IMPACT OF ENVIRONMENTAL COSTS ON FINANCIAL PERFORMANCE OF LISTED INDUSTRIAL GOODS FIRMS IN NIGERIA (2010-2022)

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Abstract

The study examined the impact of environmental costs on the financial performance of listed industrial goods firms in Nigeria. The specific objectives of the study were to examine the impact of waste management cost, environmental remediation cost, employee health and safety cost and community development cost on the financial performance of listed industrial goods firms in Nigeria. The study adopted *ex-post facto* research design which enabled data to be extracted from the annual reports and accounts of eleven sampled industrial goods firms quoted on the floor of the Nigerian Exchange Group for the period of 13 years, spanning from 2010-2022. The study made use of ordinary least square (OLS) pooled panel regression model, fixed effect and random effect regression models to estimate the empirical relationship between components of environmental costs employed in the study and the dependent variable at 0.05 level of significance. The outcome of the study revealed that waste management cost had negative and significant impact on the financial performance of listed industrial goods firms in Nigeria; while environmental remediation cost, employee health and safety cost and community development cost had positive and significant impact on the financial performance of the listed industrial goods firms. The implication of the findings is that environmental accounting practices employed by the sampled firms are relevantly in estimating their financial performance. The study concluded that environmental accounting practices have contributed significantly in the enhancement of financial performance of listed industrial goods firms in Nigeria. The study recommended that listed industrial goods firms in Nigeria should adopt standard environmental accounting practices and adequate provisions for employees' welfare and community development should be made in order to encourage workers and improve on the community for sustainable optimal productivity that would lead to improved financial performance.

Keywords: Environmental Costs, Waste Management Cost, Environmental Remediation Cost, Employee Health and Safety Cost, Community Development Cost and Financial Performance

1. Background of the study

Traditionally, firms' financial performance has been measured predominantly as they affect shareholders wealth, thereby ignoring the interest of other stakeholders. Contemporarily, this narrowed perspective has changed, which gave way to broader stakeholders consideration. For instance, Smita (2022) opined that business is a socio-economic activity that draws its inputs from the society; hence its objectives should include the welfare of the society. Consequently, firm performance measurement should include all facets of performance indicators to satisfy the wider Stakeholders considerations which is a derivative of both internal and external factors. A new business model that considers the environment and people before profit has emerged. Hence, the Stakeholders' theory propounded by freeman in 1984 advocated that business entities should not be shareholders focused, but Stakeholders focused. This eventually brought the idea of social responsibility, which makes corporate organizations socially responsible to the entire public that defines its environment; rather than only the owners of such entity (Adewoye, Olaoye & Ogundipe, 2018). Therefore, the success or failure of any corporate entity is no longer going to be based only on return on investment, but also on parameters that question their responsibilities and responsiveness to the environment in which they operate. Hence, Alade (2022) who warned that where companies disregard environmental laws and regulations and continue to degrade the environment with its attendants consequences of health hazard, marine and land ecosystem disturbances, dispute between the companies and host communities is inevitable.

Historically, awareness about the natural environment and damages caused by activities of man started since 1950 (Bassey, Effiok & Eton, 2013). However, with the emergence of corporate environmental and social responsibility in 1990 with respect to multinational companies, much attention has been given to knowing how the environment is being managed from the effects of companies' activities (Juhmani, 2014). The role of corporate entities with respect to overall management of the environment was duly recognized in a world conference, called the "Earth Summit", held in Brazil in 1987. In that summit, heads of different states signed four agreed documents including "Agenda 21" which contains a checklist of do's and don'ts to protect the natural environment (Nwabueze, 2015). In 1997, a treaty known as Kyoto protocol was signed, setting binding targets for 37 industrialized nations and the European community to reduce their green house gas emission (Olaleye, Jagunna & Mustapha, 2021). These developments attracted the attention of the international community to assess the problems of the global environment and more importantly to suggest corrective measures with emphasis on preserving the capacity of the environment to support human life. Consequently, accounting became concerned with achieving new goals such as measuring and evaluating actual environmental impacts of business activities.

In Nigeria, one major event that triggered national outcry against environmental degradation was the dumping of over two thousand drums of toxic waste in Koko in Delta State by Italian companies in December 1987, but was discovered by the Nigerian authorities in May 1988 (Egbadju & Elaigwu, 2023). The Koko incidence was a pivotal moment in the formulation of the international regulations on hazardous waste which eventually led to improvement in Nigeria's regulatory frameworks (De Major, 2020). Consequently, the Nigerian government took a drastic step by breaking diplomatic ties with Italy, signed international laws on the trans-boarder movement of hazardous waste and enacted certain laws on environmental protection (Adewoye, 2017). This culminated in the promulgation of various decrees to protect the Nigerian environment such as the Federal Environmental Protection Agency, which was replaced by the National Environmental Standards and Regulations Enforcement Agency in 2008. Others include: Environmental Impact Assessment Act 2004; Harmful Waste Act 2004 and Nuclear Safety and Radiation Protection Act 2007, which focused on the review of regulations and guidelines on the quality of

air, water, discharge of sewage and control of other forms of environmental pollution in Nigeria (Ayuba & Yumusa, 2023).

The industrial goods firms primarily deal with the process of creating goods to improve economic development. But the use of natural resources is indispensable in the development of any economy and not devoid of environmental consequences as traceable to the environmental degradation and atmostpheric pollution experience in Nigeria (Oyedokun, Egberioyinemi & Tonademukaila, 2019). Because a strong nexus exists between industrialization and economic development, countries seek ways to achieve economic development without increasing Green House Gas emissions, just as firms are seeking ways to improve their value without harming the environment. The ultimate aim of environmental accounting is environmental sustainability. The concept of sustainable development introduced by the World Commission on Environment and Development (WCED, 1987) defined sustainability as the ability to meet the demand of the present generation without compromising the needs of the future generation. Hence, industrial goods firms are facing heavy criticism in recent years across the globe over the consequences of their activities on the environment ranging from noise pollution, water pollution, emission of carbondioxide and reckless disposal of untreated industrial wastes into open drains and lagoons with its negative implications on the nations.

Environmental accounting, as defined by the Nigerian Federal Ministry of Environment (2002) in "Environmental Accounting Guidelines", is an account aimed at achieving sustainable development, maintaining a favourable relationship with the community and pursuing an efficient and effective environmental conservation activities. This type of accounting enables companies to determine the cost of conserving the environment, while carrying out their normal business activities, discover benefits from such activities and provide the best possible means of quantitative measurement and encourage the communication of the result (Oshiole, Elamah & Ndubuisi, 2020). Environmental accounting describes the effort of accounting standards, professional organizations and government agencies to get corporations to participate proactively in cleaning and sustaining the environment and to describe fully their environmental activities in either their annual report or stand-alone environmental disclosure. Whether the goal is pollution prevention or corporate sustainability, there is a widespread belief that sound environmental accounting will help firms to identify and implement financially desirable environmental innovation (Chiamogu & Okoye, 2020).

Environmental accounting enables companies and other organizations to increase their public trust and confidence which invariably will lead to a better assessment of the organization by recognizing all costs incurred by an organization. According to Okudo & Amahalu (2023), environmental costs could cover costs incurred to prevent degradation, cost of re-instating the environment to its original state or cost of restoring depleted environment to its normal position. Profit ascertainment requires the subtraction of recurrent costs from revenues. Most often, the cost that leads to changes in the environment, which affect people adversely and cause damage to the environment, are not taken into consideration before profits are determined. The result of this, in most cases, is reporting of excessive profits which will mislead the decision makers (Nzekwe, Okoye & Amahalu, 2021). Environmental accounting data is not only used by companies internally, but is also made public through disclosure in environmental reports. The disclosure of environmental accounting data as one of the key elements in an environmental report enables those parties utilizing this information to get an understanding of the company's stand on environmental conservation and how it specifically deals with environmental issues.

The European commission (2011) posited that green or environmental accounting is a pathway to a sustainable future. The Commission further explained that organizations often take cognizance of costs such as labor and material cost which have direct impacts on the organizations activities; while social costs like community development, employee health and training cost and economic cost that are external to the organization are often left out in the financial reporting and accounting processes (European Commission, 2011). Hence, the emergence of green or environmental accounting was to bridge this gap. It is meant to ensure that companies account for environmental cost. It was also meant to proffer penalties for polluters through the possible introduction of pollution tax on firms and companies whose activities leads to pollution of the Nigerian environment. Additionally, it is believed that the introduction of green or environmental accounting will aid policy makers to invest in greener technologies and eco-friendly means of production. In the view of Salah (1997), green accounting or environmental accounting has the preservation of environmental assets as one of its main objectives. This new form of accounting plays a very vital role in enhancing the corporate social responsibility of corporate firms. Besides, it plays a major role in the decision making process of a firm especially when it has to do with the methods or procedure to be applied in determining the profitability of the firm (Efut, 2020). Based on this background, the study intends to investigate the impact of environmental costs on financial performance of listed industrial goods firms in Nigeria.

Statement of the Problem

In recent times, it has been observed in Nigeria that the activities of industrial goods firms have brought factory pollutants and greater land use that have caused extensive loss of habitat for man in his environment. The firms unconsciously consume the natural resources, as they execute their business operations which generate pollutants that caused environmental damage. The severity of environmental degradation in the Nigerian environment is worrisome and has adversely affected every life within the environment (Olaleye, Jagunna & Mustapha, 2021). According to Mabogunje (2007), the pollutant include; Benzene, which on exposure can cause Leukaemia, Zylene can cause damage to skin; while ethylbenzene causes dizziness and loss of consciousness which can lead to death. Consequently, the host communities often find it very difficult to cope with their natural environment due to the pollutants generated by the activities of the firms. Although, many of those firms are aware, but have been avoiding their environmental and social responsibilities with the view that paying more attention to the environment may increase cost and reduce profit (Hossain, Islam & Andrew, 2016).

In Lagos and Portharcourt which are regarded as the trade and business hub of Nigeria, there have been so many environmental challenges, including flooding owing to massive canal blockages caused by consumer trash and industrial waste discharged into the ocean. This problem has persisted as a result of continued hazardous waste discharge and firms' lack of commitment to manage trash, mostly from packaging materials and other pollutants that pose threat to the environment. Although, different agencies and acts were established such as Environmental Impact Assessment Act 2004; Harmful Waste Act 2004; Nuclear Safety and Radiation Protection Act 2007, and National Environmental Standards and Regulations Enforcement Agency 2008; but they are only guidelines and advisory in nature and not mandatory. Hence, environmental accounting disclosure in Nigeria is more of voluntary reporting due to lack of definite accounting standard that ensures uniformity in reporting of environmental information. The failure of the firms to integrate environmental and social costs in the form of community development cost, waste management cost, environmental remediation cost and employee health and safety cost in the business

operations has grossly led to the failure to meet the needs of other stakeholders with respect to the environment which makes their performance evaluation not realistic.

Currently, several studies such as (Ayuba & Yumusa, 2023; Damieibi, 2023; Egbadju & Elaigwu, 2023; Okudo & Amahalu, 2023, Enekwe, Ugwudioha & Uyagu, 2023, Anolam & Ike 2022; Ihenyen & Ikegima, 2022, Nwanwu, 2022; Ikponmwosa & Ogbeide, 2021; Agubosim, Emeka-Nwokeji & Orijinta, 2021, Olaleye, Jagunna & Mustapha, 2021 and Baribefe, 2021) have been carried out on environmental cost and corporate financial performance in Nigeria. However, most of these studies were carried out in listed oil and gas firms in Nigeria. Although, other prior studies such as (Tamunotonye & Zukbee 2023; Akinadewo, Adebaye, Oluwagbade, Ogundele & Jabar 2023; Inyang, Effiong, Ubi, Eyo, Ogenyi & Inyang 2023; Ogiriki and Atagboro 2022; Obiora & Nwamah, 2022 and Iyoha & Igbinovia 2023) investigated the relationship between environmental accounting and performance of listed industrial goods firms in Nigeria. But, according to Egbadju and Elaigwu (2023), there is dearth of studies on environmental cost and corporate financial performance in industrial goods firms in Nigeria. Moreover, these prior studies have reported inconsistent results which are equivocal and inexhaustible. Hence, there is need for another study on this area in order to obtain sufficient evidence on the impact of environmental costs on the financial performance of listed industrial goods firms in Nigeria. This justified the imperative of this study.

2. Review of Related Literature

Environmental Costs

Environmental costs are the expenses made by business in order to avoid ecological problems and reduce environmental harm. They are the expenses associated with adhering to, or preventing the violation of corporate rules and regulations on the business environment. The true ecological costs to a corporation may be substantially greater when you include in things like the price of raw materials, the cost of treating and disposing of waste, the price of repairing damage to the company's environmental image, and the price of paying green risk premium (Iheduru & Chukwuma, 2019). There are costs associated with the environment because of things like pollution control and recycling. The harm these companies cause to the environment also accounts for some of these costs. Environmental costs may be classified into two components: Private and Social costs. Private costs are those that directly affect a business's bottom line. Expense to individuals may be broken down even further into conservative costs, contingent costs, and the costs to one's reputation and interpersonal connections. Social costs, also known as external costs, are expenses that arise as a result of a company's actions but for which it is not held accountable under the law. These include harms to the environment and to people's health, safety, and property for which monetary damages would be inadequate. To integrate environmental costs in planning and decision-making, it is important for ecologically conscious business to analyze external repercussions and, to the extent possible, value social costs (Ogiriki & Atagboro, 2022).

Waste Management Costs

Every establishment produces waste. It could be either industrial or human and could cause environmental and human hazard if not properly managed. Waste management therefore, means to prevent the negative effect of waste. It consists of reduction of waste, reuse of waste, recycling of waste, compositing, energy recovery and final disposal (Addul- Rahman 2015). To sustain profit maximization, the environment which business operates must be properly taken care of. An environment may likely lead to unfavorable business environment. This may also lead to unnecessary additional cost to business operation. It is therefore

necessary for companies to manage their waste and disclose their financial implications in their accounts. Waste is unwanted or unusable materials. Waste is any substance which is discarded after primary use, or is worthless, defective and of no use. Examples includes municipal solid waste (household trash/refuse), hazardous waste, wastewater (such as sewage, which contains bodily wastes (feces and urine) and surface runoff), radioactive waste, and others. Wastes are substance or objects, which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law (UNSD Glossary of Environment Statistics, 2013).

Employee Health and Safety Cost

These are Cost incurred to ensure that employees have a safe and conducive working environment in order to improve corporate performance. Despite the fact that people are working and spending most of their working hours at the workplace, little attention and resources are accorded to health and safety at work. In emerging economies, workplace safety and health has been overlooked in their industrial development policy and strategies. They are mostly focused on the production volume or profit, undermining the latent effect of dissatisfactory working environment. Safe workplaces are profitable workplaces, whether measured in a company's bottom line, its market share, its broader consumer reputation, or its ability to attract and retain workers, managers, or investors. Healthy people are expected to contribute more to productivity and innovation.

Community Development Cost

Community Development Cost is the total costs incurred from initiation to implementation of a project in a community in order to improve its development. It includes all the costs expended to ensure enhancement of lives of the members of the host communities. For instance, the cost of providing the host communities with good drinking water as an alternative to their already polluted water, healthcare centres, scholarships to their children, offering employment opportunities for them, electricity and schools amongst others (Crane & Scott, 2012).

Financial Performance

This is the measurement of the achievement of entities' goal, depicting the financial strength of firms, represented by earnings (Galant & Cadez, 2017). Financial performance is a measure of how much a company has the ability to create profit or revenue. It also measures the extent to which a company financial health over a period of time is (Naz, Ijaz, & Naqvi, 2016). Several ratios have been used in literature to measure performance. For instance, return on asset (Adjound & Amar, 2015; Gelb, 2017; Kowaleski, 2014); net asset per share (Brockman, 2015; Omaliko, Nweze, & Nwaialor, 2020); return on equity (Erhinyoya & Marcella, 2019; Polycarp, 2019) and earnings per share (Agbiogwu, Thedinihu & Okafor, 2016; Ahmed, Zakaree & Kolawale, 2016; Nwabueze, 2015; Polycarp, 2019). However, return on asset construct will be adopted as a measure for performance. This is in line with Jaham (2012) who opined that return on asset (ROA) is the most widely used indicator for corporate performance.

Empirical Review

Egbadju and Elaigwu (2023) examined the empirical relationship between environmental costs and financial performance of selected industrial goods firms in Nigeria. Specifically, the study sought to determine the effect of community development cost and waste management cost on net profit of the firms; firm size measured by natural logarithm of the total asset was the control variable. The population of the

study comprised twelve (12) industrial goods firms quoted on the floor of the Nigerian Exchange Group. However, the study extracted data from audited published reports and accounts of ten of sampled ten (10) firms for the period of ten years, spanning from 2011 to 2020. Unit root test was the first statistical test performed by the study so as to validate the collected panel data in order to avoid spurious regression results. The study made use of panel estimated generalized least square regression to estimate the effect of the explanatory variables on the financial performance of the sampled firms. Results of the regression analyses showed that waste management cost and community development cost had positive and significant effect on financial performance of the selected industrial goods firms in Nigeria.

Tamunotonye and Zukbee (2023) assessed the effect of corporate sustainability on value relevance of listed industrial goods firms in Nigeria. The specific objectives of the study were to determine the effect of environmental sustainability, social sustainability on value relevance of listed industrial goods firms in Nigeria. The population of the study comprised of 17 industrial goods firms listed on the floor of the Nigerian Exchange group for the period of 10 years, spanning from 2012 to 2021. However, 10 firms were selected purposively as the sample size. Panel data were extracted from the financial reports and accounts of the 10 sampled firms. The study made use of descriptive statistics test to analyze the data in order to determine the characteristics of the model variables. Pearson Correlation Moment test was also performed so as to ascertain the strength and magnitude of the relationship between explanatory variables and dependent variables. Baseline panel regression analyses was performed using pooled ordinary least square, fixed effect model and random effect model to estimate the statistical relationship between dependent variable and independent variables. Results of the regression analysis revealed that environmental sustainability had negative and no significant effect on share price (aproxy for value relevance) of listed industrial goods firms in Nigeria. However, the study also found that social and governance sustainability reporting had positive significant effect on the value relevance of the sampled firms.

Akinadewo, Adebaye, Oluwagbade, Ogundele and Jabar (2023) carried out a study on sustainability reporting practices and financial performance of listed industrial goods firms in Nigeria. Specifically, the study sought to determine the effect of community disclosure practice, environmental and economic disclosure practice on the financial performance of listed industrial goods firms in Nigeria. The study adopted ex-post facto research design which enabled panel data to be extracted from the audited annual report and accounts of 10 sampled firms for the period 2011 to 2020. The data was analyzed using descriptive statistics such as mean, standard deviation, maximum and minimum amongst others. Correlation Matrix test was also performed to ascertain the nature of the relationship between sustainability reporting practices and firms financial performance. Panel regression analyses were carried out to estimate the empirical relationship between explanatory variable and the dependent variable. Results of the study showed that community disclosure practice had positive and no significant effect on financial performance. Besides, the study found that environmental disclosure practice had positive and significant effect on financial performance of industrial goods firms in Nigeria. Lastly, it was also discovered that economic disclosure practice had positive and no significant effect on financial performance of listed industrial goods firms in Nigeria.

Inyang, Effiong, Ubi, Eyo, Ogenyi and Inyang (2023) examined the effect of corporate social responsibility on value of industrial goods firms in Nigeria. The specific objectives of the study were to evaluate the effect of donations, employee welfare package and creditor days on return on asset of listed industrial goods firms in Nigeria. Panel data were extracted from published annual reports and accounts of four (4) industrial

goods firms for the period, 2003 to 2021. The data were analyzed using ordinary least square panel regression model such as the pooled, fixed effect and random effect models; while Hausman specification test was used to determine the most appropriate model for test of hypotheses. Results of the study indicated that donations to host communities, employee welfare package and creditor days had positive and significance effect on financial performance of the sampled industrial goods firms in Nigeria.

Iyoha and Igbinovia (2023) evaluated the impact of environmental information disclosures on value of agro-manufacturing firms in Nigeria. Specifically, the study sought to determine the impact of waste information disclosure, compliance to environmental laws disclosure and the impact of biodiversity information disclosure on value of listed agro-manufacturing firms in Nigeria. Panel data were extracted from annual reports of 5 agricultural firms, 12 industrial goods firm and 3 consumer goods firms for the period of 7 years, spanning from 2014 – 2020. Due to heterogeneity problem in cross-section study, the study adopted panel estimation technique which include the pooled effect model, random effect model and fixed effect model. Hausman specification test was applied to select the most appropriate model between random effect model and fixed effect model. The results of the analysis indicated that waste management and biodiversity information disclosures had positive and significant impact on firm value of agro-manufacturing firms in Nigeria. However, the study discovered that compliance to environmental laws disclosures had positive and no significant impact on the value of the sampled firms.

Ogiriki and Atagboro (2022) investigated the impact of environmental accounting on profitability of consumer goods manufacturing firms in Nigeria. The specific objectives of the study were to determine the impact of environmental accounting on dividend per share of listed consumer goods manufacturing firm in Nigeria; to ascertain the impact of environmental accounting on earnings per share of listed consumer goods manufacturing firm in Nigeria and to find the impact of environmental accounting on net profit margin of listed consumer goods manufacturing firms in Nigeria. The study made use of panel data extracted from the annual reports and account of twenty six (26) sampled firms. The data were analyzed using descriptive statistics, Pearson correlation test and panel regression models to estimate the statistical relationship between the dependent and independent variables. The study found that environmental accounting had positive and significant impact on dividend per share, earnings per share and net profit margin of listed consumer goods manufacturing firms in Nigeria.

Obiora and Nwamah (2022) studied the impact of green accounting disclosure on sustainability of manufacturing firms in Nigeria. the specific objectives of the study were to examine the impact of waste management disclosure, pollution control disclosure and environmental remediation disclosure; while sustainability was measured using Kinder Lydenberg Domini (KLD) social environmental performance rating system. The study made use of ex-post facto research design and panel data were extracted from the audited annual reports and accounts of 12 industrial goods firms in Nigeria for the period of 5 years, spanning from 2016 to 2020. The study made use of variance inflation factor to check the existence of multicolinearity. Descriptive statistical analysis was used to determine the characteristics of model variables. Pooled effect model, fixed effect model and random effect model were used to estimate the statistical relationship between green accounting disclosure practices and sustainability of the firms. Findings from the regression analysis showed that waste management disclosure, pollution control disclosure and environmental remediation disclosure had positive and significant impact on firms' sustainability.

Gaps in Literature

Many scholars have researched on environmental costs and corporate financial performance in Nigeria (Ayuba & Yumusa, 2023; Damieibi, 2023; Egbadju & Elaigwu, 2023; Okudo & Amahalu, 2023, Enekwe, Ugwudioha & Uyagu, 2023, Anolam & Ike 2022; Ihenyen & Ikegima, 2022, Nwanwu, 2022; Ikponmwosa & Ogbeide, 2021; Agubosim, Emeka-Nwokeji & Orijinta, 2021, Olaleye, Jagunna & Mustapha, 2021 and Baribefe, 2021). However, findings from these prior studies are inconsistent which are equivocal and inexhaustible. Moreover, most of the studies carried out on this area concentrated on oil and gas firms. Hence, their findings canot be extrapolated for the explanation of environmental cost and financial performance of industrial goods firms in Nigeria. Although, prior studies such as (Tamunotonye & Zukbee 2023; Akinadewo, Adebaye, Oluwagbade, Ogundele & Jabar 2023; Inyang, Effiong, Ubi, Eyo, Ogenyi & Inyang 2023; Ogiriki and Atagboro 2022; Obiora & Nwamah, 2022 and Iyoha & Igbinovia 2023) examined the relationship between environmental costs and financial performance of listed industrial goods firms in Nigeria. But there is dearth of studies that focused on environmental costs and corporate financial performance of industrial goods firms in Nigeria according to Egbadju and Elaigwu (2023). Therefore, there is need for the convocation of another study on this area in order to obtain sufficient evidence that will guide policy and decision-making better. This is the justification for this study.

Theoretical Framework

This study is anchored on two theories, namely: Environmental quality cost management theory and Stakeholder Theory.

Environmental Quality Cost Management Theory

This study is rooted in environmental quality cost management theory propounded by Hech in 1999. Environmental cost is costs that arise because poor environmental quality exists or may exist and it has to be prevented, reduced or remedied so as to maintain sustainability. The theory states that management of corporate organizations should provide environmental costs information that will help to prevent, reduce or remedy the negative impact of the business activities on the environment in which the business operates. The assumption of this theory is that the lowest environmental cost will be attained at the point of zero-damage to the environment. This implies that before environmental costs information can be provided, environmental cost must be defined. The theory is concerned with how environmental cost helps to remedy the damages caused by the activities of business organization in an environment in which they operate. The theory is therefore, relevant to this study since profit may not be attained if the environment in which the business operates is not sustained.

Stakeholder Theory

This study is anchored on stakeholder's theory propounded by Richard Edward Freeman in 1984. The main idea behind Freeman's stakeholder approach was to build a framework that will be responsive to the concerns of management of corporate organization who were being confronted with certain goals of environmental turbulence. This theory focuses more on meeting stakeholders' expectations and demands so as to achieve strategic firm objectives. It considers how best the different stakeholder groups within the society can be managed. It considers essential, the relationship between organizations and their internal and external environment. It also takes into cognizance how these relationships affect the corporate existence and outlook of the organizations. This theory according to Watts & Zimmerman (1978) assumes that

disclosure on social and environmental information by an organization is as a result of the pressure from stakeholders such as communities, customers, employees, environment, shareholders and suppliers. The success is dependent upon the successful management of all the relationships that a firm has with its stakeholders. The stakeholder theory asserts that corporation's 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, 1996). The more powerful the stakeholders, the more the company must adapt. This theory concludes that corporate social responsibility is a way to show a good image to these stakeholders to boost long-term profits because it would help to retain existing customers and attract new ones.

3.METHODOLOGY

The study adopted *ex-post facto* research design. *Ex-post facto* requires the use of historical records which is relevant in explaining a consequence based on antecedent conditions. The appropriateness of *ex-post facto* research design in this study was based on the fact that the event to be investigated had already taken place. Hence, data are already available to be extracted and utilized. The issue of data is at the very centre stage of research, and the nature of data for any study depends entirely on the objectives of the research. The data for this study were obtained from secondary source. The secondary data were sources and extracted from the published financial statements and accounts of listed industrial goods firms on the Nigerian Exchange Group for the period, 2010-2022.

Model Specification

The study employed panel regression models to determine the objectives of the study for the period, 2010 to 2022. These models include ordinary least square (OLS) pooled panel model, fixed effect and random effect panel regression models. The fixed effect and random effect models were jointly applied because of the fact that the samples that were used in the study exhibits heterogeneous features. Whereas fixed effects model assumes that the effects of the omitted variables were captured in the constant term (œ) of the regression equation; the random effect models assumes that the effect of the omitted variables were captured in the error term (£). The benefit of fixed effect model is that it can be used to capture the effect of omitted explanatory variables in the changing intercept which vary across the firm and/ or time. Fixed effects panel regression model is specified as follows:

$Y_{it} = \beta' X_{it} + \varepsilon_i$ ……..(1)

Where:

Y_{it} = Dependent variable (ROA_{it}) (aproxy for financial performance)

X_{it} = Explanatory Variables (WMC_{it}, ERC_{it}, $EHSC_{it}$, CDC_{it}, FS_{it})

β' = Regression coefficient of parameters estimate (β_1_ β_5)

ε_i = Error term

Random effect panel regression model is similar to the fixed effects model due to the fact that it postulates a different intercept for each firm; however, random effects model differ from fixed effect model in that it incorporates the individual intercepts as though they are part of the error term. Hence, the original constant is treated as a random variable. Random effects model is specified as follows:

$Y_{it} = \beta' Xit + \alpha + \mu_i + \varepsilon_{it}$ ……(2)

Where:

Y_{it} = Dependent variable (ROA_{it})

X_{it} = Explanatory variables (WMC_{it}, ERC_{it}, $EHSC_{it}$, CDC_{it}, FS_{it})

β' = Regression coefficient of parameters estimate (β_1 _ β_5)

α = Common intercept

$\mu_i + \dot{\varepsilon}_i$ = W_{it} is the disturbance term.

The decomposition of the error term ($W_{it} = \mu_i + \varepsilon_i$) into two components is the reason why the model is often called error component model. The random individual differences are separated into two parts. The fixed part, œ, representing the population average and the random individual differences μ_i, called the random effect. The choice of the two models (ordinary least square panel regression model) is motivated by the need to take into consideration some hetroskedastic influences inherent in the fixed and random effects regression. To fit the panel data against the identified violation of the conditions for hetroskedasticity, the panel regression model was adopted as the baseline regression model; while Hausman specification test was used to select the most appropriate model for the test of hypotheses of the study. The baseline panel regression model is specified as follows:

$$ROA_{it} = \alpha + \beta_1 WMC_{it} + \beta_2 ERC_{it} + \beta_3 EHSC_{it} + \beta_4 CDC_{it} + \varepsilon_{it} \quad \text{…….(3)}$$

Where:

ROA_{it} = Return on asset of firm i in year t (dependent variable)
WMC_{it} = Waste management cost of firm i in year t (independent variable)
ERC_{it} = Environmental remediation cost of firm i in year t (independent variable)
$EHSC_{it}$ = Employee health and safety cost of firm i in year t (independent variable)
CDC_{it} = Community development cost of firm i in year t (independent variable)
α = intercept term or constant factor
μ_i = Random effects
ε = error term (incorporating omitted factor)
$\beta_1 - \beta_5$ = regression coefficient to be determined
i = index for individual firm (for the 13 sampled deposit money banks)
t = time effect (2010-2022).

4. RESULTS

Descriptive Test Results

In order to present the descriptive results of the research variables, analysis of the mean, standard deviation, skewness, kurtosis, minimum and maximum were done. Table 1 provided the number of characteristics, mean, median, maximum, minimum, standard deviation, skewness and kurtosis amongst others for the individual variables of interest. The mean is the average value of the series which is determined by dividing the total value of the series by the number of observations. Standard deviation on the other hand, is a measure of the changes in a series of data. Skewness is a measure of how data were distributed; while kurtosis is the measure of how data cluster around a central point for a standard distribution.

Table 1: Descriptive Statistics

	ROA	WMC	ERC	EHSC	CDC
Mean	0.48137	6123.40	7639.66	3606.42	6622.48
Median	0.46896	5716.50	6089.57	2221.68	3428.50
Maximum	0.94942	7169.10	8526.23	9603.34	7916.20
Minimum	0.16756	5294.00	4661.04	6056.88	6194.68
Std Dev.	0.16546	2506.21	3558.62	2505.27	4823.12
Skewness	0.63329	3285.23	4553.48	2250.43	1535.98
Kurtosis	0.18356	2824.00	6383.23	1202.57	2588.92

Jarque-Bera	4.64233	2.41420	8.62874	2.64780	4.83814
Prob	0.02883	0.60613	0.06996	0.18000	0.20122
Sum	182.6442	68.6406	52.2236	14.6694	118.3642
Sum Sq. Dev.	1.96514	6.64920	30.2346	81.4523	42.6253
Observation	143	143	143	143	143

Source: Author's Computation 2023 from E-views, Version 10.0

Table 1: showed the summary of descriptive statistics for all the variables of interest captured in the model of the study with an observation of 143 (ie. 11 firms x 13 years). The average values of return on asset (ROA), waste management cost (WMC), environmental remediation cost (ERC), employee health and safety cost (EHSC) and community development cost (CDC) were 0.48137, 6123.40, 7639.66,3606.42 and 6622.48 respectively; while their standard deviation values were 0.16546, 2506.21, 3558.62, 2505.27 and 4823.12 respectively. These values showed the extent to which the mean values of theses variables (ROA, WMC. ERC.EHSC and CDC) deviated from their expected average values. The Jarque-Bera probability values of the explanatory variables (WMC. ERC.EHSC and CDC) were 0.60613, 0.06996, 0.18000 and 0.20122 respectively, indicating that the null hypothesis of normal distribution was accepted at 5% level of significance.

Correlation Test

The study made use of Pearson Correlation Matrix Test to ascertain the strength and magnitude of the relationship between the dependent and independent variables. The results of the correlation matrix test is presented in table 2.

Table 2: Correlation Matrix Results

	ROA	**WMC**	**ERC**	**EHSC**	**CDC**
ROA	1.000000				
WMC	-0.84668	1.000000			
ERC	0.61462	0.34664	1.000000		
EHSC	0.34326	0.08474	0.28264	1.000000	
CDC	0.49783	0.52855	0.40339	0.05862	1.000000

Source: Author's Computation 2023 from E-views, Version 10.0

The correlation test results in table 2 showed that waste management cost (WMC) had negative relationship with return on asset of the sampled industrial goods firms in Nigeria. This implies that waste management cost had an inverse relationship with the return on asset of the sampled firms, meaning that increase in the size of WMC led to the reduction in return on asset of the listed industrial goods firms in goods in Nigeria. The correlation test results also revealed that environmental remediation cost (ERC), employee health and safety cost (EHSC) and community development cost (CDC) have positive relationship with return on asset of the listed industrial goods firms in Nigeria. This implies that they have direct relationship with return on asset (ROA), meaning that increase in environmental remediation cost, increase in employee health and safety cost and increase in community development produce upward growth in return on asset of the

sampled listed industrial goods firms in Nigeria. The correlation matrix results obtained was significant at 0.05 level of significance.

Result on Multicollinearity Test

Table 3: Variance Inflation Factor (VIF)

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.24088	62.83864	NA
WDC	0.08552	12.60518	4.38095
ERC	0.09263	1.47187	1.81527
EHSC	1.92420	1.88150	8.64479
CDC	0.00206	32.83682	2.23265

Mean VIF = 4.26842

Source: Author's Computation 2023 from E-view version 10.1

We also checked to confirm whether the problem of multicollinearity does not largely arise to affect the results. To achieve this purpose, the variance inflation factor (VIF) test was performed in table 3. VIF test is one of the most conventional test that are reliable in measuring the level of multicollinearity or collinearity. The presence of multicollinearity will lead to large standard errors of the estimated coefficients. Thus, the variance inflation factor test was performed to test for multicollinearity in the study. The variance inflation factor (VIF) explains how much of the variance of a coefficient estimate of a regressor has been inflated, as a result of collinearity with other regressors. The bench mark to VIF is that the value of VIF should not exceed ten, as suggested by Guiarati (2003). The results are within the bench mark, and as such, we concluded they are acceptable and there is no presence of multicollinearity in the regression. See table 3.

Table 4: Baseline Panel Regression Results

Series	Pooled OLS (1)	FE OLS (2)	Random E. OLS (3)
C	22.4129	15.1353	-19.9937
	[0.0000]**	[0.0707]	[0.0000]**
WMC	-0.3629	-0.4887	-1.2892
	[0.0061]	[0.0226]	[0.0301]
ERC	1.4726	1.2029	1.2212
	[0.0017]	[0.0067]**	[0.0032]**
EHSC	0.4130	8.4995	1.2835
	[0.3975]	[0.0466]	[0.0325]
CDC	1.4575	0.7559	1.3145
	[0.0270]**	[0.0465]**	[0.0163]**
Observations	143	143	143
R. Squared	0.6333	0.8120	0.3984
F-Value	23.3162	16.56	8.9435
		[0.0000]	[0.0000]

Hausman Test = 12.24225 P-Value = [0.072150]

Source: Researcher's computation 2023 from E-view (version 10)
** indicates 5% level of significance.

The study considered the pooled regression, fixed and random effect ordinary least square (OLS) regression, the results are in table 4 above. Observing this result, the study pools all 169 observations together and ran the regression model, not taking cognizance of features such as the cross section and time series nature of the data. The R-squared value for the pooled regression model is 0.6333 indicating that 63.33% of total variation in return on asset of the quoted industrial goods firms in Nigerian is explained by the waste management cost, environmental remediation cost, employee's health and safety cost and community development cost. However, parameters such as waste management cost (WMC) environmental remediation cost (ERC) and community development cost (CDC) are variables which significantly influence financial performance proxied by return on asset of the sampled firms. This is confirmed by their P-values [0.0061], [0.0017] and [0.0270] respectively. In considering reliability, the pooled regression model is unreliable as it is fraught with problems including its inability to distinguish between the various firms sampled. The individual peculiarities of the firms are lost during pooling.

To accommodate the specific or peculiar characters of each individual firm, they are allowed to have their own intercept value, hence the progression of the analysis to the fixed effect model (FEM). The fixed effect model was necessary because if is time invariant so that despite change in the intercept across the sampled firms, it however does not change over time. The R-squared value of 0.8120 indicates that 81.20% of the total variation in financial performance of the firms is explained by the combined effect of waste management cost (WMC), environmental remediation cost (ERC), employee health and safety cost (EHSC) and community development cost (CDC) of the quoted industrial goods firms. Meanwhile, waste management cost (WMC) environmental remediation cost (ERC), employee health and safety cost (EHSC) and community development cost (CDC) are the variables which significantly influence financial performance (return on asset), the P-values were [0.0226], [0.0067], [0.0466] and [0.0465] respectively.
In panel analysis, unobserved effects in the fixed model are very important as they inform policy decisions. To imbue this into the system, the random effect regression model was applied. The random effect model shows that 39.84% of the total variations in financial performance represented by the return on asset (ROA) are accounted for, by the explanatory variables WMC, ERC, EHSC and CDC). This is evidenced from the R-squared value of 0.3984. In addition, WMC, ERC, EHSC and CDC are the variables which significantly influence ROA as confirmed by their P-values [0.0301], [0.0032], [0.0325] and [0.0163] respectively. To affirm direction and properly inform policy statements arising from the study, there was need to decide between the fixed effect model and the random effect model; hence the application of Hausman test. The Hausman test selects the model most appropriate for estimation and it is performed under null hypothesis that the random effects model is the most appropriate. In the alternative, the fixed-effects model is appropriate. The selection of either fixed effect model or random effect model is based on the statistical significance of the P-value. Following the result in table 5, the Hausman test statistics P-value is 0.07215. This is insignificant given that it is greater than the 5% (0.05) chosen level of significance. Consequently, the null hypothesis cannot be rejected. Therefore, it is concluded that random effect model is desirable for prediction.

The panel regression result presented in table 4 revealed that waste management (WMC) had negative and significant impact on the financial performance of the listed industrial goods firms in Nigeria. This implies

that increasing waste management cost reduces the financial performance proxied by return on asset of the sampled industrial goods firms. The result also showed that a unit increase in waste management cost leads to 1.2892 units reduction in financial performance. This is a strong indication of an inverse relationship between waste management cost and financial performance of the quoted industrial goods firms in Nigeria. The panel regression result presented in table 4, reveals that environmental remediation cost (ERC) has positive and significant impact on financial performance of the quoted industrial goods firms in Nigeria. This result is in conformity with the apriori expectation that environmental remediation cost influences financial performance. This implies that increasing environmental remediation cost enhances financial performance of listed industrial goods firms. The result showed that a unit increase of environmental remediation cost leads to 1.2212 increase in financial performance of the sampled industrial goods firms in Nigeria. This outcome is in agreement with Obiora and Nwamah (2022) who found that environmental remediation practices had positive and significant impact on sustainability of manufacturing firms in Nigeria.

The regression result also revealed that employee health and safety cost (EHSC) has significant and positive impact on financial performance of the listed industrial goods firms in Nigeria. This result is in conformity with its apriori expectation because provision of conducive working environment for the employees of the sampled firms enhances their efficiencies which improves financial performance of the firms. This implies that increasing employee health and safety cost enhances financial performance of the listed industrial goods firms. The result showed that a unit increase in employee health and safety cost leads to 1.2835 units increase in financial performance of the quoted firms. It is a direct indication of significant positive relationship between the employee health and safety cost and financial performance of the listed industrial goods firms in Nigeria. This is in line with the work of Inyang, Effiong, Ubi, Eyo, Ogenyi and Inyang (2023) who investigated the effect of corporate social responsibility on value of industrial goods firms and found that employee welfare package had positive and significant effect on financial performance of listed industrial goods firms in Nigeria.

The panel regression result also showed that community development cost (CDC) had positive and significant impact on financial performance of the listed industrial goods firms in Nigeria. This result is in line with the apriori expectation that provision of social amenities to host communities facilitates peace between the firm and their host communities which also improves sustainability. It implies that increase in community development cost increases financial performance (return on asset) of the sampled firms. Therefore, a unit increase in community development cost leads to 1.3145 units increase in financial performance of the firms.

Test of Research Hypotheses

In this study, the decision making on the statistical significance of the results obtained for each of the research hypotheses rests on the probability values and the direction of the coefficient of the explanatory variables. Thus, in testing the first, second, third and fourth hypothesis, the probability values (P-values) of the t-statistics in table 4 were used. The hypotheses were tested considering random effect model in line with the outcome of Hausman specification test. The baseline panel regression result obtained in table 4 formed the basis for the test of hypothesis one to hypothesis four.

Test of Hypothesis One

$H0_1$: Waste management cost has no significant impact on financial performance of listed industrial goods firms in Nigeria.
HA_1: Waste management cost has significant impact on financial performance of listed industrial goods firms in Nigeria.
The results presented in table 5 showed that the coefficient of waste management cost (WMC) was – 1.2892, while its P-value was [0.0301]. Based on the results presented, and in line with the decision rules guiding the study, the study accepted the alternate hypothesis and concluded that waste management cost (WMC) had negative and significant impact on financial performance of listed industrial goods firms in Nigeria. The implication of this result is that N1 increase in waste management cost led to N1.2892 reduction in return on asset of the selected industrial goods firms in Nigeria for the period covered by the study.

Test of Research Hypothesis Two
$H0_2$: Environmental remediation cost has no significant impact on financial performance of listed industrial goods firms in Nigeria.
HA_2: Environmental remediation cost has significant impact on financial performance of listed industrial goods firms in Nigeria.

The panel regression results presented in table 4 indicated that the coefficient of environmental remediation cost was 1.2212, while its P-value was [0.0032]. In line with the guiding decision rules, the researcher accepted the alternate hypothesis and concluded that environmental remediation cost had positive and significant impact on financial performance of listed industrial goods firms in Nigeria. This implies that ₦1 increase in environmental remediation cost led to ₦1.2212 increase in financial performance (return on asset) of the sampled listed industrial goods firms in Nigeria. The result showed a strong direct relationship between environmental remediation cost and financial performance of the sampled firms.

Test of Research Hypothesis Three
$H0_3$: Employee health and safety cost have no significant impact on financial performance of listed industrial goods firms in Nigeria.
HA_3: Employee health and safety cost have significant impact on financial performance of listed industrial goods firms in Nigeria.
The panel regression results presented in table 4 indicated that the coefficient of employee health and safety cost was 1.2835, while its probability value was [0.0325]. Based on the result presented and guided by the decision rules stated earlier, the researcher accepted the alternate hypothesis and concluded that employee health and safety cost had positive and significant impact on financial performance of the selected industrial goods firms listed in Nigerian Exchange Group for the period, 2010 – 2022. The implication of this result is that ₦1 increase in employee health and safety cost (EHSC) led to ₦1.2835 increase in financial performance proxied by return on asset of the selected industrial goods firms in Nigeria. The positive value of the coefficient (1.2835) of EHSC indicated a direct relationship between the independent variable (EHSC) and the financial performance of the sampled firms.

Test of Research Hypothesis Four

$H0_4$: Community development cost has no significant impact on financial performance of listed industrial goods firms in Nigeria. It implies that the estimated.

HA_4: Community development cost has significant impact n financial performance of listed industrial goods firms in Nigeria.

The panel regression results presented in table 4 revealed that the coefficient of community development cost (CDC) was 1.3145, while its p-value was [0.0163]. Based on the results presented and in line with the decision rules guiding the study, the researcher accepted the alternate hypothesis and concluded that community development cost had positive and significant impact on financial performance of the listed industrial goods firms in Nigeria.

5. Discussion Of Findings

Impact of Waste Management Cost on Financial Performance of Listed Industrial Goods Firms in Nigeria.

The panel regression results presented in table 4 showed that the coefficient of waste management cost (WMC) was -1.2892, while its P-value was 0.0301. Based on these results, the study found that waste management cost had negative and significant impact on financial performance of listed industrial goods firms in Nigeria. This result indicated a strong inverse relationship between waste management cost and the financial performance of the listed industrial goods firms in Nigeria. This result indicated consistency with the prior empirical study by Kowsana (2021) who investigated the relationship between environmental accounting practices and firm financial performance. The study found that environmental costs had negative and significant impact on return on asset of Food, beverages and Tobacco Companies listed in Srilanka.

Impact of Environmental Remediation Cost on Financial Performance of Listed Industrial Goods Firms in Nigeria.

The study found that environmental remediation cost had positive and significant impact on financial performance of listed industrial goods firms in Nigeria. This result is in conformity with the finding of Obiora and Nwamah (2022) who studied the effect of green accounting disclosure on sustainability of listed manufacturing firms in Nigeria. This prior study discovered that environmental remediation disclosure had positive and significant impact on sustainability of listed firms in Nigeria. Besides, the finding of Fijabi and Adegbie (2022) who examined the relationship between environmental accounting practices and environmental capacity for sustainable economy also corroborate with our result. This prior study found that there is a positive relationship between environmental accounting practices and firms sustainability in Nigeria.

Impact of Employee Health and Safety Cost on Financial Performance of Listed Industrial Goods Firms in Nigeria

In line with the panel regression results obtained in table 5, employee health and safety cost (EHSC) was found to have positive and significant impact on financial performance of listed industrial goods firms in Nigeria. This result is in conformity with the researcher's aprior expectation; because employee welfare package enhances employees efficiency which improves firm's overall performance. Accordingly, Inyang, Effiong, Ubi, Eyo, Ogenyi and Inyang (2023) analyzed the effect of corporate social responsibility on value relevance of listed industrial goods firms in Nigeria. This prior study found that employee welfare package

had positive and significant effect on financial performance of the selected firms. Ogiriki and Atagboro (2022) evaluated the impact of environmental accounting practices on profitability of consumer goods manufacturing firms in Nigeria. It was discovered by this prior study that environment accounting practices had positive and significant impact on profitability of consumer goods manufacturing firms in Nigeria.

Impact of Community Development Cost on Financial Performance of Listed Industrial Goods Firms in Nigeria

Based on the panel regression results presented in table 5, community development cost had positive and significant impact on financial performance of listed industrial goods firms in Nigeria. This indicate consistency with the result of Egbadju and Elaigwu (2023) who analyzed the relationship between environmental costs and financial performance of selected industrial goods firms in Nigeria. Using panel estimation equation in the analysis of the study, it was found that community development cost had positive and significant impact on financial performance of the selected industrial goods firms in Nigeria. Similarly our result also agreed with the work of Nwambeke, Udama and Oko (2019) who evaluated the impact of environmental accounting disclosure on financial performance of Cement Companies in Nigeria. This prior study discovered that community development cost hap positive and significant impact on the financial performance of cement companies in Nigeria.

6. SUMMARY, CONCLUSION AND RECOMMENDATIONS

The study found that waste management cost with coefficient value of -1.2892 and P-value of [0.0301] had negative and significant impact on the financial performance of listed industrial goods firms in Nigeria.

The study found that environmental remediation cost with coefficient value of 1.2212 and P-value of [0.0032] had positive and significant impact on the financial performance of listed industrial goods firms in Nigeria. The study discovered that employee health and safety cost with coefficient value of 1.2835 and P-value of 0.0325 had positive and significant impact on the financial performance of listed industrial goods firms in Nigeria. Finally, the study discovered that community development cost with coefficient value of 1.3145 and P-value of [0.01637] had positive and significant impact on financial performance of listed industrial goods firms in Nigeria. In line with the findings drawn from the panel regression results, the study concluded that the variables employed as proxies for environmental costs were significantly relevant in estimating the financial performance of listed industrial goods firms in Nigeria.

Recommendations

The study recommended as follows:

i. Industrial good firms should pay adequate attention to waste management by engaging in waste recycling instead of outright disposal. Waste recycling creates new products that would be sold to make more money and improve on the financial performance of the firms.
ii. The study found that environmental remediation cost is positively related with financial performance of the sampled firms; hence, industrial goods firms should be mandated by government to submit environmental impact remedy plans annually to ensure that practice of environmental accounting are kept by the firms.
iii. Listed industrial goods firms should ensure that all the policies with respect to employees' health and safety cost are strictly adhered to in the course of their operations in order to keep improving on the welfare package of their employees and add more value to the organization.

iv. The study discovered a positive relationship between community development cost and financial performance of the sampled firms. To maintain this relationship, the government should provide tax credit to any firm that contribute towards the development of their host communities. This would enable the firms to be environmentally friendly with their host communities since it makes them more socially acceptable by stakeholders and strategically positioned.

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