Environmental Accounting and Sustainable Financial Performance: Evidence from the Nigerian Petroleum Industry

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Abstract
The issue of Environmental degradation has attracted much research attention in the environmental science literature but much is left to be done in the area of how accounting captures environmental degradation costs in the annual reports in relation to the effects it has on the sustainable financial performance of firms in developing countries especially Nigeria. This paper therefore re-examine the effect of the neglected but important issue of Environmental accounting in the context of how it affect sustainable financial performance of firms in Nigeria. Using data from ten petroleum companies operating in the Niger – delta part of Nigeria over a period of 48 years (1970-2017) analyzed through the lenses of ordinary least square regression method, our finding sugests that environmental operating costs and environmental prevention costs have significant and negative effect on the performance of petroleum firms in Nigeria. However, we found important differences in the correlates of firms capital expenditure on sustainable financial performance. The finding of this study therefore have important implications for policy.

Keywords: Environmental Accounting, Firm performance, petroleum firms, Niger-Delta, Environmental degradation, Nigeria oil.

1. INTRODUCTION
Over the years most African countries have not paid adequate attention on the issue of environmental accounting. In industrialized countries such as the US and the UK,
serious attentions have been paid to activities that degrade the environments. In other words, environmental accounting has developed to the extent that it has been incorporated in the System of National Account. Norway, has also done this incorporation in 1970, Philippines in 1990, Namibia in 1994 and Indonesia in 2003. Saudi Arabia, one of the major oil producing countries has also provided for environmental accounting to checkmates the activities of industries that degrades the ecosystem through pollution and degradation of natural environment. Prior evidences have linked environmental accounting to industrial performance (Beredugo, and Meñor, 2012; Asuquo 2012; Tiesieh, Bassey and Kekung, 2012; Adams, 1998). By attempting to compel companies to report environmental issues, Legislations were enacted in some of the developed countries. Some of them include: The 1997 Kyoto Protocol, World Bank Global Gas Flaring Reduction (GGFR) Public-Private Partnership, 2002, The 2007 Bali Climate Declaration by Scientists, The UNCTAD 2003, U.S.EPA, 1995; IUCN 1980 etc.

In Nigeria many legislations have been enacted (such as: Associated Gas Reinjection Act Cap 26, LFN 1990, The Federal Environmental Protection Agency Act Cap, 131 LFN 1990, Statement of Accounting Standards (SAS) 14 and 17 which regulate both the upstream and downstream sectors of the petroleum industry and the Nigerian Gas Master Plan, 2008 which is a guide for the commercial exploitations and management of Nigeria’s gas sector aimed at growing the economy with gas) for the protection of the environment. There is no such law on environmental accounting that has compelled the firms to report this environmental information separately in annual reports and accounts. The report of the Environment Research Group (ERG) of the institute of Chartered Accountants in England and Wales (ICAEW) recommends as part of the annual reporting cycle, that company should publish details of the company’s environmental policy, detail of director’s overall responsibility for environmental issues and the company’s environmental objectives which should be expressed in a way that enables performance against them to be measured as well as information on actions taken to preserve the environment (Macve, 2000).

Proponents of environmental accounting argue that the use of environmental accounting is very important while others were of the opinion that it does not. Interestingly, Adams (1998) acknowledges that the use of environmental accounting has gained consensus among the developed countries because allows companies to reduce the level of degradations on the environment which in turn lead to the reduction in the level of penalties and fines, and other social costs. It makes companies to be socially responsible to the society. Available evidence suggest that the neglect of the environment in Nigeria have been enormous (Enahoro, 2009; Kuratin, 2011; Ayoola 2011). This according to Enahoro (2009) has necessitated local groups to declare force majeure on oil shipments and to engage in various heinous crimes such as oil theft commonly referred to as bunkering, pipeline damage, abduction of oil workers and forcing companies to shut in production. FEPA (2011) report shows that since December 2005, Nigeria has experienced increased pipeline vandalism, kidnappings and militants takeovers of oil facilities in Niger Delta. This is an attempt to seek for a redistribution of oil wealth since their environment is
not taken care of by the company, and in most cases accuse the industry of abandoning the goose that lays the golden eggs. Moreover, kidnapping of oil workers for ransom and vandalisation of oil facilities are common, most of which arises because of the neglect meted on the environment from which this oils are extracted (Awasthi, 2009). Ayoola (2011) concurred with Awasthi when he noted that oil industry in Niger-Delta had severely been blamed for polluting the environment. For instance, a research carried out by Tiesieh et al (2012) indicated that oil and gas companies operating in Nigeria had been fined, and made to pay some compensations for outright neglect of the environment. Apart from pollution caused by oil, natural gas often associated with oil production is always flared to the environment and the damages to the ecosystem not accounted for by the company who are supposed to take financial responsibility of any damages done as a liability in their financial statements. Hansen et al (2000) summarized these costs in a model called Environmental Quality Reporting (EQR) model with the following components of costs Environmental operating expenditure (EOPEX), Environmental Externality Expenditure Cost (EEXTC), Environmental Pollution Prevention Expenditure (POPREV), Environmental Detection Expenditure (PODEC), Environmental Capital Expenditure (ECAPEX) and Environmental Technology Content for production Responsiveness (COTEC).

Based on the foregoing, this study has set to investigate the extent to which Petroleum companies report the aforementioned costs and their effect on sustainable performance of firms in Nigeria. Stakeholders such as regulators and policy makers will find this research very interesting. The research also add to literature on the area of environmental accounting in Nigeria. It will also help to reduce conflicts between the companies and stakeholders.

2. REVIEW OF RELATED LITERATURES

Environmental accounting covers information relating to all aspects of the environment. It includes environment-related expenditure, environmental benefits of products and details regarding sustainable operations (Irish times, 2000 in Beredugo et al 2012). Environmental accounting provides details of the role played by the natural environment in the economy. It provides data which highlight both the contribution of natural resources to economic well-being and the cost imposed by pollution of resource degradation (IUCN, 1980; Bebbrington, 2006). Environmental accounting according to UNCTAD (2003) enables organizations to track their environmental data and other greenhouse gas (GHG) emissions against reduction targets, and facilitates environmental reporting to provide sustainability related data that is comprehensive, auditable, and timely to advance and strengthen the interdependent and mutually reinforcing pillars of sustainable performance and development and environmental protection in Nigeria.

Enahoro (2009) pointed out that Environmental accounting as a prevalent subject in the international community is not yet a priority in Nigeria. Ayoola (2011) noted that environmental cost does not only refer to costs paid to comply with regulatory
standards and costs which have been incurred in order to reduce or eliminate releases of hazardous substances but includes all other costs associated with corporate processes which reduce adverse effect on the environment. Hansen and Mowen (2000) define 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. Previous studies on this area has concentrated more on the developed countries than it is in the developing countries especially Nigeria. For instance, Beredugo and Mefor (2012) find that environmental operating expenditures are not charged independently of other expenditures, and that there is a significant relationship between environmental accounting and reporting and sustainable development. Again Asuquo (2012) in his study of costs of environmental friendly policies and their financial effects on corporate performance of selected oil and gas companies observed that the related cost of environmental protection and management has a positive influence on firm’s corporate performance, and that environmental friendly organizations enjoy high level of corporate competitiveness resulting in high performance. Moreover, Tiesieh, Bassey and Kekung (2012) observed that there is a significant relationship between environmental activities and profitability. The study recommended that Nigeria Oil companies should show data on environmental expenditures, environmental costs charged to income in the account as well as details in the notes to the accounts. Wayman (2008) examined the implication of environmental accounting on corporate performance using 500 companies in Europe and America between September 2006 and December 2007 and found that 67 per cent (335) of the companies issue environmental reports. He also found that that those organizations that issue environmental report receive increased patronage from stakeholders than those that do not, pointing out that this affect performance. Other notable studies in environmental accounting are the Ontario Hydro Full Cost Accounting (1995) and the AT & T Green Accounting of the U.S. Environmental Protection Agency (1995). Also, the industrial green substance emissions (Carbon dioxide, Methane and Hydro-carbons) and the penalties resulting from the Kyoto Protocol have made it a requirement for corporate organizations to take serious considerations and actions on issues that affect the environment in the western countries, but in Nigeria such studies are limited.

2.1 Theoretical Justifications

This study is anchored on the Efficient Market Hypotheses Theory propounded by Eugene Fama in 1970. Fama while working on Random Walk Hypothesis (RWH) in the University of Chicago Graduate School of Business developed the Efficient Market Hypothesis (EMH) as academic concept of study through his published Ph.D thesis in 1965 and later in 1970 modified it into theory with three basic assumptions. He also looked at flaws in the RWH, by focusing on the issue of market leptomurkosis which he called EMH. EMH theory states that if available information relating to a
product is given, actual prices at every point in time will represent very good estimates of intrinsic values. The three basic assumptions of EMH Theory includes:

i. All investors are independent, rational, well-informed and hope for the highest profit.

ii. All information are free and randomly available in the market, that’s means, no one can predict any new information. Once the information is released in the market, the price will respond as soon as possible.

iii. There are no taxes or transaction fees of information in the market.

Since the market price and its performance will be affected by the available information, all available information (both conventional) should be fully reflected on the security or product (Fama, 1970 in Gray, 2001). If available information is reflected in the annual reports, and accounts, all investors and other stakeholders will be well informed, thus promoting the performance of the industry. A survey of the existing literatures indicates that information add values to organizational sustainable performance be it financial, environmental, management etc. Regardless of the form, useful information according to existing literatures (Ozor, 2010; Hall, 2004) must possess the following characteristics: relevance, timeliness, accuracy, completeness and summarization, and these will help an organization to achieve their three fundamental information system objectives which are common to all organizations. These include: (a) to support the stewardship function of management, (b) to support management decision making and (3) to support the firm’s day-to-day operations. When these attributes are consistently presents, information has reliability and provides value to the users, thus promoting the corporate performance of the company. Unreliable information has no value as it can lead to dysfunctional decisions. (Hall, 2004). Just like EMH, environmental accounting seeks to provide stakeholders with up to date/timely, relevance, accurate and complete information to aid decision making. This is effect, aids performance. This is the essence of the theory in this present study.

3. METHODOLOGY

This study adopted the ex-post factor research design to enable the researcher make use of secondary data to determine the extent to which environmental accounting affect sustainable performance of petroleum industry in Nigeria. The data were collected from ten petroleum companies selected based on their high level of economic activities in Nigeria at that period. Data collected were analyzed using the multiple regression. Ayoola (2011) stated the general multiple regression model as follows:

\[ Y = b_0 + b_1x_1 + b_2x_2 \ldots + \mu \]

Where y is a function of x and \( \mu \) is an error term.

Based on this, our model can be specified as follows:
\[ \text{PAT} = a_0 + b_1 \text{EOPEX} + b_2 \text{EPOPREX} + b_3 \text{ECAPEX} + e_i \]

where \( a_0 \) is the intercept between the dependent and independent variables while \( e_i \) is the error term.

### 4. RESULTS

**Table 1:** Regression results of the relationship between the indices of environmental activities and profitability

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimated Coefficients</th>
<th>Standard Error</th>
<th>T- Statistics</th>
<th>P – Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.695</td>
<td>670429.001</td>
<td>-2.528</td>
<td>.045</td>
</tr>
<tr>
<td>EOPEX</td>
<td>-3.410</td>
<td>1.056</td>
<td>-3.229</td>
<td>.018</td>
</tr>
<tr>
<td>EPOPREX</td>
<td>-7.903</td>
<td>1.552</td>
<td>-5.093</td>
<td>.002</td>
</tr>
<tr>
<td>ECAPEX</td>
<td>-8.977</td>
<td>2.830</td>
<td>-3.172</td>
<td>.019</td>
</tr>
</tbody>
</table>

R = .970,

R-Square = .940

Adjusted R-Square = .911

SEE = 7.864

F – Statistic = 31.592

Durbin Watson Statistic = 1.323

The general objective of this study is to investigate extent to which environmental accounting affect performance of petroleum industry in Nigeria, using EOPEX, EPOPREX and ECAPEX. The results in table 1 show that the dependent variable, profitability, is negatively influenced by EOPEX, EPOPREX and ECAPEX. This implies that an increase in the independent variables will bring about a decrease in the dependent variable. The coefficient of determination R-square of 0.94 implied that 94% of the sample variation in the dependent variable profitability is explained or caused by the explanatory variable while 6% is unexplained. This remaining 6% could be caused by other factors or variables not built into the model. The high value of R-square is an indication of a good relationship between the dependent and independent variables. The value of the adjusted \( R^2 \) is 0.911. This shows that the regression line captures more than 91.1% of that total variation in profitability caused by variation in the explanatory variables specified in the equation with less than 8.9% accounting for the error term. Testing the statistical significance of the overall model, the F-statistic was used. The model is said to be statistically significant at 5% level.
because the F-statistics computed of 31.592 (p value = .000) is greater than the F-statistics table value of 4.76 at df1=3 and df2=6. The test of autocorrelation using D.W test shows that the D.W value of 1.323 falls within the inconclusive region of D.W partition curve. Hence, it can clearly be concluded that there exists no degree of autocorrelation. Overall, the implication of the findings is that organizations, particularly oil and gas companies that ignore their responsibility of proper management of environmental conservation cost stand the risk of losing income through fines and penalties. This avoidable expense could be averted if the necessary precautionary measures are taken on time. Besides, the actual fines and penalties, the effect of such negligence is depletion of the natural resources which is very harmful to the society.

5. CONCLUSION AND RECOMMENDATIONS

Accounting has an instrumental role in disclosing environmental responsibility for different entities especially extracting industry such as oil and gas entities. The study was anchored on the theory of Efficient Market Hypothesis. Secondary data were used and the data generated from the ten (10) selected oil and gas companies were analyzed using the Ordinary Least Square regression method. The significance findings of the study was that environmental accounting has a significant impact on the profitability of oil and gas companies in Nigeria. Moreover, the study indicates that environmental operating expenditure, environmental prevention expenditure and environmental capital expenditure are very necessary in determining the profitability of oil and gas companies. The findings in the study are consistent with the findings of other scholars. The implication of the findings is that if petroleum industry fails to make environmental issues available in the annual statements, risk of environmental liabilities may increase, resulting in higher price of risk taking and contingencies while decreasing the value added by the enterprise. It was however recommended for oil and gas companies to report environmental costs and liabilities in their annual statements as this will help to reduce the rate of risks of environmental liabilities and increase the value added by the companies in Nigeria. Future researchers should carry out more research in this area in Nigeria using another method of data collections that may involve meeting with the management of the petroleum firms.

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