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RESEARCH ARTICLE

Effect of Environmental Costs Disclosure on Productivity of Listed Oil and Gas Firms in Nigeria

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ABSTRACT

This study assessed the effect of Environmental Costs Disclosure on the Productivity of listed oil and gas firms in Nigeria for a thirteen-year period covering from 2008-2020. Environmental Prevention Cost Disclosure, Community Development Cost Disclosure, and Environmental Remediation Cost Disclosure were used to proxy Environmental Costs Disclosure (independent variable), while Revenue Growth was used to measure Productivity (Dependent Variable). An ex-Post facto research design was employed. Seven (7) listed oil and gas firms constituted the sample size of this study. Secondary data were extracted from the sampled firms' annual reports and accounts and analyzed using E-Views 10.0 statistical software. The study employed inferential statistics using Pearson correlation, Multicollinearity test, and Multiple regression analysis. The empirical analysis findings showed a significant positive relationship between Environmental Prevention Cost Disclosure, Community Development Cost Disclosure, Environmental Remediation Cost Disclosure, and Revenue Growth, at 5% significance. It was recommended inter alia that environmental accounting standards should be published locally and internationally and reviewed continually to bolster firms' productivity.

Keywords: *Environmental Costs Disclosure; Productivity; Oil and Gas Firms; Nigeria*

Introduction

The environmental cost is an issue that has captured the attention of national and international, political and business leaders across the globe and the developed world. However, the increase in global environmental awareness and the campaign for sustainable economic development is redirecting the attention of firms towards environmental sensitivity. Sustainable development as is generally known, focuses on the creation of wealth and prosperity, whilst considering the true importance of social and environmental aspects, allowing business and public organizations to meet triple bottom line in sustainable management (Filippo, Raimo, Rubino & Garzoni, 2021). The search for sustainability has made various global institutions to set out policies that guide human interaction with the environment. These guidelines have great effect on corporations, as they are made to understand that their business strategies affect the society, can influence behaviour and disorganize the physical, social and economic environment.

Proper disclosure of accounting information relating to the environment is a very important aspect of accountability. Environmental accounting enables companies and other organizations to increase their public trust and confidence. This however will lead to fair assessment of the organizations. Environmental costs include costs of complying with environmental laws. It includes environmental remediation costs, pollution control equipment costs and non-compliance penalty. 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 damages to the environment, are not taken into consideration before profits are determined. In other words, the profits could be wrongly determined. The result of this, in most cases, is reporting of wrong and excessive profits which will also mislead the decision makers (Amorelli & García-Sánchez, 2020). The measure of environmental performance and propensity increasingly emphasizes the awareness and empowerment of stakeholders. The regulation of environmental performance seems to depend crucially on the content and quality of environmental information disclosure. The stakeholders pay much attention to environmental information disclosure and environmental risk measure with an increase of environmental risk and market risk, and they are anxious to capture more environmental information disclosure and improve environmental risk management. Most firms naturally seek the goodwill of neighboring communities, employees, stockholders, investors, financial institutions, local government and citizens. The widely spreading of environmental responsibility and information has a significant impact on stakeholders' interests.

The search for competitive advantage is a priority for firms that operate in a complex global environment, to ensure the capacity to create value in the long-term. Moreover, companies are becoming aware that they can contribute to sustainable development by reorienting their operations and processes. This position assumes that the firm obtains economic results that are sufficient to enable the business's viability, since the company's first concern must be its survival. The current opinion holds that long-term profits for shareholders are ensured by means of corporate management applying both economic and sustainability criteria. Awareness and interest in these issues has led to the emergence of the concept of environmental cost (José-Valeriano & Aibar-Gúzman, 2021). Most corporate leaders agree that a main objective for the economy is sustainable development. Sustainability requires companies to strive for eco-efficiency, but they can only measure that by producing accurate information on both environmental costs, revenues and environmental performance.

Statement of the Problem

Non-financial corporate performance has begun to capture the attention of increasing number of investment professionals as they realize that profitability alone is not sufficient for a firm's long-term growth. By looking beyond economic, strategic and operational factors to include environmental and social considerations, sustainability reporting helps boost corporate transparency, strengthen risk management, promote stakeholder engagement and improve communications with stakeholders. Firms are commonly assumed to pursue profit maximization while such non-financial disclosure seems to be costly. Businesses development has social and environmental impacts that result in social problems, global warming, actual disaster and pollution. Therefore, many business organizations take much responsibility for social and environment issues as they do for economic issues.

However, a lack of regulation and/or consistent guidelines regarding the structure and quality of sustainability reporting have led to the production of various types of reports that have a social, ethical and environmental focus. Traditionally companies, particularly in the oil and gas sector of the national economy have used annual reports as a medium to inform stakeholders about accounting and economic performance as well as accountability and transparency. The sector has been a challenging one, may be because of the enormity of income it generates, hence has attracted varied forms of attention in the accounting sphere. Environmental accounting needs therefore, cannot be wished away in the sector in the pursuit of probity, accountability, transparency in the field, thus impacting on the accounting reporting method. Consequently, the focus has predominantly been on the shareholders, which meant that wider concerns of other stakeholders are left out.

Objectives of the Study

The main objective of this study is to establish the effect of environmental costs disclosure on productivity of listed oil and gas firms in Nigeria. Specifically, this study ascertained the:

i. Effect of environmental prevention cost disclosure on revenue growth of quoted oil and gas firms in Nigeria.
ii. Effect of community development cost disclosure on revenue growth of quoted oil and gas firms in Nigeria.
iii. Effect of environmental remediation cost disclosure on revenue growth of quoted oil and gas firms in Nigeria.

Research Hypotheses

The research hypotheses for this study were stated in null form:

i. Environmental prevention cost disclosure has no significant effect on the revenue growth of quoted oil and gas firms in Nigeria.
ii. Community development cost disclosure has no significant effect on the revenue growth of quoted oil and gas firms in Nigeria.
iii. Environmental remediation cost disclosure has no significant effect on the revenue growth of quoted oil and gas firms in Nigeria.

Review of Related Literature

Conceptual Review

Environmental Cost

Environmental costs are costs connected with the actual or potential deterioration of natural assets due to economic activities (Wang, Wu, Guo Wei & Dooling, 2020). Environmental costs are those incurred by companies, directly or through third parties, to prevent, reduce or repair damage to the environment arising from their operating activities. These costs therefore include: waste disposal and measures taken to prevent its formation; protection of the soil, surface waters and ground waters; protection of air and climate from pollution; reduction of noise pollution; biodiversity and landscape protection (Teerawattana & Yang, 2019). Environmental costs are costs connected with the actual or potential deterioration of natural assets due to economic activities. Such costs can be viewed from two different perspectives, namely as (a) costs caused, that is, costs associated with economic units actually or potentially causing environmental deterioration by their own activities or as (b) costs borne, that is, costs incurred by economic units independently of whether they have actually caused the environmental impacts (Bermúdez & Laxe, Aguayo-Lorenzo, 2019).

Environmental Prevention Cost Disclosure

Environmental prevention costs are the costs of activities carried out to prevent the production of contaminants and/or waste that could cause damage to the environment (Bermúdez, Laxe & Aguayo-Lorenzo, 2019). Prevention costs are costs incurred to avoid or minimize the number of defects at first place. Some examples of prevention

costs are improvement of production processes, workers training, quality engineering, statistical process control etc (Hervás-Peralta, Roži´c, Poveda-Reyes, Santarremigia, Pastor-Ferrando, & Molero (2020).. Environmental prevention costs include the costs of preventive environmental management activities such as cleaner production projects. It also include costs for other environmental management activities, such as environmental planning and systems, environmental measurement, environmental communication, and any other relevant activities (Castellano, Ferretti, Musella & Risitano, 2020).

Community Development Cost Disclosure

The Community Development Challenge report (2014) defines community development as a set of values and practices which plays a special role in overcoming poverty and disadvantage, knitting society together at the grass roots and deepening democracy. Community Development Exchange defines community development as both an occupation (such as a community development worker in a local authority) and a way of working with communities. Its key purpose is to build communities based on justice, equality and mutual respect (Dong, Zhu, Li, Wang & Gajpal, 2019). Community development involves changing the relationships between ordinary people and people in positions of power, so that everyone can take part in the issues that affect their lives. It starts from the principle that within any community there is a wealth of knowledge and experience which, if used in creative ways, can be channeled into collective action to achieve the communities' desired goals (Eswari, & Yogeswari, 2019). Community development practitioners work alongside people in communities to help build relationships with key people and organizations and to identify common concerns. They create opportunities for the community to learn new skills and, by enabling people to act together, community development practitioners help to foster social inclusion and equality (Kuznetsov, Dinwoodie, Gibbs, Sansom & Knowles, 2019). **Community development cost entails the cost of financing growth-related infrastructure (**Puig, Micail, Wooldridge & Darbra (2017).

Environmental Remediation Cost Disclosure

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. Environmental remediation costs include, without limitation, costs and expenses payable in connection with the foregoing for legal, engineering or other consultant services, for investigation, testing, sampling, and monitoring, for boring, excavation, and construction, for removal, modification or replacement of equipment or facilities, for labor and material, and for proper storage, treatment, and disposal of hazardous materials (Rosa, Lunkes & Brizzola, 2019).

Productivity

Productivity is a measure of performance or output *(William, 2019)*. Productivity is the number of sales generated per sales person. Productivity is the basic measure that defines growth in an organization and one's living standards (higher income, better benefits) (Ravinder, 2019). Productivity is a measure of the efficiency of a person, machine, factory, system, in converting inputs into useful outputs. Productivity is a metric that measures the process of creating goods and services (Darius, 2019). Productivity is the ratio of the amount of output from a team or organization per unit of input (Bordoloi, 2019). Productivity captures the ability to transform physical and human resources to generate the desired outputs (Gibson & Shrader, 2014). Productivity is a critical determinant of cost efficiency (Borowiecki, 2015).

Productivity is a crucial factor in production performance of firms. Increasing organisatinal productivity can raise living standards 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 (Robson, Kirk, Kietzmann & McCarthy, 2016). Productivity growth is a crucial source of growth in living standards. Productivity growth means more value is added in production and this means more income is available to be distributed (*Zelenyuk, 2018).*

Revenue Growth

Revenue growth is the increase (or decrease) in a company's sales from one period to the next. Shown as a percentage, revenue growth illustrates the increases and decreases over time identifying trends in the business (Bernard, 2019). The amount of a company's total revenues is the total money it earns from providing its products or services to customers before paying any expenses. Revenue growth is the increase or decrease, in a company's sales between two periods. Communicated as a percentage, revenue growth demonstrates the degree to which a company's revenue has grown (or shrunk) over time (Keythman, 2017).

Revenue growth can increase a company's profits and increase value for stockholders (Campbell, 2019). Revenue growth is the increase, or decrease, in a company's sales between two periods. Communicated as a percentage, revenue growth demonstrates the degree to which a company's revenue has grown (or shrunk) over time (Keythman, 2017). Revenue growth rate is calculated by comparing the previous period's revenue with the current period's revenue (Spacey, 2017). Revenue Growth Rate is an indicator of how well a company is able to grow its sales revenue over a given time period (Chen, 2019).

$$\text{Revenue Growth:} \quad \frac{\text{Current Year Revenue} - \text{Prior Year Revenue}}{\text{Prior Year Revenue}}$$

Environmental Prevention Cost Disclosure and Productivity

Environmental accounting is to use lifecycle assessment to measure the environmental impacts of corporate activities, promote the use of clean production, adopt total cost assessment and combine traditional accounting to disclose the environmental financial information of the enterprises (Rosa, Ensslin, Ensslin & Lunkes, 2012). The purpose is to urge enterprises to implement effective and efficient environmental activities, so as to achieve sustainable development. Environmental accounting makes environmental expenditure a part of operational cost; thus, new thinkingshould be adopted for product design, in order to maintain the existing profits, enhance environmental performance or meet the green (environmental) accounting rules (Kegalj, Traven & Bukša, 2018). Roos and Kliemann-Neto (2018); Lonsdale, Weston, Barnard, Boyesand and Elliott (2015) found a positive relationship between prevention cost and financial performance. On the contrary, Macková, Hazuchová and Stávková (2019); Rosa, Bartolacelli and Lunkes (2021) posited that expenditure on prevention negatively affects the performance of companies.

Community Development Cost and Productivity

The quest for sustainability has caused an emergence of many global firms enunciating various norms that guide human interaction with the environment. The increase in global environmental awareness and the campaign for sustainable economic development is redirecting the attention of firms toward environmental costs. Environmental costs have been expanded to account for product design for sustainability, recycling, and disassembly; process design to reduce the environmental impact of operations; worker training; research, and development. Many companies are increasingly interested in capturing benefits associated with environmental sustainability and stewardship (Gobbi, Sanches, Guimarães, Freitas & Pacheco, 2019). Vogt, Degenhart, Da Rosa, and Hein (2016); SchØyen and Odeck (2013) documented a positive relationship between community development cost and net profit margin while Dong, Zhu, Li, Wang, and Gajpal (2019) revealed that community development cost has a statistically significant and negative relationship with profitability.

Environmental Remediation Cost and Productivity

The use of natural resources and continuous emissions of greenhouse gases by industries around the world are on increase. This is traceable to the industrial revolution of the late 18th century where economic activities in many areas moved from agriculture to manufacturing. The industrial revolutions lead to economic improvement for most people in the industrialized society. These economic developments are not without costs. Industrialization which required the use of natural resources including energy brought about factory pollutant and greater land use, which

harmed the natural environment (Islam, Hunt, Jantan, Hashim, Chong, 2019). This is evidenced in environmental degradation and atmospheric pollution generally experienced in the world and particularly in Nigeria today. However, the increase in global environmental awareness and the campaign for sustainable economic development is redirecting the attention of firms towards environmental sensitivity. (Rehman, Zahid, Asif & Ullah, 2020; Rehman, Zahid, Asif & Ullah, 2020).

Theoretical Framework

This study is anchored on Stakeholder Theory

Stakeholder 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. The traditional definition of a stakeholder is “any group or individual who can affect or is affected by the achievement of the organization’s objectives” (Freeman1984). Stakeholders could also be institutions, like banks, governmental bodies, oversight organizations, and others. Stakeholder theory holds that a company’s stakeholders include just about anyone affected by the company and its workings. Stakeholder theory suggests that a company’s stakeholders include people like employees, customers, community members, competitors, vendors, contractors, and shareholders. Stakeholder theory suggests that a company’s stakeholders are "those groups without whose support the organization would cease to exist." These groups would include customers, employees, suppliers, political action groups, environmental groups, local communities, the media, financial institutions, governmental groups, and more. This view paints the corporate environment as an ecosystem of related groups, all of whom need to be considered and satisfied to keep the company healthy and successful in the long term. 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

Falope, Offor and Ofurum (2019) determined the effect of environmental disclosure and performance of quoted Nigerian construction firms. Specifically, the objectives of the study were to ascertain the degree in which pollution control cost affect return on assets of quoted construction firms in Nigeria, determine the dimension with which environmental protection cost affect return on assets of quoted construction firms in Nigeria and ascertain the extent environmental recycling disclosure affect return on assets of quoted construction firms in Nigeria. The study adopted *Ex Post Facto* research design. Hypotheses were formulated in line with the research objectives and tested using linear regression analysis with the aid of SPSS Version 20.0. It was observed that environmental pollution prevention cost, environmental protection cost and environmental recycling disclosure have effects on return on assets of quoted construction firms in Nigeria. The study recommended among others that regular and continuous environmental evaluation will improve organizations sales, income and ensure that environmental situational needs are met.

Baba (2020) examined the determinants of environmental accounting disclosure of listed oil and gas firms in Nigeria. The study adapted Dibia and Onwechekwa (2015) model and measure environmental accounting disclosure with a dichotomous variable. Data for the study were obtained from the audited annual report of the 10 sampled firms for a period of 7 years covering 2012 to 2018. The study employed pooled logistic regression as tool for analysis and testing of hypotheses. The result shows that profitability has negative and significant effect on environmental information disclosure, leverage has insignificant effect on environmental accounting disclosure, audit firm type and firm size have positive and significant effect on environmental accounting disclosure.

Shehu (2014) examined the effect of environmental expenditure on the performance of quoted Nigerian oil companies, within a period of twelve years (1999-2010) using selected firm financial statement of all quoted oil companies listed in the Nigerian Stock Exchange. The data was analyzed using multiple regression, employing ROA and three independent variables; Cost of Environmental Remediation and Pollution Control (ERPC), Cost of Environmental Laws Compliance and Penalty (ELCP), Donations and Charitable Contributions (DCC). The result reveals that environmental expenditure has significant effect on the performance of quoted oil companies in Nigeria.

Iheduru and Ike (2019) examined the effect of environmental and social costs on performance of manufacturing companies in Nigeria. The objectives of this study are to examined the relationship between environmental and social costs and performance of manufacturing companies in Nigeria. The population consists of fourteen (14) randomly selected manufacturing companies for food and beverages sector, cement, etc quoted in the Nigeria stock Exchange for the year 2016. The data for the study were collected from annual reports and accounts of fourteen (14) randomly selected manufacturing companies in Nigeria. The data were analyzed using multiple regression models. The key findings of the study show that there is significant negative relationship between Environmental and social costs and Return on Capital Employed (ROCE) and Earnings per share (EPS) and a significant positive relationship between environmental and social costs and Net Profit Margin (NPM) and Dividend per Share (DPS).

Bassey, Oba and Onyah (2013) critically analyze the extent of implementation of environmental cost management and its impact on output of oil and gas companies in Nigeria from 2001 to 2010. The paper was aimed at ascertaining the extent to which implementation of environment cost management has impacted on the oil and gas industries in Nigeria. The study used multiple regression analytical technique. Findings revealed that there is a significant relationship between the parameters that influence environmental cost management and output of oil and gas produced in Nigeria. Also, it was discovered that there are no established standards in Nigeria guiding environmental cost management in the oil and gas industries in Nigeria.

Ekubiat (2019) examined of environmental accounting disclosure practices (EADP) in annual reports of listed oil and gas companies in Nigeria. Ex-post facto research design was adopted in the study. The ten (10) oil and gas companies listed on the Nigerian Stock Exchange (NSE) was the population as census sampling technique was used in the study. Secondary sources were the main sources of data for the study. An environmental disclosure index with 40 items in line with Global Reporting Initiative (GRI) (2006/2008/2011/2013) was developed and environmental data from the annual reports of the listed ten oil and gas companies from 2009 – 2018 were captured using content analysis. The data obtained were analysed using descriptive and inferential statistics. Findings revealed that the sampled oil and gas companies were disclosing very inadequate financial and nonfinancial environmental information in their annual reports at a minimum disclosure practice of 0.0283 and maximum of 0.2727; and that on average the disclosure level of the sampled companies' representing the oil and gas industry EADP stood at about 11.67% as at December 31, 2018. The findings revealed that profitability has a significant negative influence on EADP; leverage and liquidity have significant positive influences on EADP while long-term financing contribution has an insignificant positive influence on EADP.

Methodology

An *ex-post facto* research design was adopted. This is because *ex-post facto* research design involves repeated observations of the same units (companies in this study) over a period of time (2008 to 2020). *Ex-post facto* research design also seeks to determine the cause-effect relationship between the dependent and independent variables of the study. Data were collected from the twelve (12) oil and gas companies listed on the Nigerian Stock Exchange as at 31st December, 2020. 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.

However, a sample size of seven of the twelve listed oil and gas firms in the Nigeria Stock Exchange (NSE) from 2008 to 2020 were purposively adopted. Purposive sampling technique was adopted to select oil and gas companies that are involved in upstream activities for the study period (2008-2020). These included 11 Plc (formerly Mobil Oil Plc); Anino International Plc; Conoil Plc; Eterna Plc; Japaul Oil & Maritime Services; Oando Plc; Seplat Petroleum

Development Company Plc. Consequently, the study basically utilised secondary data that were extracted from the annual reports and statements of account of the sample listed oil and gas companies.

The data for this study were descriptively presented. Analysis took the form of inferential statistics. The study adopted Pearson Correlation Coefficient and multiple regression analysis using E-Views 10.0 statistical software. This study adopted the Global Reporting Initiative (GRI) framework disclosures according to the G4 guidelines for the purpose of developing the Environmental cost disclosure index. Environmental cost disclosure was evaluated by 12 indicators on policies and systems on environmental issue: Materials, Energy, Water, Biodiversity, Emissions, Effluents and Waste, Products and Services, Compliance, Transport, Overall, Supplier Environmental Assessment, and Environmental Grievance Mechanisms

All the above indicators were rated on a scale from 0 to 3 points. When a company does not take into account the specific indicator at all, it is rated with 0 (i.e non-reporting). A company is ranked 1 or 2 depending on the broadness of the description (e.g. 1 if the company only names the indicator and 2 if there is a very poor or unclear description (partial reporting). The company is rated 3 if it takes the indicator into consideration with a satisfying description (full disclosure). So, a total score for environmental costs disclosure could reach the maximum score of 36 (i.e 3x12).

Therefore,

ECDI =TDP/MP

Where;

ECDI = Environmental Cost Disclosure Index

TDP = Total Disclosure Points of a firm

MP = Maximum Points for a firm (36)

Model Specification

The following research model was formulated in line with the research hypothesis in order to empirically determine the effect of environmental costs disclosure on productivity.

$REVG_{it} = \beta_0 + \beta_1 EPCD_{it} + \beta_2 CDCD_{it} + \beta_3 ERCD_{it} + \mu_{it}$ - **Model 1**

Where:
β_0= constant term
β_1, β_2 and β_3 = are slopes to be estimated of firm *i* in period *t*.
í= firm identifier (7 firms)
t= time variable (2008, 2011 ……2020) – (Thirteen Years)
$REVG_{it}$ =Revenue Growth of firm í in period t
$EPCD_{it}$ = Environmental Prevention Cost Disclosure of firm í in period t
$CDCD_{it}$ = Community Development Cost Disclosure of firm í in period t
$ERCD_{it}$ = Environmental Remediation Cost Disclosure of firm í in period t

Decision Rule:

Accept H_o, if the P-value of the test is greater than 0.05, otherwise reject.

Results

Data Presentation

The panel data that were extracted from the sample oil and gas firms and for the study period were presented in Appendix I.

Data Analysis

Table 1: Pearson Correlation Matrix

	REVG	*EPCD*	*CDCD*	*ERCD*
REVG	1.0000			
EPCD	0.0206	1.0000		
CDCD	0.3326	-0.1014	1.0000	
ERCD	0.2871	-0.0755	0.0796	1.0000

Source: E-Views 10.0 correlation output, 2021

The result of the Pearson Correlation Matrix result in table 1 indicates that REVG positively correlate with EPCD, CDCD and ERCD at coefficient factors of 0.0206, 0.3326 and 0.2871 respectively.

Table 2: Multicollinearity Test

Variance Inflation Factors

Date: 06/09/21 Time: 20:31

Sample: 2008 2020

Included observations: 12

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.099629	9.469788	NA
EPCD	1.797583	4.566283	1.015086
CDCD	1.253606	3.667036	1.015725
ERCD	0.465060	2.663314	1.011053

Source: E-Views 10.0 Output, 2021

Variance Inflation Factors (VIF) statistics below 10 imply the non-existence of multicollinearty. Table 2 shows that the Centered VIF for EPCD = 1.015086; CDCD = 1.015725; ERCD = 1.011053; are all below 10.0 which is an indication that there is no multicollinearity problem in the model amongst the independent variables, therefore the model is fit for regression purpose.

Test of Hypotheses

Ho_1: Environmental prevention cost disclosure has no significant effect on revenue growth of quoted oil and gas firms in Nigeria.

Ho_2: Community development cost disclosure has no significant effect on revenue growth of quoted oil and gas firms in Nigeria.

Ho_3: Environmental remediation cost disclosure has no significant effect on revenue growth of quoted oil and gas firms in Nigeria.

Table 3: Multiple Regression Analysis testing the effect of EPCD, CDCD and ERCD on REVG of quoted Oil and Gas Companies

Dependent Variable: REVG
Method: Panel Least Squares
Date: 06/10/21 Time: 03:59
Sample: 2008 2020
Periods included: 13
Cross-sections included: 7
Total panel (balanced) observations: 91

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.133607	0.222416	6.600709	0.0000
EPCD	0.974916	0.870312	2.506838	0.0096
CDCD	0.721777	0.591379	2.911462	0.0047
ERCD	0.590708	0.331643	4.781154	0.0000

R-squared	0.667303	Mean dependent var	0.596071
Adjusted R-squared	0.636076	S.D. dependent var	0.990290
S.E. of regression	0.920450	Akaike info criterion	2.718540
Sum squared resid	67.77825	Schwarz criterion	2.834293
Log likelihood	-110.1787	Hannan-Quinn criter.	2.765071
F-statistic	35.35769	Durbin-Watson stat	1.850557
Prob(F-statistic)	0.000000		

E-Views 10.0 Regression Output, 2021

Interpretation of Regression Result

Table 3 shows the empirical effect of Environmental Prevention Cost Disclosure (EPCD), Community Development Cost Disclosure (CDCD) and Environmental Remediation Cost Disclosure (ERCD) on Revenue Growth of quoted oil and gas companies in Nigeria. The Beta Coefficient value for the variables reveal that: EPCD (β_1) = 0.974916; CDCD (β_2) = 0.721777; ERCD (β_3) = 0.590708. The slope coefficients; P(x_i=0.0096<0.05; x_2=0.0047<0.05; x_3=0.0000<0.05). However, considering the adjusted R-squared, the empirical results show that EPCD, CDCD and ERCD accounts for 63.6% of the changes in REVG Q while 36.4% are attributed to other factors apart from EPCD, CDCD and ERCD, that could equally affect REVG. The F-statistic = 35.35769 with its associated Prob(F-statistic) = 0.000000 implies that the overall joint effect of EPCD, CDCD and ERCD on REVG is statistically significant at 5% level.

The estimated relationship equation of the model is:
REVG = 0.133607 + 0.974916EPCD + 0.721777CDCD + 0.590708ERCD + μ
The implication is that, for there to be a unit/one naira increase in REVG there will be 0.974916, 0.721777 and 0.590708 units increase in EPCD, CDCD and ERCD respectively, holding other factors constant.

Decision

Going by the rule of thumb, H_1 is accepted while Ho is rejected, since the P-value of the equation is 0.000000 which is less than the critical value of 0.05 (5%). This implies that Environmental Costs Disclosure has a significant positive effect on Productivity of quoted oil and gas companies at 5% level of significance.

Discussion of Findings

The regression result demonstrates that the Beta coefficient value for the variables reveal that: EPCD (β_1) = 0.974916; CDCD (β_2) = 0.721777; ERCD (β_3) = 0.590708. The slope coefficients; P(x_i=0.0096<0.05; x_2=0.0047<0.05; x_3=0.0000<0.05). However, considering the adjusted R-squared, the empirical results show that EPCD, CDCD and ERCD accounts for 63.6% of the changes in REVG Q while 36.4% are attributed to other factors apart from EPCD, CDCD and ERCD, that could equally affect REVG. The F-statistic = 35.35769 with its associated Prob(F-statistic) = 0.000000 implies that the overall joint effect of EPCD, CDCD and ERCD on REVG is statistically significant at 5% level.

The findings of this study is consistent with the findings of Onwuka (2021), Atang and Eyisi (2020); Yongliang, Wen and Li (2020); Muhammad (2019), Mihai, Pavaloaia, Mihai-Bogdan and Georgescu (2019), Kilic & Kuzey (2018), Uwuigbe, Obarakpo, Uwuigbe, Ozordi, Asiriuwa, Eyitomi and Oluwagbemi (2018) but negates the results of Nechita (2021), Nguyen, Ta, Lai, Dao and Cao (2020); Ibrahim (2019),García-Sánchez, Hussain, Martínez-Ferrero, & Ruiz-Barbadillo (2019), and Rusyda (2018).

The findings in the current study are congruence with the theoretical framework. The findings indicate that the overall joint effect of EPCD, CDCD and ERCD on REVG is statistically significant at 5% level. Similarly, the theoretical framework adopted for the study is the stakeholder theory. The theory addresses the morals and values in managing an organization, particularly in raising awareness of the relationships and the ripple-effect of a company and its stakeholders. This paints the corporate environment as an ecosystem of related groups who are involved in environmental information disclosure and improvement of environmental risk management. The significance level of the findings, therefore, establishes the correlation between the theory and the findings.

Summary of Findings

i. Environmental prevention cost disclosure has a significant and positive effect on revenue growth of quoted oil and gas firms in Nigeria at 5% level of significance (β_1= 0.974916; p-value = 0.0096).
ii. Community development cost disclosure has a significant and positive effect on revenue growth of quoted oil and gas firms in Nigeria at 5% level of significance (β_1= 0.721777; p-value = 0.0047)
iii. Environmental remediation cost disclosure has a significant and positive effect on revenue growth of quoted oil and gas firms in Nigeria at 5% level of significance (β_1= 0.590708; p-value = 0.0000)

Conclusion

This study determined the effect of Environmental Cost Disclosure (proxied by Environmental Prevention Cost Disclosure (EPCD), Community Development Cost Disclosure (CDCD) and Environmental Remediation Cost Disclosure (ERCD) on Productivity (measured by Revenue Growth) of listed oil and gas firms in Nigeria. Data were obtained for a thirteen-year period using seven (7) quoted oil and gas firms in Nigeria. The study found that Environmental Prevention Cost Disclosure, Community Development Cost Disclosure and Environmental Remediation Cost Disclosure have significant positive effect on Revenue Growth of listed oil and gas firms in Nigeria at 5% level of significance respectively.

Recommendations

i. Based on the positive relationship between environmental prevention cost disclosure and productivity, Nigeria firms should increase their involvement in environmental activities for improved and sustainable productivity.
ii. Firms should be actively involved in community development in a bid to sustain their growth in revenue
iii. Environmental accounting standards should be published locally and internationally and reviewed continually to bolster firms' productivity.

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