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Article

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EuroEconomica

Provided in Cooperation with:
Danubius University of Galati

Reference: Iredele, Oluwamayowa Olalekan/Ogunleye, Omowunmi Jumoke et. al. (2017). Determining the business case for Environmental Management Accounting (EMA) practices among listed firms in Nigeria : the stewardship approach. In: EuroEconomica 36 (2), S. 195 - 210.

EE
E u r o E c o n o m i c a
Issue 2(36)/2017 *ISSN: 1582-8859*

Determining the Business Case for Environmental Management Accounting (EMA) Practices among Listed Firms in Nigeria: The Stewardship Approach

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Abstract: This study investigated the business case for environmental management accounting (EMA) practices in financial terms among listed firms in Nigeria in line with stewardship theory. The population of the study comprised of all 170 non-financial listed firms in Nigeria as at 31st December, 2015 but a sample of 22 firms that were purposively selected based on the impacts of their activities on the environment. Primary data on EMA practices were obtained through the aid of a structured questionnaire as well as secondary data on financial variables such as Return on Equity (ROE), size, leverage and growth through content analysis of annual reports. Descriptive statistics such as mean score, frequencies, and inferential statistics (regression analysis) were used to analyse the data. Findings showed that the level of EMA practice in Nigeria is low and has no significant effect on the financial performance of sampled firms. This implies that there is no business case for EMA practice in Nigeria at the moment. The study therefore recommends that relevant stakeholders enforce environmental regulations so as to promote widespread adoption of EMA practices such that, the possible numerous benefits there from can be enjoyed by listed firms in Nigeria.

Keywords: Environmental Management Accounting; Stewardship; Business Case; Nigeria

JEL Classification: M56; Q01; M41

1. Introduction

Businesses do not operate in a vacuum, they require resources to manufacture products and/or render services; they operate in an environment from which they draw resources and release wastes and such activities may come with negative environmental impacts. Corporate environmental accounting practices such as environmental management accounting is one of the tools that can be used by businesses to address the challenges of the negative impact of businesses activities on the environment. However, according to Godschalk (2008), for an organisation to apply environmental accounting there should be benefits which are expected to accrue to the business, as such it must make business sense. This is because EMA requires resources to implement and a business must weigh up the benefits and costs thereof. This is in line with the stewardship perspective in which maximum firm performance, such as sales growth, or profitability, is the desired outcome of a proactive environmental management practice.

Basically, EMA practices are expected to lead to a significant reduction in the company's operating costs (Bennett & James, 2000), which will in turn positively influence the financial performance of firms in the long run. In line with this, Khalid & Dixon (2012) as cited in Mumbi (2014) opined that though one of the goals of EMA is to ensure that firms remain environmentally responsible, financial consideration remains as the focal point of EMA considerations, and organizations that have

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implemented EMA expect financial returns. Even though according to Schaltegger, Bennett, Burritt & Jasch (2008), historically the usual (and apparently reasonable) assumption amongst most managers has been that improving environmental performance results only in extra costs for a firm, with no corresponding benefit other than to ensure compliance with laws and regulations and to avoid possible prosecutions and fines, yet corporate environmental managers have struggled against this preconception in their organisations and have sought ways of 'making a business case' for EMA activities (Wagner & Schaltegger, 2001).

Numerous studies have addressed the business case for EMA practices all of which were conducted in the developed and some developing countries other than Nigeria (Godschalk, 2008; Schaltegger, Bennett, Burritt & Jasch, 2008; Nyirenda, Ngwakwe & Ambe, 2013; Larojana & Janaki, 2014). In Nigeria there is little prior research evidence regarding environmental management practices and their effect on firms' financial performance. Environmental accounting related research in Nigeria have focused more on disclosure or reporting of environmental costs (Owolabi, 2008; Uwuigbe, 2011; Oba, Fodio & Soje, 2012). Some studies have also focused on combining environmental externalities with internal costs (Owolabi, 2006; Enahoro, 2009) but none of these studies have examined the effect of firms' environmental management accounting (EMA) practices on financial performance hence this study. This research is important to fill this gap and, in doing so will add to existing literature on environmental management practices and firms' financial performance from a Nigerian perspective. Drawing from this problem, this paper attempts to answer the research question which seeks to determine the effect of EMA practices on firms' financial performance. Accordingly, the objective of the study is to examine the effect of EMA practices on the financial performance of listed firms in Nigeria from the stewardship approach using Return on Equity (ROE) as a proxy for financial performance.

The next section of the paper addresses the literature review and hypothesis development and this is followed by the discussion of the research methodology. The presentation, analysis and discussion of findings follows and lastly, the conclusion and recommendations of the study are presented.

2. Literature Review and Hypothesis Development

2.1. Environmental Management Accounting (EMA)

Environmental management accounting is viewed as an extension of conventional management accounting. According to the United Nations Division for Sustainable Development (UNDSD 2003), EMA is simply a better and more comprehensive approach to management accounting. A definition given by the United Nations expert working group (representing 30 nations) on EMA and the UNDSD (2001) define EMA as the "identification, collection, analysis and use of two types of information for internal decision making namely, physical information on the use, flows and destinies of energy, water and materials; and monetary information on environmental related costs, earnings and savings". However, the scope of this study includes only the consideration of information on monetary costs and these are costs that impact on the firms' bottom-line.

There are a number of studies that discussed the benefits of EMA and recommended it to firms (Bennett, James & Lane, 1996; Gray, Bebbington & Walters, 1993). EMA helps companies to reveal their real environmental costs and to identify cost reduction opportunities. Parker (1997), posited that through the identification, evaluation and distribution of environmental costs, environmental management accounting allows management to identify opportunities for cost savings and to calculate actual costs of projects and investments; ultimately better environmental management is enhanced. It also helps them to evaluate in a better way investment alternatives. In addition, by using EMA, companies can incorporate in their strategic planning the increasing environmental demands. The

United Nations Division on Sustainable Development (UNDSD) states that the adoption of EMA is vital for business to apply cleaner and more productive procedure such as reduction of carbon emissions, efficient use of physical resources such as water and raw materials (UNDSD 2001). It can also be harnessed by firms to make decisions on product pricing, calculation of costs associated with environmental projects among others.

In the past, the environment did not seem to appear on the business agenda, pressure was less evident to force organizations to minimize their environmental impact and manage environmental costs. However, with the growing environmental crisis, this has now changed. The problem of the environment which is an integral part of the business can no longer be ignored, and of particular interest to both external and internal stakeholder is organizational environmental performance, especially for sectors with perceived environmental impacts (Gray & Bebbington, 2001). This has raised a major challenge for accounting which has led to the emergence of environmental management accounting (EMA), and an increased recognition of EMA as a management tool that assists in improving the financial and environmental performance of firms through enhanced environmental accountability.

2.2. Previous Research on the Effect of EMA Practices on Firms' Performance

Until recently, there had not been much discussion on environmental management accounting in research. Most studies examined environmental accounting in general rather than EMA. For instance, Belkaouri (1976) examined the information content of pollution control disclosures and found a positive relationship between economic performance and environmental performance. Similarly, Rockness, Schlachter & Rockness (1986) conducted a research on hazardous waste disposal in the chemical industry (environmental performance) and the return on equity as a measure of financial performance and the study found a positive relationship when the results showed that companies with higher financial performance are those who also had smaller amounts of chemical waste disposal.

In the study conducted by Freedman & Jaggi (1995), in which environmental disclosure was evaluated against six accounting ratios to measure financial performance, the result showed that there was no long term association between pollution performance and financial performance in the pulp and paper industry in Sweden. Cohen, Fen & Konar (1997) examined the relationship between environmental performance and financial performance and their results showed that profitable firms were more environmentally responsible because they have superior financial performance. Similar result was reported by Russo & Fouts (1997), who found a positive relation between environmental rating and firm performance, as measured by return on assets.

Clarkson, Richardson & Vasvari (2006) also investigated the relationship between proactive corporate environmental policies and financial performance and found that only firms with sufficient financial resources and management capabilities can pursue proactive environmental strategy because these firms have a better financial performance. This assertion is in line with the findings of Zhang & Stern (2007) who concluded that financial performance has a small positive impact on current environmental performance and that financially well-performed firms tend to invest more in environmental activities.

In Nigeria, Nwagkwe (2009) examined the relationship between environmental responsibility and firm performance in a study of sixty Nigerian manufacturing and found that investment in social and environmental responsibility was related to improved return on total assets. Oba, Fodio & Soje (2012), examined the value relevance of environmental responsibility information disclosure in Nigeria by investigating the association between environmental responsibility information disclosure and financial performance (Return on capital employed) and they found a positive relationship between the two variables. Duke & Kankpang (2013) also examined the implications of corporate social

responsibility performance of Nigerian firms using ROCE to measure performance and the result showed a positive relationship as well.

In the study by Owolabi (2008) which carried out a content analysis of 20 companies from 2002 to 2006 with a view to determining social and environmental disclosures, the findings showed that only 35% of companies sampled provided some form of social disclosure in their annual reports hence the level of disclosure in Nigeria is still very low. In line with this finding, Uwuigbe (2011) also concluded that corporate environmental reporting practice in a developing country like Nigeria is still very ad-hoc, general, self-laudatory and voluntary in nature. Appah (2011) revealed that a large proportion of firm's social and environmental disclosure is in the area of social works/community development while responsible human resources and environmental practices come second and third.

Increasing academic and applied research on EMA were conducted as from the 1990s and a large number of these contributions to EMA research were from developed countries (Angel, 2003; Jasch, 2003; Delmas & Toffel, 2003; Chang, 2007; Schaltegger, Bennett, Burritt & Jasch, 2008; Qian & Burritt, 2009). Similarly a numerous studies in the developing countries also emerged (Jalaludin, Sulaiman & Ahmad, 2011; Mumbi, 2014; Ambe, 2011; Queen, 2011; Abiola & Ashamu, 2012; Altohami, 2013; Nyirenda, Ngwakwe & Ambe, 2013; Ali, Joseph & Mohammed, 2013; Larojana & Janaki, 2014; Mokhtar, Zulkifli & Jusoh, 2014; Jamil, Mohamed, Muhammad & Ali, 2015). The debate over the business sense of EMA practices was the focus of some of the studies such as (Schaltegger, Bennett, Burritt & Jasch, 2008; Nyirenda, Ngwakwe & Ambe, 2013 and Larojana & Janaki, 2014) as they provided empirical evidence of the effect of EMA practices on firms' financial performance.

The general conclusion among studies that have examined the effect of EMA practices on firms' financial performance was that environmental performance represents only extra costs for a firm with no corresponding benefit. This is the reactive approach which represents the view of the traditionalist group who support the implementation of EMA practices only because it is required by law. They are of the opinion that firms that invest in environmental management practices do so out of their financial resources without a corresponding benefit and as such the relationship will be negative (Nyirenda, Ngwakwe & Ambe, 2013; Link & Naveh, 2006; Watson, Klingenberg, Polito & Geurts, 2004). This group is known for an advocacy for minimal EMA practice.

From the perspective of the revisionist group, EMA practice is expected to positively influence the financial performance of firms in the long run. Against the assumptions that EMA represents increased cost, they believe that firms that have implemented EMA should expect a higher financial return. This is because studies have revealed by contrast that dirty production is inefficient production, and waste and pollution are signs of low efficiency. Clean production (CP) on the other hand is a sign of more efficient production; and efficient production in turn is more innovative and competitive, and in principle also economically superior (Schaltegger, Bennett, Burritt & Jasch, 2008). The position of this view therefore is that there is a positive relationship between EMA practices and financial performance, and more recent studies have produced results that support this position (Artiach, Lee, Nelson & Walker. 2010; Iwata & Okada, 2011; Barnett, 2007; Mir & Rahman, 2011; Aragon-Correa & Rubio-Lopez, 2007; Wahba, 2008; Larojan & Janaki, 2014; Galdeano & Gomez et al, 2008; Nakao, Amano, Matsumura, Genba & Nakano, 2007; Waddock & Graves, 1997; Clarkson et al., 2006).

Godschalk (2008) specifically established the business case for EMA by asserting that overheads are allocated to various cost centres on a basis that normally bears no relation to actual environmental causal relationships, thereby leading to environmental costs being incorrectly charged. This might result in wrong product line and pricing decisions as well as inappropriate investment decisions which affect the profitability of the business. By getting these environmental costs out of the magical box of

overheads and into the cost centres where they belong, the company will be able to make better product and pricing decisions and thereby enhance its profitability. The study therefore supported the Porter hypothesis which posited that stricter environmental regulation would lead to innovative approaches that would enhance competitiveness and, that companies implementing environmental management accounting will at least receive some benefits from doing so.

The proponents of the business case for EMA practice found that the financial rewards of engaging in environmental management practices outweigh the costs involved in the long run and they are thus proactive in approach. They apply EMA practices as a strategic management tool for internal decision making in order to curtail the occurrence of environmental problems rather than as compliance with regulations. They believe that firms that implement EMA are likely to have modified production process and ultimately lower costs of production through reduced input expenses resulting from recycling of raw materials. Schaltegger & Burrit (2000) are also of the opinion that EMA practices reduces the negative environmental impacts of firms' activities thereby reducing costs associated with environmental protection. This school of thought therefore advocates for a higher level of EMA practices from firms (Jalaludin, Maliah & Ahmad, 2011). Other benefits of EMA practices that have been identified include competitive advantage, increased market share, image improvement and technological leadership (Mumbi, 2014).

2.3. Theoretical Framework

There is an absence of a universally accepted theory for EMA practices (IFAC, 2005; UNDSD 2001), consequently various theories have been used as the theoretical foundation for EMA practices. A number of studies show that the institutional theory provides useful insights to the practice of EMA (Jalaludin et al, 2012; Chang, 2007). This theory emphasizes the effects of extra-organizational institutions (social, economic and political) on organisational practices (Chang, 2007) and it is beneficial in addressing the role of institutions in determining the behaviour of companies and their employees. It is based on the institutional isomorphism which is concerned with understanding why organisations with similar environmental conditions appear similar. In becoming similar, organisations enhance their level of legitimacy within society by implementing strategies that are believed to be appropriate and acceptable (Meyer & Rowan, 1977). DiMaggio & Powell (1983) as cited in Chang (2007) and Jalaludin et al (2011), posits that there are three forces driving institutional isomorphism by which managerial decisions are strongly influenced: coercive isomorphism, mimetic isomorphism and normative isomorphism. They assert that coercive isomorphism occurs when both formal and informal pressures are exerted on organizations by other organizations upon which they are dependent. These pressures may be driven by government and its agencies and organisations will attempt to become isomorphic with the policies, mandates and beliefs of dominant organisations. Mimetic isomorphism involves organisations seeking to mimic or improve upon the institutional practices of other organisations in their field which are perceived to be more legitimate or successful and this implies that firms imitate other firms with similar scale and better performance. Normative isomorphism stems from professional response which can occur through either formal education or the creation of professional associations.

Similarly, the legitimacy theory has been adopted as a basis for environmental-related research because of the need to ensure that a firm's existence is perceived as being legitimate by stakeholders. Deegan (2002) and Qian & Burrit (2009) used the theory to justify the quest by organizations to acquire legitimacy through ensuring that they operate within the bounds and norms of society. The theory is considered as a generalized perception or assumption that actions of an entities are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions and therefore organizations attempt to establish congruence between the social values associated with

or implied by their activities and the norms of acceptable behaviour in the larger social system of which they are part.

Stewardship theory upon which this study is based proposes that managers are not driven by self-interest but rather by the alignment of their goals with those of the shareholders (Davis, Schoonman & Donaldson, 1997). The stewardship theory is also about the agency relationship between a principal (owner) and the steward (manager) (Davis et al., 1997; Donaldson & Davis, 1991). This theory examines this relationship from a behavioural and a structural perspective and it suggests that stewards will behave in a pro-social manner; which is behaviour that is aimed at the interest of the principal and the organisation (Davis et al., 1997; Zahra, Hayton, Neubaum, Dibrell & Craig, 2009). This behaviour is fostered by the quality of the relationship between the principal and the steward (Corbetta & Salvato, 2004; Davis et al., 1997) and it is achieved when both the principal and the manager in the employment relationship select to behave as stewards (Davis et al., 1997). At the heart of stewardship theory is the assumption that the principal-steward relationship is based on a choice. When both parties choose to behave as stewards and place the principal's interest first, this will have a positive impact on performance because both parties are working toward the same goal (Davis et al., 1997; Eddleston & Kellermanns, 2007).

Though EMA is one of the methods of ensuring that firms remain responsible, financial benefit is at the heart of the consideration to engage in EMA practices (Khalid & Dixon, 2012). This is in congruence with the stewardship theory. Thus, EMA practices should be adopted because they contributed to the profit maximization objective of the firm. Several studies have been conducted in this regard in the developed countries and have concluded that the use of EMA may significantly lead to a reduction in a company's operational costs (Bennett & James, 2000; UNDSD, 2001). There is little prior research evidence in Nigeria on this assertion thus; this research intends to investigate the business case for EMA practices in Nigeria. On the basis of the above discussion, we hypothesize that:

H$_0$ 1 EMA practice has no significant effect on firms' financial performance.

3. Research Methodology

3.1. The Sample and the data

The sample for the study comprised of 25 listed companies in Nigeria which were purposively selected based on the impact of their activities on the environment and availability of the latest annual reports. Primary data on EMA practices were obtained from the accounts staff of sampled companies through the aid of a structured questionnaire and 22 copies of the questionnaire were returned and found useable. Secondary data on financial performance -Return on Equity (ROE), firm's size, leverage and growth were obtained from the annual reports and accounts of the firms for the year 2015. This is the latest year for which audited annual reports are obtainable. The objective of using reports from 2015 was also to ensure that the secondary data aligned with the primary data on EMA which was obtained at a point between March and April 2016.

3.2. Measurement of EMA Practices

Until now, measurement of EMA practices have been based on the items listed in Burritt et al.'s (2002) EMA comprehensive framework which utilizes a checklist of techniques for applying EMA. The checklist includes management accounting practices such as activity based costing, lifecycle costing, environmental capital budgeting and others. In a study by Jalaludin *et al*., (2011) and Jamil *et al.,* (2015), respondents were asked to measure on a scale of 1 (none at all) to 5 (very much) the understanding of these techniques. Similarly, Mumbi (2014) based the level of EMA practices on the number of techniques used in a particular firm compared to the total number of techniques examined

in the study. This study in addition to adopting Burritt *et al.*'s (2002) EMA framework as used in Mumbi (2014) constructed three additional parameters for measuring EMA practices. The purpose of this construction is because no prior study has utilized these parameters in measuring EMA practices as follows:

Occurrence: It is a term used to capture information as regards the level of occurrence of environmental costs within the firm. This is because EMA is concerned with monetary (financial) and physical (non-financial) environmental-related information in order to improve organizational financial and environmental performance. Inability to identify these costs will make it extremely difficult to minimise, control and manage them. Measures that will aid better environmental performance are put in place when firms can identify these costs with precision. Bartolomeo, Bennett, Bouma, Heydkamp, James & Wolters (1995) suggest that environmental managers and experts be engaged in the accounting process to ensure that identification of environmental costs occurs. Measurements of variables for this parameter are adopted from (Enahoro, 2009. See appendix I). A checklist was used in the questionnaire to gather data on this parameter by measuring on a scale of 1 (No occurrence) to 5 (Very high).

Generation: This entails how the environmental costs are accounted for and generated by firms. Chang (2007) defined EMA as the generation, analysis and use of monetary (financial) and physical (non-financial) environment related information in order to improve organizational financial and environmental performance. This aspect investigates how firms generate these environmental costs; whether they are generated separately from overheads, generated as part of the general ledger system or if they are generated as part of management accounting system separate from general ledger system. Measurements of variables for this parameter were adopted from (Enahoro, 2009. See appendix I). A checklist was used in the questionnaire to gather data on this parameter by measuring on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

Sustainability: This focuses on sustainable business practices within the firms which are measures put in place to run their businesses in a sustainable manner. These variables help firms to identify ways of reducing or avoiding environmental costs while at the same time improving environmental quality (USEPA, 1995). The process of achieving this goal has motivated firms to develop cost reduction measures such as efficient use of water and energy. Wastes have been reduced to the minimum through recycling because of the polluting effect on the environment. Firms have also invested in cleaner production machines to ensure that the production process is environmentally friendly. Measurements of variables for this parameter are adopted from (Mumbi, 2014. See appendix I). A checklist was used in the questionnaire to gather data on this parameter by measuring on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree). The mean score of each of these parameters were aggregated to generate EMA score.

To ensure the relevance of the research instrument in measuring EMA practices, construct validity was obtained through expert opinions, internal validity was ensured through the use of widely accepted variables for measuring the variables. Cronbach's Alpha estimates for all the parameters used to measure EMA were computed to ensure reliability which yielded the following; occurrence (0.955), generation (0.734), sustainability (0.641).

3.3. Measure of Financial Performance

The selection of this variable is guided by the results of the previous empirical studies. Accounting performance variables include Return on Equity (ROE), Return on Assets (ROA), Return on Investment (ROI) and Return on Capital Employed (ROCE). However, following the work of (Ngwakwe, 2009), this study has utilised ROE because it is among the most widely used accounting measures. Furthermore, stakeholders are believed to be interested ultimately in their equity and thus

concerned about corporate engagements such as environmental management practices that may make their equity grow (Artiach et al., 2010) as cited in (Nyirenda et al, 2013). ROE therefore, will help to establish the extent to which a firm generates sufficient returns on its asset and satisfy investors' needs.

3.4. Control Variables

Extant literature showed that firm size, leverage and growth will have a positive impact on firm performance (Enahoro, 2009; Kakani, Biswatosh & Reddy, 2001). The size of the company can have a positive effect on financial performance because larger firms can use this advantage to get some financial benefits in business relations such as cheaper funding therefore; the relationship is expected to be positive. The capital structure of a firm can play an important role in determining corporate performance as well as the rate of growth. Entities with higher profit rates will remain low leveraged because of their ability to finance their own sources. On the other hand, a high degree of leverage may increase the risk of bankruptcy of companies. Growth is represented by the growth in sales of the corporation during the year and according to Peng (2004) it can be a as a determinant of firm performance.

3.5. Model Specification

The effect of EMA practices on firms' performance together with other control variables will be examined. The general form of multiple linear regression equation as stated in Field (2005) and Asteriou & Hall (2007) is:

$$y_{i,t} = \beta_0 + \beta_1 x_{1i,t} + \beta_2 x_{2i,t} + \ldots + \beta_k x_{k\,i,t} + u_{i,t} \quad \text{Eqn 1}$$

Where $y_{i,t}$ is the variable to be forecast and $x_{1i,t}, \ldots x_{k\,i,t}$ are the k predictor variables. Each of the predictor variables must be numerical. The coefficients $\beta, \ldots \beta_k$ measures the effect of each predictor after taking account of the effect of all other predictors in the model. Thus, the coefficients measure the marginal effects of the predictor variables.

The specific multiple regression equation showed:

$$ROE = \beta_0 + \beta_1 \sum EMA + \beta_2 Siz + \beta_3 Lev + \beta_4 Grw + u \quad \text{Eqn 2}$$

Where;

ROE = Ratio of profit after tax to shareholder's equity (PAT/Total equity)

EMA = Environmental Management Accounting score generated from questionnaire

Siz = Firm size proxy as the natural log of total asset

Lev = Leverage measured as $\frac{\text{Total debt}}{\text{Equity}}$

Grw = Growth of company measured as $\frac{\text{Year 2 sales} - \text{Year 1 sales}}{\text{Year 1 sales}}$

U= Error term without control variables

4. Analysis and Results

4.1. Demographic Information

Table 1. Presentation of Demographic Summary of Accounts Respondents

	Category	***Nigeria***	
		Freq.	***%***
Title of Position	Management Accountant	10	45.5
	Financial Accountant	11	50.0
	Finance Officer	1	4.5
	Cost Accountant	0	0.0
	Others	0	0.0
	Total	22	100
Duration on Job	Less than 1 year	2	9.1
	1-5 years	5	22.7
	6- 10 years	10	45.5
	Over 10 years	5	22.7
	Total	22	100
Highest Educational Level	Graduate	8	36.4
	Postgraduate	14	63.6
	Total	22	100

Source: Field Survey (2016)

Table 1 shows the demographic summary of the 22 participates of which majority are made up of management and financial accountants (n=21, 95.5%). The duration on the job reveals the number of years of experience of the respondents. Majority of the respondents have experience from 6-10 years (n=10, 45.5%). Also, more respondents with postgraduate qualifications participated in the study (n=14, 63.6%).

4.2. Level of EMA Practices

Table II shows the result of the descriptive statistics of the level of EMA practices among the firms sampled. The mean value of 2.9258 is the aggregate value of the four parameters of EMA practices amongst the firms. This is considered a low level for EMA practices because the score is expected to be higher given the high proportion of environmental costs generated by these firms. The results presented in Table III in which the level of EMA techniques applied among the firms is 41 out 220 confirms the assertion that the level of EMA practices for the sampled firms is low.

Table 2. Descriptive Statistics of the level of EMA practices

	N	Minimum	Maximum	Mean	Std. Deviation
EMA	22	1.67	3.82	2.9258	.54845
Valid N (listwise)	22				

Source: Field Survey (2016)

Table 3. Level of EMA Techniques applied among Firms in Nigeria

TECHNIQUES	ACTUAL		EXPECTED	
	Freq.	*%*	*Freq.*	*%*
Activity Based Costing	5	12.2	22	100
Total Cost Assessment	5	12.2	22	100
Full Cost Accounting	7	17.1	22	100
Life Cycle Costing	0	0.0	22	100
Material Flow Accounting	2	4.9	22	100
Environmental Cost Estimation	0	0.0	22	100
Environmental Impact Reduction	8	19.5	22	100
Environmental Business Strategy	6	14.6	22	100
Estimation of Environmental Contingencies	4	9.8	22	100
Environmental Cost Accounts creation	4	9.8	22	100
TOTAL	**41**		**220**	

Source: Field Survey (2016)

Multicollinearity Test for independent variables

Prior to the regression analysis, the presence of multicollinearity was tested. Multicollinearity occurs when two or more independent variables are correlated making it exceedingly difficult to isolate the effect of each independent variable on the dependent variable (Mumbi, 2014). Variance Inflation Factor was used to measure the degree of collinearity.

Table 4. Mutlicollinearity Test for EMA, SIZ, LEV and GRW

Variable	NIGERIA	
	Tolerance	VIF
EMA	.950	1.052
SIZ	.795	1.258
LEV	.876	1.142
GRW	.785	1.274

Source: Author's Computation (2016) Using SPSS 20.0

The VIF and tolerance statistics (with tolerance being 1 divided by VIF) are relevant for this test. If the largest VIF is greater than 10, it calls for concern (Myers, 1990; Bowerman & O'Connel, 1990); If the average VIF is substantially greater than 1 then the regression may be biased (Bowerman & O'Connel, 1990); Tolerance below .1 indicates a serious problem; Tolerance below .2 indicates potential problem (Menard, 1995). For the current model the VIF are far below 10 and the tolerance statistics all well above 2; therefore we conclude that there is no collinearity within the data set and thus the regression analyses.

Tables V is the regression results of EMA, SIZ, LEV AND GRW on performance using ROE. The table indicates that the regression model is significant ($p < 0.10$, $F = 3.184$) and has an adjusted R^2 of 40.2%. The results particularly indicate that EMA has no significant effect on firms' financial performance. The implication of this result is that, for each unit increase in EMA practice, ROE increases by 10.024. Thus, supporting the hypothesis that EMA practice has no significant effect on firms' financial performance.

Table 5. Results of regression using ROE

Independent Variable	Standard Value	Standard Error	t	Probability
EMA	10.024	12.914	0.776	.458
SIZ	-0.226	4.072	-0.055	.957
LEV	0.271	0.083	3.268	.010
GRW	3.974	3.144	1.264	.238
Adjusted R^2 = 0.402, F = 3.184, Probability < 0.10				

Source: Field Survey (2016)

The results of the explanatory variables shows that LEV has a significant positive effect on firms' performance (β = 0 .271; t= 3.268; p = 0.10). This shows that the ability of firms to finance its business from their own sources of finance increases the earning capability of such firm. However, the effect of SIZ and GRW on firms' performance is not significant as they indicate (β = -0.226; t= -0.055; p > 0.10) and (β = 3.974; t= 1.26; p > 0.10) for SIZ and GRW respectively even though the direction of relationship is negative.

5. Discussion and Conclusion

The findings of this study provide evidence that EMA practices does not make business sense in Nigeria. This is because of the inability of EMA practices to yield financial gains in line with the stewardship perspective. A common reason found for such result is the costs involved in adopting more environmentally friendly practices results in resource distribution and increased costs to the firm. Previous studies have corroborated this position. Nyirenda et al (2013) examined the impact of environmental management practices on the financial performance of a South African mining firm. The major aim of the study was to investigate whether such practices have a close relationship with the mining firm's financial performance (represented by return on equity (ROE). Using multiple regression statistics, the return on equity of the firm under study was regressed on three environmental management practices (carbon reduction, energy efficiency, and water usage). The result showed that there is no significant relationship between the variables. This conclusion is also in line with the findings of (Barnett, 2007; Becchetti, Di Giacomo & Pinnachio, 2005; Cho & Patten, 2007; Artiach et al., 2010) that there is no significant relationship between EMA practices and financial performance.

The lack of significant positive relation between EMA practices and firms' financial performance in Nigeria may account for the low level such practice because it is expected that firms will be quick to adopt practices that result in greater financial yield. This is despite the fact that if appropriately pursued, EMA techniques may present opportunities for costs reduction through reduction in environmental impacts or through the management and prevention of environmental liabilities in line with (Lober, 1998; Lawrence & Cerf, 1995). In fact, Godschalk (2008) advanced that though each element of corporate environmental accounting can generate its own benefits for a company, the benefits of some elements such as environmental management accounting are more internally orientated and enhance efficiency and competitive advantage.

It is also expected that environmental management accounting will offer more visible and prominent benefits than other branches of environmental accounting. Given the benefits that can accrue through the implementation of environmentally-friendly processes, the level of such practice is expected to be significant. The low level of EMA practice observed in this study is thought to be a consequence of the neglect by relevant stakeholders in providing the impetus for the implementation of environmental management activities. Environmental accounting practice by firms is largely voluntary because the Nigerian government does not enforce compliance with international environmental regulations. Also, professional accounting bodies are yet to assume the responsibility of providing the needed guidance

for the implementation of environmental management initiatives through the training of members on EMA methods. Until relevant stakeholders arise to make a case for the enforcement of environmental regulations, the level of implementation of EMA practices will be low and the potential benefits may continue to elude firms in Nigeria.

In conclusion, though there is no business case for EMA practices in Nigeria at the moment, managing the negative impacts of firms' activities on the environmental is as important as managing the business itself. This will enable firms minimise their environmental costs and liabilities and increase the potential benefits to the firm. In view of these, it is recommended that firms implement environmental management initiatives, and all relevant stakeholders such as government and professional accounting bodies should be actively involved in promoting EMA practices in order to bring to the fur the hidden potentials and benefits that accrue therefrom. Future research should provide empirical evidence on the benefits of environmental management practices beyond improvement in financial performance.

6. Acknowledgements

The authors are grateful to the University of Lagos for providing the grant under the TETFUND intervention scheme to carry out this research.

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Appendix 1. Parameters and measurement of EMA Practices

Details of EMA Practices among Firms

PARAMETER	MEASUREMENT
OCCURRENCE OF ENVIRONMENTAL COSTS IN FIRMS	Cost incurred for treating and disposing of toxic wastes
	Cost of licensing for producing contaminants
	Cost resulting from recycling
	Cost of maintaining pollution prevention equipment
	Cost of hiring environmental staff
	Cost of acquiring/installing pollution control equipment
	Cost of acquiring/installing Recycling equipment
	Cost of evaluating and selecting pollution control equipment
	Cost of implementing EMS and obtaining ISO 14001
	Cost of R & D on environmental issues
	Waste management cost
	Cost of monitoring carbon emissions level
	Cost of designing environmental friendly process
	Cost of renewable sources of energy
	Cost of conducting environmental audit
	Cost of inspecting products and processes
	Cost of developing environmental performance measures
	Cost of testing contamination and measuring contamination level
GENERATION OF ENVIRONMENTAL COST	Environmental costs are generated by your company
	Environmental costs are generated separately from overheads
	The accounting system provides detailed environmental cost data
	Accounting department is properly linked to section that generate environmental costs
TECHNIQUES FOR APPLYING EMA IN FIRMS	Activity Based Costing for environmental cost allocation
	Total Cost Assessment for inclusion of environmental costs in investment appraisal
	Full Cost Accounting for long term and short term environmental cost
	Life Cycle Costing for quantification of environmental costs
	Material Flow Accounting for analysing physical flows of materials
	Estimation of environmental costs to determine its selling price
	Identification of opportunities for reduction of environmental impacts
	Incorporation of environmental goals into business strategy
	Estimation of potential environmental contingencies
	Creation of environmental cost accounts
SUSTAINABLE BUSINESS PRACTICES IN FIRMS	Recycling of waste/effluent produced
	Use of water catchment (Water saving methods)
	Monitoring levels of carbon emissions
	Use of renewable sources of energy
	Investment in cleaner technologies

Sources: (Enahoro, 2009; Mumbi, 2014)