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# Environmental Cost and Financial Performance: Analysis of Cement Companies in Nigeria

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***Abstract***: *The study of Environmental cost savings in relation to Financial Performance has attracted global scholarly interest with emphasis on the industrialized nations. This study therefore, evaluated the effect of Environmental cost savings on financial performance of cement companies in Nigeria. To achieve this objective, two cement companies constituting over 65 percent of cement production in the country were purposively selected for the study. Glenn sample size formula was adopted to administer the questionnaire on four hundred and forty eight respondents sampled from both companies, of these about 84 percent responded appropriately. Data was also sourced from annual financial reports and accounts of the two companies. Regression analysis was adopted with the aid of Statistical Package for Social Sciences (SPSS) so as to determine the correlation between the two variables. The study found that Environmental Cost Savings was significantly related to Financial Performance of the quoted cement companies. The study concluded that Environmental cost Savings positively impacted on the business value of the companies and therefore recommends that continues investment in Environmental Cost Savings will yield a strong relationship to financial performance of the companies and should be considered as significant stimulant of financial performance.*

**Keywords** - Environmental Cost, Financial Performance, Profitability

## 1. INTODUCTION

Accounting is now faced with the challenge of accounting for the environment not only through its traditional role of recording and reporting financial information, but also by managing environmental cost. There is an increasing interest in environmental protection at all levels. This is clear after the issuance of environmental regulations in most countries as the quest for new solutions to prevent environmental degradation intensifies. The model through which regulatory solutions are designed and implemented by public agencies on different entities is becoming increasingly outdated. So, economics and more specifically accounting can perform an important role in relation to environmental issues.

The inclusion of environmental dimension in the traditional accounting system at all levels (company, sector, government and nation-wide) will result in adjustment to economic indicators including financial performance. This will enable different users at all levels to take sound decisions that support sustainable development. Environmental cost, however, has many meaning and uses. In this context, Environmental cost is seen as the cost incurred on natural resource at macro level, ecological accounting at local administration level and at micro level related to financial accounting, cost accounting or managerial accounting (Osemene and Olaoye 2009).

Environmental cost is cost incurred in monetary value for prevention and reduction of environmental impact as well as cost of restoration and removal after damage. It has to do with all allocated cost for the prevention, reduction and or avoidance of environmental impact, removal of such impact, restoration in the case of occurrence of a disaster and other activities.

Environmental costs within a business area are cost for activities to reduce environmental impact which occurs within the business area due to key business operations. The business area is the region of operations where the company directly impacts the environment. Environmental cost in this case is composed of cost of pollution prevention, cost of environmental performance and cost of resource recycling.

Financial performance is a major key in all economic decision making relating to public and private companies to identify the difficult and hidden cost (Chashim & Fadaee 2016). Financial performances are a quantitative ration of how well a firm uses assets from its business operations and generate revenues. The Financial performance is also seen as

a measure of a firm's overall financial health over a given period of time.

Analyzing environmental information to determine the extent of effect it has on financial performance in a manufacturing firm includes analysis and interpretation of financial statements in such a way that it undertakes full diagnosis of the profitability and financial soundness of the firm.

Lately, a great deal of interest has been focused on the relation between business activities and environmental issues as companies are now expected to be more environmentally responsible (Christmann & Taylor 2001). An increasing number of companies worldwide are putting in place environmental management systems as part of their efforts towards better environmental cost management (Melnyk, Sroufe & Calantone 2003). Measuring environmental cost and setting targets is a critical component for organizations to become more productive, more profitable, and more sustainable (Freedman, 2006). Monitoring key metrics such as energy, waste, and water usage leads to reductions in greenhouse gas emissions as well as operational efficiency improvements and cost savings.

When environmental costs are not adequately allocated, cross-subsidization occurs between products. In most cases, different products are made by different processes, and each process tends to have a different environmental cost (Christ & Burritt, 2013).

Accountants, as the basic custodian and light bearer of economic development can no longer shut their eyes to the effect of environmental issues on business management, accounting, auditing and disclosure system. Protection of environment and the potential involvement of accountant is becoming a common subject of discussion among the accountant all over the world (Pramanik, Shil & Das, 2007). Accountants are expected to take a proactive role in the environmental protection process with the advent of liberalization, remove of trade barriers makes it logical that the costs of environmental degradation due to industrial activities should be internalized incorporate account to the extent possible, that is why environmental accounting therefore is of paramount importance today (Pellegrino & Lodhia, 2012).

Nigeria has indeed moved from a cement import dependent nation to a cement manufacturing country with an increasing production volume of a capacity of about 10 million metric tons per annum as at 2013 and a target of 25 million metric tons per annum by the year 2020, yet the production cost of cement in Nigeria remains one of the highest globally (Chete, Adeoti, Adeyinka and Ogundele 2015). The costs are subsequently built in the cement pricing and passed on to the final consumers and this limits the volumes purchased.

A good number of scholars have contributed to the wealth of knowledge on Environmental cost and financial performance but with concentration on the industrialized nations and in most part of Asia with very few studies conducted in Africa and particularly Nigeria. This study aim to examine the effect of environmental cost savings on financial performance by exploring what manufacturing industries are doing to promote effective environmental management and the extent to which they are applying environmental cost savings in their accounting systems.

## 2. METHODOLOGY

Population and sampling

Two cement manufacturing companies quoted on the Nigerian Stock Exchange were purposively selected going by the availability of their annual financial report and the fact that the two companies constitutes over 70% of the cement production capacity of the country.

Sample size of four hundred and eighty four (484) respondents were selected using stratified sampling technique, this being in line with Bailey (1994) who recommended a minimum sample size of one hundred (100) respondents being sufficient for most researches. It is also in line with Roscoe Rule of Thumb that states that a sample size between thirty (30) and five hundred (500) is sufficient. After which simple random sampling will be employed for selection of items for the sample from each stratum.

The sample size was arrived at by using Glenn, 2005 formula;

$$\boldsymbol{n = \frac{N}{1 + N\,(e)^2}}$$

Where: n = Sample Size

N = Population Size

e = level of precision/ sampling error

Data collection method

Both primary and secondary data were sourced for this study. Primary data was obtained from management and other workers of the cement companies. A questionnaire with closed ended questions was applied for collecting data. Secondary data was collected from audited annual reports and accounts. This was used in investigating the state of financial performance.

## 3. DATA ANALYSIS

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This study made use of both descriptive and inferential statistics. Data was collected, coded, edited and input in a Statistical Package for Social Science (SPSS). Altman Z-Score model was employed to determine the state of financial health of the cement companies

The model is specified below:

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1X5$$

Where:

X1 = Working Capital / Total Assets

X2 = Retained Earnings / Total Assets

X3 = Earnings Before Interest and Taxes / Total Assets

X4 = Market Value of Equity / Total Liabilities

X5 = Sales / Total Assets

The expectation is that Environmental Management Accounting has a positive relationship with the Z- Score index.

## 4. RESULTS

### Environmental Cost Saving

Table 1 presented the distribution of respondents by tracking of environmental cost saving. Based on the result, the fact that operations that are significantly related to environmental concern in the company are identified was ranked highest with a heighted mean score (WMS) of 4.82. Moreover, the belief that the company often monitor disposal of any hazardous waste generated by our operations was ranked second with WMS of 4.44. Ascertain that management always encourage employee to take initiative that reduces environmental impact was ranked third with WMS of 4.08 while the assumption that company account well for investment on environmental issues was ranked forth with WMS of 4.17. However, the fact that the management always seeks to protect vulnerable groups in communities directly affected by their operations was ranked lowest with WMS of 4.08.

| 1.0 | Environmental Cost Saving | Strongly Agree | Agree | Not Sure | Disagree | Strong Disagree | WMS | Rank |
|---|---|---|---|---|---|---|---|---|
| 1.1 | Our company account well for investment on environmental issues | 47 (17.0) | 230 (83.00 | 0(0.0) | 0(0.0) | 0(0.0) | 4.17 | 4th |
| 1.2 | Our company often monitor disposal of any hazardous waste generated by our operation | 125 (45.1) | 151 (54.5) | 0(0.0) | 1(0.4) | 0(0.0) | 4.44 | 2nd |
| 1.3 | Operation that are significantly related to environmental concern in our company have been identify | 230 (83.0) | 46 (16.6) | 1 (0.4) | 0(0.0) | 0(0.0) | 4.82 | 1st |
| 1.4 | Management always encourage employee to take initiative that reduces environmental impact | 121 (43.7) | 155(56.0 | 1(0.4) | 0(0.0) | 0(0.0) | 4.43 | 3rd |
| 1.5 | The management always seeks to protect vulnerable groups in communities directly affected by our operation | 22 (7.9) | 255(92.1) | 0(0.0) | 0(0.0) | 0(0.0) | 4.08 | 5th |

### Financial Performance

The result in Table 2 shows the absolute financial performance of the companies, the result is generated with the aid of Altman Z Score. It was found from the result that the year 2014 with the Z- Score of 2.598, 2015 (2.832), 20117 (2.203) and 20118 (2.284) were all in the Gray Zone coverage of Altman Z- Score. The year 2013 (3.850) and 2016 (3.133) were both in the safe zone of Altman Z- Score. This may be due to higher demand for cement and its bye-products or as a result of change in government policies and that of the industry regulatory agencies. The average Z-Score for the cement industry in Nigeria was found to be 2.817 which are in the Gray Zone coverage of Altman Z-Score. This shows that the cement manufacturing sector of Nigeria's economy needs adequate monitoring and support from all stakeholders so as to avoid collapse or going bankruptcy.

| INPUT | FINANCIAL RATIO | YEAR 2013 | YEAR 2014 | YEAR 2015 | YEAR 2016 | YEAR 2017 | YEAR 2018 |
|---|---|---|---|---|---|---|---|
| **X1** | Working Capital/Total Assets (WC/TA) | 0.006 | (0.025) | (0.022) | (0.022) | (0.117) | 0.038 |
| **X2** | Retained Earnings/Total Assets (RE/TA) | 1.188 | 0.505 | 0.764 | 0.824 | 0.264 | 0.269 |
| **X3** | Earnings Before Interest and Tax/Total Assets (EBIT/TA) | 0.851 | 0.757 | 0.680 | 0.747 | 0.754 | 0.705 |
| **X4** | Market Value of Equity/Total Liability (MV/TL) | 1.206 | 0.904 | 0.957 | 1.126 | 0.904 | 0.829 |
| **X5** | Sales/Total Assets (S/TA) | 0.599 | 0.458 | 0.453 | 0.458 | 0.398 | 0.443 |
| **Z-SCORE** | **2.817** | **3.850** | **2.598** | **2.832** | **3.133** | **2.203** | **2.284** |

**Relationship between Environmental Cost Savings and Financial Performance**

Based on the result of regression model, the Environmental Cost Savings (t=4.174***) was significantly (P≤0.05) related with financial performance of the company. The relationship is positive (proportional) which implies that a unit increase in the tracking of environmental cost will influence a correspondence increase in the financial performance. It was also observed that the predictor variable had about 24.4% influences on the financial performance of the company.

**REGRESSION**

**Model summary**

| Model | R | R-square | Adjusted R square | Std. Error of the estimate |
|---|---|---|---|---|
| 1 | .244[a] | .060 | .056 | 1.261 |

a. Predictors: (Constant),TEC index

**ANOVA[a]**

| Model | | Sum of squares | Df | Mean square | F | Sig |
|---|---|---|---|---|---|---|
| 1 | Regression<br>Residual<br>Total | 27.686<br>437.228<br>464.924 | 1<br>275<br>276 | 27.696<br>1.590 | 17.420 | .000[b] |

a. Dependent Variable: FP index

b. Predictors: (Constant), TEC index

**Coefficients[a]**

| Model | | Unstandaridized Coefficients | | Standadrdized Coefficients | T | Sig |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (constant ) | 6.958 | 2.535 | | 2.745 | .006 |
| | TEC index | .482 | .115 | .244 | 4.174 | .000 |

a. Dependent variable : FP index

## 5. DISCUSSION ON FINDINGS

The research found that established procedures for tracking the company's cost commitment to environmental issues were in place. The findings is in accordance with the work of Christopher (2014) where he asserts that managers believe that implementation of Environmental Management Accounting systems in their organization was costly and they also incorrectly believed that customers were more focused on quality and lower prices than environmental responsibility. It is also in consonance with Porter & Esty (1998) that organizations are finding resource-saving opportunities by tracking of environmental cost saving opportunities that are bringing down costs and improving efficiency. Greg & Raymond also held that, a firm that can effectively control pollution might also be able to effectively control other costs of production and hence earn a higher rate of return.

Environmental costs are no longer a minor cost item which can be pooled together with other costs; the use of environmental management accounting saves money and improves control. There exists a positive and significant relationship between variables of the environmental management accounting. Environmental information, environmental cost savings, tracking of environmental cost savings and compliance to environmental laws are significantly and positively related to perceived financial performance of corporate organizations. This therefore implies that the above have a positive effect on financial performance of cement manufacturing companies (Magara, Aming & Momanyi 2015).

## 6. CONCLUSION

Sequel to the findings of this study, it was concluded that environmental cost savings is significant and positively related to financial performance of the cement industry in Nigeria. Integrating cost into pricing is a pathway to innovation and an efficient means to lower costs. This translates that spending on environmentally related concerns will boost the financial performance of cement manufacturing companies in Nigeria. Furthermore, management of cement manufacturing companies should increase their involvements in environmental cost activities for improved financial performance.

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