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Research Article

Responsiveness of Organizational Performance to Environmental Accounting Information of Motor Vehicle Manufacturing Organizations in South East Nigeria

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***ABSTRACT*:** *This study is aimed at examining the responsiveness of organizational performance to environmental accounting information of motor vehicle manufacturing firms in South East, Nigeria. Past studies show that there is a gap as a result of gross inadequacy in including environmental costs in processing firm accounting information. The data sources were mainly primary. The simple survey design was used in carrying out the research, employing questionnaire method, interviews, phone calls and e-mails. Judgmental techniques were employed in the sample selection from the population. Hypotheses formulated were tested, using appropriate test statistics, Analysis of Variance (ANOVA) for Hypothesis 1 and the Pearson's product moment correlation co-efficient (PPMCC) for Hypothesis II. Data collected were presented using tables, figures, and analyzed with the appropriate test statistic as mentioned above. The results of the hypotheses testing reveal as follows: Hypothesis I: Environmental cost allocation processes adopted by motor vehicle manufacturing firms in South East, Nigeria are not significantly different. Hypothesis II: There is significant positive relationship between environmental cost and firm profitability. The study revealed that environmentally- friendly firms perform better. It is relevant to the extent that the management of the motor vehicle manufacturing firms should make use of the result to plan the firms' operations to achieve effective performance. It is suggested that future works should address the issue of Environmental Accounting Information with respect to non-motor vehicle manufacturing firms.*

Keywords: *Environmental accounting information, environmental cost allocation, firm profitability, motor vehicle manufacturing organizations, organizational performance.*

I. INTRODUCTION

The importance of Environmental Management Accounting (EMA) can never be over-emphasized. It is becoming increasingly important for Environmental Management decisions, as well as for all types of routine management activities. Environmental accounting data is mainly used by the management of organizations to carry out their

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internal processes. Environmental Accounting Information has a very important role to play in organizational performance. As indicated previously, a good number of authors like Allewine and Stone on environmental issues and environmental accounting in particular, have given a variety of meanings to the term environmental accounting. Most importantly, environmental accounting can be seen as a means whereby environmental costs are identified and reported on by accountants. Such environmental costs can be liability costs or costs of waste disposal. In a broader explanation, environmental accounting can be seen beyond just accounting for environmental costs and benefits. As a matter of fact, both the form and presence of environmental accounting information influence decision-making.[1]. The issue, in particular, is to examine if environmental costs have any impact on organizational performance in Nigeria, and in particular to ascertain how that impact has influenced the performance of motor vehicle manufacturing firms in some selected states in the South East of Nigeria.

1.1 Statement of the Problem

The conventional accounting methods which include the conventional approaches to cost accounting have become grossly inadequate and incomprehensive in identifying the extent of growth and development in the economy. This can be clearly seen from the fact that accountants have either knowingly or unknowingly ignored important environmental costs or activities impacting consequences on the environment which affect firms' performance. Sustainable development cannot be said to be applicable in the economy without environmental dimensions.[2].It is like there is in existence corporate neglect and avoidance of environmental costing which has left a gap of financial incompleteness and absence of fair view of financial information reporting to users of financial information, environmental regulatory agencies, and the general public.[3]. Furthermore, it is like there is an apparent lack of awareness and understanding of the magnitude of the environmental costs generated by firms. Consequently, many opportunities for cost savings through good environmental management are lost.[4]. Many manufacturing organizations in Nigeria act in a manner that suggests that they can achieve corporate goals even if environmental costs and social responsibilities are trampled upon. [5]Most of the time, there seems to be lack of sustainability awareness in our manufacturing organizations and lack of the expected organizational positive performance in most organizations. [5].

1.2 Objectives of the Study

The general objective of the study is to examine the responsiveness of organizational performance to environmental accounting information in the motor vehicle manufacturing firms in the South East, Nigeria.

Arising from the general objective are the following specific objectives: to

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i) Identify the prevalent environmental costs allocation processes within the accounting system of motor vehicle manufacturing firms in the South East, Nigeria.

ii) Determine the relationship between environmental cost and firm profitability of motor vehicle manufacturing firms in the South East, Nigeria.

1.3 Research Questions

Two major research questions arise from the objectives stated above. These are:

i. How far do motor vehicle manufacturing firms in the South East, Nigeria put into consideration environmental costs allocation processes in their accounting systems?
ii. What is the extent of the relationship between environmental cost and firm profitability in motor vehicle manufacturing firms in the South East, Nigeria?

1.4 Research Hypotheses

i) The environmental costs allocation processes adopted by motor vehicle manufacturing firms in the South East, Nigeria are significantly different (not the same).

ii) There is no significant relationship between environmental cost and firm profitability in the motor vehicle manufacturing firms in the South East, Nigeria.

1.5 The Scope of the Study

This study carried out research on the perceived impact of environmental accounting information on the performance of manufacturing firms in Anambra, Ebonyi and Enugu States of the South East, Nigeria. These are the only states of the South East where visible and viable motor vehicle manufacturing firms are found. The motor vehicle industry tends to be lucrative in Nigeria recently, especially in the South East. Secondly, so far no work has been done on the motor vehicle industry. This work is indeed an addition to literature. Investigations were done only on such firms that are registered with the Manufacturers Association of Nigeria (MAN).[6], [7] & [8].

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Table 1: The Distribution of the Manufacturing Firms in the Selected States of the South East Nigeria is as Follows:

STATE	NO. OF MANUFACTURING FIRMS
Anambra State	112
Ebonyi State	3
Enugu State	34
Total	149

Source: MAN Directory, 2012; MAN, Annual General Meeting (AGM), 2013 & 2014)

Anambra State---112, Ebonyi State---3, Enugu State---34, thereby, giving a total of 149 (one hundred and forty-nine) firms. (MAN Directory, 2012; MAN, Annual General Meeting (AGM), 2013 & 2014).

Table 2: The Distribution of the Motor Vehicle Manufacturing (MVM) Firms in the Selected States of the South East, Nigeria is as Follows:

STATE	NO. OF MVM FIRMS
Anambra State	1
Ebonyi State	0
Enugu State	3
Total	4

Source: MAN Directory, 2012; MAN, Annual General Meeting (AGM), 2013 & 2014)

Anambra State---1, Ebonyi State---0, and Enugu State---3 thereby, giving a total of 4 (four) motor vehicle manufacturing firms.

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Table 3: The Distribution of the Staff Strength of the Selected Motor Vehicle Manufacturing Firms is as Follows:

MVM FIRM	STAFF STRENGHT
ANAMMCO	1000
INNOSON (IVM)	2000
COSPAM	50
UNION	700
Total	3750

Source: MAN Directory, 2012; MAN, Annual General Meeting (AGM), 2013 & 2014)

ANAMMCO = 1000, INNOSON = 2000, COSPAM = 50, and UNION = 50, thereby, giving a total of 5000.

Table 4: The Distribution of Management Staff Strength of the Selected Motor Vehicle Manufacturing Firms is as Follows:

MVM FIRM	MANAGEMENT STAFF STRENGHT
ANAMMCO	30
INNOSON (IVM)	25
COSPAM	25
UNION	20
Total	100

Source: MAN Directory, 2012; MAN, Annual General Meeting (AGM), 2013 & 2014)

ANAMMCO = 30, INNOSON = 25, COSPAM = 25, UNION = 20, thereby giving a total of 100. Imo and Abia States are conspicuously excluded from the scope of study since they do not have any visible and viable motor vehicle manufacturing organization.

II. REVIEW OF RELATED LITERATURE

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Conventional accounting practices lay emphases mainly on the economic aspects of firm operations. The inclusion of environmental consciousness is an improvement on firm operations. In this work we have reviewed the works of previous researchers both theoretically and empirically. We also looked at various environmental accounting concepts and theories which have greatly impacted positively on firm operations and performance.

2.1 Theoretical Review

Many renowned authors and researchers have studies on Environmental Issues relating to Accounting Processes with respect to firm performance. The main issue in the Environmental Agenda is pollution. Pollution is the introduction of harmful substances to the air, land and water. The Environmental Agenda is a global issue, which is a broad description that is often used to explain matters of great social concern that affect human population locally, and are shared among diverse human societies within our global human community. A number of theories have been postulated with respect to the environmental accounting issues. Some of them are explained below as follows:

2.2 Gray et al's Theory

[9] theory popularly referred to as Gray et al's theory, says that Environmental Accounting can represent new voices, new visibilities and new discoveries. They went further to say that these can disrupt as well as encourage possibilities of change. These authors in their theory not only had in mind to contribute towards the environmental agenda, but to dispute the criticism mentioned above. However, their argument against the above criticism failed. In the bid to provide arguments against the criticism they ended up supporting it. Some other authors contributed significantly in discussing the importance of environmental accounting information, its historical development and structure, its concerns with regards to business organizations, environmental cost accounting, environmental accounting and reporting, environmental report audit, as well as its associated problems.[10],[4].

2.3Polluter Pays Principle (PPP)

It is an already known fact that Environmental Cost Accounting (ECA) deals with environmental costs in order to reach the full cost accounting. The full cost accounting is the identification, evaluation, and allocation of conventional costs, environmental costs, and social costs to processes, products, activities, or budgets. However, according to the Polluter Pays Principle (PPP), each polluter has to pay for the costs for dealing with the pollution resulting from his operation. In environmental law, the polluter pays principle is enacted to make the party responsible for producing pollution responsible for paying for the damage done to the natural environment. It is regarded as a regional custom because of the strong support it has received in most Organization for Economic Co-operation and Development (OECD) and European Community (EC) countries. Failure to bear these costs by the polluter will mean that some other party (a third party) will have to shoulder them - external environmental costs.

III. CONCEPTUAL FRAMEWORK

3.1 The Impact of Environmental Information Framework

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Environmental information framework is undergoing a developmental process. It contributes standards for reporting, and standards for accounting. [11] gave a state of regulatory framework. The emphasis of a framework is to provide a fit over the area regulated as follows:

(i) Awareness of environmental issues being raised
(ii) Guidelines to assist identification of environmental issues, evaluation and reporting of these issues being developed.
(iii) Education programs across disciplines focused on environmental issues and their accounting treatment being provided
(iv) Practices of environmental accounting, with recommendations on best practices being developed.

The essence of environmental framework is to demonstrate that the accounting profession is accepting the challenge of a contemporary issue which actually is the environmental impact of business activity. The relevance of the main focus of accounting professionals with respect to environmental issues can never be over-emphasized. As a matter of fact, environmental accounting professionals appear to focus on the role of environmental accounting, under the consideration that environmental issues are fundamental not only to human survival, but to firm performance.

3.2 Uses and importance of Environmental Accounting

An important question to ask is whether there is any need for environmental accounting at all. In the first instance, it has to be recognized that business must necessarily incur costs in their bid to provide goods and services to their various customers. In this vain therefore it is recognized that environmental costs are good examples of such costs. Performance measurement practices are normally used to measure business successes. In like manner, environmental performance is an important measure of business success. It is important to observe that both environmental costs and environmental performance are relevant to measuring business success and as such need management attention according to[12] as outlined below.

i) [12],pointed out very intelligently that many environmental costs can be significantly reduced or eliminated as a result of business decisions, ranging from operational and housekeeping changes, to investment in “greener” process technology, to redesign of processes/products. He went further to say that many environmental costs, (for instance, wasted raw materials) may provide no added value to a process, system, or product.

ii) He pointed out that environmental costs may be overlooked in overhead accounts.

iii) He brilliantly alluded that many companies have discovered that environmental costs can be offset by generating revenues through sale of waste by-products or transferable pollution allowances, or licensing of clean technologies.

iv) When environmental costs are managed better, it can give rise to improved environmental performance and significant benefits to human health, including business success.

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v) the understanding of environmental costs and performance of processes and products can promote more accurate costing and pricing of products and can aid companies in the design of more environmentally preferable processes, products, and services for the future.

vi)[12] went further to advance the sixth reason for environmental accounting being that competitive advantage from customers can result from processes, products, and services that can be demonstrated to be environmentally preferable.

vii)Furthermore, the Environmental Accounting covered in the guidelines 2005, Ministry of Environmental Issues of Japan made it comprehensively clear that the results of Environmental Accounting can be used for analysis and evaluations.

IV. REVIEW OF RELATED EMPIRICAL STUDIES

Many accountants in the profession and in the academia have written much on the world-wide acclaimed and wildly-growing topic relating to the Environmental Agenda. Some renowned researchers and authors have observed a growing number of environmental information published in corporate reports as being optimistic. [13] (Rubenstein, 1992). The above named authors on environmental agenda in relation to environmental accounting and organizational change have interpreted the environmental information process as the construction of new views that could strengthen an environmentalist's point of view of business operations. [14] also saw[13] as a Trojan horse into the conventional managerial view of the organizations which is leading man to live in dangerous times.

Nevertheless, it is not possible that the hopeful view of environmental accounting as the most evolved aspect of sustainability and accountability in the business world would just escape without generating some strong criticisms. Tinker, et. al. (1991) and Cooper (1992) criticized the role of environmental accounting with respect to organizational change to the extent of arguing that environmental accounting is suffering from conservative bias simply because it avoids political issues thereby failing to articulate the mechanism of change. A second criticism against environmental accounting was by Power (1991). He argued that inherent to the creation of new areas of expertise by accountants in particular is the danger of premature disclosure (or appropriation) of the environmental agenda. Power (1991) also argues that environmental accounting tries to avoid departure from the conventional business accounting management. It is important to recognize that the above criticisms against the environmental accounting roles in relation to organizational change were what actually led these great minds, [13] delve into some hair splitting research on the matter, with the aim of proving that environmental accounting can represent new voices, new visibilities and new discourses which cannot only encourage possibilities of change but will also disrupt

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it. Grey et. al. had in mind not only to contribute towards the environmental agenda, but to dispute the criticisms mentioned above. However, their arguments against the above criticisms failed. In the bid to provide arguments against the criticisms they ended up concluding that environmental accounting not only involves a trade-off between transparency and control, but that it is being used at present to negotiate and to limit the concept of the environment. According to [12] in his write-up "Environmental Accounting : Concepts And Principles", he made it clear that Environmental Accounting Information need not be the product of accountants, nor need it be used by accountants alone. Furthermore, he said that it is any information with either explicit or implicit financial content that is used as an input to a firm's decision-making; and that Product designers, financial analysts, and facility managers are equally likely to be the users of environmental accounting data. It is already known by most, if not all who are acquainted with environmental accounting that environmental accounting is an inclusive field of accounting. They have also identified that environmental accounting provides reports for both internal use, generating environmental information to help make management decisions on pricing, controlling overhead and capital budgeting, and external use, disclosing environmental information of interest to the public and to the corporate/financial community.[11]. Interestingly, there have been numerous prior studies that have concentrated on the views of accounting practitioners with regard to their role in environmental accounting. The findings of studies by authors such as[14],[15], [16] and[17] indicate that presently, accountants are not extensively involved in the practices of environmental accounting by business entities. As [13] suggest, accountants are not involved in trying to put in place organizational change through the incorporation of environmental accounting strategies into the accounting practices of business entities that are conventional. [13,14]It is a well-known fact that accountants have not come to the knowledgethat their skills could be utilized in creating a heightened awareness of environmental sensitivity in organizations.

V. METHODOLOGY

The research design for the study rested mainly on survey method which relied on primary data derived from an extensive field survey on the manufacturing firms established in the Anambra, Ebonyi and Enugu States of the South East Zone of Nigeria that are registered with (Manufacturers Association of Nigeria (MAN). The list of manufacturing firms in the affected states was obtained from both the Directory [6] and Annual General Meeting [7]of Manufacturers Association of Nigeria (MAN). The manufacturing firms in the motor vehicle industry in the selected states are four (4) in number. The data for the study were sourced from both Primary and Secondary

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sources. The primary source of data was through carrying out a survey to gather quantitative and qualitative. A combination of both open-ended and closed-ended questions was designed. Face-to-face administration of the questionnaire was applied also.

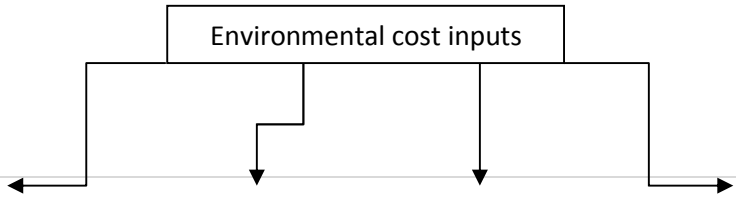
5.1 Brief Profile of the Motor-vehicle organizations understudied

(i) Anambra Motor Manufacturing Company (ANAMCO) Limited, Enugu State.
Factory Address: Airport Road, Emene Industrial Layout Enugu. Enugu, State.
Corporate Office: same as above.
Year of Establishment: 1997. MAN Registration: RC. No.20106.
Products: Buses and Trucks for Haulage, Disposal & Fire-fighting, etc. Brand Name(s): Mercedes Benz.

(ii) COSPAM NIG. LTD, Nsukka, Enugu State.
Factory Address: 124-126, Enugu Road, Nsukka.
Corporate Office: 17, Nise St, Uwani-Enugu.
Year of Establishment: 2004. MAN Registration No. : RC. No.
Products: Fire-fighting Vehicles and equipments.

(iii) INNOSON VEHICLE MFG. CO. LTD., Nnewi, Anambra State.
Factory Address: Innoson Industrial Estate, Umudim.
Year of Establishment :2009 MAN Registration: RC. No. 681355.
Products :Waste Disposal Vans, SUVs, Buses & Trucks Brand Name (s): IVM.
(iv) UNIONS AUTO PARTS MANUFACTURING CO. LTD Nnewi, Anambara State.
Factory Address: 60/61 IgweOrizu Rd, Otolo, Nnewi.
Corporate Office: as above.
Year of Establishment :1992. MAN Registration: RC. No.
Products: Automobile Spare parts e.g Shoe brake pads

5.2. Model: Environmental Cost Impact on Performance.(Adopted &Modified).



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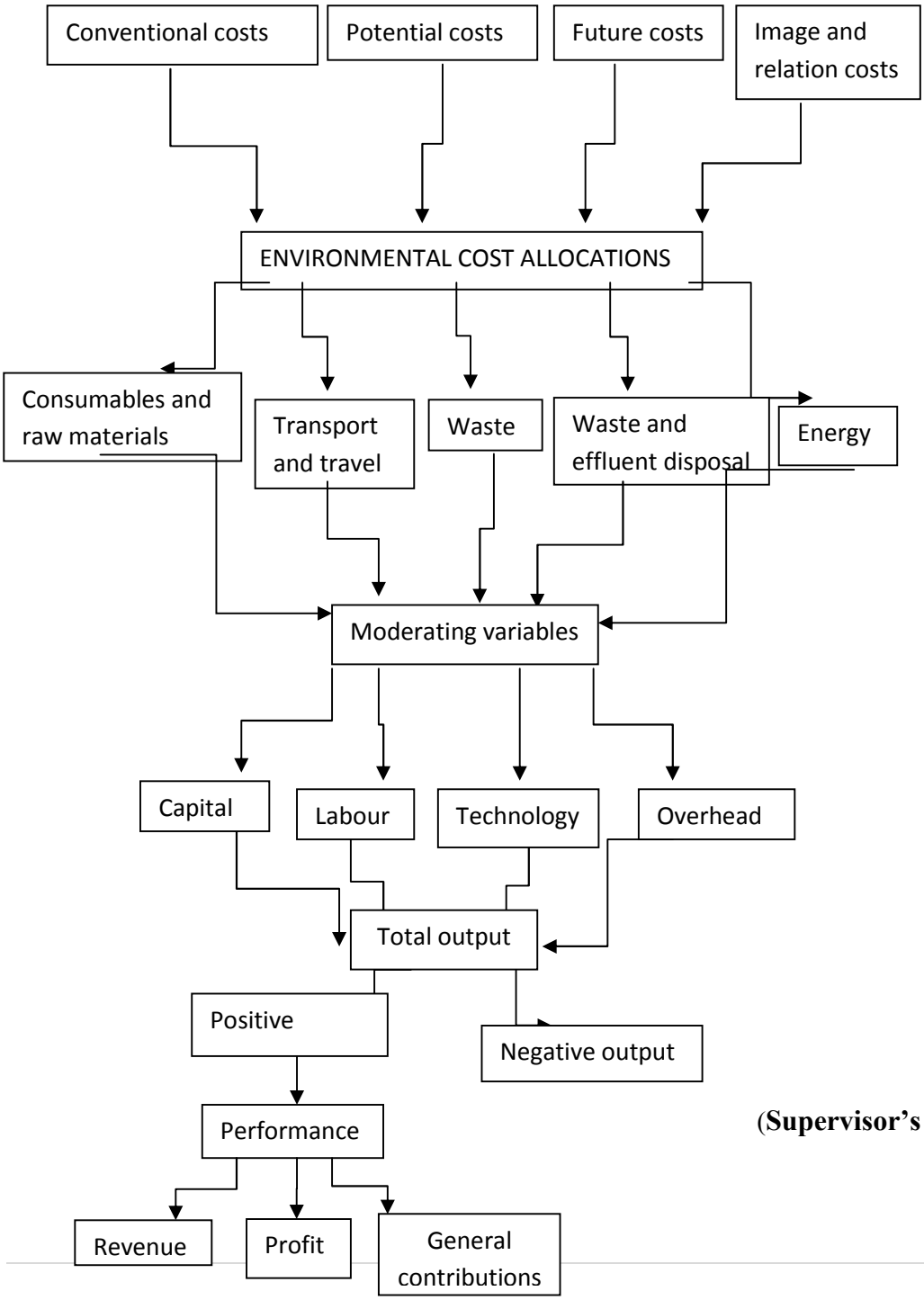

(Supervisor's Concept)

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5.3 Model Specifications:

Performance =f ∑[CRC + FRC + PHC + IRC]

Performance Model is therefore given as follows:

Performance = a + bCRC + b^{2FR}R +b^{3}PHC + b^{4}IRC + e…

Where,

CRC = Average Conventional Resource Costs

FRC = Average Future Resources Costs

PHC = Average Potential Hidden Costs

IRC = Average Image and Relationship Costs

e = error term

b_1-b_4 = co-efficient of determination.

If the co-efficient of determination is not significant, then one can argue that there is no significant relationship between cost and performance. However, where otherwise, it means that there is significant relationship between cost and performance.

5.4. Test of hypotheses and analysis of data

The simple survey design was used in carrying out the research, employing questionnaire method, interviews, phone calls and e-mails. Judgmental techniques were employed in the sample selection from the population. Hypotheses formulated were tested, using appropriate test statistics, Analysis of Variance (ANOVA) for Hypothesis 1 and the Pearson's product moment correlation co-efficient (PPMCC) for Hypothesis II. Data collected were presented using tables, figures, and analyzed with the appropriate test statistic as mentioned above. The results of the hypotheses testing reveal as follows: Hypothesis I: Environmental cost allocation processes adopted by motor vehicle manufacturing firms in South East, Nigeria are not significantly different ($p>0.05$). Hypothesis II There is significant positive relationship between environmental cost and firm profitability ($p<0.05$). In ANOVA, we set the NULL hypothesis which states that the environmental costs allocation processes adopted by motor vehicle manufacturing firms in Nigeria are significantly different.
The hypothesis is stated as follows:

H_o: $x_1 = x_2 = x_3$[The environmental costs allocation processes adopted by motor vehicle manufacturing firms in Nigeria are significantly different].

Vs

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H_1: $\ddot{x}_1 \neq \ddot{x}_2 \neq \ddot{x}_3$ [The environmental costs allocation processes adopted by motor vehicle manufacturing firms in Nigeria are not significantly different].

Decision Rule:

Two approaches were used in analyzing the variables:

1) The variability determined by difference between the group means, which are from experimental manipulation or treatment. It is represented by the:
sum of squares between groups (SS_b), or mean squares between groups (MS_b)

2) The variability determined by the difference within the groups. This implies that the difference is due to sampling error or other factors and it is represented by the:
sum of squares within groups (SS_w), or mean squares within groups (WS_w).

a) The sum of squares is converted into estimate variance when each is divided by its appropriate degrees of freedom. Thus the variance estimate for group treatment is:
($SS_b/\delta F_b$) Where,δF_b is the degree of freedom between treatment groups;
While, the error variance estimated within the group treatment is:
($SS_w/\delta F_w$).Where, δF_w is the degree of freedom within treatment groups;
Thus, the ultimate decision rule is that if the rate of -MS_b to MS_w is greater than one, and then it will be too great to attribute variance in mean to sampling error.
This implies that the difference is attributed to experimental treatment and as such the F- ratio (named after Fisher) is adopted for ANOVA.
That is (MS_b/MS_w).
The critical value of F (from F- table) is compared with the F- ratio obtained from calculated to test the NULL hypothesis at a selected level of significance (normally 5% level).
For between treatment, we have where SS_b or K – sample means $=(\sum x_1)^2/n_1+(\sum x_2)^2/n_2+(\sum x_3)^2/n_3)N$.
Degree of freedom (between) = K - 1 where K is the number of groups (states).
Therefore, $MS_b \Rightarrow MS_b = SS_b/\delta F_b$.

b) For within the group variation: the formula is $SS_t = \sum (x_1)^2+\sum (x_2)^2+\sum (x_3)^2 - N(\sum x)^2/N$.
Thus, the sum of squares within the group (SS_w) will be: $SS_w = SS_t - SS_b$
Where N is the number of samples
Degree of freedom $\delta F_w = N - K$

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Therefore $MS_w = MS_w = SS_w/\delta F_w$

Statistically: these can be represented in a table form as follows:

$\gamma = \mu + \alpha t + \sum ij$

γ = observation

$\gamma ij = \mu + \alpha t + \sum ij$

Where αt = effect of t^{th} treatment $\sum ij$ = random error treatment

Table 5: Analysis of Variance Table

Sources of variation	Δf	SS	MS	F
Between treatment	K – 1	S_T^2	S_T^2/k-1	
Within treatment	N – K	S_w^2	S_w^2/N-k	
Total sum of squares	N – 1	TSS		

ANOVA table: δf = degree of freedom, SS = Sum of Squares, MS = Mean Square Error, F = Fisher distribution K - 1 = (K) class of the observation (i.e. states), S_T^2 = sum of square treatment, S_w^2 = sum of squares between treatment, N - K = number of observations minus (-) the number of classes, N - 1 = total number of observation minus 1, TSS = total sum of squares corrected.

VI. RESULTS

From the above table, if F – critical (from table value) is more than F – calculated, i.e F- critical ≥ F- calculated, then, The NULL hypothesis H_o: will be accepted. (meaning that there is significant difference with environmental cost allocation processes). But if on the other hand, the F – calculated becomes more than the F – critical, i.e F-calculated ≥ F-critical, then, the NULL hypothesis will be rejected, while the alternative hypothesis will be accepted. (meaning that there is no significant difference in the environmental cost allocation processes).

With this scientific investigation on the manufacturing organizations in the country, this research result will create more impact on the establishment of manufacturing organizations in the country.

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6.1 The Pearson Product Moment Correlation (PPMCC)

This is a statistical index employed to measure the degree of association between variables. There may be series of pairs of observations of two or more variables. We may wish to measure the degree of closeness or relationship or association between them.

Therefore, the index of this correlation coefficient, r, is calculated using two main approaches:

(i) Deviation from means approach:

Where $r = \sum xiyi/(\sum xi^2)\ (\sum xi^2)$…………………..(1)

(ii) The actual values of observation approach:

Where $r = \sum XY\text{-}(\sum X)(\sum Y)/\sqrt{}n\sum X^2 - (\sum X)^2\sqrt{}\sum X^2 - (\sum X)^2$…………2

OR

Where $r = \sum XY\text{-}nXY/\sqrt{}\sum X\text{-}nX^2)\ \sqrt{}(\sum X\text{-}nY^{-2})$……………………..(3)

Using any of the formulae above, the relationship or association between the two variables can be calculated very easily.

6.2 Multiple Regression Model

A general linear multiple model can be illustrated as follows:

$Y= bo + b_1X_1 + b_2X_2 + b_3X_3+$……..$+b_kX_k$………………… (1)

In a situation like this, one can conclusively allude that the dependent variable, Y, is a function of K independent variables which are in the form of X_1, X_2, ………..X_K

In equation 1, assuming X = 1, for all observations 1 to n, then we can proceed to obtain the estimates of the true parameter of b_0, b_1, and b_2

$Y = b_0 + b_1X_1 + b_2X_2$…………………………………………….(2)

With b_0, b_1, and $b_{2,}$ as being estimates of the true parameters. To calculate these parameters, the relevant formulae is stated as follows:

$.b_1 = (\sum x_iy_i)\ (\sum x_2{}^2i) - (\sum x_{2i}y_i)\ (\sum x_{2i})$

Hypothesis 1
We restate Hypothesis 1 in Null Hypothesis (H_o) and Alternative Hypothesis (H_1) forms as follows:

H_o The environmental costs allocation processes adopted by motor vehicle manufacturing firms in Nigeria are significantly different. (not the same).

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H_1The environmental costs allocation processes adopted by motor vehicle manufacturing firms in Nigeria are not significantly different. (are the same).

Decision rule

(Rule a): Accept H_o and Reject H_1 if critical value F >0.05 and calculated value F<0.05, under the critical condition alpha α =0.05 level of significance.

(Rule b): Reject H_o and Accept H_1 if critical value F <0.05 and calculated value F>0.05, under the critical condition alpha α =0.05 level of significance.

Presentation of Relevant Results and Analysis

We hereby present the Analysis of Variance (ANOVA) method of data analysis using SPSS Version 17 from Table 6 below:

(1) Within group mean square calculated value =0.696 and, within groups mean square critical value = 0.00.which implies, F-calculated (0.696) > F- critical (0.00).

(2) Within group sum of squares calculated value = 66.850 and, within group sum of squares critical value = 0.00 which implies, F-calculated (66.850) > F-critical (0.00).

(3) Within group mean square calculated value = 0.890 and within groups mean square critical value = 0.00.which implies, F-calculated (0.890) > F- critical (0.00).

Decision
Hence, the Null hypothesis (H_o) is rejected, while the Alternative hypothesis (H_1) is accepted which states that Environmental Cost Allocation processes adopted by motor vehicle manufacturing firms in Nigeria are not significantly different. (are the same).
Testing Hypothesis 1

Table 6: Environmental Cost Allocation Processes

ANOVA :ONEWAY

		Sum of Squares	Df	Mean Square	F	Sig.
Your Firm Generates Environmental Cost Data	Between Groups	29.660	3	9.887	14.198	.000
	Within Groups	66.850	96	.696		
	Total	96.510	99			
ECD is Generated as Part of the General Ledger System	Between Groups	38.583	3	12.861	19.810	.000
	Within Groups	62.327	96	.649		
	Total	100.910	99			
ECD is Generated as Part of	Between Groups	25.183	3	8.394	13.572	.000

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the Management Accounting System Differently from the general Ledger System	Within Groups	59.377	96	.619		
	Total	84.560	99			
ECD is Generated by Using Electronic Transfer System from the General Ledger System to the Management Accounting System	Between Groups	22.380	3	7.460	8.464	.000
	Within Groups	84.610	96	.881		
	Total	106.990	99			
ECD Generated is Classified Under Conventional, Potential, Contingent, Image and Relationship Costs	Between Groups	29.503	3	9.834	14.006	.000
	Within Groups	67.407	96	.702		
	Total	96.910	99			
Your Firm Adopts the Conventional cost Allocation process	Between Groups	29.043	3	9.681	14.185	.000
	Within Groups	65.517	96	.682		
	Total	94.560	99			
Your Firm Adopts the Potential Hidden Cost Allocation Process	Between Groups	35.103	3	11.701	19.486	.000
	Within Groups	57.647	96	.600		
	Total	92.750	99			
Your Firm Adopts the Contingent Cost Allocation Process	Between Groups	37.390	3	12.463	18.680	.000
	Within Groups	64.050	96	.667		
	Total	101.440	99			
Your Firm Adopts the Image and Relationship Cost Allocation Process	Between Groups	39.303	3	13.101	15.959	.000
	Within Groups	78.807	96	.821		
	Total	118.110	99			
The Different Environmental Cost Classifications in your Firm can be Identified as Follows: Consumables,Raw Material, Transport, Waste and Energy	Between Groups	29.180	3	9.727	12.804	.000
	Within Groups	72.930	96	.760		
	Total	102.110	99			
The Different Cost Moderating Variables Applicable in the ECD in your Firm can be Identified as Follows: Capital, Labour, Technology and Overhead	Between Groups	44.230	3	14.743	25.397	.000
	Within Groups	55.730	96	.581		
	Total	99.960	99			
The Following Internal Barriers Affect the Collection	Between Groups	22.533	3	7.511	7.939	.000
	Within Groups	90.827	96	.946		

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of ECD: i) Lack of Classification of Cost on Environmental Bases. ii) Lack of Trained Staff on Environmental Accounting	Total	113.360	99			
Environmental Costs Data are Tracked as Part of Overhead Costs	Between Groups	27.953	3	9.318	10.473	.000
	Within Groups	85.407	96	.890		
	Total	113.360	99			
Environmental Operating Expenditures are Tracked Independently of other Operating Expenditures	Between Groups	41.970	3	13.990	23.288	.000
	Within Groups	57.670	96	.601		
	Total	99.640	99			
The Techniques Used to Evaluate EnvironmentalProjects are Different from those used to Evaluate non-Environmental Projects	Between Groups	35.593	3	11.864	19.057	.000
	Within Groups	59.767	96	.623		
	Total	95.360	99			

Source: Field Survey (2014) with SPSS Version 17 Analysis of Variance (ANOVA).

The objective of this test is to find out how far the environmental costs allocation process adopted by motor vehicle manufacturing firms is being put into consideration in the firms' accounting systems. For all the tests which the fifteen questions represent, the SPSS Table shows that the P-value is zero (0.00). This means that with the P-value (0.00), the implication is that the calculated value is more than the critical F-value at $\alpha = 0.05$ level of significance. Hence we reject H_o and accept H_1: which states that Environmental Cost Allocation processes adopted by motor vehicle manufacturing firms in Nigeria are not significantly different (are the same).

Hypothesis 2

H_o There is no significant relationship between environmental cost and firm profitability in the motor vehicle manufacturing firms in Nigeria.

H_1 There is significant relationship between environmental cost and firm profitability in the motor vehicle manufacturing firms in Nigeria.

Decision Rule

(Rule a): Accept H_a and Reject H_o if critical value >0.05 and calculated value P<0.05, under the critical condition alpha α =0.05.

(Rule b): Reject H_a and Accept H_o if critical value <0.05 and calculated value P>0.05, under the critical condition alpha α =0.05.

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Presentation of Relevant Results and Analysis

We hereby present the Pearson's Product Moment Correlation Coefficient (PPMCC) method of data analysis using SPSS Version 17, from Table 7 e.g. (1) Correlation (r) between environmental cost and firm profitability: critical value >0.05 = 1, while calculated value P<0.05 = -0.137 which implies that the critical value (1) > calculated value (-0.137) e.g. (2) Correlation (r) between environmental cost and firm profitability: critical value>0.05 = (1), while calculated value P<0.05 = -0.403 which implies that the critical value (1) >calculated value (-0.403)e.g. (3) Correlation (r) between environmental cost and firm profitability: critical value >0.05 = 1, while calculated value P<0.05 = -0.375which implies that the critical value (1) >calculated value (-0.375).

Hence, H_o is rejected, while H_1 is accepted, which states that there is significant relationship between environmental cost and firm profitability in the motor vehicle manufacturing firms in Nigeria.

Testing Hypothesis 2

Table 7: shows the presentation of data and analysis of Hypothesis 2 with SPSS Version 17 Analysis, using Pearson's Product Moment Correlation Coefficient (PPMCC).

Table 7: Environmental cost and firm profitability

Test Statistic: Pearson's Product Moment Correlation Coefficient (PPMCC)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
Q1	1.000	0.774	-0.137	-0.697	0.494	0.568	0.503	0.552	0.247	0.686	0.413	0.567	0.374	0.469	0.478	0.456	0.362	0.363	0.405	0.408
Q2	0.774	1.000	-0.140	-0.614	0.334	0.501	0.469	0.448	0.246	0.673	0.428	0.546	0.369	0.583	0.558	0.425	0.335	0.442	0.498	0.483
Q3	-0.137	-0.140	1.000	-0.017	-0.108	-0.170	-0.128	-0.076	-0.040	-0.102	0.077	-0.072	-0.110	0.041	-0.060	-0.116	-0.194	-0.071	-0.074	-0.101
Q4	-0.697	-0.614	-0.017	1.000	-0.403	-0.523	-0.363	-0.410	-0.301	-0.495	-0.395	-0.373	-0.235	-0.412	-0.414	-0.353	-0.281	-0.259	-0.220	-0.375
Q5	0.494	0.334	-0.108	-0.403	1.000	0.400	0.153	0.269	0.171	0.345	0.160	0.171	0.165	0.167	0.411	0.356	0.209	0.356	0.066	0.275
Q6	0.568	0.501	-0.170	-0.523	0.400	1.000	0.591	0.530	0.219	0.419	0.333	0.275	0.223	0.339	0.291	0.360	0.277	0.387	0.426	0.342
Q7	0.503	0.469	-0.128	-0.363	0.153	0.591	1.000	0.733	0.350	0.433	0.311	0.386	0.426	0.381	0.247	0.419	0.295	0.314	0.455	0.387
Q8	0.552	0.448	-0.076	-0.410	0.2	0.53	0.733	1.000	0.299	0.404	0.292	0.336	0.307	0.316	0.285	0.578	0.364	0.298	0.347	0.309

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					69	0														
Q9	0.247	0.246	-0.040	-0.301	0.171	0.219	0.350	0.299	1.000	0.318	0.203	0.221	0.382	0.251	0.105	0.306	0.337	0.449	0.276	0.415
Q10	0.686	0.673	-0.102	-0.495	0.345	0.419	0.433	0.404	0.318	1.000	0.456	0.478	0.373	0.516	0.529	0.444	0.341	0.417	0.549	0.398
Q11	0.413	0.428	0.077	-0.395	0.160	0.333	0.311	0.292	0.203	0.456	1.000	0.319	0.286	0.434	0.479	0.314	0.423	0.373	0.511	0.422
Q12	0.567	0.546	-0.072	-0.373	0.171	0.275	0.386	0.336	0.221	0.478	0.319	1.000	0.352	0.512	0.285	0.316	0.274	0.140	0.381	0.342
Q13	0.374	0.369	-0.110	-0.235	0.165	0.223	0.426	0.307	0.382	0.373	0.286	0.352	1.000	0.383	0.240	0.403	0.416	0.425	0.375	0.458
Q14	0.469	0.583	0.041	-0.412	0.167	0.339	0.381	0.316	0.251	0.516	0.434	0.512	0.383	1.000	0.451	0.433	0.375	0.334	0.513	0.410
Q15	0.478	0.558	-0.060	-0.414	0.411	0.291	0.247	0.285	0.105	0.529	0.479	0.285	0.240	0.451	1.000	0.369	0.316	0.341	0.390	0.380
Q16	0.456	0.425	-0.116	-0.353	0.356	0.360	0.419	0.578	0.306	0.444	0.314	0.316	0.403	0.433	0.369	1.000	0.391	0.490	0.332	0.371
Q17	0.362	0.335	-0.194	-0.281	0.209	0.277	0.295	0.364	0.337	0.341	0.423	0.274	0.416	0.375	0.316	0.391	1.000	0.472	0.357	0.413
Q18	0.363	0.442	-0.071	-0.259	0.356	0.387	0.314	0.298	0.449	0.417	0.373	0.140	0.425	0.334	0.341	0.490	0.472	1.000	0.320	0.536
Q19	0.405	0.498	-0.074	-0.220	0.066	0.426	0.455	0.347	0.276	0.549	0.511	0.381	0.375	0.513	0.390	0.332	0.357	0.320	1.000	0.381
Q20	0.408	0.483	-0.101	-0.375	0.275	0.342	0.387	0.309	0.415	0.398	0.422	0.342	0.458	0.410	0.380	0.371	0.413	0.536	0.381	1

Source: Field Survey (2014) with SPSS Version 17 Analysis, using Pearson's Product Moment Correlation **Coefficient (PPMCC)**

The null Hypothesis states that there is no significant relationship between environmental cost and firm profitability in the motor vehicle manufacturing firms in Nigeria. However, the SPSS 7 above shows positive response in almost all the questions asked, critical value > 0.05, P- value = 1. It is seen that there are few respondents that responded negatively to the questions which SPSS also indicated. Nevertheless, the overall analysis of the table is that there is significant relationship between environmental cost and firm profitability in the motor vehicle manufacturing firms in Nigeria. We therefore reject H_o and accept H_1 which states that there is significant relationship between environmental cost and firm profitability in the motor vehicle manufacturing firms in Nigeria.

VII. DISCUSSIONS

The result of ANOVA applied on hypothesis 1 indicates that Environmental Cost Allocation processes adopted by motor vehicle manufacturing firms in South East, Nigeria are not significantly different (they are significantly the

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same). The Environmental Cost Data were collected from the following accounting systems: the general ledger system, the management accounting system and the electronic transfer system. The Environmental Cost Allocation processes were classified and understudied as follows: Conventional Cost Allocation, potential hidden cost allocation, contingent cost allocation, and image and relationship cost allocation. The Environmental Cost classifications are identified as follows: consumables, raw materials, transport, waste and energy. The cost moderating variable indicators evaluated in this study include: capital, labour, technology and overhead. The result of PPMCC applied on hypothesis 2 indicates that there is significant relationship between environmental cost and firm profitability in the motor vehicle manufacturing firms in Nigeria. The firm performance with respect to profitability was understudied in this work as follows: increased profitability, average profitability and decreased profitability. In this study, it was found that both business strategies and government policies normally affect firm performance with respect to profitability, in spite of environmental factors. The study revealed that designers and engineers use appropriate tools to improve environmental performance and efficiency of production, thereby improving firm profitability. It was also found that integration of business strategy and environmental policy positively affects firm performance with respect to firm profitability. This finding is in line with the finding of [19], who ascertained that accounting for environmental cost and performance can support an organizations development and increase firms profitability and operation in an overall Environmental Management System (EMS).

VIII. FINDINGS

The study revealed that:

1. Motor vehicle manufacturing firms in Nigeria do include Environmental Cost Allocation processes in their accounting systems on very rare occasions and the Environmental Cost Allocation processes adopted by them are not significantly different.
2. The firms that do include environmental cost allocation processes in their accounting systems do achieve performance in their strategic operations.
3. There is significant relationship between environmental cost and firm profitability in the motor vehicle manufacturing firms in Nigeria.

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4. Sustainability and development are sure to be achieved in the firms in the motor vehicle manufacturing industry in Nigeria as long as environmental issues are adequately considered in processing accounting information in the system.

IX. CONCLUSION

Conclusively therefore, from the responses from the various respondents, the importance of including environmental costs in processing accounting information for management decision making in the motor vehicle manufacturing firms in Nigeria can never be over-emphasized. It has been concluded definitely that for sustainability and developments and consequently performance, to be achieved in any motor vehicle manufacturing firm, environmental costs must necessarily be put into consideration. Most firms that consider environmental costs, and consequently include them in their accounting processes do produce more reliable accounting information needed in carrying out managerial activities and decisions. It is now clear that business manufacturing firms that do not consider environmental costs in processing accounting information are susceptible to failure, and consequently may collapse. Therefore, for the folding up of any business organization to be averted completely, environmental costs must necessarily be put into consideration very adequately while processing accounting information.

X. RECOMMENDATIONS

Based on this study, the following recommendations apply:

1. Motor vehicle manufacturing firms in Nigeria should of necessity always include environmental costs in processing their accounting information. As a matter of fact, there should be a business policy making it as a mandate that for a firm to receive approval to operate in the motor vehicle manufacturing industry, that such a firm must of necessity include environmental costs in processing its accounting information. Failure to include environmental costs in processing its accounting information must receive some government approved sanction that might lead to its being removed as a firm in the industry.
2. Sustainability and development should be the main objective required of all the firms in the manufacturing industry. Consequently, any firm that is not ready to strive effectively and efficiently by including environmental costs in its accounting processes should be stopped from operating as a recognized organization in Nigeria.

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3. All firms upon thorough investigation, without significant relationship between their operation and environmental accounting information will be encouraged to include environmental issues in their accounting processes.
4. Adequacy in consideration of environmental issues in processing accounting information should be a prerequisite in confirming sustainability and development.

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