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Environmental cost disclosure and productivity of quoted oil and gas firms in Nigeria

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Abstract
This study examined the association between environmental cost disclosure and productivity of listed oil and gas firms in Nigeria. Specifically, this study respectively ascertained the relationship between health and safety cost disclosure, remediation cost disclosure, compliance cost disclosure abd revenue growth of listed seven (7) oil and gas firms in Nigeria from 2010-2022. The panel data used for this study were obtained from the annual reports and accounts of the sampled firms and statistical bulletins from Nigeria stock exchange from 2010-2022. Inferential statistics of the stated hypotheses were carried out using the Pearson coefficient of correlation and Panel least square (PLS) regression Health and Safety Cost Disclosure, Remediation Cost Disclosure, Compliance Cost Disclosure have a significant positive relationship with Revenue Growth of quoted Oil and Gas in Nigeria at 5% level of significance. This study recommended inter alia that oil and gas firms should be environmentally friendly to enable them gain competitive advantage and achieve economies of scale.

Keywords: Health and Safety Cost Disclosure, Remediation Cost Disclosure, Compliance Cost Disclosure, Productivity

Introduction

Environmental reporting and disclosure practices are means of communicating to the stakeholders about the impact of the organization's actions on the environment. The most popular reason why they want environmental information disclosed is to hold companies accountable for their environmental stewardship. However, in Nigeria, Oil and gas firm is one of the sectors in economy that has attracted a lot of public outcry on environmental issues. Even though a core source of revenue to the country, their activities are often associated with environmental hazard, severe health implications and environmental depletion and degradation which in recent times have caused nagging social disputes and disruption of some multinational companies economic activities. Hence, the need for sustainable environmental cost management in the oil and gas industries has thus become the concern of most nations and the responsibility of corporate managements across the globe (Amahalu & Moedu, 2023) [43]. Organizations are now expected to be able to demonstrate that they are aware and addressing the impact of their operations on the environment and society at large.

Environmental Cost Disclosure (ECD) systems have the dual purpose of managing and enhancing the financial and environmental performance of a corporate firm. Environmental Cost Disclosure generate information about the use of resources with environmentally related impacts on the financial position and performance of companies (Amahalu & Obi, 2020) [45]. Increasing emphasis on the role of corporations in ensuring environmental sustainability has necessitated the need for a multidisciplinary approach to issues of environmental protection. While it is observed that environmental practices have often been perceived as the opportunity cost of economic growth, the ideology of sustainable development is beginning to dominate the sphere of public policy. The implication on corporate entities in this regard is to reconfigure their corporate objectives to reflect the same levels of environmental accountability. However, environmental disclosures are discretionary, suggesting that corporations exert unimaginable control over the preparation and disclosure of social and environmental information (Charles, John & Umeoduagu, 2017; Okudo & Amahalu, 2023) [3, 14].

The need for environmental cost has become the concern and focus of nations and corporate managements. Environmental disclosure has emerged as a means to systematically apply business management to environmental costs to enhance a firm's long-run financial performance by developing processes and products that simultaneously improve competitive and environmental performance. However within the developing nations, the understanding is quite different may be due to poor government regulations and absence of coordinated pressure groups and consumer awareness to influence corporate behavior. It is against this backdrop, that this study investigates the relationship between environmental cost disclosure and productivity of quoted Oil and Gas firms in Nigeria.

Statement of the Problem

The nature of business a firm operates defines the risks attached to such business and risk constitutes a significant factor in the profitability of the firm's operation. Higher financial risks constitute enormous treats to firms' profitability, though they are likely to attract huge amount of profits. Many researchers have investigated the relationship between environmental cost disclosure and performance with different strands of findings. For example, Amahalu and Okudo (2023) [3]; Sudiyatno, Puspitasari, Suwarti & Asyif (2021); (Sanusi & Sanusi, 2019) [47] found a negative relationship between environmental disclosure and financial performance. On the other hand, Machmuddah, Sari and Utomo (2020); Kurnia, Darlis, & Putra (2020); Amahalu, Ezechukwu and Okudo, C.L. (2022) [8] found a positive relationship between environmental disclosure and financial performance, thereby creating a lacuna which this study tends to fill. However, plethora of reasons could be attributable to the observed inconsistencies in previous studies. It is against the backdrop, that this study sought to examine the nexus between environmental disclosure and productivity.

Objectives of the study

The broad objective of this study is to examine the relationship between environmental cost disclosure and productivity of quoted oil and gas firms in Nigeria. The specific objectives are:

1. To determine the relationship between health and safety cost disclosure and revenue growth of listed oil and gas firms in Nigeria.
2. To evaluate how compliance cost disclosure relates with revenue growth of listed oil and gas firms in Nigeria.
3. To assess the degree of relationship between remediation cost disclosure and revenue growth of listed oil and gas firms in Nigeria.

Research Hypotheses

The following null hypotheses were tested:

Ho_1: There is no significant relationship between health and safety cost disclosure and revenue growth of listed oil and gas firms in Nigeria.

Ho_2: There is no significant relationship between compliance cost disclosure and revenue growth of listed oil and gas firms in Nigeria.

Ho_3: There is no significant relationship between remediation cost disclosure and revenue growth of listed oil and gas firmsin Nigeria.

Conceptual Review

Environmental costs are such costs of business in an enterprise aimed at fulfilling environmental protection responsibilities, the implementation of national environmental protection laws, regulations and policies, and operations in order to prevent adverse impact on the natural environment. It includes such costs that take appropriate measures to achieve environmental objectives. It also includes the reduction of pollutant emissions, waste material recycling and disposal, environmental management, environmental protection activities to support social and environmental damage compensation costs (Mbonu, & Amahalu, 2022) [9]. They include cleanup costs, costs of recycling materials or conserving energy, closure costs, capital expenditure and development expenditure. These costs are incurred in preventing, reducing or repairing damage to the environment and conserving resources (Ayu, Lindrianasari, Gamayuni & Urbański 2020; Modozie & Amahalu, 2022) [8].

Health and Safety Cost Disclosure

Health and Safety is the regulations and procedures intended to prevent accident or injury in workplaces or public environments. Health and Safety Cost are those costs covered by workers compensation insurance and other minor medical costs for the accident. The company pays insurance to cover these costs (Udo, Oraka & Amahalu, 2022) [9]. Health and Safety Cost disclosure means the part of the Organisation's management system which covers the health and safety work organisation and policy in a company; the planning process for accident and ill health prevention; the line management responsibilities and the practices, procedures and resources for developing and implementing, reviewing and maintaining the occupational safety and health policy (Okudo, Amahalu, Obi & Okafor, 2022) [8].

Compliance Cost Disclosure

Compliance cost refers to all the expenses that a firm incurs to adhere to industry regulations. Compliance costs include salaries of people working in compliance, time and money spent on reporting, new systems required to meet retention, and so on (Auliyah and Basuki, 2021) [11]. Compliance cost is the direct costs to businesses of performing the various tasks associated with complying with government regulation. All monetary and non-monetary costs incurred by a company while complying with applicable laws (Okafor, Egbunike & Amahalu, 2022) [9]. These costs are measured in terms of the man-hours spent on administration, planning, adherence to laws and the need for skilled staff in addition to money spent on compliance.

Remediation Cost Disclosure

Remediation is the act of remedying or correcting something that has been corrupted or that is deficient. Environmental remediation is the removal of pollutants or the reversal of other environmental damage, especially in a particular location, to attempt to return it to its natural state (Ekweozor, Ogbodo & Amahalu, 2022) [8]. Remediation Costs means reasonable expenses incurred to investigate, quantify, monitor, mitigate, abate, remove, dispose, treat, neutralize, or immobilize pollution conditions to the extent required by environmental law.

Productivity

Productivity is the efficiency of production of goods or services expressed by some measure. Measurements of productivity are often expressed as a ratio of an aggregate output to a single input or an aggregate input used in a production process, that is, output per unit of input, typically over a specific period of time (Okonkwo, Amahalu & Obi, 2022) [8]. Productivity is a crucial factor in the production performance of firms and nations. Increasing firms productivity can raise a country's economy because more real income improves people's ability to purchase goods and services, enjoy leisure, improve housing and education and contribute to social and environmental programs. Productivity growth can also help businesses to be more profitable.

Revenue Growth

Revenue growth entails sustaining existing revenue position by a firm in an industry while strategising for successive revenue increment through business and market expansion in a competitive business environment (Okudo, Mbonu & Amahalu, 2022; Ekpoese, Umanah, Akpan & Okafor, 2019) [9, 18]. However, attaining such target requires strategic management decisions which in turn increase the revenue margin. Effective management also stabilises business cash flow and provides greater visibility in streams of revenue (Nzekwe, Okoye & Amahalu, 2021). Furthermore, revenue growth describes the increase or the decrease in the rate of converting a firm's goods or services into cash and cash equivalent from one business period to another.

Health and Safety Cost Disclosure and Revenue Growth

The need for disclosure on healthy and safer work conditions is gaining wider recognition as an expansive idea influencing quality of life of employees as well as its significant influence at the social/societal sphere. Employee health and safety encompasses the physical, mental and emotional welfare of an employee relative to the performance of his duties and as a result impacts positively on the achievement of organizational goals (Okudo & Ndubuisi, 2021; Mbonu & Amahalu, 2021a) [30]. Disclosure on employee health and safety are reports/ programs geared towards the protection of employees against organizations activities; products and service hazards. Increased industrialization and economic development have further heightened industrial accidents and exposure to dangerous chemicals and toxic substances with their attendant health implications for employees and the environment. Developing countries endowed with mineral resources are prone to occupational, job and health related deaths most of which are as a result of employees engaging in hazardous activities. This impedes employee performance adversely (Auliyah & Basuki, 2021; Oshiole, Elamah & Amahalu, 2020) [11, 45]. Organizations environmental and social policies are a boast towards environmental sustainability and enhance firm's opportunity to gain increased market share and profitability (Egolum, Amahalu & Obi, 2019; Okafor, 2018) [36].

Compliance Cost Disclosure and Revenue Growth

Regulations are in place to support a fair and competitive marketplace, as well as to protect workers, consumers, and the environment. However, any unnecessary red tape associated with complying with those regulations negatively impacts business productivity (Amahalu, Ezechukwu & Obi, 2017) [7]. To help eliminate the regulatory burden associated with the federal regulatory system. Moreover, the efforts and costs that firms expend to comply with unnecessary aspects of any regulatory regime can impede a firm's ability to meet its business performance goals. Firms likely adjust their capital and labour inputs to accommodate regulatory compliance costs. In this way, regulatory burden could impact various aspects of a firm's business operations, including resource allocation, production, productivity, profitability and expansion. Okudo, Amahalu & Oshiole (2023) [3]; Ifada, Ghozali and Faisal (2019) [24] found a negative relationship between a firm's regulatory burden and its performance, but, Ioannou and Serafeim (2017) [25]; Amahalu and Okudo (2023) [3] found a positive relationship between compliance cost disclosure and financial performance.

Remediation Cost Disclosure and Revenue Growth

Environmental Protection Agency declared that environmental cost information can be applied in internal management decisions (Tom-West, Okoye & Amahalu, 2021). Remediation Costs means reasonable expenses incurred to investigate, quantify, monitor, mitigate, abate, remove, dispose, treat, neutralize, or immobilize "pollution conditions" to the extent required by "environmental law". Remediation Costs means any reasonable losses, expenses, or costs incurred by an organisation in connection with environmental remediation. The absence of such information increases the stress of accounting for costs and struggles to reduce costs to managers (Diamastuti, Muafi, Fitri & Faizaty, 2021; Okudo, Ezechukwu & Amahalu, 2022) [9].

Theoritical Framework

Stakeholders Theory

The stakeholder theory is a theory of organizational management and business ethics that addresses morals and values in managing an organization, such as those related to corporate social responsibility, market economy, and social contract theory. Edward Freeman propounded the stakeholder theory in 1984, it raised awareness of the relationships and the ripple-effect of a company and its many stakeholders. Stakeholder theory suggests that the purpose of a business is to create as much value as possible for stakeholders. In order to succeed and be sustainable over time, executives must keep the interests of customers, suppliers, employees, communities and shareholders aligned and going in the same direction. Innovation to keep these interests aligned is more important than the easy strategy of trading off the interests of stakeholders against each other. Hence, by managing for stakeholders, executives will also create as much value as possible for shareholders and other financiers.

Empirical Review

Emmanuel, Elvis and Abiola (2019) studied environmental accounting disclosure and performance of listed Companies in Nigeria from 2007 – 2016. Data were analyzed through the use of multiple regression. The result of the study shows that non-financial indicators of environmental disclosure have a positive significant effect on performance, while performance indicator of environmental accounting disclosure has no effect on performance of firms.

Polycarp (2019) [46] conducted a research on environmental accounting and financial performance of oil and gas companies in Nigeria from 2016-2017. Data was collected from annual reports, performance was measured using Return on equity, earnings per share and net profit margin. Multiple regression was used to analyze the data, the study found out that environmental disclosure has no relationship with financial performance.

Victor, Adiga, Shaki, Bassey (2020) [51] focused on environmental reporting and corporate performance with particular reference to listed oil and gas companies in Nigeria. The study adopted the ex-post facto design and data was sourced from the published financial reports of 6 listed oil and gas companies out of the 12 quoted oil and gas companies and covered a period of five years from 2015-2019 using only secondary data. Ordinary least square was used in analyzing the data using Minitab 17. The findings revealed that environmental protection, development and safety cost has a negative but significant relationship with ROA. More also, environmental protection, development and safety cost showed a negative and insignificant relation with EPS.

Agubosim, Nwokeji, Orjinta (2021) [1] evaluated the relationship between environmental cost disclosure and profitability (performances) of firms in oil and gas industry in Nigeria. Time series data were collected from published annual reports of ten sampled companies for ten years (2010-2019) based on data availability. Ex post facto design was used. Environmental costs were represented in terms of waste management cost, pollution control cost, fines and litigation cost and community development cost while return on assets, ROA, was used as proxy to firm profitability. Pearson product moment coefficient of correlation and multiple regression analysis were used to analyze the data. Econometric result revealed that environmental cost has no significant effect on the performance of oil and gas firms in Nigeria.

Methodology

The research design used in this study is the ex-post facto research design.

The study population consists of twelve (12) oil and gas firm listed on the floor of the Nigerian Exchange Group as at 31st December. 2022. They include 11 Plc (formerly Mobil Oil Plc); Anino International Plc; Capital Oil Plc; Conoil Plc; Eterna Plc; Ardova Plc (formerly Forte Oil Plc); Japaul Oil & Maritime Services; MRS Oil Nigeria Plc; Oando Plc; Rak Unity Petroleum Company Plc; Seplat Petroleum Development Company Plc; Total Nigeria Plc. Purposive sampling technique was adopted to select seven (7) oil and gas with up to date annual reports and accounts from 2010 to 2022, which are Capital Oil Plc; Conoil Plc; Eterna Plc; MRS Oil Nigeria Plc; Oando Plc; Rak Unity Petroleum Company Plc; Total Nigeria Plc. Primarily, secondary data were used in this study which was sourced from the financial statements of the sample firms. The panel data were analysed using correlation and multiple regression analysis and with the application of content analysis.

Operationalisation of Research Variables

Table 1

Variable	Acronym	Measurement
Independent (Environmental Cost Disclosure)		
Health and Safety Cost Disclosure	HSCD	Total Health and Safety Cost Disclosed
		Maximum Disclosed Health and Safety Score
Compliance Cost Disclosure	CCD	Total Compliance Cost Disclosed
		Maximum Disclosed Compliance Score
Remediation Cost Disclosure	RCD	Total Remediation Cost Disclosed
		Maximum Disclosed Remediation Score
Dependent Variable (Productivity)		
Revenue Growth	RG	Previous Period's Revenue – Current Period's Revenue
		Previous Period's Revenue

Model Specification

This study adapted and modified the model of Oshiole, Elamah and Amahalu (2020) [45]:

$NPM = \beta o + \beta i HSCD + \beta 2RCD + €$

The modified model is:

$RG = \beta o + \beta_1 HSCD + \beta_2 CCD + \beta_3 RCD + €$

Where

NPM = Net Profit Margin
HSCD = Health and Safety Cost Disclosure
RCD = Remediation Cost Disclosure
CCD = Compliance Cost Disclosure
RG = Revenue Growth

Test of Hypotheses

Content analysis was applied to generate the scores that were subjected to Regression Model in the determination of the linear relationship between the dependent and independent variables. It was operated using E-Views 10.0 statistical software.

Table 2: Correlation Matrix

	RG	HSC	CCD	RCD
RG	1.0000			
HSC	0.5267	1.0000		
CCD	0.0847	0.3098	1.0000	
RCD	0.1152	-0.4198	0.4695	1.0000

***Source*:** E-Views 10.0 Output, 2023

The correlation matrix in table I shows that Revenue Growth has a positive relationship with HSC (0.5267), CCD (0.0847) and RCD (0.1152).

Table 3: Panel Least Square Regression Analysis

Dependent Variable: RG				
Method: Least Squares				
Date: 05/30/23 Time: 16:48				
Sample: 2010 2022				
Included observations: 13				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.597603	0.141490	4.223633	0.0039
HSC	0.486350	0.180294	2.697530	0.0307
CCD	0.372837	0.161425	2.309660	0.0497
RCD	0.520796	0.190642	2.731794	0.0258
R-squared	0.516790	Mean dependent var		0.477273
Adjusted R-squared	0.439699	S.D. dependent var		0.143254
S.E. of regression	0.119022	Akaike info criterion		-1.143730
Sum squared resid	0.099164	Schwarz criterion		-0.999041
Log likelihood	10.29051	Hannan-Quinn criter.		-1.234936
F-statistic	2.495480	Durbin-Watson stat		1.832385
Prob(F-statistic)	0.000000			

***Source*:** E-views 10.0 regression output, 2023

Discussion of Findings

The panel least square regression in table 2 demonstrates that revenue growth positively associates with HSC, CCD and RCD at beta coefficients of $\beta_1 = 0.486350$; $\beta_2 = 0.372837$; β_3 **=** 0.520796. Moreover, holding other factors constant, a unit increase in HSC, CCD and RCD will lead to a corresponding increase in revenue growth. The t-statistics and its associated probability values for x1= 2.697530, 0.0307 < 0.05; x2 =2.309660, 0.0497 < 0.05, x3 = 2.731794, 0.0258 < 0.05; reports that explanatory variables (HSC, CCG and RCG) significantly relate with revenue growth. The adjusted r-squared of 0.439699 tells that HSC, CCG and RCG have 44% influence on revenue growth. The Durbin-Watson statistic of 1.832385 proves that there is no presence of serial correlation in the model.

In conclusion, considering the panel regression result, this study posits that Health and Safety Cost Disclosure, Remediation Cost Disclosure, Compliance Cost Disclosure have a significant positive relationship with Revenue Growth of quoted Oil and Gas in Nigeria at 5% level of significance.

Recommendations

1. Based on the positive relationship between health and safety disclosure and productivity, management should invest in occupational health and safety activities such as risk assessment and and safe technologies
2. There is need for an effective and regular compliance disclosure so as to ensure a chaotic free ambience for improved productivity.
3. As a result of the positive relationship between Remediation Cost Disclosure and revenue growth, oil and gas firms should be environmentally friendly to enable them gain competitive advantage and achieve economies of scale.

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