EFFECT OF ENVIRONMENTAL ACCOUNTING DISCLOSURE ON FIRM PROFITABILITY OF LISTED OIL AND GAS COMPANIES IN NIGERIA

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Abstract

Environmental Accounting disclosure is an emerging subject of interest globally as a link between accounting and environmental management. This study aims to examine the effect of Environmental Accounting Disclosure (EAD) on the firm's profitability of listed oil and gas companies in Nigeria. The study employed ex post facto research design in a sample of nine (9) oil and gas companies for a period of years (2013-2021). Secondary data from the financial statement of the sample companies was used. Dynamic panel regression technique of data analysis was used in the analysis, after controlling for firm size and leverage. The study reveals that environmental accounting disclosure has a positive significant effect on firm profitability of listed oil and gas companies in Nigeria In line with the findings, the study recommends that Nigerian oil and gas companies should adopt environmental accounting disclosure practices as part of their corporate social responsibility initiatives. This will help improve their environmental performance and also enhance their financial performance.

Keywords: *Environmental Accounting disclosure, profitability, firm size leverage*

Introduction

Environmental information disclosure is becoming increasingly important in the face of environmental degradation caused by industrial activities, particularly in the oil and gas sector. According to a report by the International Energy Agency, the oil and gas industry is responsible for about 70% of global greenhouse gas emissions (IEA, 2020). This underscores the need for increased transparency and accountability in the industry's environmental impact.

In Nigeria, there have been several instances of oil spills and other environmental incidents caused by the activities of oil and gas companies. These incidents have had significant impacts on local communities, including damage to crops and fishing grounds, loss of livelihoods, and health problems caused by exposure to pollutants. In response, there have been increasing calls for greater transparency and accountability from the oil and gas industry, including through the disclosure of environmental information (Okafor & Ezejiofor, 2014; Farooq et al. 2021).

Environmental accounting disclosure (EAD) is a process through which organizations provide information about their environmental performance and its impacts on the environment (Ahmed, et al 2021). This information can include details on a range of factors, such as emissions of greenhouse gases, water consumption and waste generation, energy use, and other environmental impacts caused by their operations. By disclosing this information, organizations can help to identify areas where they can improve their environmental performance and reduce their negative impact on the environment.

Furthermore, environmental accounting disclosure can enable companies to identify opportunities to reduce their environmental impact and increase their operational efficiency, which can lead to cost savings and improved competitiveness. It can also help organizations to comply with regulations and standards related to environmental performance, and to measure progress towards environmental goals (Ngwakwe & Okoyeuzu 2019).

The relationship between environmental accounting disclosure (EAD) and firm profitability is a topic of much debate and research. Some studies suggest that EAD can have a positive impact on firm

profitability, while others have found no significant relationship. One argument is that EAD can enhance a firm's reputation and stakeholder trust, leading to increased customer loyalty and improved financial performance. This is supported by studies such as the one by Farooq et al. (2021), which found a positive relationship between EAD and firm profitability in the banking sector. However, other studies have found that the relationship between EAD and profitability is not always straightforward. For example, research by Lee et al. (2014) found that the impact of EAD on profitability depends on the industry and the level of environmental performance. In some cases, investing in environmental performance can lead to increased costs that may offset any potential financial benefits.

Despite some studies on the link between environmental accounting disclosure (EAD) and firm profitability in other countries, limited research exists on the dynamic effect of the relationship in the Nigerian oil and gas sector. The mixed findings from previous studies make it crucial to investigate how EAD affects financial performance in the distinct context of Nigeria. Factors like regulatory frameworks, institutional structures, and cultural values may all influence the relationship between EAD and firm profitability in the Nigerian context. Therefore, this research attempts to bridge the theoretical gap in the Nigerian oil and gas sector by exploring the relationship between EAD and firm profitability. To achieve the underlining aim of this study it was presumed that environmental accounting disclosures has no significant effect on firm profitability of listed oil and companies in Nigeria.

Literature Review

Concept of Environmental Accounting Disclosures

Environmental Accounting Disclosures (EAD) refers to the process of disclosing information related to an organization's environmental impact. It encompasses the measurement and reporting of environmental costs, liabilities, assets, and impacts, including emissions, waste generation, energy consumption, and other environmental indicators. EAD plays a critical role in promoting sustainable practices, reducing negative environmental impacts, and increasing transparency and accountability.

Environmental accounting is an innovative sustainability initiative that has been defined by Steele and Powell, (2002) as that aspect of accounting which has to do with the identification, allocation and analysis, of material streams and their related money flows by using environmental accounting systems to provide insight in environmental impacts and associated financial effects. It is an accounting system that can be used to support the National income accounting, financial accounting, and or internal business managerial accounting (Leontief, 1970; Chen & Huang 2021). Environmental or green accounting involves measuring the environmental performance of an organization, including government bodies and manufacturers in economic terms. It is a type of cost benefit analysis system, which relates to the monetary assessment of environmental costs associated with the development and operational activities and the economic benefits of good environmental management (United Nations, 1971). Peskin (1989) viewed environmental accounting as a tool that can be used to determine less tangible and external costs for projects and activities, such as bio-diversity, human health and aesthetic values. It is also aimed at broader issues such as implementing sustainable business practice to conserve natural resources for future generations.

The practice of EAD has become increasingly prevalent over the years, with companies recognizing the importance of measuring and reporting their environmental impact. In recent years, there has been a growing trend towards voluntary reporting of environmental information through sustainability reports. While sustainability reporting is not mandatory, many companies have recognized the benefits of disclosing their environmental performance, including enhanced reputation and stakeholder engagement, improved risk management, and increased access to capital (Adams 2002; Hasan & Khan, 2022).

EAD has gained widespread recognition as a vital tool for improving environmental performance and enhancing corporate social responsibility. By disclosing their environmental impact, companies can gain insight into their environmental footprint and identify opportunities to improve their environmental performance. Moreover, EAD can help firms identify potential environmental risks and liabilities, which can have significant financial implications. Environmental risks such as pollution,

water scarcity, and climate change can cause significant disruptions to operations, supply chains, and market demand, ultimately affecting a company's bottom line (Clarkson, et al 2008).

Concept of Firm Profitability

Firm profitability refers to the ability of a company to generate profits and sustain growth over a certain period. It is an important aspect of financial performance, as it indicates whether a company is earning enough revenue to cover its expenses and make a profit. Marshall (1952) sees profit as the residue after outgoings belonging to productions have been deducted from its gross profit. In this definition, the idea of tax to government is not considered neither is dividend to shareholders nor interest on capital. Another important definition from an economist is the definition given by Hicks (1950) where profit is considered to be a feeling of wellbeing after the maximum value that can be consume by man during a week and still remain well of at the end of the week just as he was at the beginning of the week. This definition takes into consideration all commitment a firm or individual may have and after meeting such, is not poorer as an individual and capital is maintained as a firm. Profitability is a measure of evaluating the overall efficiency of the business using input-output analysis (Bello, 2008). Profitability can be measured by relating output as a proportion of input or matching it with the results of other firms of the same industry or results attained in the different periods of operations. For this study, the concept of matching effort with accomplishments best explains profit and profit is the residue which owners can share after all necessary deductions have been made

Firm profitability is a measure of a company's ability to generate profits or earnings from its operations. One commonly used measure of profitability is earnings per share (EPS), which represents the portion of a company's profit that is allocated to each outstanding share of common stock. EPS is calculated by dividing a company's net income by the total number of outstanding shares of common stock.

EPS is an important measure of profitability because it provides an indication of how much profit is being generated per share of stock. It is also a key component in determining a company's valuation,

as it is often used as a basis for calculating the price-to-earnings ratio (P/E ratio). The P/E ratio is a commonly used valuation metric that compares a company's stock price to its earnings per share.

Empirical review

Cheska, et al (2022) examined the impact of Environmental Accounting Disclosure (EAD) on the firm's profitability and firm value. The object used in this study was the thirty (30) publicly-listed chemical, mining and oil companies under the Petrochemical Industry in the Philippines which are considered as pollutant contributors. Causal-explanatory research was utilized. Financial and environmental data from years covering 2015-2019 were gathered from secondary sources specifically, Annual Reports and Annual Corporate Governance Reports of these companies. Environmental Accounting Disclosure (EAD) was measured using EAD Index. Profitability was measured through the use of Return on Assets, Return on Equity, Net Profit Margin and Debt to Equity Ratio whereas, firm value was measured by Tobin's Q. Furthermore, firm's size and age were used as moderating variables. This study found that it has no significant effect on either the profitability and firm value.

Obiora, et al (2022) assessed the impact of environmental accounting disclosure on profitability of quoted firms in Nigeria from 2017 to 2021. Environmental disclosure index was employed as the independent variable while financial performance measures such as return on assets, return on equity and return on capital employed were employed as the dependent variable. Related conceptual, theoretical and empirical literatures were reviewed. The study was anchored on stakeholders' theory. Ex post facto research design was employed. Five firms from different sectors of the economy were sampled. The data used in this study were sourced from annual reports and statement of accounts of the selected firms. Descriptive statistics, correlation analysis and ordinary least square regression were employed in analyzing the data. The study found that environmental accounting disclosure has a significant impact on return on assets of quoted firms in Nigeria. Environmental accounting disclosure was also found to have significant impact on return on equity of quoted firms in Nigeria.

Uniamikogbo and Ifeanyichukwu (2021) investigated the relationship between environmental accounting disclosure and financial performance of manufacturing firms in Nigeria. Precisely, the study examined the effect of environmental accounting disclosures on Share Price, Return on Asset and Return of equity of selected manufacturing firms in Nigeria. The ex-post-facto research design was engaged in this study, using a sample of 40 manufacturing firms. The secondary source of data collection method was employed using the convenience sampling technique. Data were harvested from the content analysis disclosure index and corporate annual reports of the sampled manufacturing firms listed on the Nigerian Stock Exchange for the period 2010-2019 financial years. The descriptive statistics, correlation matrix and regression analysis were the statistical tools used in the study. Data were analysed with the aid of the panel data regression technique. The findings revealed that environmental accounting disclosures had a significant effect each on Share Price, Return on Asset and Return on equity of manufacturing firms in Nigeria.

Gatimbu et al (2016) examined the effect of corporate environmental disclosure on financial performance of firms listed at Nairobi Securities Exchange, Kenya from 2009 to 2013. The study made use of longitudinal secondary data from the annual reports and financial statements of listed companies at the Nairobi Securities Exchange. Content analysis of sampled listed companies' annual reports was undertaken to examine environmental disclosure practices. A checklist of environmental disclosure items and categories was developed and environmental disclosure indices computed. Casual research design was employed to determine the cause-effect relationship between corporate environmental Disclosure and financial performance. Target population of the study was listed companies. Purposive sampling was employed in selecting firms that have been listed for entire period of study and whose annual reports are available at the Nairobi Securities Exchange. Linear regression was employed in analyzing the data. Findings reveal that environmental disclosure has a positive significant effect in the mean financial performance.

Makori and Jagongo, A. (2013) assessed whether there is any significant relationship between environmental accounting and profitability of selected firms listed in India. The data for the study were

collected from annual reports and accounts of 14 randomly selected quoted companies in Bombay Stock Exchange in India. The data were analyzed using multiple regression models. The key findings of the study shows that there is significant negative relationship between Environmental Accounting and Return on Capital Employed (ROCE) and Earnings per Share (EPS) and a significant positive relationship between Environmental Accounting and Net Profit Margin and Dividend per Share.

Theoretical framework

Stakeholder theory was developed by Freeman, (1984). Stakeholder theory emphasizes that to maintain fairness, an organization must meet the expectations of stakeholders. In this context, a stakeholder is defined broadly as "any group or individual who can influence or is influenced by the achievement of the organization's objectives" (Freeman, 1984).

Clarkson (1995) further classifies stakeholders into primary and secondary groupings. Principal stakeholders are those without whose support the organization would cease to exist. Included in this category are stockholders, customers, suppliers, employees, government, and communities. Secondary stakeholders, on the other hand, influence or are influenced by the organization but do not conduct transactions with it. The support of secondary stakeholders is not necessary for the organization's sustainability. However, they are able to rally other stakeholders and challenge the organization's validity. For instance, the media and social and environmental activist groups play a substantial role in shaping public opinion in support of or against the organization. Multiple studies have embraced stakeholder theory and established that organizations use sustainability reporting to manage stakeholders' expectations regarding their social and environmental performance. The stakeholder theory has two branches (Fernando, & Lawrence 2014): the ethical or normative branch and the positive or management branch. The ethical branch of stakeholder theory disregards differences in

stakeholder (economic) power and "argues that all stakeholders have the right to be treated equally by an organization."

Environmental accounting disclosure (EAD) can be seen as a tool for implementing stakeholder theory, as it allows companies to disclose information about their environmental impact and engage with stakeholders in a transparent and accountable way. By disclosing their environmental impact, companies can demonstrate their commitment to sustainability and environmental responsibility, which can build trust and goodwill with stakeholders. Moreover, EAD can lead to improved environmental performance and cost savings, which can positively impact firm profitability. For example, by tracking and disclosing information about their energy use and emissions, companies can identify areas for improvement and implement energy efficiency measures that can reduce costs and improve profitability in the long term. Patten and Zhao (2014) found that companies that disclose more environmental information have higher levels of profitability, suggesting that EAD can improve stakeholder relations and lead to improved financial performance. Another study by Yu et al. (2020) examined the relationship between stakeholder engagement, EAD, and financial performance in the Chinese context. The study found that companies that engage with stakeholders and disclose more environmental information have higher levels of financial performance, suggesting that EAD can be an effective tool for implementing stakeholder theory in practice.

Control variable

Firm size

Firm size as an internal factor of a company has been considered a very important determinant of profitability. This is because the size of a firm determines its level of economic activities and the possible economics of scale enjoyed by the firm. When a firm becomes larger it enjoys economics to scale and its average cost of production is lower and operational activities are more efficient. Hence, larger firms generate larger returns on assets. (Pathirawasam& Adriana, 2013).

Leverage consists of various financial instrument or borrowed capital such as margin used to increase the potential return of an investment of a firm. It is that amount of debt used to finance a firm's assets. It is assumed and expected that, the greater the amount of debt, the more stringent is the monitoring of managers and therefore firms" performance will be superior. Thus, firms with a significant level of debt than equity is said to be highly levered. Khan, et al (2022) found that there is a significant negative relationship between leverage and firm profitability.

Methodology

The ex post facto research design was used in this study since the goal is to establish causal links between past events and circumstances. The population of this study was made up of all the thirteen (13) oil and gas companies that are listed on the floor of the Nigerian Exchange Group (NGX) for 9 years i.e. between 2013 and 2021.

Table 1 listed Oil & Gas Nigeria

1	TOTAL NIGERIA	
2	SEPLAT PETROLEUM DEVELOPMENT	
3	RAK UNITY PETROLEUM	
4	OANDO PLC	
5	MRS OIL NIGERIA	
6	JAPAUL OIL & MARITIME SERVICES	
7	FORTE OIL	
8	ETERNA	
9	CONOIL	
10	CAVERTON OFFSHORE SUPPORT GROUP	
11	CAPITAL OIL	
12	ANINO INTERNATIONAL	
13	11 PLC	
14	BECO PETROLEUM PRODUCTS PLC	
15	AFROIL PLC	

Source: Author's Compilation from Nigerian Exchange Group (NGX)

The study intends to take the entire population, but some companies did not pass the sample criteria.

This is arrived at after using 2 stages of criteria in table 2:

Table .2 Criteria for Sample Selection

	Must meet the criterion of being listed on the Nigerian Exchange Group within 2013-2021 and should not have been delisted within the period

In view of the filters, firms will be eliminated because they are delisted from the Nigeran Exchange group (see table.2) and the remaining 13 firms are found to have satisfied all the filters (see table .3).

Table 3 Delisted with the date

	OIL & GAS	
	ANINO INTERNATIONAL	12-Oct-20
	11 Plc	May 7, 2021
	BECO PETROLEUM PRODUCTS PLC	2-May-17
	AFROIL PLC	24-Nov-14
Total		23

Source: Author's Compilation from Nigerian Exchange Group (NGX)

Table 4 Names of the Sample Firms

	OIL & GAS	
	TOTAL NIGERIA	
	SEPLAT PETROLEUM DEVELOPMENT	
	RAK UNITY PETROLEUM	
	OANDO PLC	
	MRS OIL NIGERIA	
	JAPAUL OIL & MARITIME SERVICES	
	FORTE OIL	
	CONOIL	
	CAVERTON OFFSHORE SUPPORT GROUP	

This research relied on secondary sources of data. The panel data for the period 2013 to 2021 was derived from the annual reports and financial statements of nine (9) sampled enterprises. This research employed the dynamic panel data regression technique or the Generalized Method of Moment (GMM) due to the structure of the data, which consists of a combination of cross-sections and time-series and is based on the number of enterprises from various industries over an 9-year period.

Model specification

The study modified the model of Obiora; et al (2022)

$$FP_{it} = \alpha_0 + \gamma FP_{it-1} + \beta_1 EAD_{it} + \beta_2 FS_{it} + \beta_3 LEV_{it} + \mu_{it} + \varepsilon_{it}$$

Where:

FP= Firm Profitability

β_0= Intercept

γFP_{it-1} indicates one lag of the dependent variable Firm Profitability (previous year Profitability),

β_1 to β_3 = coefficient of slop or regression coefficient

EAD= Environmental Accounting Disclosure

FS= Firm size

LEV= Leverage

ε = error term

it = i cross-sectional t time

Independent variables

Table 3.4 Measurements of variables

Variables	Measurement	Source
Firm profitability (dependent Variable)	Net income divided by the number of outstanding ordinary shares	(Ali & Iman, 2011); Dada. & Adeniji,(2022)
Environmental accounting disclosure (Independent Variable)	Content Analysis based on the Global Reporting Initiative	(GRI, 2021) Checklist.
Firm Size (Control Variable)	Natural Log of Total asset	(Salaudeen&Ejeh, 2018)
Leverage (Control Variable)	Total debt divided by the total equity.	(Vitolla et al. 2020; Roman et al. 2019).

Result and Discussions

In this section results are presented and discussed in the light of the research findings. First, a set of descriptive statistics are presented, then followed by the dynamic regression results.

Table 1: Descriptive Statistics

	Mean	Std. Dev.	Min	Max
FP	11.28925	27.23556	-111	70
EAD	.2432099	.1696128	.0111111	.6444444
FS	7.213595	1.018819	3.673482	8.996312
LEV	1.180183	2.057409	-.3092975	14.68711

Source: output of descriptive statistics using STATA 13

Table 1 describes the data of the study. Firm profitability was measurement using EPS. the mean value of EPS was 11.28925, indicating that, on average, these companies generated a profit of 11.29 naira per share. However, it is important to note that the standard deviation of EPS was relatively high at 27.23556, indicating that there was significant variability in profitability among the oil and gas companies in Nigeria. The minimum value of EPS was -111, while the maximum value was 70, which further highlights the significant differences in the profitability of companies in the sector.

The mean value of EAD for the sample of oil and gas companies in Nigeria is .2432099, with a standard deviation of .169612. The minimum value of EAD is .0111111, and the maximum value is .6444444. These values suggest that there is significant variation in the level of EAD among oil and gas companies in Nigeria. The low mean value of EAD suggests that, on average, oil and gas companies in Nigeria are not disclosing much information about their environmental impact. This lack of disclosure may be due to the absence of regulatory requirements for EAD in Nigeria, as well as a lack of awareness and interest among stakeholders. However, the high maximum value of EAD indicates that there are some companies in Nigeria that are making significant efforts to disclose their environmental impact.

The mean value of firm size in the sample of oil and gas companies in Nigeria is 7.213595, with a standard deviation of 1.018819. This suggests that the majority of companies in the sample are relatively large in size and have significant market share and assets. The minimum value of firm size

in the sample is 3.673482, which may represent smaller or newer companies in the industry, while the maximum value of 8.996312 may represent the largest and most established companies in the industry.

The debt-to-equity ratio measures the amount of debt a company has relative to its equity. In the context of oil and gas companies in Nigeria, leverage measured using debt to equity ratio has a mean value of 1.180183, indicating that, on average, companies in the sector have more debt than equity. However, the standard deviation of 2.057409 suggests that there is significant variation in the debt to equity ratios of companies in the sector, with some having very high levels of debt relative to equity. This high level of debt could be attributed to a number of factors, including the capital-intensive nature of the oil and gas industry, which requires large amounts of investment to develop and maintain oil fields and other infrastructure. Additionally, the Nigerian oil and gas sector has faced challenges in recent years, including a slump in oil prices and a decline in production levels, which may have led some companies to take on more debt in order to stay afloat.

Table 2: Correlation Matrix Table

	FP	EAD	FS	LEV
FP	1.0000			
EAD	0.0773	1.0000		
FS	0.2097	-0.1913	1.0000	
LEV	-0.0094	0.1667	-0.3219	1.0000

Table 2 reveals the degree of relationship between the dependent and independent variables and among the independent variables as well as the level of their significance. FP from the table has a positive correlation with firm EAD of 0.0773. FP also has a positive relationship of 0.2097 with firm size (FS). Furthermore, the relationship between FP and leverage is 0.3861, explaining a positive relationship. While firm age and ROA, has a negative relationship of -0.0094

Table 3: Summary of dynamic Regression Result

	Coef.	Std. Err.	z	P>|z|
FP L1.	-.1481976	.0679846	-2.18	0.029
EAD	45.78853	7.897795	5.80	0.000
FS	9.135235	10.79652	0.85	0.397
LEV	2.113696	3.848774	0.55	0.583
_cons	-65.48342	81.43087	-0.80	0.421
Wald chi2(4) = 64.44				
Prob > chi2 = 0.0000				

The negative coefficient (-.1481976) suggests that there is an inverse relationship between the lagged firm profitability and the current firm profitability, meaning that if the firm was less profitable in the previous period, it is likely to be less profitable in the current period as well. The GMM value (0.029) indicates the level of statistical significance of the coefficient, suggesting that it is statistically significant at a 5% level.

The GMM result shows a coefficient of 45.78853 for EAD, which indicates a positive relationship between EAD and firm profitability. This means that as a company increases its level of EAD, it is likely to experience an increase in profitability. The p-value of 0.000 indicates that this relationship is statistically significant at a 95% confidence level, meaning that we can reject the null hypothesis that there is no relationship between EAD and firm profitability. This finding is affirmed by the result and finding of Uniamikogbo and Ifeanyichukwu (2021); Makori and Jagongo, A. (2013)

Based on the GMM result, the coefficient for firm size and leverage are 9.135235 and 2.113696 with the p-value is 0.397 and 0.583. This indicates that there is no significant relationship between firm size and leverage on firm profitability in the Nigerian oil and gas sector. It is important to note that although leverage was not found to be a significant predictor of firm profitability in this study, it is still an important factor to consider in the overall financial health of a company. High levels of debt can increase financial risk and potentially lead to bankruptcy or insolvency, especially in volatile industries such as oil and gas. Therefore, companies must carefully manage their leverage. While larger firms

may have advantages in terms of economies of scale and access to resources, they may also face higher administrative and managerial costs that can offset these benefits.

Conclusion and Recommendation

This study examined the effect of environmental accounting disclosure on firm profitability of listed oil and gas companies in Nigeria. Based on the findings of the study, it can be concluded that environmental accounting disclosure (EAD) has a positive and significant effect on the profitability of listed oil and gas companies in Nigeria. This implies that firms that disclose their environmental impact and sustainability practices tend to have higher levels of profitability compared to firms that do not. Additionally, EAD can lead to cost savings for companies through improved efficiency in resource utilization and waste reduction. By disclosing their environmental impact and sustainability practices, companies can identify areas where they can reduce costs and improve their bottom line. Overall, Companies that adopt EAD practices are likely to benefit from increased stakeholder trust, improved efficiency, and cost savings, leading to higher levels of profitability. it is therefore, recommended that Nigerian oil and gas companies should adopt environmental accounting disclosure practices as part of their corporate social responsibility initiatives. This will help improve their environmental performance and also enhance their financial performance.

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