Identifying barriers to environmental management accounting practices: a comparative study of Nigeria and South Africa

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Abstract

This study established the level of environmental management accounting practices among listed firms in Nigeria and South Africa, and identified the barriers limiting such practices. The study utilised primary data through the administration of structured questionnaire, and a total of 44 accountants (22 from each country) participated. Data collected were analysed using descriptive statistics involving mean scores, frequencies, tables and percentages. The study found that EMA practices are higher in South Africa than Nigeria given the number of EMA techniques applied by firms in South Africa (n=72) compared to Nigeria (n=41). Also, as indicated by the mean scores, the study identified institutional barrier (3.4148) as the major factor preventing EMA practices in Nigeria while EMA practices in South Africa are prevented mainly by financial barriers (3.5605). This paper concluded that the government and other stakeholders in Nigeria should play active roles in making and enforcing environmental laws and regulations so as to curb complacency in relation to environmental issues among firms. Also, given the long term benefits of EMA practices, the government of South Africa should introduce green tax incentives and other market-based environmental policy instruments as reward for environmental performance by firms. This will help ameliorate the short-term negative effect which EMA practices have on their financial performance.

1. Introduction

There has been a growing pressure on firms from external and internal stakeholders to reduce the environmental impacts resulting from their economic activities (Angel, 2003). This pressure is heightened by the adverse environmental effects of continuous consumption of materials, energy and water by companies, resulting in depletion of these resources (Ruth & Eno, 2014). The rising environmental cost of firms is therefore the reason for the pressure from stakeholders for firms to be ethical and environmentally responsible in their business conduct. To respond to this pressure requires a response by the firms to account for and manage the costs associated with their environmental impact. Greater environmental impact and its related costs, as well as the failure of conventional accounting systems to provide required information for reducing these impacts and costs, have led significantly to the emergence of environmental management accounting (EMA) (Gale, 2006 and Jasch, 2006). The main purpose of EMA therefore is, to provide management with the necessary information for adequate consideration of environmental costs and performance, with a greater emphasis on the management of environmental costs. EMA helps companies to reveal the actual costs associated with the environmental impact of their activities 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 which will ultimately enhance better environmental management. In addition, by using EMA, companies

can incorporate in their strategic planning the increasing demands from interested stakeholders as regards the impact of their activities on the environment.

The United Nations Division on Sustainable Development (UNDSD) states that the adoption of EMA is vital for business to apply cleaner and more productive procedures such as the reduction of carbon emissions and the efficient use of physical resources like water (UNDSD, 2001). EMA can also be harnessed by firms to assist in making decisions on product pricing and the calculation of the costs associated with environmental projects among others. Despite the benefits that accrue from the implementation of EMA, there is empirical evidence that point to the fact that there are various barriers to adopting environmental cost management initiatives. Earlier researchers identified some important barriers such as a fundamental lack of interest and commitment among stakeholders, long payback periods and a general lack of incentives and information on environmental issues (Creighton, 1998). These barriers appear to be interrelated and, combine to make implementation of environmental initiatives difficult. The US National Wildlife Federation's (NWF) Campus for Ecology program and University Leaders for a Sustainable Future (ULSF) as cited in Chang (2007) identified five major categories of the barriers to environmental sustainability, they are; institutional barriers, management barriers, financial barriers, informational barriers, and cultural barriers. A recent study by Mumbi (2014) showed that the level of EMA practices is low because there appears to be lack of standard or generally acceptable framework for its implementation and organisations may apply EMA practices differently. Contextual differences could also be used to explain variations in the level of adoption as it may be that a significant number of entities lack an adequate system for measuring and tracking environmental cost (Schaltegger & Burritt, 2000).

In general, increasing academic and applied research was conducted and a number of contributions to EMA in developed countries were made (Qian & Burritt (2009); Chang (2007); Deegan, 2003; Schaltegger & Burritt, 2000; Bailey & Soyka 1996; Ditz, Ranganathan & Banks, 1995; Epstein, 1996; Schaltegger, Muller & Hindrichsen, 1996; Tuppen, 1996). Evidences also show that EMA is receiving greater attention due to considerable environmental incidents which creates significant financial consequences for various organisations that need to be managed (Schaltegger & Burritt, 2000). However, while EMA practices in developed countries have improved as a support mechanism to manage environmental issues, firms on the African continent that are burdened with multiple challenges resulting from environmental degradation have underutilised this tool (Nyirenda, Ngwakwe & Ambe, 2013).

Although in South Africa there is a growing awareness of the significance of environmental performance and, firms have begun to integrate environmental management practices into their corporate strategy (Mohr-Swart, 2008; Ambe, 2011; Queen, 2011; Nyirenda *et al.,* 2013), but notwithstanding, the level of progress is low (Ambe, 2011). In the case of Nigeria, EMA studies are scarce and most studies have focused on the reporting/disclosure of environmental information in firms' annual reports (Owolabi, 2008; Appah, 2011; Uwuigbe, 2011, Iredele & Akinlo, 2015). This has therefore left a gap in literature because none of these studies have examined environmental management accounting practices among firms as well as the barriers associated with the practices.
This study undertakes a comparison between Nigeria and South Africa due to the fact that South Africa has been ranked as the largest greenhouse emitter of carbon-dioxide (CO_2) in Africa and is also 14th among the world's top 20 greenhouse emitters but, corporate environmental governance is gaining momentum in South Africa with 49 companies currently listed on the Social Responsibility Index of the Johannesburg Stock Exchange (Mohr-Swart, 2008). Going by this, South Africa is positioned as the leading environmentally conscious country in Africa and they have become a motivation for other countries in Africa on environmental issues and particularly for an emerging economy like Nigeria where there are rising environmental agitations.

At the moment, there is a dearth of literature on the barriers that limit the progress of African nations towards adopting environmental management accounting practices as well as a dearth of

studies that provide information on comparative dimension to EMA implementation on the African continent. Hence, to bridge this gap, a study of EMA practices among African nations is necessary in order to ascertain whether the variations in resources and nature of production among various countries could lead to differences in the level of their EMA practices. The objectives of this paper are therefore to undertake a comparative study of the level of EMA practices among listed firms in Nigeria and South Africa and to examine the barriers that limit the adoption of EMA practices by listed firms in these two countries.

The next section of this paper provides a brief review of literature which is followed by a discussion of the research methodology and then the data analysis. The final section provides a discussion on the findings and conclusion of the study.

2. Literature review

2.1 The concept of Environmental Management Accounting (EMA)

Environmental Management Accounting (EMA) practices involve the tracking, tracing and treatment of costs, earnings and savings incurred in relation to the company's environmental-related activities (Burrit, Hahn & Schaltegger, 2002). In a study by Chang (2007), EMA is defined as the generation, analysis and use of monetary (financial) and physical (non-financial) environment related costs in order to improve organisational financial and environmental performance. In general, it is agreed that two types of environmental costs exist – private or internal costs and externalities or societal costs (Deegan, 2003; Schaltegger & Burritt, 2000; UNDSD, 2001; USEPA, 1995). Private or internal costs are 'costs that directly impact on a company's bottom line', while externalities or societal costs 'encompass the costs to individuals, society, and the environment for which a company is not accountable' (USEPA, 1995). Environmental Management Accounting (EMA) deals with the management of environmental costs that directly impacts organisational financial performance which are referred to as private or internal costs.

2.2 Theoretical Framework

It has become imperative for firms to become environmentally responsible and to be ethical in their business conduct. This is necessitated by the growing pressure from both external and internal stakeholders to reduce the environmental impacts resulting from firms' activities on the environment. External stakeholders such as investors, financial analysts, regulatory authorities, host communities, and the public increasingly take into consideration the environmental activities of the companies which are being put under pressure to improve their environmental performance (UNDSD, 2001). In addition to the external pressures, internal financial benefits to the firm can also drive the quest for better environmental performance. For some firms, environmental costs constitute a huge portion of their operational costs and these need to be managed and well accounted for.

The need for firms to satisfy the demand of stakeholders has therefore necessitated the relevance of the stakeholder theory as the basis for EMA practices among firms. The basic proposition of the stakeholder theory is that a firm's success is dependent upon the successful management of all the relationships that the firm has with its stakeholders. This theory according to Watts & Zimmerman (1978) assumes that environmental performance by an organisation is as a result of the pressure from stakeholders such as communities, customers, employees and suppliers. It therefore holds that companies are accountable for stewardship over the resources entrusted to them by a coalition of these stakeholders (Chan, 1996), and that the corporation's continued existence requires the support of the stakeholders. The approval of these stakeholders must be sought and the activities of the corporation adjusted to gain that approval (Chan, 1996), and the more powerful the stakeholders the more the company must adapt.

2.3 Prior Empirical Studies on Environmental Management Accounting

EMA has been extensively discussed in literature in the last 15 years. USEPA and Tellus Institute (USA) are among the first organisations that adopted EMA and applied it in several industrial organisations to demonstrate its benefits (USEPA, 1995; White, Becker & Goldstein, 1991,

1992). There are a number of studies that discussed the benefits of EMA and recommended it to firms. Many of these studies originated from the US, and a few from the UK (Bennett, James, & Lane, 1996, Gray, Bebbington, & Walters, 1993). An increasing number of governments from Denmark, Netherlands, Germany, Austria, Australia, China and Japan have been involved in promoting EMA to industries in their countries (UNDSD, 2001).

Angel (2003) in Sweden considered factors that determine the need for EMA in industries. It adopted a case study approach and concluded that EMA has many components and there are a number of ways to apply each component. Similarly, a study by Jasch (2003) in Austria as published by the Expert Working Group defined some principles and procedures for EMA, with a focus on techniques for quantifying environmental expenditures or costs, as a basis for better controlling and benchmarking purposes. A study in the US by Delmas & Toffel (2003) examined why some firms adopt environmental management practices that go beyond regulatory compliance while other firms only comply with regulations. It built a model that links institutional pressures to organisational characteristics to explain the adoption of environmental management practices at the plant level. Chang (2007) conducted a study in Australia and examined current accounting practices for managing environmental costs within universities and factors that influenced their adoption. The result showed that there was a general low level of EMA utilisation within the sampled universities and this was partly due to a poor knowledge of the extent of environmental costs being incurred.
Schaltegger, Bennett, Burritt, & Jasch (2008) also examined environmental management accounting as a support tool for cleaner production. The study demonstrated the potential of EMA in aiding Cleaner Production (CP) as benefit to businesses. Qian & Burritt (2009) in Australia examined the institutional view of the development of environmental management accounting by considering the possible development of EMA in relation to three pillars: regulatory, normative and cognitive institutions. This led to an understanding of the development of EMA in four institutional contexts involving; direct regulatory pressures, social environmental movements, professional structure and inter-professional communication, and environmental mimicry in specific organisational fields.

Few authors in developing countries have also examined EMA practices. Jalaludin *et al.*, (2011) in Malaysia conducted a study on understanding environmental management accounting (EMA) adoption by utilising a new institutional sociology perspective. Also the relationship between institutional pressure and environmental management accounting (EMA) adoption was examined. Recognising the important role of accountants in managing environmental issues in organisations, the study highlighted the influence of education and training as determinants of EMA adoption. Altohami (2013) investigated factors influencing EMA adoption in oil and manufacturing firms in Libya. Specifically, it investigated the influence of the dominant factors in the organisational, environmental and technological contexts on firms' intentions to adopt EMA. The results revealed that organisational, environmental and technological variables significantly influenced firms' intention to adopt EMA.

Mokhtar *et al.,* (2014) in Malaysia adopted social issue life cycle theory to explore EMA and Environmental reporting practices using social issue life cycle theory as an interpretive lens, the paper proposed a theoretical framework to investigate the relationship between the extent of EMA implementation and ER practices. Jamil *et al.,* (2015) in a study conducted also in Malaysia investigated factors and barriers influencing the practice of environmental management accounting. The institutional theory was employed and data was collected via questionnaire. The results indicated that most firms practice physical EMA and also have a budget allocation for environmental activities.
From the discussion above, more studies on EMA practices have been conducted in the developed countries than developing countries. Specifically in Nigeria, the practice and research of environmental accounting over the past decade has focused mainly on environmental reporting and disclosures (Owolabi, 2008, Appah, 2011; Uwuigbe, 2011; Oba, Fodio & Soje, 2012; Duke & Kankpang, 2013, Iredele & Akinlo, 2015). Aside the emphasis on environmental reporting and

disclosures, only few studies in Nigeria are similar to the current study even though they differ significantly in focus. For instance, Owolabi (2006) examined externalities with a focus on the oil and gas industry in Nigeria. Enahoro (2009) conducted a study that combined both internal and external environmental costs together for manufacturing and oil and gas firms in Nigeria. Abiola & Ashamu (2012) conducted a study on EMA by adopting a case study of a single company, NNPC and investigated how it manages, accounts for and reports its environmental risk performance without consideration of any monetary or physical costs in particular.

Studies conducted in South Africa (DeVilliers & Vorster, 1997; DeVilliers, 1999; DeVilliers & Barnard, 2000) have focused on issues such as green reporting while the implementation of environmental management accounting (EMA) has begun, though it is still at infancy stage (Ambe, 2011). However, there is a growing awareness of the significant financial implications of environmental performance which has led to a gradual emergence of research on environmental management accounting practices as evidenced in studies such as Ambe (2011); Queen (2011) and Nyirenda, Ngwakwe & Ambe (2013). All these studies focused either on a case study of a single firm or a single sector. It is therefore noteworthy to conduct a study that cuts across several firms and sectors as well as provide a comparative perspective on the level of EMA practices and barriers to implementation between Nigeria and South Africa.

3. Research methodology

This is an exploratory study utilising primary data obtained from accountants of sampled firms through the aid of structured questionnaire. The population for the study consist of 170 and 269 non-financial companies listed on the Nigerian and Johannesburg Stock Exchanges respectively as at 31st December 2015. A sample of 50 companies (25 from each country) were purposively selected across seven (7) industrial sub- sectors of the economy namely; breweries, building materials, food, beverages and tobacco, healthcare, industrial/domestic product, oil and gas, and chemical and paints, based on the nature of their activities and how it impacts the environment. Out of the 50 copies of questionnaire administered to participating accountants in each country, 22 copies were retrieved from firms in Nigeria (response rate of 88%) and were found useable while all the 25 copies of the questionnaire in South Africa were returned (response rate 100%) and found useable. A higher response rate was recorded among firms in South Africa because respondents supplied the information through the faxing facility. However, only data from 44 copies of the questionnaire (22 from each country) were used in the study to aid effective comparison. Data obtained were analysed using descriptive statistics (tables, mean score).

3.1 Measurement of variables

Measurement of EMA in this study is as used in previous studies. Originally, in line with Burritt *et al*,'s (2002) EMA framework, EMA practices was based on the application of certain management accounting tools such as activity based costing, lifecycle costing, environmental capital budgeting in identifying and managing environmental costs. In the study respondents were asked to measure on a scale of 1 (none at all) to 5 (very much) the understanding of these tools (Jalaludin *et al*., 2011; Jamil *et al*., 2015). Also adopting Burritt *et al*.,'s (2002) EMA framework, 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 used in the study.

Thus, EMA practice in this study is based on the number of methods/techniques used within sampled firms. A score of 1 was used to indicate that a method was used and 0 if not used. The total number of practices adopted by each firm was divided by the total number of practices to establish the level of EMA practices in percentage. The techniques are as follows:

- Activity Based Costing
- Total Cost Assessment
- Full Cost Accounting
- Life Cycle Costing

- Material Flow Accounting
- Environmental Cost Estimation
- Environmental Impact Reduction
- Environmental Business Strategy
- Estimation of Environmental Contingencies
- Environmental Cost Accounts creation

Measurement of variables for barriers to EMA practices (Attitudinal barriers, informational barriers, institutional barriers, financial barriers, and management barriers) were derived by adopting the information as listed in (Chang, 2007 and Jamil *et al.*, 2015).

4. Analysis and findings

Respondent's Profile

Table 1 shows the respondents' profile. Almost all the participating accountants in Nigeria fall within the position of Management Accountant (n = 10, 45.5%) and Financial Accountant (n =10, 50%) respectively. Respondents in South Africa cut across all the title of positions indicated in the questionnaire.

	Category	*Nigeria*		*South Africa*	
		Freq.	*%*	*Freq.*	*%*
Title of Position	Management Accountant	10	45.5	7	31.8
	Financial Accountant	11	50.0	4	18.2
	Finance Officer	1	4.5	6	27.3
	Cost Accountant	0	0.0	2	9.0
	Others	0	0.0	3	13.6
	Total	22	100	22	100
Duration on Job	Less than 1 year	2	9.1	1	4.5
	1-5 years	5	22.7	6	27.3
	6- 10 years	10	45.5	13	59.1
	Over 10 years	5	22.7	2	9.1
	Total	22	100	22	
Highest Educational Level	Graduate	8	36.4	5	22.7
	Postgraduate	14	63.6	17	77.3
	Total	22	100	22	100

Table 1: Presentation of Demographic Summary of Accounts Respondents
Source: Field Survey (2016)

The duration on the job reveals the number of years of experience of the respondents. More experienced respondents participated in the study as majority of the respondents have experience from 6-10 years and over 10 years, for Nigeria (n = 15, 67.12%), and (n = 15, 68.2%) for South Africa. Also, more respondents with postgraduate qualifications participated in the study (n=14, 63.6%) and South Africa (n=17, 77.3%).

4.1 Level of EMA Practices

Assessment of the level of EMA practices is based on the number of EMA techniques applied as shown in Table 2. If all the 22 participating firms for each country applied all the techniques the total of the techniques will sum up to 220 (10 techniques for 22 firms). The result indicates the total score for Nigeria (n= 41) and South Africa (n=72) respectively. The scores for Nigeria and South Africa indicate that the level of EMA practices is low among firms in developing countries. This supports the result in Ambe (2011). However, the level of EMA practices is higher in South Africa

(n=72, 32.73% of 220) compared to Nigeria (n=41, 18.64% of 220). From this total, the technique that South African firms apply more is full cost accounting (n=13, 18.1%). This technique ranks second as the most applied technique in Nigeria (n=7, 17.1%), while the first is environmental impact reduction (n=8, 19.5%). The second highest technique in South Africa is environmental business strategy (n=12, 16.7%), and the third is total cost assessment (n= 12.5%), environmental impact reduction (n= 9, 12.5%) and environmental cost account creation (n= 9, 12.5%) with equal percentage ranking. In Nigeria, environmental business strategy is the third most applied technique (n= 6, 14.6%). While in Nigeria, lifecycle costing technique and environmental cost estimation technique are not applied at all as shown by (n = 0), they indicate (n = 4, 5.6%) and (n= 1, 1.4%) respectively for South Africa.

	NIGERIA	**SOUTH AFRICA**		
TECHNIQUES	***Freq.***	***%***	***Freq.***	***%***
Activity Based Costing	5	12.2	4	5.6
Total Cost Assessment	5	12.2	9	12.5
Full Cost Accounting	7	17.1	13	18.1
Life Cycle Costing	0	0.0	4	5.6
Material Flow Accounting	2	4.9	5	6.9
Environmental Cost Estimation	0	0.0	1	1.4
Environmental Impact Reduction	8	19.5	9	12.5
Environmental Business Strategy	6	14.6	12	16.7
Estimation of Environmental Contingencies	4	9.8	6	8.3
Environmental Cost Accounts creation	4	9.8	9	12.5
TOTAL	**41**	**100**	**72**	**100**

Table 2: Level of EMA Techniques applied among firms in Nigeria and South Africa .

Source: Field Survey (2016)

4.2 Barriers associated with EMA Practices

This study analyses the problems identified to constitute barriers to EMA practices. Adapting from Chang (2007) and Jamil *et al.,* (2015), these problems include when the accounting functions of a firm does not give priority to environmental costs, when firms have difficulties in collecting environmental costs or difficulties in allocating environmental costs, when management provides little or no incentives for managing environmental costs. All these and more constitute barriers to the implementation of EMA or not. These barriers according to Chang (2007) and Jamil et al (2015) have been classified into five categories; attitudinal barriers (ATT), financial barriers (FIN), informational barriers (INF), institutional barriers (INS), and management barriers (MGT). Even though they are potential factors, they are barriers that prevent organisations from practicing EMA practices. Table 3 shows the descriptive statistics of the barriers and Table 1 (Appendix 1) shows the frequency and mean distribution of individual barriers.

BARRIERS	**NG**					**SA**			
	Mean	Std. Dev	Min	Max		Mean	Std. Dev	Min	Max
ATT	3.1190	1.08288	1.00	5.00	2.9545	0. 82965	1.50	4.00	
FIN	3.1190	0.89929	0.00	4.67	3.5606	0 .41641	2.67	4.33	
INF	3.2063	0.92181	1.67	5.00	2.9394	0.52085	1.67	3.67	
INS	3.4148	1.05660	1.00	5.00	3.0758	0.59479	1.67	4.00	
MGT	3.3849	1.13421	1.25	5.00	3.3902	0.70024	2.00	4.33	
	N = 22					N = 22			

Table 3: Overall descriptive statistics of barriers associated with EMA practices among firms in

Nigeria and South Africa.
Source: Field Survey (2016)

The Table shows that institutional barriers have a mean score of (3.4148), and it constitutes the highest factor that prevents firms in Nigeria from practicing EMA. This includes lack of institutional pressure (3.19), lack of stakeholder power (3.13) and lack of shareholder power (3.24). The pressure could come from government; it could also be mimetic or normative pressures. This is followed by management barriers (3.3849), which come in form of few incentives being provided by management for managing environmental costs (3.52), lack of environmental responsibility and accountability by management (3.40), lack of integration of the environment into strategic planning (3.21), and lack of management support for environmental issues (3.33). Informational barriers ranked third with (3.2063), and this entails difficulties in collecting environmental costs (3.10), difficulty in allocating environmental costs (3.43), and the perception of the insignificance of environmental costs in overheads (3.10). This finding is consistent with Johnson (1993), Setthasakko (2010) and Jamil *et al.,* (2015) that indicates the lack of guidance on EMA, lack of information framework leading to the difficulties in effectively collecting, identifying and evaluating environmental-related data, especially in pollution prevention, waste management decisions and performance evaluation.

The least barriers are attitudinal and financial barriers with equal mean of 3.1190 each. Attitudinal barrier can be in form of low priority of accounting for environmental costs and reluctance to change while financial barriers come in form of considerations for the cost implications of EMA, efficiency or financial consideration as to whether cost of implementation outweighs the benefits and vice versa, resources constraints, and magnitude of environmental costs.

South African firms are prevented mostly by financial barriers as indicated by the mean score (3.5606). Further analysis of the individual barriers indicate that EMA practices in South Africa is hugely hindered by consideration for the cost implication of its implementation (4.00), knowing the huge fund required to incorporate EMA into business process and systems. Also, in the light of the many competing projects calling for attention, resources constraints with mean (3.95) play a major barrier to EMA adoption, especially when the other projects appear to enhance short term profitability. Efficiency with mean score (2.95) as to whether the benefit of implementation outweighs the cost also is a major barrier. The implication is that South African firms have largely overcome other barriers. This result supports the position of the study by Jamil *et al.,* (2015) that finds financial barriers as a challenge to EMA practices by Malaysian manufacturing SMEs. This is followed by management barriers (3.3902), institutional barriers (3.0758), attitudinal barriers (2.9545), and lastly by informational barriers (2.9394).

5. Discussion and conclusion

The result of the study indicated that the major limitation to EMA practices in Nigeria is institutional barriers. This barrier exists because of weakness of institutional forces such as government, shareholders and all other stakeholders in promoting environmental conscious society. Although this barrier exist in South Africa but not a strong barrier as such since it ranked third. This connotes that environmental issues are regulated to a reasonable measure in the Republic of South Africa. Even though South Africa has been ranked as the largest greenhouse emitter of carbon-dioxide (CO_2) in Africa and is also 14th among the world's top 20 greenhouse emitters, much progress has been made by firms so far as corporate environmental governance is gaining momentum with 49 companies currently listed on the Social Responsibility Index of the Johannesburg Stock Exchange. No sooner than when government and stakeholders in Nigeria go from policy making to commitment to environmental issues that firms will attain the feat made by firms in the Republic.

Also high among the problems associated with EMA practices in Nigeria are management barriers. This connotes the failures of management of firms in providing incentives and leadership

support for implementing environmental management practices. The failure also includes lack of integration of the environment into strategic planning. This barrier is also a significant limitation to the implementation of EMA in South Africa being the second barrier in the order of ranking. Nigeria is also bedeviled by informational barriers which imply inherent difficulties in collecting and allocating environmental costs due to dearth of advanced manufacturing technologies among Nigerian firms. This is evident in the low level of application of relevant EMA techniques and methods. South Africa is known for its well-developed infrastructure and advanced manufacturing technologies and so the firms do not find difficulty in collecting and allocating environmental cost information.

The major limitation to implementation of EMA practices in South Africa is financial barrier. The high point and foundation of this barrier is on whether the cost of implementing EMA outweighs its benefit. This is because since EMA represents increased costs and investments, with negative effect on the firms' bottom-line, studies and practical cases of its implementations have shown that it does not lead to financial performance. However, since dirty production, waste and pollution are signs of low efficiency, then clean production (CP) is a sign of more efficient production, which enhances performance different from financial performance such as strategically positioning of environmental friendly firms as superior than others that are not and in principle this is economically superior with profitability in the long run. Having discovered that the influence of institutional forces is capable of promoting environmental responsibility among firms, the study therefore recommends that Nigerian government and other stakeholders should play an active role by making and enforcing environmental laws and regulations to curb complacency to environmental issues among firms. Nigerian governments should also formulate national policies and programmes to encourage cleaner production among businesses by establishing a learning centre with the task of training manufacturing businesses on EMA and promoting resource efficiency among local manufacturers. This initiative will further improve the competence of the firms in EMA techniques and methods, and remove the problem of informational barriers.

In South Africa, government should introduce green tax incentives and other market-based environmental policy instruments as a reward for environmental performance by firms. This will help ameliorate the perceived financial barrier to EMA practices. Apart from financial benefit, corporate firms in South Africa should be motivated by the need to promote sustainable business practices, ensure eco-efficiency and strategically position the firm for long run economic superiority.
Management of firms in both countries should integrate environmental issues into strategic planning, provide incentives for environmental management activities within the organisation, and give the needed support and leadership for environmental performance within firms in Nigeria where EMA practice is low for possible improvement, and in South Africa where EMA practice is higher to ensure sustainability of this practice.

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