

The Role of Environmental Cost Accounting in Environmental Sustainability in Nigeria

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Abstract

This study aims to determine the role of environmental cost accounting towards environmental sustainability in Nigeria. The source of data for this study is primary source of data collection with the aid of questionnaire. The research instrument was randomly administered to 200 respondents from organizations in Nigeria: Agricultural/Agro-Allied, Breweries, Chemical and Paints, Health Care/Pharmaceutical and Oil Marketing companies. The findings of the study revealed that majority of the respondents agreed that business organizations in Nigeria have not being aware of environmental policies. It was also found that that there exists no significant difference on business organizations in Nigeria not being aware of environmental policies. The result revealed that majority of the respondents believe that environmental sustainability practice is an important concept for organizations to imbibe in Nigeria. The findings further revealed that majority of the respondents agreed that business organizations in Nigeria have not adopted the use of environmental cost accounting techniques cost management. It was revealed that there exists no significant difference on the adoption of environmental cost accounting techniques cost management by business organizations in Nigeria which implies strong evidence that business organizations in Nigeria have not adopted the use of environmental cost accounting techniques cost management. Also, result revealed that majority of the respondents agree that environmental cost accounting will help in managing negative effect of companies waste discharge in its environment. It was found that majority of the respondents agreed that environmental cost accounting influences Nigeria's environmental sustainability. The result of the analysis further revealed that there exists significant difference on environmental cost accounting influencing Nigeria's environmental sustainability which implies strong evidence that environmental cost accounting influences Nigeria's environmental sustainability.

Keywords

Accounting, Business, Management, Organization, Policies, Sustainability

1. Introduction

The call for environmental sustainability has emerged in recent times as a major aspect of discussion in the problems of environmental degradation. Such issues have taken, inter alia, the form of global warming; atmospheric, soil and water pollution caused by industrial activities (Dutta and Bose, 2008). This issue of increasing environmental degradation amidst developed and developing countries has generated much calls for increased attention on environmental sustainability worldwide. World Commission on Environment and Development (INCED), known as "BRUNTLAND COMMISSION" headed by Norway's Prime Minister, Mrs. Gro Haslem Bruntland, which was established by the United

Nation (UN) also focused on environmental sustainability as its major objective. The commission published a report called "Our Common Future", in 1987, with the proposed concept of "Sustainable Development". This concept received worldwide acceptance which led to the convening of the UN conference on "Earth and Development (UNCED), in Rio de Janeiro, Brazil known as Earth Summit.

Sustaining the environment has also received great attention in Nigeria since 1988 and this led to Decree 58 of 1988 that gave birth to the Federal Environmental Protection Agency (FEPA). This Decree was later amended in 1992 by Decree No. 59 of 1992, granting FEPA the responsibility of environmental protection, biological diversity, conservation and environmental technology and research. It was this decree that created the first standards of environment regulation in Nigeria.

Environmental sustainability is seen as an important component of social, economic and environmental dimensions of business organizations. Sustainability is an extremely important area of focus recently by many business organizations. In today's global business environment, businesses are facing increased competitive, regulatory and community pressures. There is also pressure for environment sustainability, which requires strategies to be put in place to reduce the environmental impacts caused by the products and services offered. Environmental consciousness reflects a social consciousness around saving and advancing the Earth's natural resources, preserving and protecting them for the sake of civilization. As customers become more aware of environmental issues, there is an increase in the demand for ecological products. This increased awareness and sensitivity towards environmental issues places certain demands on business functions to become environmentally conscious.

According to [1], an important function of environmental accounting is to bring environmental costs to the attention of corporate stakeholders who may be able and motivated to identify ways of reducing or avoiding those environmental costs while at the same time, improve environmental quality. Environmental accounting according to [2], can be expressed within the context of global environmental accounting, national environmental accounting and corporate environmental accounting.

The term "Environmental accounting" is more than accounting for environmental benefits and costs. It is accounting for any costs and benefits that arise from changes to a firm's products or processes, where the change also involves a change in environmental impacts. Environmental accounting information need not be the product of accountants, nor need it be used by accountants. Instead, it is any information with either explicit or implicit financial content that is used as an input to a firm's decision-making. Product designers, financial analysts, and facility managers are equally likely to be the users of environmental accounting data. Almost any type of information collected and analyzed by firms will qualify. Examples include input prices, technical and scientific studies that relate production processes to physical outputs, and legal, marketing, and financial analyses. The need for organizations to be conscious in controlling waste discharge into the environment has led many firms around the world to adopt the use of environmental cost accounting in order to determine the cost of their operation activities in their environment, thereby determining the environmental responsibility their organization is owing to its community. To justify the role environmental cost accounting has been playing in environmental sustainability around the world led the researcher to carry out this study.

The uncontrolled impact of industrial activities on the natural environment in previous years has created critical ecological concern [3]. The depletion of the ozone layer, over-exploitation of natural resources, air pollution and toxic waste are harming the sustainable development of the planet and economic system. Although, governmental policies in both developed and developing economies have allayed many

environmental problems mostly with more important role to be played by corporations in crucial achievement of ecological sustainable development [4]. A logical reason for this liability lies in the fact that companies are definitely the main source of environmental trouble. Ref [4] added that most of these companies have the financial resources, the technological knowledge and the institutional influence to provide ultimate solutions; yet the response seems to be relatively passive.

The response to environmental sustainability made businesses previously to assume that incorporating environmental cost into their business strategy would cost more resources of the organization. This led many firms to ignore negative impacts of the operation activities of their organizations on the environment. The waste emitted into the environment has been found to not only have negative impact on the environment alone but pose more cost to the organization in the future because most community dwellers are beginning to be conscious of the damages caused to their environment by waste emission resulting from organizations' activities which has led to series of conflicts between organizations and their immediate environment.

Also, the global business environment has been facing increased competitive, regulatory and community pressures. As customers become more aware of environmental issues, there is an increase in the demand for products of companies who are environmentally conscious of the impact of their operation activities on the environment. In order for organizations to meet up its target market in this present environmentally conscious society, many organizations have been led to adopt environment accounting towards environmental sustainability. Despite the adoption of environmental accounting around the world, the case of Nigeria seems different from other countries.

The operational activities of manufacturing companies especially oil companies have caused extensive hazard to the environment. This spans from destruction of wildlife and biodiversity pollution of air, water, farmland to damage of aquatic ecosystem. This has caused much health and economic problems to the inhabitants. Consequent upon this, responsible environmental management has become an important focus of companies throughout the world. This was followed up by enactment of series of environmental regulations. Government requires management to consider the environmental implications of virtually every decision facing their company.

Environmental cost constitutes a subset of the cost of operating a business. This cost of managing the environment were formerly considered a social cost and an external cost but regulations have resulted in internalization of some of these environmental externalities. With environmental externalities becoming internalized, a new cost emerges. If this new costs are not captured by the cost accounting system, product cost will not be accurate and this will not facilitate sound decision making in product pricing, product retention, production mix and improving the environment. Companies have been observed to be spending significant amount of money on pollution abatement and control. In most cases, the costs

represent the most obvious and most easily measured environmentally related cost but it is only a tip of an iceberg. Also, hidden environmental costs may be greater than expenditures to pollution abatement and control; uncovering these hidden costs can provide significant opportunities for decision making and business planning.

One wonders whether these companies have a supportive corporate culture which forms the foundation for developing a successful environmental cost accounting system with the capacity to capture these hidden costs. The management of these companies are crucially lacking environmental cost information and so the decision makers are seldom able to make use of the extent avoidable to link environmental information to economic variable. One is bored that this scenario will consequently make decision makers to fail to recognize the economic value of natural resources as assets and integrate environmental concern in decision making. There seems to be the risk of companies not been able to determine the impact of an environmental cost on net profit and conversion cost as dearth of environmental information cost to appropriate products or processes.

Environmental accounting advocates the identification, prioritization, quantification or qualification and incorporation of environmental cost into business decision, including informing decision to product mix, product retention and product pricing. This will be farfetched without formal studies on the extent to which companies have developed their environmental cost accounting systems to track and control all environmental costs. It also becomes important to examine if the use of environmental accounting in management decision making will enrich the quality of decision making and the application of full cost environmental accounting in firms. It is against this background that the researcher was motivated to evaluate the role environmental accounting can play towards environmental sustainability in Nigeria business environment.

Objective of the Study

The major objective of this study is to determine the role of environmental cost accounting towards environmental sustainability in Nigeria. To this end, this study seeks to achieve the following objectives:

1. To ascertain the level of environmental management consciousness among business organizations in Nigeria
2. To investigate the level of adoption of environmental cost accounting among business organizations in Nigeria
3. To determine the impact of environmental cost accounting on environmental sustainability in Nigeria

2. Literature Review

2.1. Conceptual Framework

Despite all efforts that has been made in Nigeria since the Rio Conference to address the core environmental issue; environmental degradation has remained the greatest problem in Nigeria. In addition, the country has witnessed a high level of water and air pollution (oil spills, gas flaring) while efforts

to reduce the rate of natural resources depletion and desertification is yet to yield significant results [5].

Major oil spills and industrial waste disposal heavily contaminates marine shorelines, causing severe localized ecological damage to the near-shore communities. The harmful effects of these on the environment are numerous. These spillages and disposals destroy plants and animals in the estuarine zone. It settles on beaches and kills organisms and marine animals like fishes, crabs, and other crustaceans. It endangers fish hatcheries in coastal waters and as well contaminates the flesh of commercially valuable fish. Oil spillages poison algae, disrupts major food chains and decreases the yield of edible crustaceans. Oil on water surface also interferes with gaseous interchange at the sea surface and the oxygen levels will thereby be lowered. This no doubt reduces the life span of marine animals [6].

In a bid to clean oil spills by the use of oil dispersants, serious toxic effects will be exerted on plankton thereby poisoning marine animals. This can further lead to food poisoning and loss of lives. Another effect of oil spill is loss of economic resources to the government. When spilled, oil is not quickly recovered; it will be dispersed by the combined action of tides, wind and current. The oil will therefore spread into thin films, dissolve in water and undergo photochemical oxidation, which will lead to its decomposition [7].

On the Nigerian Coastal environment, large areas of the mangrove ecosystem have been destroyed. Oil spill has also destroyed farmlands, polluted ground and drinkable water and caused drawbacks in fishing of the coastal waters. There have been continuous regional cries in the Niger Delta area as a result of oil spill pollution of the coastal ecosystem. As a result of these environmental challenges, there is need for companies (both the manufacturing and oil sector) involved in oil exploration and waste disposal to deal with activities, methods of recording, analyzing and reporting environmentally induced financial impact and ecological impact. These will in the long run promote more accurate costing and pricing of products and can also aid companies in the design of more environmentally preferable processes, product and services for the future. The implementation of sustainable development and the preparation of meaningful reports on performance, require appropriate means of measuring performance. This has led to more emphasis on role accounting is playing towards environmental sustainability.

2.2. Review on Environmental Accounting

Environmental accounting also referred to as Green Accounting has different meanings and can be used in varied contexts. It is an inclusive field of accounting that provides reports for both internal use, generate 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 financial community. According to [8], environmental accounting is an aspect of accounting which has to do with the identification, allocation and analysis, of material streams and their related money flows by using

environmental accounting systems to provide insight in environmental impacts and associated financial effects. In his contribution, [9] viewed environmental accounting as a tool that can be employed to determine less tangible and external costs for projects and activities, such as bio-diversity, human health and aesthetic values. It is also aimed at broader issues such as implementing sustainable business practice to conserve natural resources for future generations. Ref [10] also viewed environmental accounting as the generation, analysis and use of financial and non financial information in order to optimize corporate environmental and economic performance and to achieve sustainable business. An important function of environmental accounting is to bring environmental cost to the attention of corporate stakeholders who may be able and motivated to identify ways of reducing or avoiding those costs while at the same time improving environmental quality [1]. According to [11], environmental accounting is the management of environmental and economic performance through the development and implementation of appropriate environmental-related accounting systems and practices. While this may include reporting and auditing in some companies, environmental accounting typically involves life cycle costing, full-cost accounting, benefits assessment, and strategic planning for environmental management. Ref [12] viewed environmental management accounting as a combined approach which provides for the transition of data from financial accounting, cost accounting and material flow balances to increase material efficiency, reduce environmental impact risk and reduce cost of environmental protection and this has a financial as well as physical component. Ref [13] surveyed 125 listed manufacturing companies and analyzed the annual reports of these companies for the period. Findings from the study suggest firms' size as a factor influencing pollution control, as larger companies had better record than smaller firms. In line with this, [14] found that larger corporations tend to disclose more information because larger corporations are highly visible, make greater impact to the society, and have more shareholders who might be concerned with social activities undertaken by corporations. Ref [15] examined the association between the content of corporate environmental disclosure and corporate financial performance. The study was concerned with a lack of corporate social responsibility disclosures in annual reports due to their voluntary nature. The authors scored environmental disclosures in 20 pre-selected content categories along four dimensions; evidence, time, specificity, and theme. Ref [15] proxies environmental performance by a performance index devised by the Council on Economic Priorities (CEP), a non-profit organization specializing in the analysis of corporate social activities. Forty firms were selected from 50 firms that were monitored by CEP. Regression result indicated no association between environmental disclosure and environmental performance disclosures in annual reports. Ref [16] relied on the corporate stakeholder theory to argue that the value of a firm depends on both the cost of explicit claims such as wage contracts and implicit claims e.g. environmental responsibility. More

environmentally friendly firms and consequently, would be likely to achieve better financial performance. Ref [17] investigated the effect of company size as indicated by firms' assets and paid-up capital on corporate social environment accounting. Ref [13] suggested that firm size as factor influencing pollution cost control determination, as larger companies had better records in this regards than smaller firms. Ref [18] studied Royal Dutch Shell oil exploration activities and corporate social responsibility in Nigeria as well as the Ogoni crisis. Based on its findings, the study concludes that the level of Shell's corporate social responsibility in Ogoni-Land has been relatively low compared with what the oil company gets from the area.

According to [19], a company's attitude to the environment is likely to be seen as a benchmark of its commitment to innovation and good management. Companies setting the pace on environmental issues will be seen as the leaders of the corporate sector.

Environmental accounting affects the company's internal costs and encompasses costs to the society. Total Quality Environmental Management (TQEM) supports continuous improvement of corporate environmental performance. Given the importance of accurate cost information in making decisions, the term environmental cost has been introduced into the vocabulary of environmental managers. During the environmental cost accounting cooperative benchmarking process, environmental cost was described severally as costs which have been incurred in order to comply with regulatory standards, costs which have been incurred in order to reduce or eliminate releases of hazardous substances, all other costs associated with corporate practices aimed at reducing environmental impacts and costs associated with not addressing these issues. It can therefore be deduced that:

1. Environmental costs are really a subset of the costs of operating a business
2. As environmental externalities become internalized, new costs emerge which must be captured by the cost accounting system so that product costs remain accurate enough to facilitate sound decision making.
3. The magnitude of environmental costs are greatly underestimated, and their impact on product or process costs is often obscured through inaccurate overhead accounting. Environmental costs are often hidden in overhead and underestimated.
4. Environmental cost information, like all cost information is only useful when there are decisions that are facilitated by knowing that information. Among the decisions that can be facilitated by environmental cost information is product costing. Product cost accuracy is not improved by defining costs already accurately assigned to products by the cost accounting system, regardless of whether they are called environmental. That is, the label "environmental" does not improve cost accuracy in this case but it may enable cost reduction of the product.
5. Many superior environmental projects are often not identified as environmental because they convey

operating benefits as well pollution prevention projects which increase yields). Sometimes, the best environmental projects are not identified as environmental at all. Conversely, end of pipe treatments are classified as environmental and are often accorded high priority by management, but may not represent the best solution to the problem. Thus, proactive environmental management often leads to higher non-environmental costs and lower environmental costs.

6. Despite the existence of fledging environmental cost accounting systems, participating companies elide on techniques such as life cycle assessment and materials balancing, which do not require financial data. They claim that, in many cases, environmental cost information is less useful than non-financial, real-time measures of performance. Participating companies had difficulty providing environmental cost data relating to various types of environmental activities.

Decision-makers require precise information about the environmental costs of the Company's products, processes and activities. The USA Environmental protection agency views environmental costs as dependent on utilization of information in a company and the environmental costs can include conventional costs (raw materials and energy costs with the environmental relevance); potentially hidden costs which are captured by the accounting system but then lose their identity in overheads. Hidden costs are environmental costs that may be potentially unrecognized by managers because of their infrequent/episodic nature or because of their collection in company overhead accounts; *Hidden Cost* refer to regulatory compliance or other costs that are "hidden" or lumped into a general account. According to the U.S. EPA, *Potentially hidden costs* result from among other factors activities undertaken to comply with environmental law. These hidden costs are obscured in overhead accounts, making it impossible for managers to manage them effectively. Examples of hidden costs are: compliance reporting; legal support; waste management; sampling and testing; and monitoring. Typically, environmental costs and associated opportunities are buried in various overhead accounts. By distorting costing and pricing across the business, this practice can result in poor investment and strategic decisions. On his part, [20] sees Environmental costs as costs relating to the use, release and regulation of materials in facility operations which comprises environmental management costs, opportunity costs, contingent costs and image costs. Environmental costs are categorized into waste and emission treatment, prevention and environmental management, material purchase value of non-product output, and processing costs of non-product output. Environmental costs are costs within internal management account or external financial accounts. Internal environmental costs are composed of direct costs, indirect costs and contingent costs. Direct costs are traceable to particular products, site, type of pollution or pollution prevention program; they are costs clearly and exclusively associated with a product or service and treated as such in cost accounting system while indirect costs include costs such as

environmental training, research and development, record keeping and reporting. On the other hand, external costs are costs of environmental damage external to the firm; that is, all costs that are not accounted for as the direct costs of a particular process, system, product, or facility commonly pooled and allocated on the basis of some formula or are not allocated at all. These externalities include environmental degradation for which firms are not legally liable. Whereas internal costs can usually be estimated and allocated using the standard costing models available to the firm, the monetary equivalent values of external costs can be assessed by the economic methods that determine the maximum amount that people would be willing to pay to avoid the damage, or the minimum amount of compensation that they would accept to incur.

Given ever-changing environmental laws and the complexities of environmental management, proactive businesses recognize the need to integrate environmental considerations into decisions made *throughout* the organization. The challenge however lies in the identification and allocation of the environmental costs. Ref [21], warned that when environmental costs are not adequately allocated, cross subsidization occurs between products. In most cases, different products are made by different processes and each process tends to have a different environmental cost depending on the design of the process of production, and possible use of hazardous chemicals. As exemplified by [21], in a facility with two processes, A and B that use the same number of direct labour hours for a batch of product, process A, however uses hazardous chemicals while process B does not. The facility incurs environmental costs from the use of hazardous chemicals in a number of ways: specification and procurement of the chemical which includes evaluation of material safety data sheets; design of the process to minimize worker exposure; shipping costs associated with transporting hazardous chemicals; monitoring, reporting and permitting to meet applicable regulations, employee training in handling and emergency response; storage and disposal costs; and liability for the chemical from purchase to grave. While not all costs can be correctly and unambiguously identified, it is imperative to collect data relevant to decision makers as fully as possible.

Full Environmental cost accounting refers to the addition of environmental cost information into existing cost accounting procedures and/or recognizing embedded environmental costs and allocating them to appropriate products and processes. Full cost accounting is a term often used to describe desirable environmental accounting practices. It refers to the allocation of all direct and indirect costs to a product or product line for the purposes of inventory valuation, profitability analysis, and pricing decisions. Hence, full environmental cost accounting embodies the same concept as full cost accounting but highlights the environmental elements. Since the early 1990s, concerted efforts have been underway through the United Nations Statistics Division, the European Union, the OECD, the World Bank, country statistical offices, and other organizations to standardize the framework and

methodologies. The Institute of Management Accountants in its 1996 report showed that methods are now available to measure, report and manage current and future environmental costs and opportunities adding that some management tools and techniques can help management isolate the sources and magnitude of previously hidden and misallocated environmental costs and facilitate better business decisions.

A supportive corporate culture forms the foundation for developing a successful environmental cost accounting system. Companies like International refineries and Ciba-Geigy generate environmental cost data as part of the general ledger system. International Refineries is addressing environmental cost accounting by identifying environmental costs through a coding system. Ciba-Geigy on the other hand, describes the development of an environmental cost accounting system based on detailed overhead accounting; one which also incorporates standard cost variance analysis. This system will be useful in allocating environmental costs to the products and processes that cause them and isolating nonstandard cost performance where it occurs. In their study, [22] imputes a price on air pollution emissions equal to marginal damages in order to measure the externalities from air pollution. Ref [23] highlighted four main observations regarding how useful environmental accounts are for policy:

1. Although some countries are using the environmental accounts quite actively, the accounts are still underutilized, especially in developing countries.

2. No country has truly comprehensive environmental accounts.

3. International comparisons are important, but not yet possible because of differences in methodology, coverage, environmental standards, and other factors.

4. For a country to fully assess its environmental impact, it must have;

- (a) accounts for the trans-boundary movement into and out of the country of pollutants via air and water

- (b) accounts for its major trading partners to calculate the pollution and material content of products that it imports.

According to [24], firms need information for both financial and managerial accounting. On the financial side, information is required for a range of uses such as corporate financial planning and control, performance evaluation, and to verify credit worthiness and taxes owed. On the management side emphasis is usually on controlling costs. The relationship between the environment and managerial accounting can be seen through the lens of cost control. This is because managerial accounting emphasizes the use of accounting information to serve business managers in making capital investment decisions, costing determinations, process/product design decisions, performance evaluations, and a host of other forward-looking business decisions.

Ref [25] noted that environmental costs can be substantial, from five to twenty percent of the total costs of business activities. This is because these costs are likely to rise as pressures for environmental protection measures increase, the purpose of this chapter is to make the case that incorporating environmental costs directly into accounting functions and

business strategies can improve a business's competitive position.

Discussing the expanding base of cost accounting, [26] narrated that while research on social accounting and reporting was rooted in the early 1970s, the validity of corporate environmental accounting in professional practice has only been widely accepted over the last five years. By 1998, many of the major North American accounting organizations had produced at least one publication on environmental accounting. For example, the Canadian Institute of Chartered Accountants (CICA) published *Environmental Costs and Liabilities: Accounting and Financial Reporting Issues* in 1993, and *Environmental Reporting in Canada: A Survey of 1993 Reports* in 1994. Ref [26] added that in gathering literature on the emerging environmental accounting area of inquiry, CICA now maintains a twenty-page list of environmental accounting references on its web site. Elsewhere, the Society of Management Accountants of Canada has produced an excellent series of guides including *Tools and Techniques of Environmental Accounting for Business Decisions* (1996) and *Accounting for Sustainable Development: A Business Perspective* (1997). Other accounting organizations have had publications prepared for them by specific experts in the area. These include the Certified General Accountants Association of Canada, the U.S. Institute of Management Accountants and the International Federation of Accountants.

A recent survey of environmental management strategies by the Society of Management Accountants of Canada (SMAC) suggests that the majority of major corporations in Canada and the U.S will begin implementing environmental accounting and reporting practices by the end of 1998 (SMAC 1997). The survey indicated that the three motivating factors to account for this trend in order of priority are:

1. Compliance with standards; 2. A moral commitment to environmental stewardship; and 3. The desire to promote good relations with the residents of local communities.

According to [26], environmental accounting can be defined as an assessment and allocation of environmental costs and expenditures for the purposes of cost and resource management, compliance reporting, and capital budgeting, planning, and operational decision making. Environmental accounting can be further delineated into two main areas: financial environmental accounting and managerial environmental accounting.

Financial environmental accounting emphasizes the analysis and reporting component of internal costs and liabilities related to environmental matters. This is typically the domain of an accountant who prepares financial reports for lenders and investors. The assessment and reporting of environmental risks and liabilities, capitalization for environmentally related expenditures and the treatment of environmental debt, all fall into this stream of environmental accounting. In these matters, accountants are guided by professional accounting standards such as the Generally Accepted Accounting Principles (GAAP).

Managerial environmental accounting has a different focus.

It supports the internal management and decision-making process through various techniques of cost allocation, performance measurement and business analysis. This type of environmental accounting is interdisciplinary in scope. On the one hand, scientists, economists, and policy advisors can identify internal and external environmental costs. On the other hand, the management accounting profession can use its expertise to allocate these costs within existing and emerging environmental and sustainability accounting frameworks [26].

Given the two main areas of environmental accounting and the fact that both accountants and environmental experts are required to delineate and allocate internal and external costs, it is not surprising to find different methods related to environmental accounting in the literature. These include:

(a) activity-based costing/activity-based management (b) total quality management/total quality environmental management (c) business process re-engineering/cost reduction (d) design for environment/life-cycle design and assessment (e) life-cycle assessment/life-cycle costing (f) total cost assessment full cost assessment

There exist many ways in which environmental costs, losses or benefits may go unrecorded in traditional accounting systems. One broad approach to calculating full environmental costs is to distinguish between internal costs (those borne by the organization) and external costs (those passed on to society, e.g., environmental and health costs). In this approach, internal environmental costs to the firm are composed of direct costs, indirect costs, and contingent costs. These typically include such things as remediation or restoration costs, waste management costs or other compliance and environmental management costs. Internal costs can usually be estimated and allocated using the standard costing models that are available to the firm. Direct costs can be traced to a particular product, site, type of pollution or pollution prevention program (e.g., waste management or remediation costs at a particular site). Indirect costs such as environmental training, record keeping and reporting are allocated to cost centers such as products and departments or activities.

External costs are the costs of environmental damage external to the firm. These costs can be “monetized” (i.e., their monetary equivalent values can be assessed) by economic methods that determine the maximum amount that people would be willing to pay to avoid the damage, or the minimum amount of compensation, that they would accept to incur it.

Full environmental costs = (internal + external costs)

Where:

Internal costs = (direct + indirect + contingent)

External costs = the costs of external environmental and health damage (examples of external environmental costs includes depletion of natural resources, noise and aesthetic impacts, residual air and water emissions, long-term waste disposal, uncompensated health effects, change in local quality of life, the costs of uncompensated health effects and environmental impacts, Stratospheric ozone depletion; biodiversity loss; climate change)

From the perspective of society as a whole (i.e., the firm and

the rest of society), economic efficiency is achieved (i.e., full environmental costs are minimized) when the firm takes internal measures to protect the environment up to the point where the sum of internal and external costs is minimized.

Contingent or intangible environmental costs are costs that may arise in the future to impact the operations of the firm. Contingent costs can fall into both internal and external cost categories, and include:

(a) changes in product quality as a result of regulatory changes that affect material inputs, methods of production, or allowable emissions; (b) an unforeseen liability or remediation cost; (c) employee health and satisfaction; (d) customer perception and relationship costs; and (e) investment financing costs or the ability to raise capital.

External costs are typically of less interest to the firm than internal costs, unless the external costs lead to liabilities for the firm. It should be of interest to note that within the existing financial reporting framework, the Canadian Institute of Chartered Accountants [27], applies the term “environmental losses” to the category of environmental cost expenditures for which there are no returns or benefits. According to CICA, environmental losses are damages that have to be paid to others as a result of damage to the environment that resulted in bodily injury to humans, damage to the property of others, economic damage to others, or damage to natural resources [27]. CICA also describes another category of environmental cost expenditures as “environmental measures”. These are the costs incurred to “prevent, abate, or remediate damage to the environment or to deal with the conservation of renewable and non-renewable resources” ([27]; [28]).

The objective of externality costing is to internalize externalities. In other words:

(a) to allow the external costs a firm imposes on society to be brought to bear in an augmented profitability calculation; (b) to bring external costs considerations into the corporate decision-making process; (c) to ensure future viability of the organization through understanding potential liability and risk scenarios; and (d) to be able to inform stakeholders on the environmental and health impacts of the organization’s economic activities.

Externality costing generates monetized estimates of environmental damage created by an organization, either at a specific site or through its activities. There are two widely used approaches for monetizing externalities. The only valid approach from the standpoint of economic theory is the damage cost approach, i.e., assessing the value of environmental (and health) damage to those who incur the damage, as described above. The damage cost approach uses the value of loss of use to estimate externality costs. Within the damage cost approach are the following evaluation methods:

1. market price method 2. hedonic-pricing method 3. travel cost method 4. contingent valuation methods (survey questionnaire methods)

However, if firms undertake (or are required to undertake) measures to reduce environmental damage to the “optimal” extent (i.e., the extent which minimizes the sum of internal

and external costs), then the marginal external cost (incremental cost of the last unit of harm) will be equal to the marginal internal cost (incremental cost of preventing the last unit of harm). On this basis, marginal external costs are sometimes assumed to be equal to marginal internal costs, and are estimated accordingly; this is generally called the “cost of control approach”.

The concern about accounting for external costs is also reflected in the increasingly widespread practice of using “shadow prices” (e.g., dollars per ton of greenhouse gas emissions) in firms’ capital budgeting decisions. This reflects the view that, although such costs are not currently imposed on the firm, it is likely that they will be before long.

Alternatively, it might be more pragmatic and realistic for a firm to take account of external costs as impending internal costs. In other words, it might be assumed that each category of external cost would eventually be reflected in internal costs. As external costs become internalized, the internal costs rise from zero (when the costs are purely external) to magnitudes that might meet or even exceed the magnitudes of the initial external costs. Therefore, rather than accounting for external costs directly and immediately, a firm might take account of them in terms of various possible time profiles of (future) internal costs (as external costs become internalized). These time profiles of future costs would still have implications for current capital budgeting (and other) decisions.

Monetary environmental management accounting can be defined as a sub-system of environmental accounting that deals only with the financial impacts of environmental performance. It allows management to better evaluate the monetary aspects of products and projects when making business decisions.

Environmental management accounting serves business managers in making capital investment decisions, costing determinations, process/product design decisions, performance evaluation and a host of other forward-looking business decisions. Thus, environmental management accounting has an internal company-level function and focus, as opposed to being a tool used for reporting environmental costs to external stake - holders. It is not bound by strict rules as is financial accounting and allows space for taking into consideration the special conditions and needs of the company concerned.

Companies and managers often believe that environmental cost does not significantly impact their business operation. However, it does not occur to them that some production costs have an environmental component. For instance, the purchase price of raw materials: the unused portion that is emitted in a waste is not usually considered an environmentally related cost. These costs tend to be much higher than initial estimates (when estimates are even performed) and should be controlled and minimized by the introduction of effective cleaner production initiatives whenever possible. By identifying and controlling environmental costs, environmental management accounting systems can help environmental managers justify these cleaner production projects, and identify new ways of saving money and improving environmental performance at

the same time.

The systematic use of environmental management accounting principles can assist managers in identifying environmental costs often hidden in a general accounting system. When hidden, it is impossible to know what share of the costs is related to any particular product or process or is actually environmental. Without the ability to isolate and separate this portion of the overall cost from that of production, product pricing will not reflect the true costs of its production. Polluting products will appear more profitable than they actually are because some of their production costs are hidden, and they may be sold under priced. Cleaner products that bear some of the environmental costs of more polluting products (through the overhead), may have their profitability underestimated and be over priced. Since product prices influence demand, the perceived lower price of polluting products maintains their demand and encourages companies to continue their production, perhaps even over that of a less polluting product. Also, implementing environmental accounting will multiply the benefits gained from other environmental management tools. Besides the cleaner production assessment, environmental management accounting is very useful for example in evaluating the significance of environmental aspects and impacts and prioritizing potential action plans during the implementation and operation of environmental management system (EMS). Environmental management accounting also relies significantly on physical environmental information. It therefore requires a close co- operation between the environmental manager and the management accountant and results in an increased awareness of each other's concerns and needs.

As a tool, environmental management accounting can be used for sound product, process or investment project decision-making. Thus, an environmental management accounting information system will enable businesses to better evaluate the economic impacts of the environmental performance of their businesses.

Environmental management accounting is a relatively new tool in environmental management. Decades ago environmental costs were very low, so it seemed wise to include them in the overhead account for simplicity and convenience. Environmental costs are no longer a minor cost item that can be pooled together with other costs: the use of environmental management accounting saves money and improves control.

Still, many companies need external help in creating or improving their environmental management accounting, as those skills are not widespread and rarely available internally. Environmental management accounting has to be tailored to the special needs of the company rather than be applied as a generic system. The cost and benefit of building such a system has to be considered and the scope of the environmental management accounting properly selected. Building the environmental management accounting incrementally is a common implementation strategy among companies.

3. Research Methodology

3.1. Research Design and Sample Population

The researcher adopted the use of survey design method in the conduct of this study. The choice of the survey design was to enable the researcher gather a wide range of relevant data adequate for proving inference for the study.

The researcher randomly selected 200 respondents from organizations in Nigeria Agricultural/Agro-Allied, Breweries, Chemical and Paints, Health Care/Pharmaceutical and Oil Marketing companies for this study. The researcher also employed the use of purposive sampling technique in the selection of the respondents for the study, this is because the researcher has keen interest in only accounting employee of the organization for the study.

The research instrument employed in this study was a close-ended questionnaire which comprises of three sections.

The various sections of the questionnaire sought information on questions structure with respect to the research objectives of the study. The responses were rated on a five point Likert scale of Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD).

3.2. Method of Data Analysis

The statistical tools used in this study include the Frequency distribution, Mean rank and Kruskal-Wallis test. The choice of these tools is to enable the researcher obtain adequate inference on the various objectives of the study.

3.3. Presentation of Data

Table 1, table 2 and table 3 represent summary of responses obtained from the research instrument. Where Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD) represents the various options.

Table 1. Summary of responses on whether business organizations in Nigeria are aware of environmental policies.

S/N	Questions	SA	A	U	D	SD
1	Environmental sustainability practices is an important concept for organizations to imbibe in Nigeria	114	86	0	0	0
2	The protection of the environment from environmental waste by companies has been a welcomed development in Nigeria	101	81	18	0	0
3	Environmental policies have been implemented in all departments of your organization	22	32	53	47	46
4	Companies in Nigeria are complying to environmental laws.	21	52	44	53	30
5	Companies in Nigeria keeps environmental cost information in order to be conscious of their environmental responsibility	22	32	71	41	34
6	Companies in Nigeria are environmentally responsible to its environment by voluntary allocation of money for the protection of the environment in which they operate	34	14	56	52	44

Source: Field Survey, (2014)

Table 2. Summary of responses on whether business organizations in Nigeria have adopted the use of environmental cost accounting techniques cost management.

S/N	Questions	SA	A	U	D	SD
1	Nigerian companies have adopted environmental cost system in cost determination	8	12	99	23	58
2	Environmental cost reports of Nigerian companies from a separate stand alone document from their annual report	9	8	19	68	96
3	Environmental cost reports disclosed by companies are used for internal operations	49	58	29	31	33
4	Environmental cost reports helps companies in Nigeria to ascertain the environmental cost responsibility of companies to its communities.	2	18	84	44	52
5	Environmental cost accounting helps companies on awareness of environmental responsibility to its community	79	85	23	6	7
6	Environmental cost accounting will help in managing negative effect of companies waste discharge in its environment	76	207	11	4	2

Source: Field Survey, (2014)

Table 3. Summary of responses on whether environmental cost accounting influence Nigeria environmental sustainability.

S/N	Questions	SA	A	U	D	SD
1	The adoption of environmental cost accounting will help in ascertaining environmental responsibility of companies to Nigeria business environment	99	81	14	3	3
2	Environmental cost accounting will help companies in summarizing environmental activities report of the business area location	92	89	12	6	1
3	The disclosure of a company's environmental information and performance practice will bring about good environmental sustenance	94	60	21	16	9
4	Environmental cost accounting will help in improving company's relationship with its host community.	63	114	21	1	1
5	Companies adoption of environmental cost accounting will help in improving Nigeria business environment	65	78	32	16	9
6	Environmental cost accounting will help companies in managing risk created as a result of the company's operations.	56	76	27	23	18

Source: Field Survey, (2014).

4. Data Analysis and Discussion

4.1. Kruskal-Wallis Test on Whether Business Organizations in Nigeria are Aware of Environmental Policies

H₀: Business organizations in Nigeria are not aware of environmental policies

H₁: Business organizations in Nigeria are aware of environmental policies

Table 4. Ranks.

	Option	N	Mean Rank
Response	Strongly Agree	6	16.75
	Agree	6	17.92
	Undecided	6	17.00
	Disagree	6	14.50
	Strongly Disagree	6	11.33
	Total	30	

Table 5. Test Statistics^{a,b}.

	Response A
Chi-Square	2.181
df	4
Asymp. Sig.	.702
a. Kruskal Wallis Test	
b. Grouping Variable: Option	

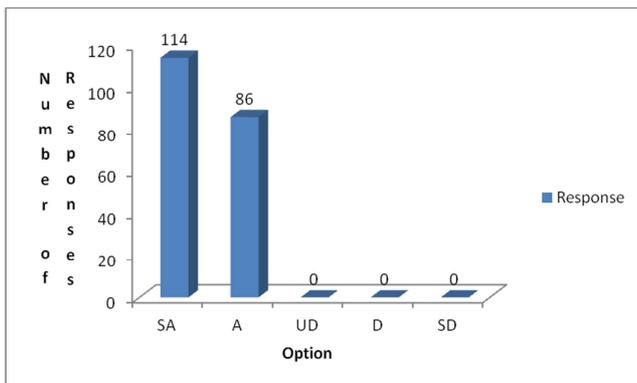


Fig. 1. Distribution of responses on whether environmental sustainability practices is an important concept for organizations to imbibe in Nigeria.

Interpretation

The result showed in table 4 that majority of the respondents agreed that business organizations in Nigeria have not being aware of environmental policies since option "Agree" recorded the highest mean rank of 17.92. Also, the result of the analysis further revealed that there exists no significant difference on business organizations in Nigeria not being aware of environmental policies since a Ch-square test value of 2.181 was obtained and a corresponding P-value of 0.702 which falls on the acceptance region of the hypothesis assuming a 95% confidence level (P-value= 0.702 > α=0.05). This result implies strong evidence that business organizations in Nigeria are not aware of environmental policies. Figure 1

revealed that majority of the respondents believe that environmental sustainability practices is an important concept for organizations to imbibe in Nigeria.

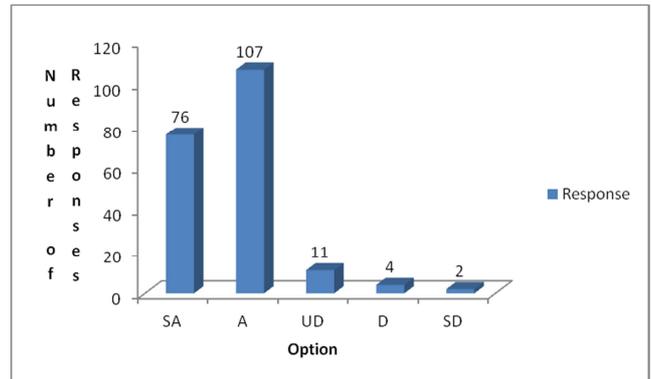


Fig. 2. Distribution of responses on whether environmental cost accounting will help in managing negative effect of companies waste discharge in its environment.

4.2. Kruskal-Wallis Test on Whether Business Organizations in Nigeria Have Adopted the Use of Environmental Cost Accounting Techniques Cost Management

H₀: Business organizations in Nigeria have not adopted the use of environmental cost accounting techniques cost management

H₁: Business organizations in Nigeria have adopted the use of environmental cost accounting techniques cost management

Table 6. Ranks.

	Option B	N	Mean Rank
Response_B	Strongly Agree	6	14.00
	Agree	6	17.67
	Undecided	6	17.42
	Disagree	6	12.92
	Strongly Disagree	6	15.50
	Total	30	

Table 7. Test Statistics^{a,b}.

	Response B
Chi-Square	1.340
df	4
Asymp. Sig.	.855
a. Kruskal Wallis Test	
b. Grouping Variable: Option_B	

Interpretation

The result showed in table 6 that majority of the respondents agreed that business organizations in Nigeria have not adopted the use of environmental cost accounting techniques cost management since option "Agree" recorded the highest mean rank of 17.67. Also, the result of the analysis further revealed that there exists no significant difference on the adoption of environmental cost accounting techniques cost management by business organizations in Nigeria since a

Chi-square test value of 1.34 was obtained and a corresponding P-value of 0.855 which falls on the acceptance region of the hypothesis assuming a 95% confidence level ($P\text{-value} = 0.855 > \alpha = 0.05$). This result implies strong evidence that business organizations in Nigeria have not adopted the use of environmental cost accounting techniques cost management. Result obtained in figure 2 revealed that majority of the respondents agree that environmental cost accounting will help in managing negative effect of companies waste discharge in its environment.

4.3. Kruskal-Wallis Test on Whether Environmental Cost Accounting Influence Nigeria Environmental Sustainability

H_0 : Environmental cost accounting does not influence Nigeria's environmental sustainability

H_1 : Environmental cost accounting influences Nigeria's environmental sustainability

Table 8. Ranks.

	Option_C	N	Mean Rank
Response_C	Strongly Agree	6	24.33
	Agree	6	24.67
	Undecided	6	13.83
	Disagree	6	8.58
	Strongly Disagree	6	6.08
	Total	30	

Table 9. Test Statistics^{a,b}.

	Response_C
Chi-Square	23.372
df	4
Asymp. Sig.	.000
a. Kruskal Wallis Test	
b. Grouping Variable: Option_C	

Interpretation

The result showed in table 8 that majority of the respondents agreed that environmental cost accounting influences Nigeria's environmental sustainability since option "Agree" recorded the highest mean rank of 24.67. Also, the result of the analysis further revealed that there exists significant difference on environmental cost accounting influencing Nigeria's environmental sustainability since a Chi-square test value of 23.372 was obtained and a corresponding P-value of 0.00 which falls on the rejection region of the hypothesis assuming a 95% confidence level ($P\text{-value} = 0.00 < \alpha = 0.05$). This result implies strong evidence that environmental cost accounting influences Nigeria's environmental sustainability.

4. Discussion

From the findings of the study, it was found that environmental sustainability practices are an important concept for organizations to imbibe in Nigeria. It was discovered that, the protection of the environment from

environmental waste by companies has been a welcomed development in Nigeria. Despite this acceptance of environmental protection, it was observed that environmental policies have not yet been implemented in all departments of Nigeria organizations. This made companies in Nigeria not being able to comply to environmental laws.

Also, it was found that companies in Nigeria do not keep environmental cost information which is expected to make them be conscious of their environmental responsibility. This has made companies in Nigeria not to be environmentally responsible to their environment by voluntary allocation of money for the protection of the environment in which they operate. The findings also concurred with the fact that business organizations in Nigeria are not aware of environmental management policies. This result is in line with findings by [29] and [30] who discovered that environmental cost information disclosure is low in Dhaka because of non awareness of companies on the need for environmental information disclosure.

It was equally discovered, that Nigerian companies have not adopted environmental cost system in cost determination. This has environmental cost reports of Nigeria companies not forming a separate stand alone document from their annual report. This is because, since environmental cost reports are not prepared, no environmental information will be available for internal operations. Also, environmental cost report do not help companies in Nigeria to ascertain the environmental cost responsibility of companies to its communities. Although, environmental cost accounting was found to help companies on awareness of its environmental responsibilities to its community. Since it was found that it has not yet been adopted, environmental cost accounting will not help in managing negative effect of companies waste discharge in its environmental cost accounting technique cost management.

5. Conclusion

This study was able to assess the role of environmental cost accounting in environmental sustainability in Nigeria. The result of the study showed that environmental sustainability practice is an important concept for organizations to imbibe in Nigeria. Environmental policies have not been implemented in Nigerian organizations. This has made business organizations in Nigeria not to be aware of environmental management policies. Also, Nigerian companies have not adopted environmental cost system in cost determination which would have helped companies to be aware of its environmental responsibility to its community. Environmental cost accounting will help in improving company's relationship with its host community. It will also help companies in managing risk created as a result of the company's operations.

In the light of the findings of this study, the researcher recommends that a detailed and well spelt out environmental disclosure themes and evidence must be established to provide foundation for improving corporate social environmental disclosure among companies. Also, environmental regulatory agencies should mandate organizations to adopt environmental

practices in its operations so as to enhance environmental sustainability consciousness within Nigerian organizations. In addition, the researcher recommends the adoption of environmental cost accounting by organizations in Nigeria to enhance better environmental waste discharge costing.

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