ENVIRONMENTAL ACCOUNTING COST AND FINANCIAL PERFORMANCE OF LISTED NATURAL RESOURCE FIRMS IN NIGERIA

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ABSTRACT

This study investigated the effect of environmental accounting cost and financial performance of listed natural resource firms in Nigeria. The objectives of the study were to ascertain; the effect of health safety and remediation costs on return on assets. The study anchored on the stakeholders' theory. The population of this study was made up of four (4) listed natural resource firms on the Nigeria stock exchange (NSE) and operating in Nigeria as at 1st January, 2010 -to- 31st December, 2022. This study utilizes census sampling technique due to availability and completeness of the secondary data. The cross-sections included in the study was four (4) natural resource firms; sample period included thirteen (13) years, and total panel observation was fifty-two (52) spanning through from 2010 to 2022. The data for this study were sourced from the published annual reports and accounts of the sampled natural resource firms on the Nigeria Stock Exchange Group. The study utilized descriptive statistics, unit root test, and Panel Least Square (PLS) regression technique were used for the data analyses. The result of the study disclosed that; the effect of health safety cost on return on asset of listed natural resource firms in Nigeria is negative and statistically not significant. This study generally concluded that the effect of environmental accounting cost on financial performance of listed natural resource firms in Nigeria is positive and statistically not significant for the period 2010-2022. The study recommended amongst others that payment of health safety costs should be sustained, as a safe and secure environment enhances the financial performance of natural resource firms in Nigeria.

Keywords: Health Safety Cost, Remediation Costs, environmental accounting cost and Return on Assets

INTRODUCTION

Businesses all over the world, especially mining or exploration industries for many decades have ignored the impact of their activities on the natural and social environment in which they operated, unless it had direct repercussions on the profit and loss account. Ilelaboye and Alade (2022) affirmed that business practices are destroying life on earth and there is no polite way to say that business is destroying the world. Businesses as part of modern society and part of the problem must also be part of the solution (Agbo & Gina, 2021). The organization's role as the solution provider is important because organizations are the primary players in economic development and have the financial backing, technological know-how (Fasua & Osifo 2020; Polycarp 2019; Emuebie et al., 2021; Sari et al., 2020; Ibrahim & Kurfi, 202w, and the institutional capacity to implement sustainable solutions to protect the environment 1; Olusola et al., 2021). The research investigated by Lyndon and Harmony (2021) acknowledged that environmental accounting involves the identification, measurement and allocation of environmental costs, and the integration of these costs into business and encompasses the way of communicating such information to the company's stakeholders. Major and Zarakpege (2021) affirmed that environmental accounting is the activities of determining, collecting, analyzing and reporting environmental cost information to relevant persons. Similarly,

Muffee (2021) advanced that environmental costs are characterized as costs associated with the creation, detection, remediation and prevention of environmental degradation.

This present study discovered that most of the empirical investigations on the relationship between environmental accounting costs and financial performance were conducted on the oil and gas sector, manufacturing sector, financial services sector, and food and beverage companies in Nigeria without given little or no considerations to the listed natural resources companies in Nigeria. (Adediran & Alade, 2018; Bassey et al., 2018;Mayndaro & Augustine 2021; Che-Ahmed et al., 2019; Emmauel et al., 2019; Karakus & Erdirencelebi; 2019; Major & Zarakpege, 2021; Naji & Hawkar, 2022). Nevertheless, to the best of researcher's knowledge none of the related empirical studies have carried out research investigation on the effect of environmental accounting cost on financial performance of listed natural resource firms in Nigeria.

Statement of Problem

The rising effect of natural resource firms' operations on the environment has continued to pose challenges on the people and the host communities. This is due to the lack of a clear framework such as the environmental accounting standard that could ensure that firms are accountable for their actions in the environment (Damieibi, 2023; Norhasimah, 2018). The conventional approaches of cost accounting have become inadequate since conventional accounting practices have ignored important environmental costs and activities impact consequences on the environment (Okezie et al., 2019; Tze et al., 2018; Utile et al., 2017). The corporate neglect and avoidance of environmental costing leave gap in financial information reporting. There is no completeness and correctness of fair view to users of financial information, such as shareholders, environmental regulatory agencies, environmentalists and potential financial investors. Ibrahim and Kurfi (2021) disclosed that there are currently only limited requirements for any formal identification or reporting with regard to environmental assets, liabilities or contingencies. The key problem is that there are few formalized definitions of what environmental assets or environmental contingencies are, although some progress has been made in this area. There is no clear stipulation of environmental issues in standards as a basic requirement, since no such specific standard exists, and the present standards include minimal guidelines concerning environmental issues. This implies that the problem of such comparison among the reports, and inadequate management of environmental costs and different calculating methods among firms are some of the unresolved issues. Kaine and Womenazu (2022) averred that the lack of effective environmental management accounting, environmental accounting cost and the absence of clear environmental accounting standards affect financial accounting practices in natural resource firms; and makes comparison between firms not possible because method of accounting is different.

Conceptual Framework
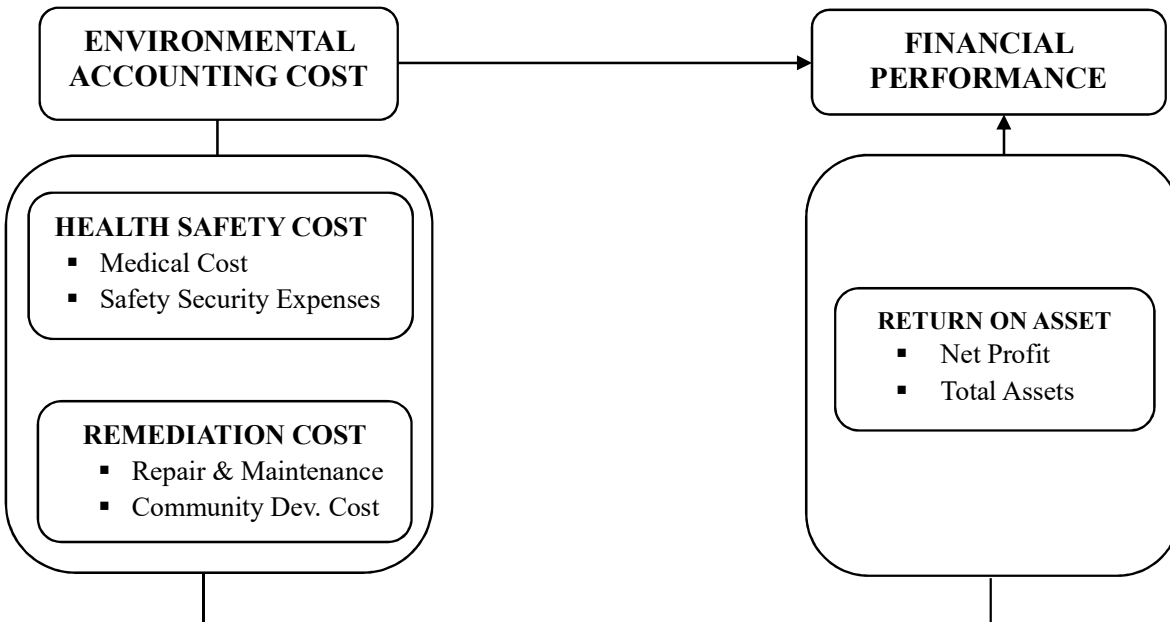
Fig. 1: A Conceptual frame work showing the effect of environmental accounting cost on financial performance

Sources: Ilelaboye and Alade (2022); Major and Zarakpege (2021), Lyndon and Bingilar (2021), Newstyle and Opuene (2022); Damieibi (2023); Iliemena et al. (2023); Nwafor et al. (2021); Emmanuel and Glays (2021).

Aim and Objectives of the Study

The aim of this study was to ascertain the effect of environmental accounting cost and financial performance of listed mining firms in Nigeria. Specifically, the study sought to:

1. evaluate the effect of health safety cost on return on asset of listed natural resource firms in Nigeria.
2. evaluate the effect of environmental remediation cost on return on asset of listed natural resource firms in Nigeria.

Research Questions

This study is guided by the following research questions:

1. What is the effect of health safety cost on return on asset of listed natural resource firms in Nigeria?
2. What is the effect of environmental remediation cost on return on asset of listed natural resource firms in Nigeria?

Hypotheses

This study is guided by the following null hypotheses:

H_{01}: Health safety cost has no significant effect on return on asset of listed natural resource firms in Nigeria.

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

REVIEW OF RELATED LITERATURE
Conceptual Review

Environmental Accounting Cost

The ideology of environmental accounting is not a function of an organization's idea but a report of stewardship in the public interest. Thus, attempts have been made to redefine environmental accounting from various dimensions and conceptual perspectives. Naji and Hawkar (2022) acknowledged that environmental accounting is a term that covers the financial and non-financial information regarding the environmental and ecological impact of company activities on humanity and resultant reactions to their impacts. The research article published by Mayndarto and Agustine (2021) opined that environmental accounting is the identification, measurement and allocation of environmental costs and the integration of these costs into business and encompasses the way of communicating such information to the companies' stakeholders. Emuebie et al. (2021) advocated that environmental accounting is the costing of the energy component of an organization activity and the efforts of preserving the environment and producing environmentally friendly products. Similarly, Ilelaboye and Alade (2022) averred that environmental accounting is also regarded as green accounting that measures in economic terms the performance of natural resource firms in respect to the environment.

Health safety cost

Health safety cost dwells on securing and promoting safety and health of staff, both physical and mental. The research study published by Ngozi and Ike (2019) affirmed that health safety cost are fees and expenses associated with taking steps to clean up or remove hazardous substances from the environment, preventing or reducing future spills or movements of hazardous chemicals, and adhering to all applicable environmental laws. Beredugo and Mefor (2018) disclosed that health safety cost includes, but are not limited to, costs and expenses incurred in connection with a modification or replacement of facilities or equipment used by employees for safety, as well as the proper storage, handling, and disposal of hazardous materials. Chiamogu and Okoye (2020) affirmed that health safety cost is characterized as all costs associated with carrying out work to remediate contamination of real property or groundwater, including engineering and other professional fees and expenses, costs to remove, transport, and dispose of contaminated soil, costs to "cap" or otherwise contain contaminated soil, as well as costs to pump and treat water and monitor water quality. Falope et al. (2019) disclosed that firms must pay these expenses to prevent, monitor, and report the environmental effects of their economic activities on a variety of stakeholders.

Remediation Costs

Environmental remediation costs means all costs and expenses of actions or activities to cleaning up or removal of hazardous materials from the environment; preventing or minimizing the further movement, leaching or migration of hazardous materials in the environment; preventing, minimizing, or mitigating the release or threatened release of hazardous materials into the environment, or injury or damage from such release, and comply with the requirements of any environmental laws (Obara et al., 2017; Udama & Ali, 2019; Agbo & Akubuilo, 2017). Obara et al. (2017) stressed that environmental remediation costs signify all disbursement from a fund to redevelop, restore or remove unsafe environmental substances, to avert or lessen further damage to societal wellbeing, which include, but are not exhaustive to, expenditure concerning environmental consultation services, pollution treatment, and discarding of dangerous environmental substances.

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Financial Performance

Financial performance can be characterized as measure of financial capability of a company at any given period of time. Newstyle and Opuene (2022) established that financial performance is a subjective measure of how well a firm can use assets from its primary mode of business to generate revenues. It can be measured in terms of net profit and loss or asset utilization. Che-Ahmad et al. (2019) acknowledged that performance is the ability of an organization to gain and manage the resources in several different ways to develop a competitive advantage. The research article published by Mayndarto and Agustine (2021) depicted that financial performance is a subset of business analytics and business intelligence concerned with the health of the company which is traditionally measured in terms of monetary activities. Likewise, Newstyle and Opuene (2022) reported that financial performance is a measure of a business ability to make profit or revenue based on the information provided in the financial statements. Okore (202I) affirmed that financial performance entails measurement of the results of a company policies and operations in monetary terms. It measures the achievement of firms using various criteria.

Return on Asset

The research articled published by Newstyle and Opuene (2022) expressed that return on asset is a financial ratio that disclosed the percentage of the company's earnings in relation to total assets. Magara et al. (2021) canvassed that return on asset measures the company's ability to generate net income based on asset levels. Mayndarto and Agustine (2021) advanced that return on asset is the ratio of profit before interest and taxes to assets. It is a very important ratio for natural resource firms to decide whether to invest on a new project or not. Olasupo and Akinselure (2019) acknowledged that firms invest on projects they expect to earn adequate return on asset. The return on assets is very important and provides a standard to evaluate how efficient the management employs the average amount invested in the firm's assets, whether the amount comes from investor or creditors. Mukah (2021) affirmed that return on assets is a financial ratio used to measure the degree to which the assets have been used to generate profits. Che-Ahmad et al. (2019) illustrated that return on assets is a financial tool used to measure the rate of return on total assets after interest expense and taxes.

Theoretical Framework
Stakeholders Theory

This study is anchored on the stakeholders' theory. It was first propounded by Mitroff in (1983) and formulated by Edward Freeman (1984) in his book "Strategic Management." Freeman (1984) characterized stakeholders as any individual or group who has an interest in the firm because he or shecan affect or is affected by the firms' activities. Similarly, Ibrahim and Kurfi (2021) affirmed that stakeholders are any individual or group who can affect or is affected by the actions, decisions, policies, practices, or goals of the organization. The stakeholders can be identified by the legitimacy of their claims, which is substantiated by a relationship of exchange between themselves and the organization. Nevertheless, stakeholders include bankers, creditors, managers, employees, customers, suppliers, local communities, and the general public. The stakeholder theory assumes that an organisation will respond to the concerns and expectations of powerful stakeholders, and some of the responses will be in the form of strategic disclosures. Organizations need to take care of the environment in which they draw resources from by ensuring that the environment is conducive and healthy. There is always a conflict between the stakeholders and the public interest. Stakeholders are interested in profit, while the public is interested in a conducive and healthy environment.

Empirical Review

This section analyzes empirical studies on the subject, making attempts to identify gaps not filled by previous studies and fill identified gaps. This present research study seeks to bridge the knowledge gap. However, several empirical studies over the years have shown the effect of environmental accounting cost and financial performance of business organizations in Nigeria and the world at large.

Damieibi (2023) investigated the effect of environmental accounting practices on profitability of quoted oil and gas companies in Nigeria. The study used pollution cost, waste management cost and drainage cost to represent environmental accounting practices. The study adopted ex-post facto research design. The annual audited financial accounts of quoted oil and gas companies in Nigeria for ten (10) years (2012-2021) were used as key data. The study used multiple regression estimation to test the hypotheses formulated in the study. The results obtained from the empirical analyses show that pollution cost accounting has positive significant effect on net profit of quoted oil and gas companies; that waste management cost accounting has insignificant effect on net profit of quoted oil and gas companies; and that drainage cost accounting has negative significant effect on net profit of quoted oil and gas companies in Nigeria. The study concluded that environmental accounting practices affects net profit of quoted oil and gas companies; and with a view to nudging oil and gas firms towards organizational transformation, recommends that management of oil and gas companies in Nigeria should pay particular attention to waste management accounting to enhance their operating environment and their net profit.

Iliemena et al. (2023) examined the effect of environmental disclosure on financial performance of manufacturing firms in Nigeria. The study adopted ex-post-facto research design while data were gathered from annual reports and sustainability reports of the 23 sampled companies from the period 2012 to 2021, which represents the international financial reporting standards reporting period in Nigeria as at the time of the study. Multiple regression analysis of ordinary least square estimation was used. The finding from the regression analysis showed there is significant positive effect of social disclosure on gross profit margin. However, no significant effect of environmental disclosure was observed on return on capital employed. The study recommended that business organizations incorporate sustainability reports as part of their reporting policy to reap the associated benefit on gross profit margin with high hopes that other things being equal, constant increase in gross profit margin will influence the return on capital employed to increase significantly at a point.

Cletus et al. (2022) investigated the effects of environmental accounting costs on the financial performance of selected quoted oil and gas firms in Nigeria. Secondary source of data was used in the study and sourced from companies' annual report on Nigeria Stock Exchange covering the period 2010-to-2020. The study adopted the descriptive and inferential statistics in analysing the panel data. The study applied multiple regression models involving ordinary least square method was used to test hypotheses formulated. The results from the regression indicated that environmental internal failure cost and environmental external failure cost have a positive and significant effect on the financial performance of oil and gas companies in Nigeria. Also, environmental pollution prevention costs and environmental detection costs revealed an insignificant effect on the financial performance of oil and gas companies in Nigeria. The study concluded that the environmental accounting costs have significantly affected the general financial performance of oil and gas industry in Nigeria. The study recommended that the management of petroleum companies should continue to put funds on environmental internal failure cost to ensure continuous reduction of contaminants in the environment to the level that complies with environmental standards.

Molokwu et al. (2022) investigated the effect of environmental accounting on financial performance of selected oil and gas companies in Nigeria. The study specifically investigates the effect of environmental remediation and cost of pollution control on earnings per share of oil and gas firms in Nigeria. The study used ex-post- facto research design. Secondary data were collected from the selected firms and analysed, using Multiple Regression analysis. Findings from the analysis suggested that environmental remediation cost has a positive and significant effect on earnings per share of oil and gas firms in Nigeria. The study also disclosed that cost of pollution control on earnings per share of oil and gas firms in Nigeria is positive and significant. The study recommended that management of the companies should channel effort on engaging in adequate spending on the environment and its revelations as way of increasing stakeholders' confidence and showing more transparency in their operations.

Ezenwaka et al. (2022) investigated the effect of pollution and health safety costs on the financial performance of listed oil and gas firms in Nigeria. The study used ex post facto research design. The study used a purposive sampling method using descriptive statistics and Panel regression approach. The study findings revealed that the cost of pollution and health safety cost has a significant positive effect on financial performance (Revenue, Profit after tax & Cash flow from operations) of listed oil and gas companies in Nigeria. The study recommended that, Nigeria's listed oil and gas companies continue their current efforts to address the costs associated with pollution remediation, as well as the health and safety concerns of both the host community and their personnel.

Kaine and Womenazu (2022) investigated the relationship between environmental degradation cost and financial performance of listed oil and gas companies in Nigeria. The research design used was the ex-post facto design. Data used, were drawn from the Nigerian Stock Exchange (NSE) for the period 2010-2020. The data analysis technique used was descriptive and multiple regression technique. The findings indicated that environmental conservation cost is positively related to return on equity; and has a positive but insignificant relationship with return on asset of listed oil and gas companies in Nigeria.

Agbo and Gina (2021) evaluated the environmental accounting and financial reporting quality of quoted companies in Nigeria. The study used descriptive and field survey research methods. Data were collected from the conduct of administration of questionnaire and financial statements of the selected quoted companies. The data collected were analysed using Kendall's Coefficient of Concordance (KCC), Pearson's Chi-square technique, and the use of tables and percentages. The study established that the value relevance of financial reporting of quoted service companies in Nigeria will be improved by the application of the developed model. The study recommended that quoted service companies in Nigeria should imbibe the culture of capitalizing and reporting all expenditures/investments on environment that can improve their quality and productivity.

Giami (2021) examined the relationship between environmental cost reporting and performance of oil and gas downstream companies in Nigeria. The study adopted historical data design and census sampling techniques was used in studying the entire population. The hypotheses were tested using multiple regression analyses. The findings revealed that, amount spent on waste management /remediation has a negative and insignificant relationship with growth in sales volume and also with return on asset. The study disclosed that amount spent on compensation also has negative and insignificant relationship with both growth in sales volume and return on assets. The study recommended that oil and gas companies continue to manage their waste and include community

development in their decision making in line with global best practices to keep them socially acceptable as these will ensure a symbiotic relationship among the various stakeholders.

Gap in Empirical Review

Extensive review of previous literature showed a population gap as studies focused mainly on the oil and gas sector, manufacturing sector, and financial services sector companies in Nigeria without given little or no considerations to the listed natural resource firms in Nigeria. Hence, the present study attempted to change the domain focus on the effect of environmental accounting cost and financial performance in the natural resource firms in Nigeria.

METHODOLOGY
Research Design

The research applied content analysis to examine the level of environmental accounting costs and financial performance of listed natural resource firms in Nigeria. The study adopted ex-post-facto and correlational research. It deals with the determination, evaluation and explanation of past events essentially for the purpose of gaining a better and more reliable prediction of the future (Kornom-Gbaraba et al., 2020).

Population for the Study

Kaine and Womenazu (2022) stated that research population is generally a large collection of individuals or objects that regarded as the main focus of a scientific query. The population of this study consists of four (4) listed natural resources firms on the Nigerian Stock Exchange (NSE) and operating in Nigeria as at 1st January, 2010 -to- 31st December, 2022.

Sample Size and Sampling Techniques

The target population of this study consists of four (4) listed natural resources firms on the Nigerian Stock Exchange (NSE) and operating in Nigeria as at 1st January, 2010 -to- 31st December, 2022. This study utilizes census sampling technique because the sampled natural resource firms' have all available and complete panel data.

Sources and Method of Data Collection

The panel data for this study was sourced from the globally published annual financial statements of the sampled natural resource firms for the period 2010 to 2022 listed on the Nigeria Stock Exchange Group. However, the data include reports on health safety cost, remediation cost and return on assets.

Measurement of Variables

This study investigated the effect of environmental accounting costs and financial performance of natural resource firms in Nigeria. The study used health safety cost (HSC), remediation cost (RC) as proxies of the independent variable environmental accounting cost and return on assets (ROA).

Table 1   Explanation of Variables

Variables	Measures/ Acronyms	Explanation	Measurement
Independent Variable	Health Safety Cost (HSC)	These are cost expend in caring for the physical and mental health of the workers that include the cost of securing the environment.	Natural Log of the value Health/Medical Expenses

	Remediation Cost (REC)	The costs and expenses of activities of cleaning up or removal of hazardous materials from the environment; preventing or minimizing the further movement.	Natural Log of Repair/Maintenance value Plus (+) Donation/Community Development cost
Dependent Variable	Return on Assets (ROA)	The ratio that measures earnings from a business investment before interest and taxes relative to its total net assets.	Net Profit / Total Assets

Source: Computed by the Researcher, (2023)

Model Specification

There are a number of factors that can influence environmental accounting costs and financial performance. The factors to be used for analysis in this research study include health safety cost, remediation cost which are categorized as the predictor variable; whereas return on asset is categorized as the criterion variables. However, panel least squares (PLS) method was applied in the analysis. The model used for this study was adapted from Umar et al, (2019) where it was written as:

Model I: Return on Asset (ROA) Model

ROA = f (HSC, REC) ……………………………………………………………….i

This can be written in Panel Least Square (PLS) form as:

$ROA_{it} = a_o + a_1 HSC_{it} + a_2 REC_{it} + U_{it}$ ii

$$a_1 > 0; a_2 > 0$$

Method of Data Analysis

This study employed descriptive statistics; unit root tests, Panel Least Squares, and partial correlation techniques for the purpose of data analysis. The E-views version 8 was used for the descriptive statistics; unit root tests on the other hand were performed to ascertain the stationarity state of the dataset as well as the regression technique of Panel Least Squares (PLS). Nevertheless, other tests of significance which was used in the study were:

i. T-test was used to test for the significance of the coefficient of the variables;
ii. R^2 – coefficient of determination was used to test the explanatory power of the independent variable;
iii. F-Ratio was used to test for the significance of the overall models;
iv. Durbin-Watson (DW) test was used to test whether auto-correlation exist or not in error term (u).

DATA ANALYSIS AND DISCUSSION OF FINDINGS

Descriptive Analysis

The descriptive statistics result shows the mean (average) for each of the variables, their maximum values, minimum values, median, standard deviation, skewness, kurtosis, and the Jarque-Bera (JB) statistics (normality test) computed for each of the variables to quantify the manifested construct central tendency, dispersion and shape of their distributions.

Table 2:   Descriptive Statistics of the Variables

	HSC	REC	ROA
Mean	3.995097	4.700603	0.143540
Median	3.827691	4.124284	0.062684
Maximum	5.758508	7.012491	2.754959
Minimum	2.940516	3.271377	0.003249

Std. Dev.	0.635186	1.124746	0.386092
Skewness	0.838541	0.756997	6.170998
Kurtosis	3.114838	2.101480	41.91862
Jarque-Bera	6.122549	6.715621	3611.798
Probability	0.146828	0.234811	0.240300
Sum	207.7450	244.4314	7.464070
Sum Sq. Dev.	20.57651	64.51778	7.602434
Observations	**52**	**52**	**52**

Source: Author's Computation, (2023) using E-Views 8

As it is presented in the table, it includes the mean, standard deviation, number of observations, minimum, maximum, skewness and kurtosis for the dependent and independent variables of the model. It shows the average indicators of variables computed from the Nigeria Stock Exchange (NSE) financial report. The independent variables health safety cost (HSC), remediation cost (REC) reported a mean value 3.995097 and 4.700603 respectively for the time frame investigated. The results disclosed that dependent variable return on asset (ROA) reported a mean value 0.143540. The descriptive statistics also disclosed the standard deviation values of the variables on health safety cost (HSC), remediation cost (REC) and return on asset (ROA) that reported 0.635186, 1.124746 and 0.386092. The standard deviation, which measures the deviation of firm data from mean, is 0.635186. This signified that the mean and standard deviation values for all the variables are clear indications that the variables are not constant over time. However, the skewness statistics indicated that all the variables are positively skewed which shows the variables has a long right tail. The results provided by kurtosis, remediation cost (REC) has a platykurtic value, which disclosed that the kurtosis value 2.101480 is less than the average kurtosis value 3. Furthermore, the kurtosis value on health safety cost (HSC) and return on asset (ROA) 3.114838 and 41.91862 reported that the variables are higher the kurtosis value (3) that was clearly mesokurtic. The corresponding probability values of the Jarque-Bera test statistics disclosed that the health safety cost (HSC), remediation cost (REC) and return on asset (ROA) variables are normally distributed at 5% significant level.

Unit Root Test
Table 3 Summary of Unit Root Test on Health Safety Cost HSC

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.90154	0.0037	4	44
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.34429	0.0094	4	44
ADF - Fisher Chi-square	14.3916	0.0021	4	44
PP - Fisher Chi-square	10.6641	0.0015	4	48

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.
Source: Author's Computation, (2023) using E-Views 8

The results in table 3 disclosed the panel unit root test summary on the variable health safety cost (HSC). The unit root test results on Levin, Lin & Chu t *, Im, Pesaran and Shin W-stat, ADF - Fisher

Chi-square, PP - Fisher Chi-square on the variable were investigated at 5% critical level.The results depicted that the health safety cost (HSC) is 1(0) or stationary at level with relation to Levin, Lin & Chu t *, Im, Pesaran and Shin W-stat, ADF - Fisher Chi-square, PP - Fisher Chi-square, and their corresponding probability value is less than chosen 5% critical level respectively. This indicated that, the null hypothesis of the panel unit root is therefore rejected with 95% certainty. This reported that the panel data series on health safety cost is cleansed of unit root.

Table 4 Summary of Unit Root Test on Remediation Cost REC

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.41716	0.0083	4	44
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.25492	0.0094	4	44
ADF - Fisher Chi-square	7.28916	0.0058	4	44
PP - Fisher Chi-square	7.91060	0.0023	4	48

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.
Source: Author's Computation, (2023) using E-Views 8

The results in table 4 disclosed the panel unit root test summary on the variable remediation cost. The unit root test results on Levin, Lin & Chu t *, Im, Pesaran and Shin W-stat, ADF - Fisher Chi-square, PP - Fisher Chi-square on the variable were investigated at 5% critical level. The results depicted that the remediation cost is 1(0) or stationary at level with relation to Levin, Lin & Chu t *, Im, Pesaran and Shin W-stat, ADF - Fisher Chi-square, PP - Fisher Chi-square, and their corresponding probability value is less than chosen 5% critical level respectively. This indicated that, the null hypothesis of the panel unit root is therefore rejected with 95% certainty. This reported that the panel data series on remediation cost is cleansed of unit root.

Table 5: Summary of Unit Root Test on Return on Asset (ROA)

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.79218	0.0041	4	44
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	0.29588	0.0003	4	44
ADF - Fisher Chi-square	10.5946	0.0057	4	44
PP - Fisher Chi-square	18.0048	0.0012	4	48

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.
Source: Author's Computation, (2023) using E-Views 8

The results in table 5 disclosed the panel unit root test summary on the variable return on asset. The unit root test results on Levin, Lin & Chu t *, Im, Pesaran and Shin W-stat, ADF - Fisher Chi-square, PP - Fisher Chi-square on the variable were investigated at 5% critical level. The results depicted that return on asset (ROA) is 1(0) or stationary at level with relation to Levin, Lin & Chu t *, Im, Pesaran and Shin W-stat, ADF - Fisher Chi-square, PP - Fisher Chi-square, and their corresponding probability value less than chosen 5% critical level respectively. This indicated that, the null hypothesis of the panel unit root is therefore rejected with 95% certainty. This reported that the panel data series on return on asset is cleansed of unit root.

Test of Hypotheses
This section of the study sought to test the null hypotheses stated in chapter one of this research study. The variables were tested using Panel Least Squares (PLS) model with the help of E-views version (8) to evaluate the effect of environmental accounting cost proxies (health safety cost, and remediation cost) on financial performance measures (return on asset) for the period 2010 -to- 2022 under investigation.

Regression Analysis of Model I Return on Asset
ROA = f (HSC, REC) ………………………………………………………………………………i
This can be written in Panel Least Square (PLS) form as:
$ROA_{it} = a_o + a_1 HSC_{it} + a_2 REC_{it} + U_{it}$ …………………………………………….. ii
$$a_1 > 0; \quad a_2 > 0$$

Table 6: Regression Analysis of Model I Return on Asset
Dependent Variable: ROA
Method: Panel Least Squares
Date: 03/21/23   Time: 23:29
Sample: 2010 2022
Periods included: 13
Cross-sections included: 4
Total panel (balanced) observations: 52

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.219157	0.557754	-0.392928	0.6961
HSC	-0.153110	0.096792	-1.581835	0.1203
REC	0.127696	0.056323	2.267219	0.0279
R-squared	0.601078	Mean dependent var		0.143540
Adjusted R-squared	0.544896	S.D. dependent var		0.386092
S.E. of regression	0.377326	Akaike info criterion		0.962388
Sum squared resid	6.833992	Schwarz criterion		1.112484
Log likelihood	-21.02210	Hannan-Quinn criter.		1.019932
F-statistic	6.799107	Durbin-Watson stat		1.977123
Prob(F-statistic)	0.000955			

Source: Author's Computation, (2023) using E-Views 8

The results in table 6 disclosed the regression coefficient (R^2 = 0.601078, Adjusted R^2= 0.544896, F-statistic = 6.799107; DW=1.977123). The results of the regression model depicted the effect of the independent variables health safety cost (HSC) and remediation cost (REC) on the dependent

variable return on asset (ROA). The coefficient of determination R^2 represented the proportion of variance of dependent variable that have been explained by the independent variables in respect to health safety cost (HSC) and remediation cost (REC) in the regression model. The Adjusted R^2 provides an insight of goodness of fit of the model. This implied that 60% changes in return on asset (ROA) are contributed to changes in health safety cost and remediation costs of natural resources firms in Nigeria. The Durbin-Watson statistic test discovered that there is positive evidence of autocorrelation in the time series data set. The F-statistic and its corresponding probability value disclosed that the regression model satisfies the overall goodness-of-fit statistical test.

Statement of Hypotheses
H_{01}: The effect of health safety cost on return on assets of listed natural resource firms in Nigeria is not significant.
H_{02}: The effect of environmental remediation cost on return on assets of listed natural resource firms in Nigeria is not significant.
Interpretation H_{01}: The results in table 4.7 reported the effect of health safety cost on return on asset of listed natural resources firms in Nigeria. The coefficient (-0.153110) and T-statistics (-1.581835) disclosed a negative effect. The Prob. ** value 0.1203 >5% significant level. Given the above result, the null hypothesis is accepted while the alternative hypothesis is rejected. This implied that the effect of health safety cost on return on asset of listed natural resource firms in Nigeria is negative and not significant.
Interpretation H_{02}: The results in table 4.7 reported the effect of environmental remediation cost on return on assets of listed natural resource firms in Nigeria. The coefficient (0.127696) and T-statistics (2.267219) disclosed a positive effect. The Prob. ** value 0.0279 <5% significant level. Given the above result, the null hypothesis is rejected while the alternative hypothesis is accepted. This implied that the effect of environmental remediation cost on return on asset of listed natural resource firms in Nigeria is positive and significant.

Discussion of Findings
Health Safety Cost and Return on Asset
The results in table 6 reported the effect of health safety cost on return on asset of listed natural resource firms in Nigeria. The coefficient (-0.153110) and T-statistics (-1.581835) disclosed a negative effect. The Prob. ** value 0.1203 > 5% significant level. Given the above result, the null hypothesis is accepted while the alternative hypothesis is rejected. This implied that the effect of health safety cost on return on asset of listed natural resource firms in Nigeria is negative and not significant. The finding of this study is in consonance with Norhasimah et al. (2018); Jamil and Rodiel(2020); Adegbie et al. (2020) Oluwafemi et al. (2018); Shehu(2020); Onuora and Chiedu (2019); Ngwakwe and Ambe (2018) whose research discovered that health safety cost has a negative but insignificant effect on return on asset of listed oil and gas firms in Nigeria.

Environmental Remediation Cost and Return on Asset
The results in table 6 reported the effect of environmental remediation cost on return on asset of listed natural resource firms in Nigeria. The coefficient (0.127696) and T-statistics (2.267219) disclosed a positive effect. The Prob. ** value 0.0279 <5% significant level. Given the above result, the null hypothesis is rejected while the alternative hypothesis is accepted. This implied that the effect of environmental remediation cost on return on asset of listed natural resource firms in Nigeria is positive and significant. The finding of this study is in consonance with Adediran and Alade (2018); Ahmed et al. (2016); Bassey et al. (2018); Che-Ahmad et al. (2019); Emmanuel et al. (2019) Muffee (2021); Mayndarto and Agustine (2021); Karakuş and Erdirençelebi (2019); Fasua and Osifo (2020)

whose research studies demonstrated that environmental remediation cost has a positive and significant effect on return on asset of oil and gas firms in Nigeria.

CONCLUSIONS

This study investigated the effect of environmental accounting cost and financial performance of listed natural resource firms in Nigeria. Based on the data analysis, and discussion of findings above, the study concluded that;

1. Health safety cost negatively affect return on asset of listed natural resource firms in Nigeria.
2. Environmental remediation costs positively influence return on asset of listed natural resource firms in Nigeria.

Note: The study generally concluded that the effect of environmental accounting cost and financial performance of listed natural resource firms in Nigeria is positive and statistically not significant for the period 2010 - 2022.

RECOMMENDATIONS

In line with the objectives of this study, findings and conclusions which facilitate for the following recommendations:

i. The study recommended that payment of health safety costs should be sustained, as a safe and secure environment enhances the financial performance of natural resource firms in Nigeria.

ii. Environmental remediation cost and financial performance are positively related. The natural resource firms should be environmentally friendly to enable them gain competitive advantage, high liquidity and reduced environmental cost in the long run.

Implications of the study

Good understanding on environmental accounting cost will foster sound decisions which will enhance the financial performance of natural resource firms in Nigeria. However, below are some of contributions to scholarship:

1. **Contribution to Concept:** This study seemed to be the first study to used board size as interaction variable as well as return on assets and return on equity as proxies for financial performance in measuring environmental accounting cost on listed natural resource firm in Nigeria.
2. **Contribution to Scope:** This study shows that environmental accounting costs and financial performance goes beyond oil and gas companies which enlightens the researcher to go far beyond the studies on oil and gas companies. Therefore, this study was carried out on listed natural resource companies in Nigeria.
3. **Contribution to Policy:** The study will be of benefit to the management of the corporate bodies by adopting and designing alternative measures of determining the effect of environmental accounting cost in relation to health safety and remediation cost and financial performance of the listed natural resource companies in Nigeria.

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