theory allows one to resolve the issue of differentiating between performance antecedents and outcomes. Performance measures assess the satisfaction of at least one group of stakeholders. This conceptualization of firm performance is applicable across different companies, as acknowledged by Goerzen and Beamish, (2013), allowing one to differentiate between high and low performers in the eyes of each stakeholder using indices such as profitability, Turnover rate and Earnings per share (Fitzgerald & Storbeck, 2013).

Superior financial performance is a way to satisfy investors and can be represented by profitability, growth (Turnover rate), and market values (Earnings per share) (Fitzgerald & Storbeck, 2013). These three aspects complement each other. Profitability measures a firm's past ability to generate returns (Waren, 2016). Growth demonstrates a firm's past ability to increase its size and meets its cash demands (Graham, 2019). Increasing size, even at the same profitability level, will increase its absolute profit and cash generation. Larger size also can bring economies of scale and market power, leading to enhanced future profitability. Market value represents the external assessment and expectation of firms' future performance in terms of the firm's ability to satisfy shareholders. It should have a correlation with historical profitability and growth levels, but also incorporate future expectations of market changes and competitive moves.

2.4 Environmental Cost Disclosure and Corporate Performance

Henderson and Pierson (Bassey,2013) explains that environmental cost reporting is an aspect of sustainable development reflecting concerns about environmental protection, inter-generational equality, the Earth and its resources. When people come together to establish a firm, they do so to allocate their resources for the purpose of a common goal and such may be to earn profit. To achieve this goal, they also interact with the society. On the basis of their motives stakeholders and groups that keep interest in the operations of the organization. Stakeholders include the customers, workforce, lenders, suppliers, government and local communities and even the environment in their business activities. Many scholars are trying to understand how environmental cost disclosure affects the financial performance of firms. Financial performance is a subjective measure of how well a firm can use assets from its primary mode of business and generate resources. The shouldering of social responsibility by firms is an issue that continues to generate mixed considerations, debates and thoughts by different subsets of the corporate world and the academics. While some argue, as Merrick Dodd did in the 1930s, that environmental cost disclosure is not only a righteous obligation of firms but one that also comes with great benefits, Adolf Berle also argued this in the 1930s, that environmental cost reporting is against the profit-making function of business, and that it does not even pay the firm any meaningful dividend to become socially responsible and the debate continues till date. Environmental cost reporting became noticeable as an issue in the 1930s and increasingly so up to the 1960s. This followed an intense debate by Merrick Dodd of the Harvard Law School and Adolf Berle of the Columbia Law School. Their debate centred on the question: "For whom are corporate managers' trustees?" Dodd argued that apart from profit making, corporations existed for another very important function: that of social service to the society. Berle however disagreed with Dodd in this regard. The debate however gradually slowed down until the 1980s when in the wake of hostile takeovers, and gain after the disintegration of Soviet Communism, the aura around the subject got increasingly enlarged as social responsibility became an important issue both for business and in the theory and practice of law, economics, management and politics. With a resurgence of the debate, there are still today proponents and opponents of environmental cost reporting. The proponents argue that "it fosters and promotes ethical behavior by managers, which has a positive impact on firm reputation and financial performance". In other words, shouldering environmental responsibilities is a feeder to the corporate performance. However, opponents of environmental cost reporting "claim that it is expensive and inconsistent with the preeminent goal of maximizing shareholder return."

2.5 Empirical Review

In research conducted by Susi (2019) on the Occurrence of Environmental Disclosures in the Annual Reports, the study was aimed at evaluating whether the occurrence of environmental disclosures in a corporate annual report is associated with a firm environmental visibility. As environmental visible firms are easier to observe by relevant constituents, they are more vulnerable to public scrutiny. This paper hypothesized that environmentally visible firms tend to disclose environmental information in their annual reports as compared to those of less visible companies. A firm's environmental visibility is proxies by size, profitability and industry sensitivity to the environment. The sample consisted of 205 companies listed on Jakarta Stock Exchange in 2012. It found out that 66 companies under non-sensitive industries did not mention any environmental information. This study also showed that the occurrence of environmental disclosure in annual reports of Indonesian companies is associated with size and industry sector, but not with profitability.

Nwaiwu and Oluka (2018) examined the effect of environmental cost disclosure and financial performance measures of quoted oil and gas companies in Nigeria. They employed the use of time series data collected from annual financial reporting and economic review of Central Bank of Nigeria; Pearson product moment coefficient of correlation and multiple linear regression analysis was used in their analysis. The econometric results analyzed reviewed adequate

disclosure on environmental cost and compliance to corporate environmental regulations has positive significant effect on financial performance measures. Thus, they recommended regulatory enforcement for adequate environmental cost disclosure and proper reporting.

Ifurueze, Lyndon and Bingilar (2017) examined the impact of environmental cost on corporate performance in oil companies in the Niger Delta States of Nigeria. They employed a field survey methodology using a selected sample of twelve oil companies. The multiple regression analysis was explored to test their hypothesis. An investigation was undertaken into the possible relationship between corporate performance and three selected indicators of sustainable business practices: Community Development Cost (CDC), Waste Management Cost (WMC) and Employee Health and Safety Cost (EHSC). Their study revealed that sustainable environmental business practices and corporate performance is significantly related. And sustainability may be a possible tool for corporate conflict resolution as evidenced in the reduction of fines, penalties and compensations paid to host communities of oil companies. Therefore, they recommended that the management of oil companies in the Niger Delta States of Nigeria develop a well-articulated environmental costing system in order to guarantee a conflict free corporate atmosphere needed by managers and workers for maximum productivity and eventually improve corporate performance. In another study conducted by De Villiers and Staden (2017), they utilized annual report content analysis to investigate the environmental disclosure practices of companies operating in South Africa. They conducted a content analysis of more than 140 corporate annual reports over a nine-year period in order to identify the trends in environmental disclosure by South African companies over time. Their results indicated a reduction in environmental reporting after an initial period of increase, for both mining companies and the top 100 industrial companies. The decrease for mining companies was bigger than for the top 100 companies, both overall and when the results were divided between specific and general information classes. The disclosure of both general and specific information increased from 1994 to 1999; disclosure of specific information then declined by five times more than the decline in disclosure of general information.

Malarvizhi and Ranjanni (2016) conducted research to examine whether there is any significant relationship between Corporate Environmental Disclosure (CED) and firms Performance of selected companies listed in Bombay Stock Exchange (BSE), India. They use content analysis methodology by developing an environmental disclosure index (EDI) and formulating hypotheses to test the association between firm performance and level of environmental disclosure. Primary data was collected using questionnaire instrument. A regression model with EDI as dependent variable and return on capital employed (ROCE), return on assets (ROA), net profit margin (NPM) and earnings per share (EPS) as independent variable is used to analyze data for this research. Results show there is no significant relationship between the level of environmental disclosure and firm performance. They recommended that corporate organizations should be educated on the benefits of better environmental performance and encouraged to comply with the requirements for long-term survival. As part of environmental governance government should include education on ethical environmental disclosure at societal level, school level. Shehu (2014) examines the effect of environmental expenditure on the performance of quoted Nigerian oil companies, within a period of twelve years (1999-2010) using selected firm financial statement of all quoted oil companies listed in the Nigerian Stock Exchange. The data was analyzed using multiple regression, employing ROA and three independent variables; Cost of Environmental Remediation and Pollution Control (ERPC), Cost of Environmental Laws Compliance and Penalty (ELCP), Donations and Charitable Contributions (DCC). Galani, (2014) conducted a study on the Relationship between Firm Size and Environmental Disclosures. The study investigated the level of environmental reporting in corporate annual reports. Specifically, it investigated the extent to which Greek companies have implemented a set of environmental accounting practices and analyzed the relationship between various firm characteristics and environmental disclosures. The results obtained showed that the degree of development of environmental accounting practices is low and there is a positive relationship between corporate size and the disclosure of environmental information in annual reports. However, neither profitability nor listing status seemed to explain differences in environmental disclosure practices between Greek companies.

3. METHODOLOGY

This study adopts ex-post facto, content analysis and regression research design. Ex-post facto research design involves the means of ascertaining the impact of past factors on the present happening of event. Content analysis is employed to measure the environmental cost component of firms in line with the five (5) environmental cost criteria adopted by Dragomir (2011). The research adopts secondary source of data in obtaining all the data needed for the study, extracted from the audited financial statements of the sampled manufacturing firms, which is meticulously examined and relevant data extracted from the period of 2011-2018 for analysis.

Model specification. The multiple regression model is stated thus:

$$ROE_{it} = B_0 + B_1 \text{LogENCOST}_{it} + B_2 \text{FSIZE}_{it} + u \text{ ----- (1)}$$

$$ROA_{it} = B_0 + B_1 \text{LogENCOST}_{it} + B_2 \text{FSIZE}_{it} + u \text{ ----- (2)}$$

ROA = Return on Assets

ROE = Return on Equity

LogENCOST = Log of Environment Cost

FSIZE = Firm Size

- B_0 = Unknown constant to be estimated
 B_1 = Unknown coefficients to be estimated
 u = Error term
 it = Cross section (i) and Time (t)

4. DATA PRESENTATION

Descriptive statistics

In this sub section the descriptive statistics of both the explanatory and dependent variables of interest are examined. Each variable is examined based on their mean, median, maximum and minimum. Table below displays the descriptive statistics for the study.

Descriptive Statistics				
stats	retoe	retoa	r fsize	lencost
mean	14.53509	6.277586	7.043879	.6590517
p50	14.065	6.585	7.02	.67
Min	-229.27	-30.28	5.79	.18
Max	143.54	34.17	8.55	1
Skewness	30.82438	9.702944	.6826638	.162683
Kurtosis	-2.196878	.7338548	.0414519	.2497983
Sum	3372.14	1456.4	1634.18	152.9

Source: Researcher Computation (2022)

The above table shows that the mean value of financial performance proxy return on equity (retoe) and return on asset (retoa) among the sampled firms were 14.54%, 6.28% and 2.25% respectively. This implies that about 14.54%, 6.28% and 2.25% of the observation shows the level of financial performance. The median value of environmental cost for the sampled companies was 0.67. The maximum value for the study was 1 while the minimum value was 0.18. This therefore means that companies with higher or equal to the median value of 0.67 spend more on environmental cost while companies with the value below 0.67 spend less. In the case of firm size, the average value was 7.04 which means company above 7.04 are considered as large firms. The probability values of the test of normality for all the variables (retoe, retoa, lencost and fsize) are lesser than 5%. This means that all the variables satisfied normality.

Unit Root Test

Panel unit root test for Dependent and Independent Variables

Stationarity of the series was checked through panel unit root test. Panel unit root test are not similar to unit root test. Panel unit root tests are simply multiple series unit root tests that have been applied to panel data structure (where the presence of cross sections generates ‘multiple series’ out of a single series. To check for common unit root process, we use the Levin, Lin and Chu Panel unit root test and, for individual unit root process, we use Lm, Pesaran & Shin W-Stat panel unit root test. At 5% level of significant, the null hypothesis will be rejected if p-value is less than 0.05 and conclude that the series is stationary. The test were conducted based on the following null unit root hypotheses;

Levin Lin & Chu Test: Assumes common unit root process, Lm, Pesaran & Shin W- Stat test: Assumes individual unit root process,

The summary result of the panel unit root test of the variables are presented in the table below and the detailed result are displayed.

Result of Panel Unit Root Tests for the Variables

Variables	Levin Li and Chu		Lm, Pesaran & Shin W-Stat	
	Statistic	P-value	Statistic	P-value
ROE	-4.4312	0.0000	-0.9281	0.1767
ROA	-7.6420	0.0000	-1.2555	0.1047
FSIZE	4.3926	0.0000	-3.6555	0.0001
LENCOST	-10.8023	0.0000	1.1523	0.8754

In case of the common unit root test, the result shows that at 5% level of significance, reject the null hypothesis common unit root for ROE, ROA, FSIZE, and LENCOST with their Levin Lin & Chu statistic as -4.4312, -7.6420, -3.9010, -14.3926 and -10.8023 respectively, and their p-values are all above 0.000. Since their p-values are less than 0.05, it's concluded that the test is significant and the series are all stationary at level. In case of the individual unit root test, the result shows the test statistic as -0.9281, -1.2555, -3.6555, and -1.1523. with associated p-values of (0.1767, 0.1047, 0.0001, and 0.8754) for ROE, ROA, so we reject the null hypothesis and concluded that the individual process of the variables are stationary. Generally, we concluded that the variables ROE, ROA, FSIZE, and LENCOST have no unit root, which implies that the series are stationary.

Co-integration Test

The panel unit root test suggested that the series were stationary. This implies that the series are integrated of order zero and can be tested for co-integration with Engle- Granger co-integration test. The test aimed at determining whether a long term relation exist between the series stating the null hypothesis that there is no co-integrating relation, and if the hypothesis cannot be accepted, we test the hypothesis that there is at most one co-integrating equation.

Co-integration Test for the Series RETOE FSIZE and LENCOST

Cointegration Test - Engle-Granger

Specification: RETOE FSIZE LENCOST C

Cointegrating equation deterministics: C

Null hypothesis: Series are not cointegrated

Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=11)

	Value	Prob.*
Engle-Granger tau-statistic	-34.32629	0.0001
Engle-Granger z-statistic	-73.98792	0.0000

*MacKinnon (1996) p-values.

From table above the Engle-Granger tau statistic and z-statistic are recorded as -34.3263 and -73.9879 with p-values of 0.0001 and 0.0000 respectively. The Engle-Granger co-integration test is significant since the respective p-value is less than 0.05. At 5% level of significance the Engle-Granger co-integration test rejects the null hypothesis which means there is a long run relationship exists within the variables. Therefore, we conclude that in model 1, the variables are co-integrated.

Co-integration Test for the Series RETOA FSIZE and LENCOST

Co-integration Test - Engle-Granger

Specification: RETOE FSIZE LENCOST C

Co-integrating equation deterministic: C

Null hypothesis: Series are not co-integrated

Automatic lag specification (lag=0 based on Schwarz Info Criterion, maxlag=11)

	Value	Prob.*
Engle-Granger tau-statistic	-4.795542	0.0324
Engle-Granger z-statistic	-35.19619	0.0289

*MacKinnon (1996) p-values.

From table above, the Engle-Granger tau statistic and z-statistic are recorded as -4.7955 and -35.1962 with p-values of 0.0324 and 0.0289 respectively. The Engle-Granger co-integration test is significant since the respective p-value is less than 0.05. At 5% level of significance the Engle-Granger co-integration test rejects the null hypothesis which means there is a long run relationship exists within the variables. Therefore we conclude that in model 2, the variables are co-integrated.

Test of Constant Variance (Heteroskedasticity)

The tests for constant variance were conducted via the White's Heteroskedasticity test.

White's test is a test of the null hypothesis of no heteroskedasticity against heteroskedasticity of some unknown general form. The Obs*R-squared statistic is White's test statistic, computed as the number of observations times the centered from the test regression. The null hypothesis is rejected if the test is significant at 5% level. The tests for the models are detailed below.

Test of Constant Variance for Model 1

Model 1 Heteroskedasticity Test: White

F-statistic	2.216527	Prob. F	0.0276
Obs*R-squared	19.29310	Prob. Chi-Square(10)	0.0367
Scaled explained SS	156.1859	Prob. Chi-Square(10)	0.0000

The test statistic, Obs*R-squared is given as 19.2931 with p-value of 0.0367. The p-value (0.0367) is less than 0.05, so the test is significant and the null hypothesis is rejected. We concluded that assumption heteroskedasticity is not violated.

Test of Constant Variance for Model 2

Heteroskedasticity Test: White

F-statistic	2.407504	Prob. F	0.0169
Obs*R-squared	20.50102	Prob. Chi-Square(10)	0.0249
Scaled explained SS	1614.203	Prob. Chi-Square(10)	0.0000

The test statistic, Obs*R-squared is given as 20.5010 with p-value of 0.0249. The p-value (0.0249) is less than 0.05, so the test is significant and the null hypothesis is rejected. It's concluded that assumption heteroskedasticity is not violated.

Test of Hypotheses

Hypothesis 1

H₀: Environmental cost has no significant effect on return on equity

H₁: Environmental cost has no significant effect on return on equity

The model is given as;

$$\text{Model 1; ROE}_{it} = \beta_0 + \beta_1 \text{LENCOST}_{it} + \beta_2 \text{FSIZE}_{it} + \mu$$

The F-statistic of 3.11 and p-value of 0.0466, which is less than 0.05, indicates that the test is statistically significant at 5% level. The null hypothesis is rejected and concluded that environmental cost has a significant effect on return on equity.

Hypothesis 2

H₀: Environmental cost has no significant effect on return on asset

H₁: Environmental cost has a significant effect on return on asset.

The model is given as;

$$\text{Model 2; ROA}_{it} = \beta_0 + \beta_1 \text{LENCOST}_{it} + \beta_2 \text{FSIZE}_{it} + \mu$$

The F-statistic of 15.17 and p-value of 0.0000, which is less than 0.05, indicates that the test is statistically significant at 5% level. The null hypothesis is rejected and concluded that environmental cost has a significant effect on return on asset.

Discussion of Findings

In line with the main objective of the study which is to examine the effect of environmental cost on corporate performance of listed manufacturing firms in Nigeria. Three hypotheses are tested to ascertain the effect of environmental cost on corporate performance of listed manufacturing firms in Nigeria.

The first specific objective was set to examine the effect of environmental cost on return on equity of listed manufacturing firms in Nigeria and to achieve this, hypothesis was tested and the results reviewed that environmental cost has a significant effect on return on equity of listed manufacturing firms in Nigeria. This finding is in line with that of Galani (2014).

In line with the second specific objective which was set to examine the effect of environmental cost on return on asset of listed manufacturing firms in Nigeria, hypothesis tested revealed that environmental cost has a significant effect return on asset of listed manufacturing firms in Nigeria. This result is in line with that of Uwalomwa (2014) who conducted a study on Corporate Environmental Reporting Practices using a comparative approach of Nigerian and South African Firms. He investigated the extent and nature of corporate environmental reporting practice among listed firms in Nigeria and South Africa and found out that there is a significant positive relationship between the operating performance, size of firms and the level of corporate environmental cost among selected firms in Nigeria. This is also supported by the findings of Tapang, Bassey and Bessong (2012).

5. CONCLUSION

In consonance with our findings, it is recommended that: Firms in Nigeria should invest reasonable amount on environmental issues and report same in their financial reports for the various stakeholders to see. This will create a good relationship with the host community which will enable growth in production and increase in turnover. The Financial Reporting Council of Nigeria (FRC) and others alike should make environmental cost reporting a mandatory report as this can help compel the firms to engage in environmental conservation activities that will mitigate the adverse effect of their business activities on the host communities. As a result will lead to a conducive business operating environment and increase in profitability. Besides shareholders interest in the report on earnings per share. There are other stakeholders who are interested in other information in the financial reports like the efforts of the firms in conserving the environment in line with global best practices. The disclosure of such environmental cost will attract diverse investors and this will bring about increase in the earnings report of the firms.

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