

ENVIRONMENTAL COST MANAGEMENT AND PROFITABILITY OF OIL SECTOR IN NIGERIA (2004-2013)

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Abstract

The problem of land degradation failures globally had tended to exacerbate the problem of environmental cost on the productivity of the Nigerian oil sector. Therefore, this study is aimed at ascertaining the effects of environmental cost management on the profitability of oil sector in Nigeria from 2004 to 2013. Data used were obtained from the Central Bank of Nigeria (CBN). Multiple Regression Analytical Technique (MRAT) was employed. Result revealed that there exist a significant relationship between influence of environmental cost management and the profitability of oil sector in Nigeria. Also, it was discovered that there are established standards in Nigeria guiding environmental cost management in the oil and gas industries in Nigeria. Again there is a lacuna in external reporting of environmental cost data in Nigeria. It was concluded that the extent of environmental cost management in the oil sector is at its rudimentary stage. It was however recommended inter alia that; there should be Policy consistency on the Improvement of external reporting in environmental cost data. The adoption of the United Nations Environmental Cost Management Accounting (ECMA) guideline which will enhance the effectiveness of the already adopted Internationally Financial Accounting Standards (IFRS) in Nigeria, and which evolves environmental cost management accounting practice, should be encouraged. This will facilitate the global campaign for environmentally enhanced society. The financial Reporting Counsel of Nigeria (FRCN) and the professional bodies (ANAN&ICAN) should accommodate the growing awareness in environmental cost management and formulated disclosure requirements. The extent of environmental cost management as emphasized in this study should be considered.

Keywords: Environmental quality cost, Environment pollution prevention costs, Environmental internal failure costs

Introduction

All over world, the paramount importance for environmental cost management in the oil sector has become the concern and focus of nations and most corporate management strategies. It has become one of the foremost issues on the agenda of nations and business earlier in the 1990s and the reasons for this were varied emanating from both within and outside of the firm and particularly at the global level, Okoye and Ng wakwe (2013). A lot of government enactments, laws and regulations on environmental protection have been made in several nations of the world. According to Nagle (2012), the United States of America, Canada, Norway, the United Kingdom and the Netherlands have led in the pursuit of degradation and pollution prevention, control and the need for environmental safety. Besides, some the developing countries like Nigeria, Zimbabwe, Namibia, Philippines and Indonesia have led in championing policies to address need for accounting and accountability for environmental costs management. Various laws and regulations are awakening to strengthen environmental protection such as the Environmental Impact Assessment Act, 1992 and the department of petroleum Resources (DPR), environmental guidelines and standards for the petroleum industry in Nigeria (EGASPIN:2002). They require corporate



managements to consider the environmental implications of all internal decisions of their managements are required by them corporate managements to consider.

The need for corporate organizations to develop environmental cost responsiveness and to disclose in annual financial report environmental information has become imperative. Therefore, all organizations monitored by environmental policy agencies in Nigeria are expected to demonstrate much consideration in decision making. The conventional approaches of cost accounting have become inadequate since conventional accounting practices have ignored important environmental costs and activities impacting consequences on the environment. Gap in financial information reporting have been as a result of corporate neglect and avoidance of environmental costing. There is no completeness and correctness of fair view to users of financial information, such as shareholders, environmental regulatory agencies, environmentalists and potential financial investors. For example, degradation or other negative impact on the environment could affect output level and corporate financial statement such as create actual or contingent liabilities and may have adverse impact on asset values. Consequential effect on corporate organizations may result in incurring future capital expenditure and cash flows which may impinge on going concern as balance sheet secured loans may not be secured after all it land values for instance are affected by environmental factors.

Moreover, because of the paucity in the awareness of environmental costing principles and methodology has become a vital areas to be addressed in this country, Nigeria. If vital environmental issues and activities are not disclosed, financial statement cannot be said to reveal state of a "true and fair view of affairs. It is necessary too, to note that ethical investors will only invest in ethical companies and therefore, will watch out for these ethically responsible companies. Ethical companies therefore, have marketing advantage if they strategically position themselves environmentally. Ethical companies stand at advantage for corporate financing. In addition, the challenge of cost and valuation for damage, depletion and degradation of the environment externalities is a critical problem which continues to demand attention. Since current requirement for reporting on environmental issues is voluntary, it is observed from most financial statements of corporate organizations that it has engendered disclosures of information which totally exclude environmental issues. At best where reported, are grossly inadequate. Environmental disclosures have become critically important to an informed public and financial stakeholders. The strenuous activities in evaluating environmental remedy for environmental degradation where environmental costs do exist are also pertinent.

"Corporations are recognizing the benefits to their long-term corporate profitability of reducing their environmental impacts. Both the accounting and the environmental areas are concerned on how to identify, measure, report and manage environmental cost impact"(Bailey2013). This is particularly critical for the downstream of oil sector in Nigeria which impact heavily on the environment in Nigeria. This study therefore focuses on Nigeria oil and gas industries which are recognized as causing heavy degradation on the environment. For emphasis, the Nigerian business environment is yet to recognize environmental cost management for environmental information and issues of raw materials, energy consumption and use of natural resources which have systematically depleted the environment. This is expected to facilitate effective and efficient costs management, measurement and reporting for corporate decision making. In the light of increasing environmental attention and the fact that the oil and gas industry have profound production impact on the environment, the study has explored an analysis of environment cost management in this economic sector in Nigeria.

The problem of environmental cost management solution worldwide on oil sector has become strident. The credibility of the accounting profession appears to be at its lowest ebb. In the United States of America and in Nigeria as well, the profession has lost its self regulatory status .In

this circumstance, the profession is bestirring itself and the result is a welter of fresh suggestions and initiatives aimed at solving the problem of environmental cost management on the oil and gas output. Some of the suggestions appear mundane while some others at best appear controversial. However, studies have even concluded that environmental cost management problem cannot be eliminated.

In the light of the above problem, the study focuses on the position of Professional Accountants in Nigeria as to the fresh suggestions and initiatives aimed at addressing the environmental cost management problem on the profitability of oil sector in Nigeria. Based on the aforementioned problem, therefore, this study is aimed at ascertaining the extent at which environment cost management has affected the oil sector in Nigeria. In the light of the above problem and objectives, the following hypotheses were formulated and tested.

H0 Environment cost management has not affect the quantity of production (profitability) in the oil sector in Nigeria

H0: Environmental cost management does not impact on the quantity of production (profitability) in the oil sector in Nigeria.

The remaining parts of this paper are structured as follows: section two deals with the Literature Review, empirical studies and theoretical framework on the environmental cost management and practices as attempted. Then, Section three deals with the research methodology; while section four discusses the result and findings. Finally, section five treated conclusion and recommendations.

Literature Review

Conceptual Nexus of Environmental Management Accounting

Eco-System: An ecosystem is largely determined by the natural environment as opposed to the activities of man. There is a dynamic interrelationship between the natural environment and man. Environmental right Action (ERA) (1998:109) contribution to the issue of environmental sustainability emphasizes man's critical responsibility to face the challenge of depletion of the environment. Eco-efficiency suggests that organizations can produce more useful products while simultaneously reducing negative environmental impacts, resource consumption and costs. Eco-efficiency further suggests that rather than focus on the consequences of negative environmental impact, attention should be on attacking the causes.

In the opinion Alert, Cormier & Magnam (2013) this concept suggests at least three important messages, firstly, improving ecological and economic performance which should be seen as complementary. Secondly, that improving environmental performance should not be viewed as charity and goodwill but a matter of competitive necessity. This is in contrast to Deegan (2012) view where he had opined that social costs (i.e. environmental costs) which are not matched with related revenue are incurred not for the good of the individual company but for the society. A third suggestion is that eco-efficiency should be seen as supportive of sustainable development. In the views of Walley and Whitehead (2009), eco-efficiency which has been emphasized as environmental management system (EMS) is the application of accounting design to attain financial and economic savings in resource usage. It is also, the reduction of wastes, energy and emissions that will necessarily lead to reductions in corporate adverse impact on the environment.

Art, Cormier and Magnam (2013) further proffered definition for sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." They opined that although, absolute sustainability may not be attained, progress towards its achievement has some merit. Eco-efficiency, an implication of



improving environmental performance will. Secure several advantages such as increasing customers demand for cleaner products, those produced without degrading the environment. Also, employees prefer to work for environmentally friendly organization.

Other benefits are that environmentally responsible firms tend to capture external benefits such as lower cost of capital and lower insurance rates; efficient environmental performance in an organization will secure good health to humanity; the consciousness to pursue environmental cleanliness will serve as a drive for improved technology and a policy of clean environment and the implementation of the policy are capable of reducing environmental costs and making for a competitive advantage.

Environmental Cost Management Accounting For Corporate Organizations

Planning and decision making on Environmental Accounting in industrial sector, requires a commitment to Full Cost Accounting (FCA) principle. FCA in the Ontario Hydro in 1993 was defined as 'incorporating environmental and other internal costs and benefits of an industry's activities on the environment and on human health and the challenge is to quantify, monetize and internalize the external costs into the companies' income measurement'(Ontario Hydro, 1993: 3 S.C.R.327). Environmental accounting terminology uses the words such as *full, total, true, life cycle* to emphasize that conventional accounting methodology were incomplete and exclude external costs i.e. societal costs.

Bailey (1991:13-29) Identifying environmental outlays and estimate spending levels were a major step in accounting for environment in Ontario Hydro in 1993 which was reported as: Environmental Spending as any monetary expenditure, revenue or revenue foregone, whether capitalized or charged to current operating expenses, made for Ontario Hydro for the primary reason of sustaining or protecting the environment. This includes any costs incurred for control, reduction, prevention, or abatement of discharges or releases to the environment of gaseous, liquid, or solid substances, heat, noise, or unacceptable appearance (Ontario Hydro in; 1993).

Categories of Environmental Costs Management Accounting

Aert, Cormier and Magnam (2013) have defined environmental costs "as costs associated with the creation, detection, remediation and prevention of environmental degradation. They therefore, classify environmental costs into four categories of (1) prevention costs (2) detection costs (3) internal failure costs and (4) external failure costs.

Levels of Environmental Accounting

The uses of environmental accounting according to U.S EPA (1995) arise in three distinct levels, namely:

i. **Managerial Accounting:** This is internal use of corporate organizations, division, facility, project or system.

Managerial or management accounting here refers to the use of a set of cost and performance data about environmental costs, decisions and operations.

ii. **Corporate Financial Accounting Reporting:** Corporate financial reporting is generally, regulated by the Securities Exchange Commission (SEC) and the Generally Accepted Accounting Principles (GAAP). Environmental accounting in this context refers to the estimation and reporting to the public and regulatory agencies of environmental liabilities and financial material environmental costs.

iii. **System of National Accounts (SNA):** The focus is the nation's macro-economic measures of the National Income Accounts in which economic indicators such as Gross Domestic Product are

measured. In this context environmental accounting can refer to consumption of the nation's natural resources in monetary form.

One flaw as remarked by Hecht (1999) is that the cost of environmental protection such as the watershed protection of the forests and crop fertilization that insects provide cannot be measured in the National Income Account. Identifiable also, is the issue of depreciation treatment in compiling the National Income Account. In this case whereas depreciation are provided for physical assets consumed in the cause of production, but in the case of the consumption of natural resources, these are rather treated as increasing national income. The example of a country that harvests its forest resources unsustainably will have its national income show high national income a few years from natural resources, but will not reflect the destruction of its productive forest assets. This is an interesting area of environmental accounting upon which there is on-going effort at the United Nations in the System for Integrated Economic and Environmental Accounting (SEEA), an option to the current System of National Accounts. Quite a number of nations' governments are incorporating environment related data into national accounting.

In 2003, the European Commission incorporated into national accounting reporting the requirement to include a definition of the types of expenditures under Total Current Expenditure on Environmental Protection. European Commission members thereafter will need to report the data to Eurostat, the statistical office of the European Union. Besides, this is a requirement of the ISO 14001 which is the Environmental Management System standard. According to IFAC International Guidance Document on Environmental Management

Accounting (2005:73), the United Nations has in 1993 and through subsequent reviews of guidelines outlined the types of physical and monetary information useful for environmental accounting at the national level. We are informed that the goal of the UN SEEA is to allow assessment of interactions between the natural world and the economy. It is also, to provide information to support the design of integrated social, economic and environmental government policies. The UN SEEA has adopted the Classification of Environmental Protection Expenditures system (CEPE, 2003) which was developed by the European Union. CEPE reports broad environmental domains such as wastewater management, waste management and subsequently into types of environmental activities Waste and Emission Treatment, Prevention Management, Research and Development. The Australia Bureau of Statistics collects information along the requirement of the UN SEEA.

Relevance of Environment Cost Management Accounting (ECMA)

The significance of ECMA are identified as not only involving information provision, management planning and control but an adaptation from the German Environment Ministry (2003) identifies three broad benefits of ECMA as emphasis on compliance, Eco- efficiency and strategic positioning, ECMA supports environmental protection through cost efficient compliance with environmental policies. Examples are in planning and implementing pollution control investments or projects. It involves also, investigating and purchasing cost efficient substitutes for toxic materials and the reporting of environmental wastes and emissions to regulatory agencies. On the benefits of eco-efficiency, ECMA supports the simultaneous reduction of costs and environmental impacts through more efficient use of water and materials in internal operations. On strategic planning, ECMA supports the evaluation and implementation of cost- effective and environmentally sensitive programmes to ensure organizations' long-term' strategic position. Examples are working with suppliers to carry out the design of products and services for environmentally -responsive market and to estimate internal costs of likely future regulations. Strategic planning may also involve reporting to stakeholders such as the customers, investors and the local communities. Conventional approaches of costing have become inadequate because they

ignore important environmental costs and potential cost savings. Gray, Kouhy and Lavers (2010) emphasize the therefore, that environmental accounting is not only about accounting for the environment, rather it is also to the extent that environmental issues can be reflected in conventional accounting practice. This is with the view of improving the condition of the natural world such as reduced land degradation and pollution abatement which enhances sustainable development.

Detection and Pollution prevention of Environmental Cost Management Accounting

Detection Costs of Management Accounting: Environmental detection costs are costs resulting from activities to determine if products, processes and other activities within the company are in compliance with appropriate environmental standards. The costs include auditing environmental activities, inspecting products and processes, developing environmental performance measures, testing contamination and measuring contamination level.

Pollution prevention of Environmental Cost Management Accounting: These are costs of activities which are meant to prevent the production of contaminants and wastes which could cause damage to the environment. The costs include costs incurred in evaluating and selecting pollution control equipment, quality environment consumables, designing processes, designing products and carrying out environment studies. Others are auditing environmental risks and developmental management systems.

Internal and External Failure of Environmental Cost Management Accounting

Internal Failure of Environmental Cost Management Accounting: These are costs resulting from the activities performed because contaminants and wastes have been produced -but have not been discharged into the environment. Internal costs are incurred to eliminate and manage the wastes produced. The costs are costs for operating pollution control equipment, licensing facilities for producing contaminants and costs resulting from recycling scrap.

External Failure of Environmental Cost Management Accounting: These are costs of activities performed after discharging contaminants and wastes into the environment. These costs are those for cleaning up a polluted lake, clearing up oil spills, cleaning up contaminated soil, settling personal injury claims which are environment related, and restoring land to natural state, among others. The need for environmental accounting is to enhance and further drive for the benefit of eco-efficiency which maintains that organizations whose activities adversely affect the environment can carry out their activities of production while simultaneously reducing negative environmental impacts, resource consumption and costs.

Empirical Studies on Environmental Cost Management Accounting

The study of Nagle (2012), on environmental accounting reveals that corporate managers are placing high priority on environmental accounting. Environmental accounting as a prevalent subject in the international community is not yet a priority in Nigeria. Epstein (2011) explains pertinent aspect of environmental degradation and cost as those including emissions into the air, water and land. Also, aspects of untreated domestic waste outflows into rivers and costal oceans quantities of solid waste that must then be disposed of perhaps through land spreading or incineration. Pollution include airborne SO₂ emissions from power plants by stack- gas scrubbing which leaves a highly concentrated sludge and degradation which incorporates midnight dumping, illegal dumping along the sides of roads or in remote areas. Field (2012) has done tremendous work on the economics of natural resources and in this instance explored the approach of benefit-cost analysis through discounting of future based input and output values of environmental projects and activities.

Measuring benefit- costs analysis has been eventually through regulatory Evaluation Impact Assessment study on the environment.

Dierkes (2013), in his works condemn the whole essence of placing monetary value above other human virtues in environmental issues. He also recognized the absurdity of discounting and discountenancing future environmental impact on human values. From investigations with the Federal Ministry of Environment, EIA study conducted by the oil and gas (exploration and producing) and other companies having activities that impact on the environment has been accepted as a regulatory requirement in Nigeria. Achieving effective EIA is however froth with uncertainties in Nigeria since the objective estimation of input and output values is hot so reliable. Besides, there is excessive fluctuation in the discount factor for purpose of benefit- cost analysis. Non-available market values for certain natural resources costs and benefits such as the fauna, fishing ponds or rivers, among others, makes it extremely difficult to place monetary value on the factors of measurement.

Theoretical Basis of Environmental Quality Cost Management Accounting

This is also known as environmental cost reduction model. It suggests that the lowest environmental costs will be attained at the point of zero-damage to the environment. It is considered that before environmental costs information can be provided, environmental costs must be defined. Environmental quality model is the ideal state of zero-damage to the environment, 'which is analogous to environmental quality management (EQM), a zero-defect state of total quality management. This is certainly compatible with the concept of eco-efficiency. Environmental costs incurred are costs arising because poor environmental quality exists or may exist and these have to be prevented, reduced or remedied.

Problems of environmental accounting

Hecht (1999:14) opined that "Building a nation's economic use of the environment (and environmental degradation) into its accounts is a response to several perceived flaws in the System of National Accounts (SNA)..." Hecht identifies the difficulties of environmental accounting in nations as:

- i. Cost of environmental protection cannot be identified. It is cited for instance, that money spent to put pollution control devices on smokestacks will increase GDP, even though the expenditure is not economically productive.
- ii. Certain environmental goods are not marketed even though they provide economic value, for instance fuel wood gathered in the forests, meat and fish gathered for consumption. Water for drinking and irrigation are not priced in themselves apart from the technology applied to make the water available.
- iii. When certain nations include these resources in their System of National Accounts, no standard practices exist for comparability.

Hecht (1999:14) observed that nations incorporate into their national accounts differently depreciation of manufactured capital and natural capital. That whereas buildings or machines are depreciated in the accounting conventional manner, but the consumption of natural resources is treated as income. A major challenge which is yet to receive a consensus among nations is valuation of natural resources resulting from resource depletion for the balance sheet (Statistics Canada:2006:1) Quite a number of natural resource-dependent countries have commenced developing environmental accounting, namely: Norway in 1970; Namibia in 1994; The Philippines



in 1990 and Indonesia. While standards have differed, environmental accounting practice has made certain nations' governments to focus on environmental accounting for policy-making purpose.

Methodology

The research design adopted is exploratory research design since the data cannot be subjected to manipulation. The study was carried out in Nigeria. To achieve this, the research designed is to cover the period of ten (10) years (2004-2013). The purpose of this study is introduce the scientific involved in carrying out this exploratory study. Accordingly, a brief account of section of sample, method of collection of data, processing of data, and the appropriate statistical tools used have been given.

A population is made up of specific conceivable traits, events, elements, people, subjects or observation, which relate to the situation of interest in the study to be conducted. The full set of cases from which the sample is taken is called the population (Saunders, et al, 1997). Therefore, the population of the study stood at about 352 officially and legally registered oil companies in Nigerian Stock Exchange as at April, 2014. The study was based on an exploratory approach, relying on secondary source of data which were obtained from the Central Bank of Nigeria (CBN) statistical bulletin. According to Taro Yamani (1964), to determine a sample from a population:

$$n = \frac{N}{1 + (Ne)^2}$$

Where n = sample size

N= Population size

e =error limit.

In this study an error limit of 10% was applied to have a manageable sample size. The number of Professional Accountants in Nigeria respondents was therefore gotten as follows:

$$N = 352$$

$$n = ?$$

$$e = 0.10$$

$$\frac{352}{1 + (352 \times 0.01)^2}$$

$$= \frac{352}{1 + 3.52} = \frac{352}{4.52} = 66.37$$

$$\text{Approximately} = 70$$

A sample size of seventy oil companies based on a time series of 2004 and 2013 was used. The exploratory statistical technique was used in analyzing the data which were obtained from the Central Bank of Nigeria (CBN) statistical bulletin. The statistical technique adopted for the analysis of data in this study is multiple regression analytical technique because more than one independent variables. To ensure the content validity of the research instrument, the research instrument was subjected to professional scrutiny of the researcher's supervisor and other experts for the purpose of boosting its content validity. Reliability (consistency of a measure, Osuala, 1982) was ensured through the adoption of split-half method. The result shows that the research instrument is reliable, as each shows consistency in the data supplied by the respondents. There is therefore an acceptable and satisfactory validity and reliability

Model

Analysis of this study is supported with following model built for it and is given below;

$$\text{PROF} = F(\text{VQGU}, \text{VQGF}, \text{VQOS}) \dots \dots \dots (i)$$

Where VOGP = Dependent variable

VQGU, VQGF and VQGF = Independent variable F = functional notation.

The ordinary least square for the above model is stated thus:

$$\text{PROF} = f_0 + f_1 \text{VQGU} + f_2 \text{VQGF} + f_3 \text{VQOS} + te \dots \dots \dots (ii)$$

Where:



PROF = Value of profit of gas produced
 VQGU = Value of Quantity of Gas utilized
 VQGF = Value of Quantity of gas flared
 VQOS = Value of Quantity of oil spilled
 fi to f3 = coefficient of the regression parameters
 te = error term

Data Presentation and Analysis

Table 1: Gas production and utilization in Nigeria (Million cubic meters)

Year	Quantity of Outputs produced	Quantity Utilized	Quality flared	% flared
2000	27,756	15,987	11769	52
2001	31,587	7,536	24,588	78
2002	32,465	7,058	25,406	78
2003	33,445	7,536	25,908	77
2004	32,793	6,577	26,216	80
2005	32,980	6,910	26,070	79
2006	36,790	10,150	26,820	73
2007	36,755	10,207	26,548	72
2008	35,937	10,877	25,050	70
2009	37,613	17,904	19,709	52
2010	44,233	20,303	23,930	54
2011	52,323	24,457	27866	52
2012	57,534	37523	20,011	35

Source: Central Bank of Nigeria, Statistical bulletin 2014.

Table2 Oil spills in the Petroleum Industry (2014)

Year	No. of spills	Value of Quantity Spilled (in billion Naira)	Value of Quantity recovered(in billion Naira)	Value of Net quality cost to environment(in billion Naira)
2000	115	29,436	21,876	22876
2001	129	31866	6109	25757
2002	208	9172	1955	7217
2003	228	5956	2153	3803
2004	166	1410	2093	12058
2005	258	108367	2786	105581
2006	378	51188	1477	49711
2007	453	8105	2937	5158
2008	495	35124	2336	32787
2009	417	36677	3110	33567
2010	158	39904	1184	3872
2011	353	52875	1344	3797
2012	245	10543	2635	98677

Source: Niger Delta Environmental Survey, phase IV Report (2014).

Test Hypothesis

In testing the hypothesis, it is pertinent to restate the hypothesis in both null and alternative form:

Ho: Environmental cost management does not influence oil and gas output in Nigeria.

Hi: Environmental cost management influence oil and gas output in Nigeria.

Table 4.1.1 (Regression Result) Dependent Variable: PROF

Variable	Coefficient	Std. error	T.statistic	Probability
Constant	-1081.132	1322.027	-0.817784	0.447
QVGU	1.013478	0.019974	50.73939	0.0000
VQGF	1.033712	0.046592	22.18629	0.0000
VQOS	0.001870	0.002289	0.816795	0.4453

$R^2 = -0.997939$, R^2 (Adjs) = 0.996909, F stat = 968.5691

Dependent Variable PROF				
Method: Last squares				
Date: 20/03/14 Time 02:14				
Sample: 2004 2013				
Included observation: 10				
Variable	Coefficient	Std. Error	t-statistic	Prob.
C	-1081.132	1322.027	-0817784	0.447
QVGU	1.013478	0.019974	50.73939	0.0000
VQGF	1.033712	0.046592	22.18629	0.0000
VQOS	0.001870	0.002289	0.816795	0.4453
R –squared	0.987939	Mean dependent var	35477.80	
Adjust R-squared	0.986909	S.D dependent var	3757.601	
S.E. of regression	208.9094	Akaike info criterion	13.81085	
Sum squared Resid	261858.9	Schwarz criterion	13.93189	
Log likelihood	-65.05427	F-statistic	978.5695	
Durbin –Watson stat.	1.477799	Prob (F-statistic)	0.0000	

Data Analysis and Findings

The result shows that the signs of coefficients of QVGU, VQGF and VQOS are consistent with expectations about the relationship between profitability of oil and gas produced and the extent of environmental cost management in the oil sector in Nigeria. These imply that the Value of Quantity of Gas utilized; Value of Quantity of gas flared and Value of Quantity of oil spilled have direct relationship with and, thus, exert positive effect on, the quantity of production (profitability). The total variation in the observed behavior of outputs of gas produced is used as a measure of the extent of cost management. This is jointly explained by variation in gas utilization, quantity of gas flared and quantity of oil spilled up to 98%. The remaining 2% accounted for by the stochastic error term. To test for the overall significance of the model the ANOVA on the f-statistic is used. Here the high significance of f-statistic value of 978.5695 confirms that the high predictability of the model did not occur by chance.

Testing for the individual statistical significance of the parameters, the f-statistic of the respective variables was taken into consideration. Considering their probability values, which were automatically generated during the computation process by the computer software, the constant term is significant at 5% level. The a priori expectations about the signs of the parameter estimates are conformation to economic theory. The quantity of oil and gas produced entered the model with a negative sign indicating a negative relationship between profitability of oil and gas produced and the extent of environmental cost management in the oil sector in Nigeria. However, gas utilization,

quantity of gas flared and quantity of oil spilled entered the model with a positive sign. By interpretation, a one percent increase in gas utilization, will increase or decrease the coefficient of 1.01% on quantity produced, ceteris paribus. For quantity of gas flared, an increase in the variable will increase or decrease the coefficient of 1.03% on the output of gas produced and one percent increase in quantity of oil spilled will increase or decrease the coefficient of 0.002% on output of gas produced all things being equal.

Decision rule

Null hypothesis(H₀), Environmental cost management does not impact on the quantity of production (profitability) in the oil sector in Nigeria is rejected; since the calculated f-statistic of 968.5691 was found to be greater than the tabulated f-value of 3.05 at 5% level of significance. Thus, we accept the alternative hypothesis (H₁) and conclude that environmental cost management impacted on the quantity of production (profitability) in the oil sector in Nigeria during the period under study.

Therefore, no serious attention is accorded to its implications in this analysis. The t-statistics with their probabilities associated with the coefficients indicate that, at 0.05 level of significance, the Value of Quantity of Gas utilized; Value of Quantity of gas flared and Value of Quantity of oil spilled have positive but insignificant effect on the quantity of production. The joint effect of these independent variables is statistically significant as indicated by the computed F-Statistic value of 978.5695 confirms that the high predictability of the model did not occur by chance. Result of the analysis also shows that the explanatory variables included in the model explain about 98% variations in the explained variable. This implies that within the context of the model, independent variables explained about 98% in profitability during the study period. This high explanatory power shows that the model is a good fit, and that these components, Quantity of Gas utilized; Quantity of gas flared and Quantity of oil spilled of are important determinants of profitability oil sector in Nigeria.

Conclusion

We have in this study made an attempt in ascertaining the effects of environmental cost management on the profitability of oil sector in Nigeria from 2004 to 2013. It was observed that there are scanty standards guiding environmental cost management in the oil and gas industries in Nigeria. Nevertheless, there has been lacuna in the external reporting of environmental cost data which in turn have hindered the environmental cost management in the oil sector in Nigeria. In a nutshell, the extent and contents of environmental cost' management in the oil sector in Nigeria is growing slowly.

Recommendations

- i. There should Policy consistency on the Improvement of external reporting in environmental cost data.
- ii. The adoption of the United Nations Environmental Cost Management Accounting (ECMA) guideline which will enhance the effectiveness of the already adopted Internationally Financial Accounting Standards (IFRS) in Nigeria, which will evolve environmental cost management accounting practice. This will facilitate the global campaign for environmentally enhanced society.
- iii. The financial Reporting Counsel of Nigeria (FRCN) and the professional bodies (ANAN&ICAN) should accommodate the growing awareness in environmental cost management and formulated disclosure requirements. The extent of environmental cost management as emphasized in this study should be considered.

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ERROR: syntaxerror
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