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## ENVIRONMENTAL ACCOUNTING PRACTICES AND NET PROFIT OF QUOTED OIL AND GAS COMPANIES IN NIGERIA

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### ABSTRACT

*This study investigated the effect of environmental accounting practices on net profit of quoted oil and gas companies in Nigeria. The study used environmental accounting practices (pollution cost accounting, waste management cost accounting and drainage cost accounting) to represent environmental accounting. The annual audited financial accounts/reports of quoted oil and gas companies in Nigeria for ten (10) years (2012-2021) were used as key data. Multiple regression analysis of ordinary least square estimation was used to test the hypotheses formulated in the study. All the analyses were computed by using statistical package for social sciences (SPSS) version 22.0. The results obtained from the empirical analyses show that that pollution cost accounting has positive significant effect net profit of quoted oil and gas companies; that waste management cost accounting has insignificant effect on net profit of quoted oil and gas companies; and that drainage cost accounting has negative significant effect on net profit of quoted oil and gas companies. The study concluded that environmental accounting practices affects net profit of quoted oil and gas companies; and with a view to nudging oil and gas firms towards organizational transformation, recommends that management of oil and gas companies in Nigeria should pay particular attention to waste management accounting to enhance their operating environment and their net profit.*

**Keywords:** Drainage cost accounting, environmental accounting, net profit, pollution cost accounting, waste management cost accounting

### INTRODUCTION

There has been an increased awareness of the interaction between firms and the environment in which they operate. This enlightenment has been sharpened by concerns about resources depletion, resources scarcity, environmental degradation and the activities of the firms that lead to the depletion of the ozone layer and thereby causing an imbalance in the environmental system (Adedran & Alade, 2013). The increasing concern about environmental degradation, resources depletion and the sustainability of economic activity have made the development of environmental accounting and reporting an area of significant interest in Nigeria.

Awareness about the state of environment is not an entirely new phenomenon among various stakeholders (Festus & Akinselure, 2017); however, it has attracted renewed attention lately. There are a lot of research relating to environment accounting because, the demand for companies to apply environment accounting is now considered very important in order to save the world and enhance organizational performance (Seyitoğulları, 2016). Mayndarto and Augustine (2021) submit that environmental accounting involves pollution prevention and continuous re-evaluation of firms' production processes which often creates opportunities for firms to innovate by strategically modifying their production, and recycling by-products that would otherwise be discharged into the natural environment.

Environmental accounting rules or pollution cost guidelines, for communication to different stakeholder groups, are not available for Nigerian companies; however, there have been efforts on the part of government towards enacting laws to enhance environmental sustainability in Nigeria (Olushola, 2020). These include Environmental Impact Assessment Act 2004, Environmental Guidelines and Standards for Petroleum Industry Act, 2002, National Environmental Standards and Regulations Enforcement Agency Act, 2004. However, corporate bodies that practice environmental accounting adopt certain principles deducible from the Global Reporting Initiative (GRI) Guidelines.

Hence, environmental accounting information in Nigeria is more of voluntary reporting which does not encourage net profit. Alhashi et al. (2018) reveal that environmental sustainability reporting information is not value relevant. It is based on this background, that this study is prompted to examine the effect of environmental accounting on net profit of oil and gas firms in Nigeria. Specifically, the study seeks to determine the effect of:

- i. Pollution cost accounting on net profit of oil and gas firms in Nigeria.
- ii. Waste management cost accounting on net profit of oil and gas firms in Nigeria.
- iii. Drainage cost accounting on net profit of oil and gas firms in Nigeria.

## **LITERATURE REVIEW**

### **Theoretical Framework**

This study on environmental accounting and net profit of oil and gas firms in Nigeria is founded on the stakeholder theory. The term “stakeholder” means that there are individuals or group with vested interest in the way a firm is operates. According to Akinsulire (2011), the traditional view is that firms operate to maximize wealth of shareholders. There is an alternative view that a firm is a coalition of different groups such as equity shareholders, preference shareholders, lenders, employees, suppliers, customers, government and the community. Lasher et al. (2006) opined that these interest groups are stakeholders of the company. Conflicts of interest sometimes arise among stakeholders. Conflict of interest occurs when something that benefits one group deprives another group. These conflicts can affect managers’ behaviour and have impact on share prices.

The stakeholder’s theory proposed an increased level of environmental awareness which creates need for companies to extend their corporate planning to include non-traditional stakeholders like regulatory adversary groups in order to adapt to changing social demands (Trotman, 1999). The basic proposition of stakeholder theory is that firms’ success is depend on successful management of all relationships that a firm has with stakeholders. The main concern of stakeholder theory in environmental accounting is to address waste management elements and valuation and its inclusion in financial statements.

### **Concept of Environmental Accounting**

Environmental accounting entails the provision of appropriate information in the financial statements regarding estimated social cost occasioned by production externalities on the environment and how much deliberate intervention cost had been incurred to bridge the gap between marginal social cost and marginal private cost by a firm. Magara et al. (2005) opined that environmental accounting involves the identification, measurement and allocation of waste management costs, and the integration of these costs into business. It also encompasses

the means of communicating the information to companies' stakeholders. Enahoro (2009) averred that waste management does not only refer to costs paid to comply with regulatory standards, but are also costs incurred to reduce or eliminate releases of hazardous substances into the atmosphere.

Weng et al. (2015) referred to environmental accounting as green accounting that measures (in economic terms) the performance of firms in respect to the environment. It involves the identification, measurement and reporting of environmental specific cost, for example liability cost and waste disposal cost; and covers more than reporting or accounting for waste management and benefits. It is the accounting for any cost or benefit that occurs from changes in an organization's product or process, while the change can also have impact on the environment. It plays a major role in understanding the significant contribution of the natural environment to the survival of the economy and humanity (Baba, 2012).

Any organization that incorporates the improvement of quality of life of habitants into their operations, will most likely experience some improvements in their net profit due to enhanced image, increased company's shares due to enhanced product image and environmental risk rating (Weng et al., 2015). Unethical business practices are no longer fashionable even in Nigeria. Such practices only attract negative image to organizations as a result of undue media attention (Osemene, 2012). Human rights cannot be infringed upon anyhow just in the same way business reputation must be guarded jealously due to quick information flow through various traditional and new media.

Environmental accounting assists accountability of enterprises, increases environmental transparency, and determines the quality of relationship the enterprise enjoys with the society in general, and especially with environmental pressure group. For this reason, the businesses, being mindful about the environment, may succeed in drawing funds from "green" individuals and groups (Basse et al., 2013). Environmental accounting is a multifaceted construct. In this study, we focus on pollution cost, waste management cost and drainage cost.

### **Pollution cost accounting**

Pollution may be defined as either: i) any discharge or residual resulting from production or consumption processes, or ii) the amount of discharge or residual from production or consumption processes that is more than an ecosystem's absorptive capacity (Omodero & Ihendinihu, 2016). Discharges or residuals may originate from any number of sources including domestic wastewater, community solid wastes, industrial waste effluents, and wastes from agricultural activities such as runoff of excess pesticides and fertilizers. Pollution may be categorized by environmental medium (air, water, and land or solid waste) (Olushola, 2020). Effiong and Akpan (2019) submit that the costs to society caused by pollution can be classified according to the two types mentioned above: those costs incurred by the polluting source when acting to either reduce or eliminate the pollution, and those costs incurred by the individual or group of individuals affected by pollution. Pollution cost is a dimension of environmental accounting, and involves detection costs, prevention costs and management costs.

**Waste management costs accounting**

The cost of waste transportation is considered an environmental cost to include depletion of natural resources, noise and aesthetic impacts. Residual air and water emissions, long-term waste disposal. Thus, accounting became concerned with achieving new goals such as measuring and evaluating potential or actual environmental impacts of projects on organizations' performance. These new goals are importance because they enable many users take different development decisions that are economically and environmentally sound (Obara et al., 2017; Baba, 2012). Ahmed et al. (2016) identified the main reasons of accounting interest in the environment to include environmental costs which can be significantly reduced or eliminated as a result of business decisions, ranging from operational and housekeeping changes to investment in cleaner production, to redesign of processes/products.

**Drainage cost accounting**

Drainage cost is defined as the costs incurred towards construction of drainages that are used to channel environmental waste as well as prevent other environmental hazards such as flooding (Okafor, 2018). It is argued that surface water, groundwater, water quality, quantity, and ecology should be looked upon in relation to each other. Thus, the introduction of the concept of sustainability has led to an increased interest for source control and open drainage of storm water within urban environments. Looking at the environment around us shows that ineffective drainage systems are basically associated with poor maintenance, indiscriminate dumping of refuse in drains that inhibit the flow of water which leads to critical environmental hazards (Alhash et al., 2018).

**Concept of Net Profit**

Profit is the monetary earning a business achieves after all costs associated with operations have been deducted (Ateke & Didia, 2017); and a financial metric often used to assess a firm's ability to generate earning in excess of the combination of all the expenses it incurred in a given investment (Ateke & Simeon, 2018). Net profit is a measure of profitability. Profitability is the ability of a business undertaking to make profit or the degree to which a business is profitable. Profitability is a strategic objective pursued through economic activities; and is a fundamental goal in business because long-term survival of a business is closely tied to its ability and capacity to make profit (Ateke & Didia, 2017).

Profitability reflects the ability of the company to invest funds received from multiple sources and reduce expenses to the extent that it achieves profits in order to maximize wealth of owners and maintain the survival of the unit and its continuation (Alhash et al., 2018). Profitability represents a large number of policies and decisions. It is a general indicator of companies' profitability performance (Okafor, 2018). Accountants are interested in forecasting profits in order to find the best way to enable the delivery of accounting information to their beneficiaries in order to assist economic decision makers.

**Environmental Accounting Practices and Net profit**

Environmental accounting has become a significant component of accounting practice owing to the increased concern about the environment and how business operations harm the natural environment. However, literature shows that some sectors in the business world are more proactive in engaging and reporting their environmental accounting efforts. Juhmani (2014) conducted a study on the determination of corporate social and pollution cost in Bahrain. The study revealed that 57.57% of sampled companies provided environmental information in

their 2012 financial statement on their websites. The study also showed that commercial banks and insurance companies made the most disclosure of social and environmental accounting, while the least disclosure was made by companies in the hotels and tourism sector and industrial sector. Nevertheless, literature is replete with prior scholarly efforts; and shows both positive and negative results on the link between environmental accounting and performance of firms.

Magara et al. (2015) determined that the practice of environmental accounting (environmental information, environmental evaluation, conformity with environmental laws, and follow-up of waste management savings) significantly relates to perceived net profit of businesses; while Festus (2017) reported that a significant relationship exists between environmental accounting and return on equity of petroleum and gas businesses. Also, Nguyen and Tran (2019) showed that a close relationship exists between level of revelation of environmental accounting information and net profit. In addition, Al-Tuwaijiri et al. (2004) found a significant relationship between practices of environmental accounting and economic performance of businesses.

In another research, Huseno (2018) noted that environmental accounting results a loss in corporate profits by as much as 15%; but showed that the losses will be greater if a company does not include waste managements in its processes. Sari et al. (2020) in their study on implementation of environmental accounting reported a positive effect of environmental accounting on organizational performance. This is even as Karakuş and Erdirençelebi (2018) concluded that green management perceptions of enterprises and green business functions sub-factors (production, accounting, logistics, human resources and marketing) and net profit positively relate to each other.

Relatedly, Kaoje et al. (2020) found that environmental protection costs have a positive significant impact on return on equity of oil companies in Nigeria. Other studies show that a significant relationship between environmental accounting disclosures, and return on equity of the selected businesses (Ezeagba et al., 2017), net profit (Okafor, 2018; Adediran & Alade, 2013) and dividend per share (Adediran & Alade, 2013).

Furthermore, Osemene et al. (2016) investigated the effects of environmental accounting practices and sustainable development on performance of listed manufacturing companies in Nigerian; and revealed a significant positive relationship among sustainable development, ROE, and net profit; and a significant positive relationship between environmental accounting and ROE. Emmanuel et al. (2019) showed that non-financial indicators of pollution cost have positive significant effect on performance, while performance indicators of environmental accounting disclosure has no effect on performance of firms; while Omodero and Ihendinihu (2016) examined the pollution cost and net profit of listed environmentally sensitive firms in Nigeria and found that pollution cost and net profit have positive and significant relationship.

However, there are reports in literature that a negative relationship exists between environmental accounting disclosures and return on capital and net profit of firms. Omnamasivaya and Prasad (2017) reported a negative relationship between environmental accounting disclosures and practices and net profit; while Adediran and Alade

(2013) determined a significant negative relationship exists between environmental accounting and return on capital and earnings per share.

Polycarp (2019) found out that pollution cost (a dimension of environmental accounting) has no relationship with net profit. Also, Makori and Jagongo (2013) examined environmental accounting and net profit of firms in India; and showed that a significant negative relationship between environmental accounting and return on capital employed. Other studies that reported negative relationship between environmental accounting practices and aspects of business performance includes Ahmed et al. (2016) which found a significant negative relationship between pollution cost and family ownership.

In view of the forgoing, this study hypothesizes that:

Ho<sub>1</sub>: Pollution cost accounting have no significant effect on net profit of quoted oil and gas firms in Nigeria.

Ho<sub>2</sub>: Waste management cost accounting have no significant effect on net profit of quoted oil and gas firms in Nigeria.

Ho<sub>3</sub>: Drainage cost accounting have no significant effect on net profit of quoted oil and gas firms in Nigeria.

### METHODOLOGY

The population of the study consists 10 quoted oil and gas companies on Nigeria’s Stock Exchange as at December, 2021. Secondary sources of data were used as the main data collection sources, in which accuracy, availability, adequacy, authority, scope, suitability and sources of data were considered for relevance. The relevant data for this study was collected from the annual reports and accounts of the companies available from Nigerian Stock Exchange of the various years in question from the official website of NSE. Considering this situation in this study, Ordinary Least Square (OLS) was adopted via SPSS (Statistical Package for Social Sciences) for the computation.

#### Model Specification

Using the Ordinary Least Square (OLS) Multiple Regression formula which states:

$Y_i = b_0 + b_1X_{1j} + b_2X_{2j} + \dots + b_kX_{kj} + e_j$ ; where,  $Y_i$  is the dependent variable from the population of the interest,  $b_0, b_1, \dots, b_k$  are the population partial regression coefficients and  $X_{1j}, X_{2j}, \dots, X_{kj}$  are the observed values of the independent variables  $X_1, X_2, \dots, X_k$ , respectively.

In view of the above, the following models are developed for this study:

Y = f( $X_{1j}, X_{2j}, \dots, X_{kj}$ ), thus:

NETP = f(EMC)

Therefore:

NETP = f(PC, WC, DC)

Put Equation (2), (3) & (4) into the linear form, it will be converted to:

NETP =  $b_0 + b_1(PC) + b_2(WC) + b_3(DC) + e$

Where:  $b_0 - b_3 =$  are coefficient of regression parameters

$e =$  error term.

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**ANALYSIS AND RESULTS**


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**Table 1: Regression Diagnostics Tests**

|  | <b>Model 1</b> | <b>Model 2</b> | <b>Model 3</b> |
|--|----------------|----------------|----------------|
| Breusch-Godfrey Serial Correlation LM Test:    |                |                |                |
| F-statistics                                   | 2.247          | 2.753          | 1.881          |
| Prob.  | 0.0537         | 0.0688         | 0.0818         |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey |                |                |                |
| F-statistics                                   | 0.765          | 0.0994         | 0.0976         |
| Prob.  | 0.468          | 0.7502         | 0.907          |

Source: Survey Data, 2022, and IBM SPSS Statistics 22 Window Output

The Breusch-Godfrey Lagrange Multiplier (LM) test for higher order Serial correlation test is conducted to test for serial correlation. In the presence of serial correlation, ordinary least squares estimators are no longer Best Linear Unbiased Estimators (BLUE). Moreover, the coefficient may be overestimated, standard errors underestimated and t-statistics overestimated. The Breusch-Godfrey Lagrange Multiplier (LM) test for higher order autocorrelation reveals that the hypotheses of zero autocorrelation in the residuals were not rejected. This was because the probabilities (Prob. F, Prob.) were greater than 0.05 and hence the LM test did not therefore reveal serial correlation problems for the model.

The test for Heteroscedasticity which is the absence of homoscedasticity or the constant variance assumption of the Ordinary Least Square estimator is also conducted. It implies the absence of non-constant variance leading to the breakdown of the BLUE properties in which the efficiency and consistency property are lost. Using the Autoregressive conditional Heteroskedasticity (Breusch-Pagan-Godfrey) test, decision rule is to conclude that there is no heteroscedasticity if the F-statistic values are respectively greater than the critical values at 5% level. In the absence of this (i.e if the critical values at 5% is greater than the F-statistic and observed R-square value), we conclude that there is homoscedasticity. From the second part of Table 1, the results show the absence of heteroscedasticity, meaning that the residuals of the three models are homoskedastic (which is desirable) because the entire p-values are more than 5%.

### **Test of Hypotheses and Interpretations**

This study sought to determine the effect of environmental accounting and net profit of quoted oil and gas companies in Nigeria. This section tested and interpreted the hypotheses formulated in this study.

**Table 2: Effect of test of hypotheses on Environmental Accounting on Net Profit**

| Environmental accounting (Independent Variables) | Unstandardized Coefficients |            | Standardized Coefficients | t - value | Significant/Probability Value | Decision      |
|--|-----------------------------|------------|---------------------------|-----------|-------------------------------|---------------|
|  | B                           | Std. Error | Beta                      |           |                               |               |
| (Constant)                                       | 50535.11                    | 1391831.13 |                           | 0.363     | 0.717                         |               |
| PC (H <sub>1</sub> )                             | 20118.61                    | 7507293.59 | .254                      | 2.679     | 0.009                         | Significant   |
| WMC (H <sub>2</sub> )                            | -5297.70                    | 153107.340 | -.033                     | -0.346    | 0.730                         | Insignificant |
| DC (H <sub>3</sub> )                             | -17321.54                   | 5863840.80 | -.278                     | -2.954    | 0.004                         | Significant   |

Source: Survey Data, 2022, and IBM SPSS Statistics 22 Window Output (Appendix I)

a. Dependent Variable: Net profit

b. Predictors: (Constant), Drainage cost accounting, Pollution Cost accounting, Waste management cost accounting

$$Y_1 = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + e \text{ -----(1) \{for testing H}_1, H_2, H_3\}$$

$$Y_1(NP) = 50535.11 + 20118.61PC - 5297.70WMC - 17321.54DC + e$$

$$t = \quad \quad \quad (2.679) \quad \quad \quad (-0.346) \quad \quad \quad (-2.954)$$

Table 2 above shows the results of the test of hypotheses H<sub>1</sub>, H<sub>2</sub> and H<sub>3</sub>. The result of the test of H<sub>1</sub> show positive and significant effect of pollution cost accounting on net profit of quoted oil and gas companies in Nigeria with t- value outcome of 2.679 @ p0. 0.009 < 0.05, meaning that pollution cost accounting has positive effect which is also significant on net profit of quoted oil and gas companies in Nigeria. Thus H<sub>01</sub> is hereby rejected. Hence, pollution cost accounting has significant effect on net profit of quoted oil and gas companies in Nigeria.

The result of test of H<sub>2</sub> revealed negative and insignificant effect of waste management cost accounting on net profit of quoted oil and gas companies in Nigeria with t- value outcome of t = -0.346 @ p0.730 > 0.05. Thus, H<sub>02</sub> is accepted. Hence, waste management cost accounting has no significant effect on net profit of quoted oil and gas companies in Nigeria.

With respect to H<sub>3</sub>, the result in Table 3 revealed negative significant effect of drainage cost accounting on net profit of quoted oil and gas companies in Nigeria with t-value outcome of -2.954 @ p0.004 < 0.05. Therefore, H<sub>03</sub> is rejected. Hence, drainage cost accounting has negative significant effect on net profit of quoted oil and gas companies in Nigeria”.

**Table 3: Summary of the Results on Test of the Research Hypotheses**

| Research Hypotheses  | t- value | Probability Value | Result                        | Decision |
|--|----------|-------------------|-------------------------------|----------|
| H <sub>01</sub> : Pollution cost accounting has no significant effect on net profit of quoted oil and gas companies in Nigeria       | 2.679    | 0.009             | Positive Significant Effect   | Reject   |
| H <sub>02</sub> : Waste management cost accounting has a significant effect on net profit of quoted oil and gas companies in Nigeria | -0.346   | 0.730             | Negative Insignificant Effect | Accept   |
| H <sub>03</sub> : Drainage cost accounting has a significant effect net profit of quoted oil and gas companies in Nigeria            | -2.954   | 0.004             | Negative Significant effect   | Reject   |

Source: Survey Data, 2022, and IBM SPSS Statistics 22 Window Output



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## DISCUSSION OF FINDINGS

In line with the outcome of the results pertaining to the effect of environmental accounting practices on net profit of quoted oil and gas companies in Nigeria, the study found that pollution cost accounting has significant effect on net profit of quoted oil and gas companies in Nigeria with the t-value of 2.679 @  $p 0.009 < 0.05$ . This led to the rejection of  $H_{01}$ . This result support findings and arguments of prior studies. Effiong and Akpan (2019) argue that bearing of pollution cost goes with a high positive fiscal effect on organization's resources; while Festus and Akinselure (2017) showed that environmental sustainability supports some existing group of studies that projected a positive effect but could not establish its statistical significance at any level.

Also, the result of test of  $H_{02}$  revealed that waste management cost accounting has no significant effect on net profit of quoted oil and gas companies in Nigeria with the t-value of -0.346 @  $p 0.730 > 0.05$ . The result however disagrees with that of Umuren et al. (2018) which showed insignificant relationships between environmental accounting practices and performance variables (return on capital employed, net profit margin earnings per share, and dividend per share).

Finally, test of  $H_{03}$  showed that drainage cost accounting has a significant effect net profit of quoted oil and gas companies. This result is in line with earlier works of Utile et al. (2017) and Obara et al. (2017) whose results indicated that adequate disclosure on waste management and compliance to corporate environmental regulations have positive significant effect on financial net profit measures.

## CONCLUSION AND RECOMMENDATIONS

Environmental accounting practice has not been easy and smooth sailing in our economy, but it is a system that is very important as it takes into consideration, the conservation of our natural resources. Obviously, it is a system that needs to be promoted as it brings to the fore, the need to take care of our natural resources in a way that the present generation can enjoy it, and the future generation will have them around for their use. The system promotes economic growth as it makes provision for funds that will be utilized to take care of depleted resources. This no doubt, is challenging. This study focused on examining the effects of environmental accounting on net profit of oil and gas firms in Nigeria. The results obtained from the empirical analyses show that environmental accounting that pollution cost has positive significant effect net profit of quoted oil and gas companies; that waste management cost has insignificant effect on net profit of quoted oil and gas companies and that drainage cost has negative significant effect on net profit of quoted oil and gas companies.

Thus, the study concludes that environmental accounting practice affects net profit of quoted oil and gas companies; and with a view to nudging oil and gas firms towards organizational transformation, recommends that management of oil and gas companies in Nigeria should pay particular attention to waste management cost accounting to enhance their operating environment and their net profit; and that, giving the fact that most oil and gas companies hardly report their environmental activities, government should make environmental reporting in annual reports compulsory by passing legislation that compels companies to integrate

environmental issues into their strategic planning process; and the publication of environmental accounting standards both locally and internationally, that may be reviewed periodically, to ensure dynamism in compliance.

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