CHAPTER ONE INTRODUCTION

1.1 Background of the Study

Nowadays, businesses have become increasingly aware of the environmental implications of their operations, products and services. The number of companies and other organizations solidifying their environmental approach and developing business activities that take the environment into consideration and encompass environmental conservation effort continue to increase. Environmental risks cannot be ignored, they are now and much a part of running a successful business as product design, marketing and sound financial management (Frost & Wilmshirst, 2000).

The industrial revolution brought with it technological progress such as discovery of oil and its virtually universal use throughout different industries. Technological progress facilitated by super efficiency of capitalist business practices like division of labour, cheaper production cost, over production of some products like cement, over consumption population etc had probably become one of the main causes of serious deterioration of natural resources.

Human activities have led to damages to the environment, including depletion of natural resources, environmental pollution and abnormal climates. The global consensus at present is to promote sustainable development among which corporate social responsibility is most closely associated with business (UNDSD, 2003). Rout (2010) further stated that Green accounting is a quantitative assessment of the expenditure and benefit in environmental protection activities and specified systematic records and reports, maintenance of a positive relationship between the enterprises and the natural ecology, and promotion of effective and efficient environmental activities, in order to achieve sustainable profit. Sustainability simply put is the ability to be sustained, supported, upheld or confirmed. The idea is that goods and services should be produced in ways that do not use resources that cannot be replaced or damaged to the environment.

Green accounting is a potent issue among businesses in this modern age. It has become necessarily for corporations to formulate methods of promoting green causes for the present and future. Green accounting helps to promote a sustainable future for business which brings green public procurement and green research and development into the big picture (Rout 2010). Poor environmental behaviour may have a real adverse impact on the business and its finances. Such adverse effect ranges from fines, increased liability to environmental taxes, loss in value of land, distribution of brand values, loss of sales, consumer boycotts, inability to secure finance, loss of insurance cover, law suit, damage to corporate image etc. Nearly all aspects of business are affected by environmental pressures, including accounting. Ordinarily, organizations would reflect environmental factors in their accounting processes via the identification of the environmental costs attached to products, processes and services. Nevertheless, many existing conventional accounting system are unable to deal adequately with environmental costs and as a results simply attributes them to general overhead account (Gray and Bebbington 2001). Consequently, managers are unaware of these costs, have no information with which to manage them and have no incentive to reduce them (United Nations Division for sustainable Development (UNDSD), 2003).

The term Green accounting has many meanings and uses. It can support national income accounting, financial accounting, or internal business managerial accounting (Sana, 2006). The focuses on the application of environmental accounting as a managerial accounting tool for internal business decision. Green accounting can be employed by large and small firms, in almost every industry in both the manufacturing and services sectors, it can be applied on large scale or a small scale, systematically or as needed. The form it takes can reflect the goals and needs of the company using it.

However, in any business, top management support and cross-functional teams are likely to be essential for the successful implementation of environmental accounting because Green Accounting may entail a new way of looking at a company's environmental costs, performance, and decisions (Staniskis & Stasiskiene 2006). Top management can set a positive tone and articulate incentives for the organization to adopt environmental accounting. Companies will likely want to assemble cross functional teams to implement environmental accounting, bring together designers, chemists, engineers, production managers, operators, financial staff, environmental managers, purchasing personnel and accountants who may not have worked together before (Sana 2005). However, environmental accounting is not solely an accounting issue, and the information needed is split up among all of these groups, these people need to talk with each other to develop a common vision and language and make that vision a reality.

Green accounting helps to analyse the use of energy in business. It is of crucial importance for businesses to account their usage of different sources of energy in a regular basis. It is stated in the report on energy resources announced by the World Energy Council in 2001 that "there are sufficient resources in every region of the world that would satisfy the growing energy demand even in the 21stcentury; however, there are no new special technologies that would markedly reduce the part of organic (fossil) fuel in the general energy balance in the nearest future (Spada, 2008). Energy is also the only commodity that cannot even in theory be recovered and reused. Due to the unique position of energy among the other industrial commodities and the growing price of energy resources and expensive infrastructure, researchers argued that energy influences the speed of business growth and economic growth of countries at large. Hibbit & Collison (2004 page 24) stated that:

".....the side effect of current activities of energy production transmission and distribution however, is the rapid use of nonrenewable resources resulting in a negative impact on the surrounding environment. An abundant supply of mostly non-renewable, energy and an increased output per energy unit are the driving force of our present industrial society. Although not really lost in physical terms, energy is degraded to the extent that no more useful work can be extracted from it. Even with the technical improvement in the production system, the energy gains achieved through improved production efficiency, are counter-balanced by the increase in volume and complexity of the production system......" Moreover, it is clear that climate change challenges companies with financial, social, and environmental risks from litigation and/or regulation of green house gases. According to Warsherst (2002) a released report by Ceres and Calvert standard & poor's S & P500 the largest U.S. publicly traded companies are doing a poor job of accounting with effect of climate change risks to their investors.

Although greater attention is slowly paid to environmental issues in accounting education in many high ranked universities, yet the general impression about the implementation and application of the Green Accounting in real life is far behind. This according to Liu (2009) is as a result of the following; First, lack of or incomplete understanding of the environmental and social impacts of Green accounting. Secondly, the shortage of necessary accounting and auditing tools and procedures to implement the Green Accounting in real applications. He further stated (page 29),

".....as regards to the real implementation, lack of the adaptation of Environmental Accounting stems from three dominant reasons: (1) the absence of clear-cut regulations and tools to implement the environmental accounting (2) the dispersed responsibilities of implementing and imposing the environmental organizations and governmental accounting, environmental and social agencies and (3) the lack of experienced corporations personnel to describe fully and forth rightly the environmental activities in either corporation' annual report or in stand-done environmental disclosures. In regards to green accounting he formulated four reasons for the lack of environmental adaptation. (1) the profession has failed to maximize its potential for leadership; (2) the sufficient expertise for participation in environmental partnerships remains undeveloped; (3) the attestation to environmental reports is still not regarded solely as an account's function and (4) the official standards with respect to Green Accounting issues and/or verification engagements continue to be lacking...."

Previous research studies recognized that most management accounting techniques significantly underestimate the cost of poor environmental behaviour, many overestimate the cost and under estimate the benefits of improving environmental practices.

Management accounting techniques can distort and misrepresent environmental issues, leading to managers making decisions that are bad for businesses and bad for the environment. The most obvious example relates to energy usage. According to UNDSD (2003), a recent UK government publicity campaign reports that companies are spending on average, 30% too much on energy through inefficient practices. With good energy management, we could reduce the environmental impact of energy production by 30% and slash 30% of organization's energy expenditure if management accounting as a discipline is to contribute to improving the environmental performance of organization, then it has to change. Green Accounting is an attempt to integrate best management account helps to tackle the social environmental problem and may have impact on attaining sustainably development on environment in any culture and influence the company's behavior in confronting social and environmental responsibility issues. Predicted on the above, the study sets out to examine the effect of Green Accounting characteristics on profit performance of selected firms in Nigeria.

1.2 Statement of Problem

The cost of reducing industrial pollution is high; how to finance it without undue economic burden remain a question. The lack of quantitative analysis of the effect of green accounting characteristics is an indication of hindrances on the way of achieving and maintaining sound business performance. This does not allow the company to accurately identify and measure investments and cost related to environmental conservation activities.

Lack of better insight into the potential effect of Green Accounting characteristics like pollution prevention cost, environmental restoration and protection cost does not allow company to improve efficiency of its activities. Some products incur more of these cost and resources recycling cost than others which the company may need to drop if the effect is ascertained. Companies spend so much at times on corporate social responsibility and research and development which may be controlled if the effect on the performance of the company is known. Frost and Wiluhurst (2000) suggested that by failing to reform management accounting practice to incorporate environmental concerns, organizations are unaware of the impact on profit performance. Moreover, they miss out on identifying cost effect and other improvement opportunities associated with Green Accounting and development decisions.

Pollution prevention, environmental protection, resource recycling, environmental restoration, corporate social responsibility and research and development costs have been identified as variables under investigation. No conclusive investigation has been made on these variables. While some research studies observed a positive relationship between these variables and business performance like Jui-che-Tu & Hsieh (2015) the study found that production cost cannot be exempted from environmental protection, the manufacturing of clean products can generate pollution. The study recommended that external production cost should be internalized and redesigned to improve the product production process and packaging, reduced resource waste and implements the recycle policy. Furthermore its lifecycle suggests assessment for all assessment and developing environmentally friendly products, true green design. Surprisingly no issue of profit performance was raised.

Other study reported negative relationship while others reported inconsistent or no relationship findings. Boyd (1998) for instance, professes that firms suffer from organization weakness that makes them unable to appreciate the financial benefit of pollution prevention investment. Karen, Jean and Thomas (2015) in a study on municipal solid waste issues, showed that even in the absence of environmental policy, long-run development is sustainable. Munaga, Farida, Shaguftan and Shahid (2014) studied the impact of corporate social responsibility on the firms financial performance and found that there was considerable positive relationship between corporate social responsibility and financial performance of a firm. These inconsistent findings or inconclusive investigations professes strong justification for this work needs to be filled by further research like this. It is in this light, that the study examined the effect of Green accounting characteristics on profit performance of selected firms in Nigeria.

1.3 Objectives of the Study

The main objective is to determine the effects of green accounting characteristics on profit performance on selected firms in Nigeria. The specific objectives are:

- i. To determine the effect of pollution prevention cost on firms' profitability.
- ii. To ascertain the effect of environmental protection cost on firms' profitability.
- iii. To ascertain the effect of costs of resource recycling on firms' profitability.
- iv. To determine the effect of environmental restoration costs on firms' profitability.
- v. To ascertain the effect of corporate social responsibility costs on firms' profitability.
- vi. To determine the effect of research and development costs on firms' profitability.

1.4 Research Questions

The study will seek to answer the following questions:

- i. To what extent does pollution prevention cost affect firms' profitability?
- ii. How does environmental protection cost affect firms' profitability?
- iii. How does cost of resource recycling affect firms' profitability?
- iv. To what extent does environmental restoration cost affect firms' profitability?
- v. To what extent does corporate social responsibility cost affect firms' profitability?
- vi. To what extent do research and development cost affect firms' profitability?

1.5 Research Hypotheses

The study was guided by the following hypotheses in their null form

- i. Pollution prevention cost does not have significant effect on firms' profitability.
- Environmental protection cost does not have significant effect on firms' profitability.
- iii. Cost of resource recycling does not have significant, effect on firms' profitability.
- iv. Environmental restoration cost does not have significant effect on firm's profitability.
- V. Corporate social responsibility costs do not have significant effect on firms' profitability.

vi. Research and development cost do not have significant effect on firms' profitability.

1.6 Significance of the Study

Companies, environmental managers, corporate stakeholders, production managers, financial staff, purchasing personnel and Accountants will benefit from this research work in the following ways:

The result from this research work would bring environmental costs to the attention of corporate stakeholders, companies, production managers who would be able and motivated to identify ways of reducing or avoiding these costs while at the same time improving environmental quality.

The financial managers, accountants would be able to allocate environmental costs to the products or processes that generate them while companies on the other hand, can motivate the affected manager and employees to find creative pollution prevention alternatives that lower these costs and enhance profitability; companies would be able to influence the decision making of stakeholders, such as consumers, business partners, investors, local residents and administrators.

It is hoped that this research work would function both as a means for companies to fulfill their responsibility of accountability to stakeholders and simultaneously as a means for appropriate evaluation of environmentally conservative activities.

1.7 Scope of the Study

This study carried out investigations spanning through mainly the Oil and Gas firms and Cement manufacturing firms quoted in Nigeria Stock Exchange market for the period of 2010 to 2015. The study is limited to the period of five years because of inconsistent financial report of these firms before and after the selected period of study. The Oil and Gas firms comprised companies in the upstream as well as marketing and distributions. Emphasis was placed on environmental accounting characteristics and profit performance. The preference for cement and oil and gas firms was motivated by the fact that their annual reports are easily accessible and capable for comparison. In addition, the choice for these firms was based on the nature of their production; nature of disposal of wastages, environmental pollution and environmental conservation. However, the importance of these products to our country, Nigeria can never be overemphasized.

1.8 Limitations of the Study

This research is not devoid of constraints. This work requires commitment of resources, procurement of necessary materials for the study was difficult because many of these firms either allocate their environmental cost to over head cost or administrative cost. There are insufficient local materials though scholarly articles and other relevant publications were used in this study. Secondly, there was lack of quantitative reports of environmental dealings of the firms under investigation in their financial report making content analysis the researcher's only possible tool to generate data.

CHAPTER TWO REVIEW OF RELATED LITERATURE

2.1 CONCEPTUAL REVIEW

2.1.1 Concept of Green or Environmental Accounting

Green accounting is a term with a variety of meanings. It is more than accounting for environmental benefits and costs (Boyd, 1998). Environmental Accounting, can support natural resource accounting at macro level, ecological accounting at local administrative level and at micro level related to financial accounting, cost accounting or managerial accounting (Raouf, 2002). There is no doubt that different organizations and sectors have social and environmental impacts which may carry bigger weight than its economic impact. Accounting has an instrumental role in disclosing about environment responsibility for different entities whether industrial, commercial, services or even voluntary at all levels whether micro, or macro (World Bank, 2000). Thus, accounting became concerned with achieving new goals such as measuring and evaluating potential or actual environmental impacts of projects and organizations. Deegan (2003) stated that environmental accounting is a new goal and is of great importance as it enables any user to take different development decisions, which are economically and environmentally sound. Christmann and Taylor (2001) said that a proper environmental accounting system is a supporting measure for achieving Sustainable development in the sense that it is the main tool for measurement control and decision -making. There are increasing needs from different stakeholders (government, investors, lenders, banks, nongovernmental organizations, etc) to have financial data on the environmental performance of different organization (Buritt, Hahn & Schattegger, 2002). Many of the environmental activities are of qualitative and accordingly of financial nature and have a major effect on organizations costs, assets and liabilities.

The first Green or environmental accounts were constructed in several European countries' working independently of each other. Norway was one of the first influenced by the publication of limits to growth (Meadows et al) as cited in Hecht (2007) and a burgeoning environmental movement. Norwegian officials were concerned that their natural resources, on which their economy is relatively dependent compared with other

European countries, would run out. They therefore developed accounts to track use of their forest, fisheries, energy and land. In the 1980s, they developed accounts for air pollutant emissions which were closely tied to the energy accounts (Hecht 2007). The energy accounts were integrated into models used for macroeconomic planning, taking into consideration the roles of resource bases sectors in economic growth.

On the other hands, Dutch interest in this area originated with the work of Roefie Hueting who developed and sought to implement a measure of sustaining national income that would take into account the degradation and depletion of environmental assets resulting from economic activity (Hecht, 2007). Although his approach was not implemented at that time, his work led the National Income Accountants to develop the national account matrix including environmental accounts. It builds a portion of the national income accounts by adding physical data on pollutant emissions by sector. This approach was adopted by Eurostat, implemented in many other European Countries and integrated into the environmental accounting procedures developed under UN auspices (Hecht 2007).

Moreover, in 1980s France developed an approach termed the comptes de patrimoine, or patrimony accounts. These involved in integrated system structured around three destined but linked units of analysis. That is, natural, cultural, and historical resources were to be measured in physical terms and their stocks and flows quantified (Hecht 2007).

In Nigeria however, some states have commenced experiments in this area. Pollution prevention statutes in particular are seen as a potential legislative vehicle for mandated environmental accounting especially in the oil producing state.

However, Frost and Wilmshurst (2000) stated that environmental accounting has many meaning and uses which can support national income accounting, ecological accounting at local administration level and at micro level related to financial accounting, cost accounting or international business managerial accounting. Environmental accounting aims at achieving development, maintaining a favorable relationship with the community, and pursuing effective and efficient environmental conservative activities (Deegan, 2003;

Okoye and Odum 2006). These accounting procedures allow a company to identify the cost of environmental conservation during the normal course of business, identify benefit gained from such activities, provided the best possible means of quantitative measurement (in monetary value or physical units) and support the communication of its result. Deegan (2003) further stated that environmental conservation is defined as the prevention, reduction and/or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster, and other activities. The environmental impacts are the burden on the environment from business operations or other human activities and potential obstacles which may hinder the preservation of a favorable environment. Environmental accounting is a structure for systematically identifying, measuring, and communicating environmental conservation cost and the economic benefit of environmental conservation measures; this is the financial performance portion of environmental accounting, representing the activities of companies and other organizations in monetary value (Frost & Wilmshurt 2000). The environmental accounting systems also identifies, measures and communicates the environmental conservation benefits, which is the environmental performance portion represented in physical units. The results of environmental accounting can be furthermore used for analysis and evaluation of business performance (Okoye and Ubaka 2005).

Environmental accounting is management accounting that has the strategic meaning even more (Lill 2004). A lot of scholars divide green accounting into green financial accounting and green management accounting. Green accounting will be regarded as a starting point merge in a financial while as a new branch, and while this is merges, green accounting will overweigh the color of strategic management even more. Green accounting is the accounting of sustainable development. It permits the computation of income for a nation by taking into account the economic damage and depletion in the nature resource base of an economy (Thomas 2001), It is a measure of sustainable income level that can be secured without decreasing the stock requires adjustment of the System of National Account (SNA) in terms of stock of national assets. According to Meyer (2000), in SNA, allowance is made for capital consumption or man-made capital while calculating Net Domestic Product (NDP).

Essay world (2012) sees Environmental Accounting as an important tool for understanding the role played by the mutual relationship identified between the two. Yakhou and Dorweller (2004) specified that Environmental Accounting is an inclusive field of accounting that provides reports for both internal use, generating environmental information to help make management decisions of pricing controlling, overhead and capital budgeting, and external use, disclosing environmental information of interest to the public and to the financial community. Jasch (2001) stated that green accounting is related to environmental eco-auditing system and has been defined as the identification, tracking, analysis, and reporting of the materials and cost information associated with the environmental aspect of an organization. The green accounting deals with accounting and management issues relating to environmental and social impact, regulations and restrictions, safety, environmentally sound, and economically viable energy production and supply as cited in (Shelton 2004). The International Federation Accounting discusses green accounting as "the management of environmental and economic performance through the development and implementation of appropriate environment related account systems and practices. While this may include reporting and auditing in some companies, green accounting typically may involve the life cycle costing, full cost accounting, benefits assessment and strategic planning for environmental management.

2.1.2 Functions and Roles of Green Accounting

Sigma project 2003 classified the functions and roles of environmental accounting into internal and external functions. Internal function as one step of a company's environmental information system makes it possible to manage environmental conservation cost and analyze the cost of environmental conservation activities versus the benefit obtained, and promotes effective and efficient environmental conservation activities through suitable decision making. On the other hand, external functions of environmental accounting by disclosing the quantitatively measured results of its environmental conservation activities allow a company to influence the decision-making of stakeholders, such as consumers, business partners, investor, local residents and administration. It is hoped that the publications of environmental accounting results will function both as a means for companies to fulfill their responsibility for accountability to stakeholders and simultaneously, as a means for appropriate evaluation of environmental conservation activities (Raouf. 2002). Eisner (2004) also stated that environmental accounting provides valid information related to a company's environmental conservation costs and benefits from associated activities which contribute to the decision-making of stakeholders. Environmental accounting helps to eliminate inaccurate or biased data and aid in building the trust and reliability of stakeholders (Deegan, 2003).

The foremost role of green accounting is to tackle the social environmental problems and may have impacted on attaining sustainable development of environment in any country and influences the company's behavior in confronting social and environmental responsibility issues. The United States Environment Protection Agency cited in Shelton (2004) deems that an important function of green 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 costs while at the same time improving environmental quality. In facts, the green accounting systems have the dual purposes of managing and improving the financial environmental systems and issues. Sjak (2008) stated that green accounting is a type of account that attempts to factor environmental costs into the fiscal results of operations. It has been argued that gross domestic product ignores the environmental and therefore policy makers need a revised model that incorporates green accounting. The major purpose of green accounting is to help businesses understand and manage the potential guide pro quo ie --- between traditional economics goals and environmental goals. Rout (2010) said that Green accounting also increases the important information available for analyzing policy issues, especially when those vital pieces of information are often overlooked. Green accounting is said to only ensure week sustainability, which should be considered as a step toward ultimately a strong sustainability. It is hopes that the publication of environmental accounting result will function both as a means for companies to fulfill their responsibility for accounting to stakeholders and, simultaneously, as a means for appropriate evaluation of environmental activities.

Table 2.1: The functions of Green Accounting



Source: UNDSD Environmental Management Accounting Procedures and Principles 2001.

2.1.3 Meaning of Environmental cost.

Uncovering and recognizing environmental costs associated with a product, process, system, or facility is important for good management decisions. Costs incurred to comply with environmental laws are clearly environmental costs and costs of environmental remediation, pollution control equipment, and non-compliance penalties are all unquestionably environmental costs (Eisner, 2004).

However, attaining such goals as reducing environmental performance required paying attention to current, future, and potential environmental costs. How a company defines an environmental cost depends on how it intends to use the information (e.g. Cost allocation, capital budgeting, process/product design, other management decision) and the scale and scope of the exercise (Eisner, 2004).

Environmental costs are one of the many different types of costs business incur as they provide goods and services to their customers. However, environmental costs deserve management attention and can be controlled. Many environmental costs can be significantly reduced or eliminated as a result of business decisions, ranging from operational and housekeeping changes, to investment in "greener" process technology, to redesign of process products (Ulph, 2004). Many environmental costs (eg. Wasted raw materials) may provide no added value to a process, system or product. Environmental cost (and thus, potential cost savings) may be observed in overhead accounts or otherwise overlooked.

Schneider (2010) stated that many companies have discovered that environmental costs can be offsets by waste by- products or transfer pollution allowances, or licensing of clean technologies, for example, better management of environmental costs can result in improved environmental performance and significant benefits to human health as well as business success. Understanding the environmental costs and performance of processes and products can promote more accurate costing and pricing of products and can aid companies in the design of more environmentally preferable processes, products, and service for the future. Even a competitive advantage with customers can result from processes, products, and services that can be demonstrated to be environmentally preferable.

Finally, accounting for environmental costs and performance can support a company's development and operation of an overall environmental management system. Such a system will soon be a necessity for companies engaged in international trade due to pending international consensus standard ISO 14001, developed by the international Organization for Standardization.

2.1.4 Green or Environmental Accounting Structural Element.

Environmental accounting is premised upon clarification of the objectives of engaging in environmental accounting. The objectives must conform to policies for environmental considerations made in business activities of companies and other organizations, and with their environmental targets and environmental action plans (SI G M A 2003) .The following are some of the structural elements of environmental Accounting according to SIGMA 2003. (1) Environmental conservation cost.

(2) Environmental conservation benefit (3) Economic benefit associated with environmental conservation activities

2.1.5 Environmental Conservation cost.

Environmental conservation cost according to United Nations (2000) refers to the investment and costs, measured in monetary value, allocated for the prevention, reduction and for avoidance of environmental impact, removal of such impact, restoration following the occurrence of disaster and other activities. Investment amounts are expenditures allocated during a target period for the purpose of environmental conservation and the benefits from these investments are seen over several periods and are recorded as expense during the depreciation period (The guideline for Environmental performance indicators for business 2002). Expenses amount refer to the expenses or losses recorded under financial accounting standard resulting from the consumption of goods or services for the purpose of Environmental conservation.

The Guideline for Environmental performance indicators for business (2002) stated that the scope of environmental conservation cost extends to objectives standards and investment amount and cost amount; Objective standard whether a specific individual cost can be categorized as an environmental conservation cost depends on the objective standard and they are those criteria for extracting cost that has been spent for the purpose of environmental conservation; Investment amount here refer to the expenditure of investment a company spends on depreciable assets for the purpose of environmental conservation. This information helps to obtain information related to capital injected into environmental conservation activities, in the case that environmental conservation activities generate long-term benefits; Expenses amount are portions of the company's overall expenses and are the amount used for the purpose of environmental conservation. The guide line further concludes that, tracking expenses aids in obtaining information related to cost accrued to the current period to achieve benefit from environment conservation cost. The Guideline for environmental performance indicators for business (2002) analyzed environmental conservation cost categories corresponding to business activities as follows; Business activities are divided into categories including key business activities, administrative activities and social activities, according to the relationship between the business and environmental impact. Each environmental cost is then categorized according to the relevant business activities.

Categories	Content
Business area cost	Environmental conservation cost to control environmental impacts
	which result from key business operations within business are
Upstream downstream	Environmental conservation cost to control environmental impact
cost	which result from key business operations upstream or down stream
Administration cost	Environmental conservation cost steaming from administrative
	activities
Social activities cost	Environmental conservation cost steaming from social activities
Environmental	Cost incurred for dealing with environmental degradation
remediation cost	
Other cost	Other costs related to environmental conservation
Source: The Guideline for environmental performance indicators for business 2002.	

Fig 2.1 Categories Corresponding to Business Activities

2.1.6 Environmental Conservation Benefits.

The Guideline for environmental performance indicators for business (2002) disused environmental conversation benefit as follows; environmental conservation benefits is measured in physical units, and is the benefit obtained from the prevention, reduction, and/ or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster, and other activities. The Guideline went further to categorize into four (4) based upon the relationship to business activities and each is measured using performance indicators. Note: companies and other organization may select and employ effective indicators for ascertaining and evaluating environmental conservation benefit according to their actual business condition. (i) Environmental conversation benefits related to resources input into business activities. This is measured using indicators like; Total energy input volume, input volume of specially controlled substance on water input volume (Liu 2004).

The second category according to the Guideline for environmental performance indicators for business (2002) is environmental conservation benefit related to waste or environmental impact originating from business activities which is measured using indicators like volume of green house gas emission, volume of specially designated chemicals transferred or emitted, Total waste emission volume and Total waste water volume (3) environmental conservation benefit related to goods and service produced from indicators like, volume of energy consumed at time of use, volume of output of materials causing on environmental impact at time of use, volume of output of materials causing an environmental impact when discard and volume of products re-circulated, such as products, containers, and packaging collection after use. (4) other environmental conservation benefits related to distribution, transport, and stock pollution and are measure using the following indicators also cited in Liu (2004), Transport volume of products and materials, volume of emission of materials associated with transport that cause an environmental impact and surface area, volume of contaminated ground.

2.1.7 Economic Benefit Associated with Environmental Conservation Activities.

The economic benefit associated with environmental conservation activities is contribution to the profit resultant of environmental conservation activities a company or other organization carried out as measured in monetary value. The guideline for environmental performance indicators for businesses (2002) further stated that it is divided into actual benefits and estimated benefits depending on whether the data is confirmed. Actual benefits are the economic benefits measured based on confirmed data while estimated benefits are those economic benefits, measured based on a certain premise.

The table below illustrated the results of adjustments of economic benefit from the perspective of profit and expense reduction.

Table 2.2



Source: The Guideline for Environmental Performance Indicator for Business (2002)

2.1.8 Approaches to Green Accounting.

There are two approaches to green accounting as discussed in Mohamed (2002) to with physical approach and monetary approach, the physical approach was suggest by the united Nations as a complete guide to be prepared indicating the available resources within a country, classified according to its state and uses. For instance, agriculture, in desert land etc. Mohamed (2002) further stated that depending on this approach the environmental operations are presented in a physical terms, the current balance of the resource and the additions and deductions from that resource.

However, the monetary approach emerged due to the fact that the physical approach does not fulfill the requirements of the environmental accounting (Mohamed 2002). The physical approach is very important to get physical information about the resources which helps to prepare the environmental statistics and is considered the first step in the monetary approach. Despite the difficulties associated with the monetary approach, it gained a lot of interest as such data will show the profit and loss associated with environmental operations and to get an environmentally adjusted economic indicators (United Nations 1994 cited in Mohamed 2004 and Lia 2004).

2.1.9 The Concept of Green Accounting Characteristics

Green Accounting Characteristics as used in this study includes environmental pollution prevention cost, environmental protection cost, cost of resource recycling, environmental restoration cost, corporate social responsibility cost and research and development Cost. Pollution is the primary target of environmental law. Pollution simply put, is the contamination of the environment as a result of human activities. The term pollution refers primarily to the fouling of air, water, and land by wastes (Hossein & Bohoall 2015). That mean, any direct or indirect alteration to the environment which is hazardous or potentially hazardous to health, safety, and welfare of any living species is called pollution. As Madhu and Donna (2009) put it, pollution, also called environmental pollution is the addition of any substance (solid liquid, or gas) or any form of energy (such as heat, sound, or radioactivity) to the environment at a rate faster than it can be dispersed, diluted, decomposed, recycled, or stored in some harm full form. The major kinds of pollution are (classified by environment) air pollution, water pollution, and land pollution. Modern society is also concerned about specific type of pollution, such as noise pollution, light pollution, etc. although environmental pollution can be caused by natural events such as forest fires and active volcanoes, use of the word pollution generally implies that the contaminants have an anthropogenic souce – that is a source created by human activities (Hossein & Bohiall 2015). Pollution has accompanied humankind ever since groups of people first congregated and remained for a long time in any one place. Indeed, ancient human settlements are frequently recognized by their pollutions, such as shell mounds and rubble heaps,. Pollution was not a serious problem as long as there was enough space available for each individual or group. However, with the establishment of permanent settlements by great numbers of people, pollution became a problem, and it has remained one ever since.

The presence of environmental pollution raises the issue of pollution prevention or control. Great efforts are made to limit the release of harmful substances into the environment through pollution control, waste water treatment, solid-waste management, hazardous – waste management and recycling, pollution control or protection is the control of the contamination of the physical and biological components of the earth atmosphere system to such an extent that normal environmental process are not adversely

affected (Madhu & Donna 2009). Pollution protection or control involves any measure taken to protect the environment from any substance that because of its chemical composition or quantity prevents the functioning of natural processes and produces undesirable environmental and health effect.

Environmental protection as green accounting characteristics aimed at conserving the natural resources, preserving the current state of natural environment and, where possible reversing its degradation. Janes (2000) defined environmental protection as an activity to maintain or restore the quality of environmental media through preventing the emission of pollution or reducing the presence of polluting substances in environmental media. He further stated that environmental protection may consist of changes in characteristics of goods and services, changes in consumption patterns, changes in production techniques, treatment or disposal of residuals in separate environmental protection facilities, recycling, and prevention of degradation of the landscape and ecosystems.

Recycling simply is the process of collecting and reprocessing materials that would typically be considered waste. Resource recycling as Graziano and Fabrizio (2012) put it is the processing of used materials (waste) into new, useful product. This is done to reduce the use of raw materials that would have been used. Recycling also uses less energy and great way of controlling air, water and land pollution, it is use to reduce the waste that goes into land filled. Effective recycling starts with household or the place where the waste was crated. In many organized cities or developed nations, the authorities help households with bin bags with labels on them. Households then sort out the waste themselves and place them in the right bags for collection. This makes the work less difficult. Graziano and Fabrizio (2012) further stated that resource recycling is a series of activities by which materials that has reached the end of its useful life is processed into materials utilized in the production of new products. Environmental restoration means compensation for destruction of or damage to natural resources by a motor carrier. This can include the cost of minimizing damage to humans, fish, and other wildlife. Robert (2016) stated that, it is the act of assisting the recovery of ecosystems that have been degraded, damaged or destroyed. He further stated that environmental restoration refers to the process by which the risk caused by hazardous effluents are

removed or minimized to prescribed and safe level by environmental cleanup. This ensures that the risks to environment and also to human beings are reduced. Environmental restoration is also termed ecological restoration or environmental remediation (Robert 2016). Environmental restoration to Eisner (2004) is an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability. The practice of environmental restoration include wide scope of projects like erosion control, reforestation, removal of non-native species and weeds re-vegetation of disturbed areas, day lighting streams, etc.

Furthermore, corporate social responsibility as a fire accounting characteristics has many definitions but the best definition is from Iso 2008 which says that corporate social responsibility is the responsibility of an organization for the impacts of it decisions and activities on society and the environment, through transparent and ethical behavior that:

- 1 Contributes to sustainable development, including the health and the welfare of society.
- 2 Take into account the expectation of stakeholders.
- 3 Is in compliance with applicable law and consistent with internatural norms of behavior, and
- 4 Is integrated throughout the organization and practiced in its relationship.

Drawing from Iso 2008 definition one can rightly say that corporate social responsibility is the business practices involving initiatives that benefit society. It can encompass a wide variety of tactics, from given away a portion of a company's proceeds to charity, to implementing "greener business operations, Mohamnad (2013) see corporate social responsibility as a movement aimed at encouraging companies to be more aware of the impact of their business on the rest of society, including their own stakeholders and the environment.

Corporate social responsibility is a concept with many definitions and practices. The way it is understood and implemented differs greatly for each company and country. It is a very broad concept that addresses many and various topics such as human rights, corporate governance, health and safety, environmental effects, working conditions and contribution to economic development (Mohanmad 2013). Whatever the definition is, the purpose of corporate social responsibility is to dire change towards sustainability. Therefore, corporate social responsibility cost is the cost of company's sense of responsibility towards the community and environment (both ecological and social) in which it operates.

Finally, we have research and development which refers to the investigative activities a business conducts to improve existing products and procedures or to lead to the development of new products and procedures. Barje and Hens (2008) see it as systematic activity combining both basic and applied research, and aimed at discovering solutions to problems or creating new goods and knowledge.

It comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new application. The aim is to create new technology or information that can improve the effectiveness of products or make the production of products more efficient. It also involves discovering new knowledge about products, processes and services and then applying that knowledge to create new and improved products, processes and services that fill market needs.

2.1.10 Sustainability or Sustainable Business Performance

There is no universally agreed definition on what sustainability means. There are many different views on what it is and how it can be achieved. The idea of sustainability stems from the concept of sustainable development which became common language at the ward's first Earth summit in Rio in 1992 (United Nation 2001). Generally, sustainability is the ability to be sustained, supported, upheld, or confirmed. That is ability to maintain or support an activity or process over a long term. From an economics point of view, Sustainability is a continued development or growth, without significant deterioration of the environment and depletion of natural resources on which human well-being depends (UNDSD, 2003). This definition measures income as flow of goods and services that an economy can generate indefinitely without reducing its natural productive capacity.

However, different ways of defining sustainability are useful for different situations and different purposes. In relation to our study, sustainability could be the study of how

natural systems function, remain, diverse and produce everything it needs for the ecology to remain in balance. It also acknowledges that human civilization takes resources to sustain our modern way of life. There are countless examples throughout human history where civilization has damaged its own environment and seriously affected its own survival chances (Jasch & Laricka 2006).

On the other hand sustainable business or green business is an enterprise that has minimal negative impact on the global or local environment, community, society or economy. Often sustainable businesses have progressive environmental and human rights policies. As UNDSD (2003) put it, business is describe as sustainable if it matches the following four criteria.

- 1. It incorporates principles of sustainability into each of its business decisions.
- It supplies environmentally friendly products for non-green products and/or services.
- 3. It is greener than traditional competition.
- 4. It has made an enduring commitment to environmental principles in its business operations.

A sustainable business is any organization that participates in environmentally friendly or green activities to ensure that all processes, products, and manufacturing activities adequately address current environmental concerns while maintaining a profit (UNDSD 2003) in other words, it is a business that meets the needs of the present world without compromising the ability of the future generations to meet their own needs.

It is the process of assessing how to design product that will take advantage of the current environmental situation and how well a company's product perform with renewable resources. United Nation (2001) emphasized that sustainability is a three – legged stool of people, planet, and profit. Sustainable business with the supply chain try to balance all three through the triple bottom – line concept using sustainable development and sustainable distribution to affect the environment, business growth and the society. Everyone affects the sustainability of market place and the planet in some way. Sustainable development within a business can create value for customers, investors, and environment. A sustainable business must meet customer needs while, at the same time, treating the environment well.

A major initiative of sustainable businesses is to eliminate or decrease the environmental harm caused by the production and consumption of their goods. The impact of such human activities in terms of the amount of greenhouse gases produced can be measured in units of carbondioxide and is referred to as the carbon footprint. Business takes a wide range of green initiative. One of the most common examples is the act of "going paperless" or sending electronic correspondence in lieu of paper when possible on a higher level. Van den (2000) said that an example of sustainable business practices include: refurbishing used products for example turning up lightly used commercial fitness equipment for resale, revising production processes in order to eliminate waste such as using more accurate template to cut out design, and choosing nontoxic raw materials and processes.

However corporate sustainability strategies can aim at taking advantages of sustainable revenue opportunities, while protecting the value of business against increasing energy costs, the costs of meeting regulatory requirement, changes in the way customers perceive brand and products, and the volatile price of resources. As Grazia and Fabrizio (2012) put it, not all eco-strategies can be incorporated on as company's eco-portfolio immediately. That the widely practiced strategies include innovation, collaboration, process improvement and sustainability reporting thus;

- 1 Innovation & Technology is an introverted method of sustainable corporate ability to change its products and services towards less waste production and sustainable best practices.
- 2 Collaboration they said is the formation of networks with similar or partner with companies that facilitate knowledge sharing and propels innovation.
- 3 Process improvement continuous process surveying and improvement is essential to reduction in waste.
- 4. Employee awareness of company wide sustainability plan further aids the integration of new and improved processes.
- Sustainability reporting periodic reporting of company performance in relation to goals. These goals are often incorporated in to the corporate mission.

2.1.11 Business Performance Management

Business performance management involves consolidation of data from various sources, querrying, and analysis of the data, and putting the results into practice. Cokins (2009) define business performance management as a set of management and analytic processes, supported by technology, that enable businesses to define strategic goals and then measure and manage performance against those goals. Core business performance management processes include financial planning, operational planning, business modeling, consolidation and reporting, analysis and monitoring of key performance indicators linked to strategy (Paladino, 2007). Business performance management is a set of management and analytic processes that enables the management of an organizations performance to achieve one or more pre- selected goals. Synonymous for business performance management include corporate performance management and enterprise performance management.

Conveney (2010) stated that business performance management has three main activities;

- a. Selection of Goals.
- b. Consolidation of measurement information relevant to an organization progress against these goals,
- **c.** Intervention made by managers in light of this information with a view to improving future performance against these goals.

He further stated that typically all three activities will run concurrent with interventions by managers affecting the choice of goals, the measurement information monitored, and the activities being undertaken by the organization.

However, Paladino (2007) opined that because business performance management activities in large organizations often involve the collection and reporting of large volumes of data, many software vendors, particularly those offering business intelligence tools, market products intended to assist in this process. As a result of this marketing effort, business performance management is often incorrectly understood as an activity that necessarily relies on software system to work, and many definitions of business performance management explicitly suggest software as being a definitive component of the approach. Paladino (2007) further said

".....this interest in business performance management from software community is sales- driven. The biggest growth area in operational business analysis is in the area of business performance management. Since 1992, business performance management has been strongly influenced by the rise of the balanced score card framework. It is common for managers to use the balanced score card frame work to clarify the goals of an organization, to identify how to track them, and to structure the mechanisms by which interventions will be triggered. These steps are the same as those that are found in business performance management, and as a result balance score card is often used as the basis for business performance management activity with organizations''.

2.1.12 Meaning Of Profit and Business Performance Measurement

Profit in account is a company's total earning, calculated according to general accepted accounting principles (GAAP), it includes the explicit costs of doing business, such as operating expenses, depreciation, interest and taxes. Profit could be seen as a reward gained by risk taking entrepreneurs when the revenue earned from selling a given amount of output exceeds the total cost of producing that output (Breth, 2014).

However, profit is only objective measure of business performance. Without profit no business can survive or grow. Profit as Vice (2003) puts it is the money generated by selling a product or service that exceeds the cost of providing that product or service. Accounting profit differ from economic profit in that accounting profit only represent the monetary expenses a firm pays and monetary revenue it receives; it tends to be higher than economic profit since it omits certain implicit costs, such as opportunity costs (Breth, 2014).

Accounting profits is the net income earned by a company after subtracting all costs from total revenue. It is derived by preparing and analyzing company's income statement, meaning that profit earned after subtracting from revenue those expenses that are directly associated with operating the business, such as cost of goods sold, administration, marketing, depreciation and other general operating cost. While operating earnings are an important measure of profitability, and since it includes non –operating expenses such as interest and taxes, it enables an assessment of the firms' core business profitability to be made.

A business performance measurement helps businesses in periodically setting business goals and then providing feedback to managers on progress towards those goals. Business performance measurement and control systems are the formal, information- based routines and procedures managers use to maintain or alter pattern in organizational activities (Simmons, 2000).

Business performance measurement then is concerned with measuring this performance relative to some benchmark, be it a competitors performance or a preset target. A measure (or metric) is a quantitative value that can be used for purpose of comparison (Simmons 2000). A specific measure can be compared to itself over time, compared with a preset target or evaluated along with other measures. Since a measure is used for the purpose of comparison, it need not represent an absolute value. For instance, in measuring customer profitability, knowing the relative distance in profitability between two customers may be valuable than knowing, the absolute value for customer profitability. According to Simmons (2000) cited in Vince (2003) stated that measures can be objective or subjective. He further stated that objective measures can be independently measured and verified, while subjective ones cannot. And measures are also typically classified as financial or non- financial. According to Vince (2003):

"....., financial measures are typically derived from or directly related to chart of account and found in a company's profit and loss statement or balance sheet, such as inventory levels or cash on hand. Non- financial measures are measures not found in the chart of accounts, such as customer satisfaction scores or product quality measures. Measures are also leading or lagging. Lagging measures give feedback on past performance, such as last months profit, and typically do not provide insight into future performance. Leading indicators, in contrast, are designed to measure future performance, and more often than not, future financial performance. Some leading indicators to future performance might include customer defection rate, customer satisfaction scores or change in consumer confidence,"

When discussing performance measurement, most practitioners refer to the type of measurement that helps companies monitor its current and past state. It provides insight into different units or levels of analysis. Performance can be ascribed to corporations, business units, supports or frictional units, teams and workgroups and individuals (Simmons 2000). One key benefit of business performance measurement lies in their

ability to help align these different levels of analysis in the firm. Many corporations consist of several business units or divisions that compete in different market with different strategies.

A company's stock price in large part is driven by the company's ability to generate earnings. Therefore, it is useful for investors to analyze the profitability of a company before investing in it. One way to do this is by calculating and tracking various profits margins, which reflect how efficiently a company uses its resources. Net profit margin tells a company how much out of every sale it gets to keep after everything else has been paid for. It could also be known as a return on sales. It is the botton-line ratio.

Profit margins are expressed as a ratio, especially "earning" as a percentage of sales. By expressing margins, as a percentage we are able to compare the profitability of different companies more easily. Margins allow investors to judge over time management ability to manage costs and expenses and to generate profit. Management success or failure depends on the company's profitability. Strong sales growth is meaningless if management allows costs and expenses to grow disproportionately.

When analyzing profit margin. It is useful to examine the trends for individual companies over time as well as to compare a company's levels to its competitors and to industry norms. However, it is important to note that margins can differ drastically from company to company and industry to industry. Some industries historically have much higher margins relative to others.

Return on capital tells you what the total input into the business that is returned to you as profit. It simply shows how effective a company is at using the capital to generate a profit. Return on capital is a profitability ratio. It measures the return that an investment generate for capital contributors that is bondholders and stockholders (Munaz et al 2014) Return on capital indicates how effective a company is at turning capital into profits. Return on capital is also known as return on invested capital or return on total capital. Return on capital is most useful when you are using it to calculate the returns generated

exclusively by the business operation itself, not the short-lived results from one time event. Return on capital can be an excellent indicator of size and strength if a company is able to generate a good returns, it has a great system for transforming investor capital into profit.

Dividend Per Share is the sum of the declared dividend insured by a company for every ordinary share outstanding. Dividend per share is the total dividends paid out by a business including interim Dividends divided by the number of outstanding ordinary shares issued. A company's dividends per share is usually derived using the dividend paid in the most recent quarter wish is also used to calculate the dividend yield.

Dividend per share is important because the number one goal of a company is to return values to its shareholders. Investors receive value through dividend payment and the price of the stock itself which is equal to a company's total expected future dividend payments'. Therefore, a company's profit and the amount it pays out in dividends drives shareholders value.

2.1.13 The Relationship Between Green Accounting and Profit Performance

An effective and efficient green accounting policy is reached by the delivery of competitively priced goods and services that satisfy human needs at the same time reduce ecological impacts. The link between green accounting and profitability is achieved by measuring the green performance of an enterprise with respect to its profitability. Green conscious organization uses fewer resources that cause fewer ecological impact while producing the same output as their competitors (Breth 2014).

The higher productivity leads to an increase in the operating margin due to lower costs which also leads to higher sales due to an enhanced value of the products to the consumer (John and Secthoraman 2013). Green accounting linking the environment and financial performance can be used to forecast the impact of green issues in future financial performance, thereby creating room for making informed investment decisions (Breth 2014). However, lower future investments and higher profit margin is important value driver, substantially influencing future free cash flow which positively contributes to

shareholders value. United Nation (2000) held that the net value added approach is a quantitative means of quantifying the relationship between the environmental performance of a company caused by its activities and economics performance that is the financial value produced by the same activities during a specific periods.

2.1.14 Environmental Liability

The Guideline for Environmental Performance Indicators for Businesses (2002) define liabilities as a probable future sacrifice of economic benefits arising from present obligations to transfer assets or provide services in the future as a result of transactions or events. A liability could be a present obligation to make expenditure or to provide a product or service in the future. Liability has an important legal dimension as well. A liability is a legally enforceable obligation, whether it is voluntary entered into as a contractual obligation, or is imposed unilaterally, such as the liability to pay taxes. (Warhurst 2002). The law both establishes liabilities and determines who is responsible in discharging them. Environmental liabilities range from compliance obligations, Remediation obligation, fines and penalties, compensation obligation, punitive damages etc.

Compliance obligations includes the cost of compliance which range from modest outlays required to conform to administrative requirement like record keeping, reporting, labeling, trainings to more substantial outlays including complex expenditure like to pre-treat wastes prior to land disposal or release to surface waters, to contain spill, to treat air emissions (Xing, Et al 2009). As regulation are enacted that apply to the manufacturing, using or releasing of regulated substances, organizations find themselves facing, future compliance lost. An organization may discover that it is not in compliance with existing regulations.

Regulations also impose exist cost like to properly close waste disposal sites and provide for post-closure care.

Secondly, Remediation obligations are sometimes subsumed under "compliance" because some property clean-up requirements have been enacted as part of regulatory programs applicable to operating facilities (Xing et al 2009). It is also easy to distinguish between the compliance obligation of routing disclosure of facilities at the end of their useful lives and the remediation obligation for cleaning up pollution posing a risk to human health and environment. Meeting current compliance obligation may help to minimize future remediation obligation. United Nation (2002) stated that remediation tends to be expensive and can include excavation, drilling, construction, pumping, soil and water treatment, and monitoring, and can include the response costs incurred by regulatory authorities. Liu (2004) also stated that technical studies and the expenditure of management, professional, and legal resources add to the cost of remediation. He further stated that the remediation obligation is distinctive because an organization may face remediation obligation due to contamination at inactive sites that are otherwise unregulated.

Thirdly, fines and penalties are such payments which fulfill punitive and deterrent function and are additions to the costs of coming into compliance (The Guideline for Environmental performance indicators for business (2002) noted that organizations that are not in compliance with applicable requirements may be subject to civil or criminal fines or penalties for non-compliance and or expenses for projects agreed to as part of a settlement for non-compliance.

Forth, compensation obligations may be companies obligated payment for compensation of "damages" suffered by individual, their properties, and businesses due to release of toxic substances or other pollutants. These liabilities may occur even if a company is in compliance with all applicable environmental standards. United Nation (2002) said that distinct sub- categories of compensation liability include personal injury like wrongful death, bodily injury, medical monitory, pain and suffering, property damage, lost of profit, and other economic lost. Shelton (2004) added that responding to compensation claims can consume management time and require expenditures in order to control damage to corporate image.

Finally, punitive damages were used to punish and deter conduct viewed as showing a callous disregard for others unlike compensatory liability. The measure of punitive damages is not directly tied to the actual injuries sustained.

2.1.15 Oil and Gas Firms Environmental effect in Nigeria

Nigeria is the largest oil producer in Africa, holds the largest natural gas reserves on the continent, and is among the world's top five exporters of liquefied natural gas (Nigerian National Petroleum Corporation (2013). Nigeria become a member of the Organization of the Petroleum Exporting Countries (OPEC) in 1971, more than a decade after oil production began in the oil-rich Bayelsa state in the 1950s.(secretariat of the organization of the petroleum exporting countries 2015). Although Nigeria is the leading oil producer in Africa, production suffers from supply disruptions, which have resulted in unplanned outages as high as 500,000 barrels per day (United Nations Environmental program 2011). Nigeria's oil and natural gas industry is primarily located in the southern Niger Delta area, where it has been a source of conflict. Local groups seeking a share of the wealth often attack the oil infrastructure; forcing companies to declare force majeure on oil shipments (a legal clause that allows a party to not satisfy contractual agreements because of circumstances that beyond their control). At the same time, oil theft leads to pipeline damage that is often severe, causing, loss of production, pollution, and forcing companies to shut in production.

Aging infrastructure and poor maintenance have also resulted in oil spills. Natural gas flaring, the burning of associated natural gas contributed to environmental pollution. (United Nations Environment program 2011). Protest from local groups over environmental damages from oil spills, and natural gas flaring have exacerbated tensions between some local communities and international oil companies. The industry has been blamed for pollution that has damaged air, soil, and water, leading to losses in arable land and decreases in fish stocks (Oil and gas Journal 2015).

The Nigeria Delta region suffers from environmental damage caused by pipeline sabotage from oil theft and also spills from illegal refineries (United Nations Environment program 2011). Poorly maintained, aging pipelines have contributed to oil

spills as oil pipelines can rupture when they corrode. The amounts spilled because of oil theft versus aging infrastructure and/ or operational failures are highly debated among oil companies and environmental and human rights groups.

The oil spills, have caused land, air and water pollution, severally affecting surrounding villages by decreasing fish stocks and contaminating water supplies and arable land. The United Nations Environment program (2011) releases a study on Ogoni land and the extent of environmental damage from more than 50 years of oil production in the region. The study confirmed community concerns regarding oil contamination across land and water resources, stating that the damage is ongoing and estimating that it could take 25 to 30 years to repair.

2.1.16 Environmental and Health Impacts of Cement Firms

The modernization and industrialization of developing countries has led to the increased use of fossil fuels and their derivatives. Accordingly, developing countries are confronted with the great challenge of controlling the atmospheric pollution, especially in the rapidly growing urban centers. Air pollution is an important problem in industrial areas which may have an adverse effect on the health of the population. Concern about air pollution in urban regions is receiving increasingly importance worldwide, especially pollution by gaseous and particulate trace metals (Adak et al, 2007).

A great deal of attention has focused on particulate matter (Pm) pollution, due to their severe health effects, especially fine particles. Several epidemiological studies have indicated a strong association between elevated concentrations of inhalable particles ($PM_{10 and} PM_{2.5}$ and increased mortality and morbidity (Lin and Lee, 2004). Particulate matter pollution in the atmosphere primarily consists of micron and sub- micron particles from anthropogenic and natural sources. The characterization of fine particles has become an important priority of regulators, and researchers due to their potential impact on health, climate, global warming, and long-range transport (Salan etal 2003). It is impossible to envisage a modern life without cements, cement is an extremely important construction material used for housing and infrastructure development and a key to economic growth. Cement demand is directly associated to economic growth and many

growing economies are striving for rapid infrastructure development which underlines the tremendous growth in cement production (Mishra, 1991). The cement industry plays a major role in improving living standard all over the world by creating direct employment and providing multiple cascading economic benefits to associated industries. Despite its popularity and profitability, the cement industry faces many challenges due to environmental concerns and sustainability issues (Mebraji et al, 2013).

Environment is a major issue which confronts industry and business in today's world on daily basis. Different industrial activities are degrading various environmental components like water, air, soil and vegetation (Kumar et al, 2008). Cement industry is one of the most polluting industries listed by the central pollution control board. It is the major source of particulate matter, Sox, Nox and Co emissions (Kumar, et al, 2008). Cement dust contains heavy metals like chromium, Nickel, Cobalt, Lead and Mercury Hazardous to the biotic environment with impact for vegetation, human health Animals, Health and ecosystem (Baby et al. 2008). Exposure to cement dust for a short period may not cause serious problem, however prolonged exposure can plants serious irreversible damage to plants and animals (Kumar et al 2008).

Blooming of cement factories has resulted in the environmental deterioration and in turn degrades the human health. Studies have shown adverse respiratory health effects in the people exposed to cement dust, exemplified in increased frequented of respiratory problems (Baby el al 2008). It has also been revealed that people of cement dust zone are badly affected by respiratory problems, gastro intestinal diseases etc. (Adak et al, 2008). Several studies have also demonstrated linkages between cement dust exposure, chronic impairment of lung function and respiratory systems, skin problems in human population (Baby et al, 2008).
2.1.17 Cement Processing and Pollutants

The production process for cement consists of drying, grinding and mixing limestone and additives like bauxite and iron into a powder known as "raw meal". (Zeleke et al, 2010). The raw meal is then heated and burned in a pre-heater and kiln and then cooled in an air cooling system to form a semi-finished product, known as a clinker. (Zeleke et al, and Zeyde el al 2010). Clinker (95%) is cooled by air and subsequently ground with gypsum (5%) to form ordinary Portland cement (OPC). other firm of cement require increased blending of clinker with other materials Tahaya, Okpuzo and Oladele(2012: p16).

"---there are two general processes for producing clinker that is a dry process and a wet process. The basic differences between these processes are the form in which the raw meal is feed into the kiln, and the amount of energy consulted on each of the processes. In the dry processes the raw meal is feed into the kiln in the form of a dry powder resulting in energy serving, where as in the wet process, the raw meal is fed into the kiln in the form of slurry. There is a semi-dry processing, which consumes more energy than the dry process but lesser than wet process. Limestone is crushed to a uniform and usable size, blended with certain additives (such as iron ove and bauxite) and discharged on a vertical roller mill, where the raw materials are ground to fine powder. An electrostatic precipitator de-dusts the raw mill gases and collects further stages of bleeding. The homogenized raw meal thus extracted is pumped to the top of a preheated by air lift pumps. In the pre-heaters the material is heated to $750^{\circ}c$. Subsequently the raw meal undergoes a process of calcinations in a precalcinatory and is then fed to the kiln. The remaining calcination and clinkerization reactions are completed in the kiln where the temperature is raised to between $1,450^{\circ}c$ and $1,500^{\circ}c$ and conveyed to the clinker silo from where it is extracted and transported to the cement mills for producing cement."



Figure 2.3 The whole processes can be summarized in the following flow chart.

Source: Tahaya et al (2012), shraddha & siddigui (2014)

Tahaya et al (2013), further stated that there are three criteria of air pollutants that are released to the air during cement manufacturing which includes particulate matter (PM), nitrogen oxides (Nox) and sulfure dioxide (So2) which can be categorized into two headings; particulates and Gaseous pollutants. Particulates air pollution small and large particles of varying origin and chemical composition. The health effects of particulates are strongly linked to such as those from fossil fuel combustion, and are likely to be most dangerous, because they can be inhaled deeply into lungs, setting in area where the body's natural clearance mechanism can't remove them, Tahaya et al 2012 stated thus;

".....The constituents is small particulate also tend to be more chemically active and may be acid as well, and therefore, more damaging. Numerous studies associate particulate pollution with acute change in lungs function and respiratory illness (Douglas et al 1996, USEPA, 1999) resulting in increase hospital admissions for respiratory disease and heart disease, school and job absences from respiratory infections, or aggravation of chronic conditions such as asthma and bronchitis (Deborah, 1996)...".

On the other hand, Gaseous pollutants have major negative impacts on health. So₂ and No₂ form acids through different chemical reactions in the atmosphere, and these acids are subsequently deposited on land and ocean surface as acid rain. Tahaya et al (2012: p15) discussed this extensively when they stated that

"...... It is anticipated that the increasing load of atmosphere sulfur dioxide (So₂), carbon dioxide (Co₂), carbon monoxide (Co), and ozone (O₃) will contribute to global climate change consequently, it is necessary to quantify the emission in the very near future. The combustion of fuel at high temperatures in cement kilns results in the release of Nox emissions from cement plant result from the combustion of sulfur– bearing. Compounds in coal, oil, and petroleum coke, and from the processing on pyrite and sulfur in raw materials, cement manufacturing releases carbon dioxide (green house gas) in the atmosphere both directly when calcium carbonate is heated, producing lime and carbon dioxide, and also indirectly through the use of energy if its production involves the emission of carbon dioxide. The cement industry is the second largest Co₂ industry beside power generation..."

Apart from particulates and gaseous pollutants, many other pollutants are also released from cement factories which include textile heavy metals. Consequently, the aerodynamic diameter of cement particles makes it a potential health hazard, as these are repairable in size and reaches in internal organs particularly lungs leading to occupational lung disease. This size distribution would make the trachea bronchial respiratory zone, the primary target of cement deposition. Beside cement dust, various gaseous pollutants are also contributed by cement factories which cause pollution and ultimately affect health. The various organs which get affected because of cements factories include: Respiratory system, gastro intestinal system, stomach, central nervous system (brain), lymphatic system, allergic reactions that interfere with breathing, chronic bronchitis, emphysema, lung cancer, pneumonia, tuberculosis, cough, wheezing etc.

Besides human, cement affect directly the quality of soil, as it adds number of harmful substances to it. Cement dust causes numerous hazards to the biotic environment, which have adverse effect and toxicological risks for vegetation, Animal Health and Ecosystems, 1990, Armolaiyis et al, 1996; Sivicommer et al, zoo: Schwatz, 1994: Adak et al, 2007, cited in (Tahaya et al, 2012)

2.1.18 Pollutants from Oil and Gas Exploitation and Consequences

The oil industry holds a major potential of hazards for the environmental and may impact it at different levels. The most widespread and dangerous consequence of oil and gas industry activities is pollution. Pollution is associated with virtually all activities throughout all stages of oil and gas production, from exploration and exploitation activities have not only altered people's livelihood, but continue to disrupt the natural balance of the regions earth crust (Ibaba 2005). During seismic surveys and exploration drilling, harmful materials like dynamites and explorative are used. The method involves into the earth's crust to measure the depth of the earth's make up the implication of this region using this method, the more the regions natural environment witness shocks and rifts in its crust.

Gas flaring and venting, which represents a significant source of global warming is one of the biggest environmental problems associated with oil exploration and exploitation in South-South region of Nigeria. The World Bank Global Gas Flaring Production (GGFP) partnership estimated that globally, 150 billion cubic meters of associated natural gas are being flared annually Torulogha (2007). This global gas flaring releases about 400 million tons of Co_2 per year into atmosphere (Ibaba 2005). According to DPR (2007) report, more than 70 percent of gas produced in the region, are flared (that is, 177 out of 139 of the oil field in the region are still flaring their gas (Okonta & Douglas 2001).

From the foregoing, it has now become worrisome that most host communities' to oil and gas producing facilities lives with gas stocks that flare gas twenty four hours' daily. This scenario exposes the people of the area to a lot of environmental and health risk or hazard. This causes major devastating environmental effects that associated with oil and gas exploration and exploitation activity such as oil spillage. Oil spill occur both onshore and off shore.

It happens as a result of any uncontrolled well blowout, pipeline rapture or storage tank failure which poses an imminent threat to the public health or welfare (Ibaba, 2005, Okonta and Douglas 2001). One percent of oil spills is due to engineering drills, inability to effectively control wells, failure of machines and inadequate care in loading and unloading oil vessels (Babatunde 2010). Audu & Arikawei (2013) stated;

"..... that one of the most visible impact of the numerous oil spills has been loss of mangrove trees. The mangrove was once a source of both fuel woods for the indigenous people and a habitat for the area's biodiversity. Now the area is unable to survive the oil toxicity of its habitat. Oil spills also poses serious health risks to people when they consume see foods contaminated by oil spillage (Onu ogha, 2007). More so, oil and gas exploration and exploitation activity in the regions has adversely destroys it original forest..."

The extraction of oil and gas as well as increased investment in the gas sector has accentuated the rate of deforestation and the constructions of pipelines for the transportation of oil and gas products within and beyond the South- South region which has led to the clearing of forest to construct pipeline and other oil and gas facilities. Audu & Arikawei (2001) stated further;

".....that the destruction of forest and coral relief in the region contributed to the vulnerability of the region to natural disaster and global climates changes. As these forest ecosystems are being depleted, the rate at which Co₂ is with drown is further reduced. Every human society depends to a large extends on their immediate environment for survival. Indeed, the oil and gas exploration and exploitation activities in the region has on one hand led to the degradation of the immediate nature environment of the region, and on the other hand, contributed significantly to the release of many Green House Gas which are the major causes of climate change. Thus, the consumption and development patterns have reached unsustainable levels manifested by widespread land degradation, erosion, deforestation, air, and water pollution"

In the water, people go to pick periwinkles and water snails for both subsistence and commercial purposes. Scouting for snail is a very viable lucrative economic activity especially among people between the age bracket of 18 and 55 years. Oil and gas exploration and exploitation in the region have impacted negatively on the people of the region with a trail of devastation such as poisoned water.

Consequently, poverty in the midst of vast oil wealth has spawned discontent and disillusion, frustrated expectations, fostered widespread indignation, entrenched deeprooted and destructive mistrust and incited unprecedented restiveness in most of the oil

producing areas of the country. Hence the oil and gas firms incurred a lot of cost in other to protect the environment and the inhabitant which may affect their profit sustainability.

2.1.19 Green Accounting Statutory Regulations and solid waste Management in Nigeria:

As part of proactive measure by the government to preserve the environment and protect its inhabitants from hazardous waste and nuisance, the Nigeria government and several states therein have established various governmental waste laws in the country. Accordingly, THE CONSTITUTION OF THE FEDERAL REPUBLIC OF NIGERIA, section 20 provides that "The state shall protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria.

THE NATIONAL ENVIRONMENTAL STANDARDS AND REGULATIONS ENFORCEMENT AGENCY Act 2007 (NESREA ACT), Environmental Protection Act of 1988, the NESREA Act, 2007 became the major statutory regulation or instrument guiding environmental matters in Nigeria. It specially makes provisions for solid waste management and its administration and prescribes sanction for offences or acts which run contrary to proper and adequate waste disposal procedures and practices.

Environmental Impact Assessment Act of 1992 (EIA)

The purpose of the EIA Act is to among other things establish before a decision taken by any person, authority, corporate body or incorporated body including the government of the federation, state or local government intending to undertake or authorize the undertaking of any activity that may likely or to a significant extent affect the environment. Such activities include the disposal of solid waste in the environment.

National Environmental (Sanitation and Waste Control Regulations, 2009

This regulation that was promulgated in 2009 among other things makes adequate provisions for waste control and environmental sanitation including punishments in cases of malfeasances.

The Harmful Waste (Special Criminal Provisions) Act Cap Hi LFN 2004

The Act prohibits the carrying, depositing and dumping of harmful waste on any land, territories waters, contagious zone, Exclusive Economic zone of Nigeria or its inland water ways and prescribes severe penalties for any person found guilty of any crime relating thereto.

The NEP (Pollution Abatement in Industries and Facilities Generating Waste Regulations

Restriction are imposed hereunder on the release of toxic substances and requirement of stipulated monitoring of pollution to ensure permissible limits are not exceeded; unusual and accidental discharges; contingency plans; Generator's liabilities; strategies of waste reduction and safety for workers.

The Management of Solid and Hazardous Waste Regulations

These regulate the collection, treatment and disposal of solid and hazardous waste for municipal and industrial source and give the comprehensive list of chemicals and chemicals waste by toxicity categories.

The National Oil Spill Detection and Response Agency Act 2005 (NOSPRA ACT)

This instrument makes it mandatory that industrial facilities install antipollution equipment, make provision for further influence treatment, prescribed maximum limit of effluent parameters allowed for discharges, and spell out penalties for contravention.

The National Guideline and Standard for Environmental Pollution Control In Nigeria

This was launched on March 12th 1991 and represents the basic instrument for monitoring and controlling industrial and urban pollution.

National Policy on Environment

Launched by Government on 27th November 1989, this document prescribes guideline and strategies for achieving the policy Goal of sustainable development.

Regulation at State Level

- Anambra State Environmental Protection Agency Law
- Imo State Environmental Protection Agency Amendment Law
- ✤ Abia State Environmental Protection Law
- Enugu State Waste Management authority Law, etc

2.2 Theoretical Review

2.2.1 Theories of Ecological Modernization.

The theories of Ecological modernization emerged in early 1980s within a group of scholars at free University and the social science research centre in Berlin, among them are Joseph Huber, Martin Janicke (de)and Udo E. Simonis. Attempts have been made on environmental improvements, ecological restructuring, or environmental reform. Studies in these areas have been directed mainly in the areas of individual produces, households, or social practices; industrial sectors, zones, chains, or networks; nation-states or countries; and even global regions. They all tried to assess whether a reduction in the use of natural resources and/or the discharge of emission can be identified either in absolute or in relative terms, compared to economic indicators such as Gross National Product (GNP). This development has manifested in studies on cleaner production industrial metabolism or industrial ecology, investigations on dematerialization and factor four/ten; and perspectives on the greasing of consumption, lifestyles and households. These studies have been found common in developed countries and are now finding their way to less developed parts of the globe.

The conclusions of these studies do not seem to have the same direction and we can summarize them as follows: it was observed that in the mid – 1980s onward, a rupture in the long established trend of parallel economic growth and increasing ecological disruption can be identified in most of the ecologically advanced nations such as Germany, Japan, Sudan, USA, etc. this slow down is often referred to as the decoupling or delinking of material flows from economic flows. In a number of cases (regarding countries and/or specific industrial sectors and/or specific social practices and/or specific environmental issues), environmental reform has even resulted in an absolute decline in

the use of natural resources and/or in discharge of emissions, regardless of economic growth in financial or material terms (product output). These conclusions are sometimes also valid for rapidly industrializing and modernizing countries in Asia for instance (Sonnenfeld & Mol, 2006).

The Fundamentals of Ecological Modernization

The basic idea of ecological modernization is that at the end of the second millennium, modern societies witness a centripetal movement of ecological interests, ideas and considerations in their institutional design. This development crystallizes in a constant ecological restructuring of modernity. Ecological restructuring refers to the ecology-inspired and environment-induced process of transformation and reform in the central institutions of modern society.

Under this theory, ecological restructuring is conceptualized at an analytical level as the growing autonomy, independence and differentiation of an ecological nationality vis-àvis other nationalities (Mol, 1995; Spaargaren, 1977). As early of 1980s, this nationality has materialized or institutionalized in different forms. The construction of governmental organizations and departments dealing with environmental issues dates from that era. Equally environmental laws, environmental impact assessment systems etc date back to that period. The process of growing independence began to extend to the economic domain in the 1990s and this is crucial to the ecological question. It means that economic process of production and consumption are increasingly analyzed and judged as well as designed and organized from an economic and an ecological point of view. In 1990s, there are noticeable changes in economic domain (production and consumption) just as we have in cement firms and oil and gas firms in our study. These changes include a widespread emergence of environmental management systems in companies; the introduction of economic valuation of environmental goods via the introduction of ecotaxes, among other things, the emergence of environment - inspired liability and insurance arrangements; the increasing importance attached to environmental goals such as natural resource saving and recycling among public and private utility enterprises; and the articulation of environmental considerations in economic supply and demand, for

instance by ecolabels and other product information systems. In this context, they are analyzed as institutional changes indicating their semi-permanent character.

2.2.2. Resource Dependence Theory

Resource dependence theory as discussed by Daris and Cobb (2009) in their article titled "Resource dependence theory. Past and Future "is adopted in this research work, According to them the seed for the theory were carried from Stanford and germinated by Jelf Pfieffer's dissertation committee, which included James Miller, Mike, Hassnman, Dick Scott, and Eugene Webb.

The most widely – used aspects of the theory in External control analyze the sources and consequences of power in intergenerational relations where power and dependence come from, and how those that run organizations use their power and manage their dependence. As Jeft Pfeiffer puts it in the revised edition of the book, "Resource dependence was originally developed to provide an alternative perspective to economic theories of mergers and board inter locks, and to understanding precisely the type of organizational relations that have played such a large role in recent market failures (Pfeiffer, 2003)".

Daris and Cobb (2009) further stated that the motivation of those running the organizations was to ensure the organization exchange relations. These were the drivers behind many of the organizations observed action. Moreover, when it came to explaining strategy, power often trumped profits, and insight distinctly at odds with the dominant economics approaches of the time. They went further to state that there are three core ideas of the theory; (1)Social context matters; (2) Organizations have strategies to enhance their autonomy and pursue interests; (3)Power (not just rationality or efficiency) is important for understanding internal and external actions of organizations. The emphasis on power, and a careful articulation of the explicit repertoires of tactics available to organizations, is a hallmark of resource dependence theory that distinguishes it from other approaches, such as transaction cost economics. The basic story of exchange based power in the theory was derived from Emerson's (1962) as also cited in Daris and cob (2009) parsimonious account: the power of A over B comes from control of resource

that B values and that are not available elsewhere. In this account, power and dependence are simply the obverse of each other, B is dependent on A to the degree that A has power over B. further, power is not zero - sum, as A and B can each have power over each other, making them Interdependent.

Finally, Organizations like cement and oil and gas firms depend on multidimensional resource Labour, Capital, Raw Material, etc. Organization or cement or oil and gas firms may not be able to come out with countervailing initiatives for all these multiplier resources hence should move through the principal of criticality and principal of scarcity for it to function.

2.2.3. Stakeholders Theory

The stakeholder's theory is a theory of Organizational management and business ethics that addressed moral and values in managing an organization (Freeman 2013). Stakeholder's theory was originally detailed by R. Edward freeman in the book "strategic management." It identifies and models the groups which are stakeholders of a corporation; and both described and recommends methods by which management can give due regard to the interest of those groups. In the traditional view of a company, the shareholders view, only the owners or shareholders of the company are important, and the company has a binding fiduciary duty to put their need first, to increase value for them. Shareholders theory instead argues that there are other parties involved, including employees, customers, suppliers, finances, communities, governmental bodies, political groups, trade associations, trade union etc(Freeman 2013). The nature of what is a stakeholders is highly contested (miles 2012) with hundred of definitions existing in the academic Robert (2003).

Freeman and Rees (1983) as cited in freeman (2013) distinguishing two senses of stakeholder; the narrow definition included those who are vital to the survival and success of the corporation. The wide definition includes any group or individual who can affect or is affected by the corporations.

Figure 2.3 A Stakeholder Model of the Corporation



Sources: Freeman 2013

According to freeman (2013) all these stakeholders have their different increase corporations in the form of stock, bonds, and so on, and they expect some kinds of financial return from them. Either they have given money directly to the firm, or they have some historical claim made through a service of morally justified exchanged. Employees have their jobs and usually their livelihood at stake. They often have specialized skills for which there is usually no perfectly elastic market in return for their Labour, they expect security, wages, benefits and meaningful work. In return for their loyalty, the corporation is expected to provide for them and carry them through difficult times. Employees are expected to follow the instructions of management most of the times, to speak favorably about the company and to be responsible citizens in the local communities in which the company operates.

Still from Freeman 2013Supplies are vital to the success of the firm, for raw materials will determine the final products quality and price. In turn, the firm is a customer of the supplies and is therefore vital to success and survival of the supplies. When the firm treats the stakeholders as the valued member of the stakeholder network, rather than simply as a source of materials, the supplies will respond when the firm is in need; customers exchange resources for the products of the firm and in return receive the

benefits of the products. Customers provide the lifeblood on the firm in the form of revenue. Given the level of reinvestment of earning in large corporations, customers indirectly pay for the development of new products and services. By paying attention to customer's needs, management automatically addresses the need of supplies and owners. Finally, the local community grants the cement and oil and gas firms the right to build facilities and in turn, it benefits from the basic, economic and social contributions of the firms. In return for the provision of local services, the firms are expected to be a good citizen, as is any person, either natural or artificial. The firms cannot expose the community to unreasonable hazards in the form of pollution, toxic waste, and so on.

2.3 Empirical Review

Thomas and Per-Olor (2015) wrote on pollution prevention: The role of environmental management and information using instrumental variable model. The first part of their work developed a theoretical framework to examine the extent to which current public policy efforts providing public recognition and regulatory benefit to induce EMS adoption lead to innovative source reduction of pollution. In their framework "green consumer was assumed to observe a firm's EMS (because of public policy efforts) and are willing to pay a price premium for products and such firms further stating that firms obtain regulatory relief and technical/financial assistance by adopting on EMS. That condition under which EMS adoption simply provides insurance against stakeholder pressure and does not lead to innovation or pollution reduction and conditions under which such initiatives social welfare are enhancing relative to potential mandatory regulations was analyzed. The second part developed testable hypothesis which empirically examined the factors motivating a sample of S & P 500 firms to adopt an EMS and or pollution prevention (P2) practices and its implications for their toxic waste. Instrumental variable methods that control for endogenous adoption decision were used. In the third part, event study methods and multivariate regressions was used to examine the impact of provision of information about toxicity of chemicals on investors and on returns to firms. They found out that the source of economic benefits (through the demand side and supply side) that EMSS and P2 activities provided firms are having a mitigating effect on stock market reactions to Toxics release inventory (TRI) and

pollution prevention pays are valid. Their result also showed that provision of information about the volume and toxicity of toxic release, P2 activities and EMSS as well as policy incentives adopted EMS are effective in achieving reduction in waste generation using innovative methods. They recommended that public policy effort should be made more cost effective if redirected to rewind actual outcomes of voluntary initiative rather than participation alone, about the type of firms towards which such policy initiative should be focused and about the value of information about toxicity of pollutions and P2 activities.

Robert (2015) examined "An Economic model of pollution prevention. In the study, pollution prevention is modeled with an approach that combines the substitutability of input in the twice-differentiable neoclassical production function and the discreteness of linear activity analysis. They found among other things that the polluting firms emission, which result from its use of a toxic input, can be reduced by substituting other inputs for the toxic impact and /or by switching to a non polluting process. The strengths of the model achievable at a finite marginal cost, the non convexity that may occur in conventional activity analysis does not occur in this model, and there is a range of output level at which polluting and non polluting firms in the same industry realistically coexist.

Boyd (1998) examined "searching for the profit in pollution prevention: case studies in the corporate evaluation of environmental opportunities. The study uses economic financial and accounting analysis and state that the concept of pollution prevention, or "P2" signifies a new, proactive environmental mindset that targets the cases, rather than the consequences of polluting activity. While anecdotal evidence suggests that P2 opportunities exist and that many have been pursued, there is also the perception that paper presented a case studies of industrial P2 projects that were in some way unsuccessful. Economic, financial and accounting analysis was used to assess the rationale for and soundness, these corporate decisions. While based on a very limited sample, the evidence contradicts the view that firms suffer from organization weakness that make them unable to appreciate the financial benefits of P2 investments. Instead, the project foundered because of significant unresolved technical difficulties, marketing challenges and regulatory barriers. Based on evidence from the cases, the paper recommends that with an environmental policy reforms, P2 innovation should be promoted.

Lanoie (2010) studied "Promoting pollution prevention in small Business: costs and Benefits of the "environ club" initiatives using environmental value transfer method stating that' environmental initiative was developed by three federal government agencies -canada. Economics development for Quebe regions environment Canada, and the National Research Council Canada and launched in 2001 to assist small and medium sized enterprises (SMEs) in improving their profitability and competitiveness through enhance environmental performance. An environ club consists of a group of 10 to 15 SMEs involved in training sessions on environmental management and carrying out at least one profitable in-plant pollution prevention project. The objective of the study was to provide a cost benefit analysis (CBA) of this original initiative in order to inform policy -makers as to the social desirability of such programs. One of the main social benefits of this initiative is to reduce emissions of various pollutants, so that one of our largest challenges is to place a value on these environmental improvements. The study used environmental value transfer method to obtain value from previous relevant studies conducting their ABC at three different levels. They considered the costs and benefits first for the whole of society, than from the participating firms point of view and, finally, from governments perspective, concluding that whichever perspective chosen, the environ club initiative has been highly profitable.

Abdoul (2009) studied "Impact of government-sponsored pollution prevention practices on environmental compliance and enforcement: Evidence from US manufacturing facilities". Using two way fixed effects poisson model to investigate the impact of 43 environmental protection activities (EPA) sponsored pollution prevention (P2) practices compliance and enforcement for a sample of facilities in the US manufacturing sector. He found that p2 adoption reduce environmental violations in three industries while increasing violation in two others, P2 adoption also spars fewer enforcement actions in three industries. He further partition the p2 practices into three categories based on their approach to improve environmental performance. He found that practices that involve changes in operating procedures- about a third of adopted p2 practices – such as instituting a self-inspection and monitoring program to discover spills or leak some improving maintenances scheduling and /or labeling procedures, and effective in reducing violations while practices that involve equipment or materials changes are not. He also found that adopters of practices that require changes in either procedures or manufacturing equipment- about half of adopted practices – are rewarded with a more cooperative treatment of environmental infractions with fewer enforcement actions.

Madhu &Donna (2009) studied "Adoption of pollution prevention techniques: The role of management systems and regulatory pressures". The study uses treatment of effect model with panel data investigated the extent to which firm level technological change that reduces unregulated emissions is driven by regulatory pressures, and firms technological and organizational capabilities. Using a treatment effects model with panel data for a sample of SP 500 firms over the period 1994-1996, and found out that organizational change in the form of total quality firms to adopt pollution prevention practices, after controlling for the effects of various regulatory pressure and firm specific characteristics. The study found that the threat of anticipated regulation and the presence of complementary assets is important for creating the incentive and an internal capacity to undertake incremental adoption of pollution prevention techniques.

Noor Mohammed (2004) studied the effect of corporate environmental performance on financial outcomes-profits, revenues, and costs: evidence from the Czech Transition Economy. The study analyzes the effect of corporate environmental performance on financial performance in a transition economy. It assesses whether good environmental performance affects profit and so in which direction, then, the study decomposes profit into revenues and costs in order to identify the challenge (s) of any identification effect of environmental performance or profit. The study analyzes the linked from environmental performance to revenues, cost and profit using an unbalanced panel of Czech firms from the years of 1996 to 1998. The empirical results indicated strongly that better environmental performance improves profitability by driving down cost more than it drives down revenues.

Noor, etal (2015) studied the impact of corporate environmental performance on market risk: The Australian industry case, using ordinary least square method, stating that prior

research suggests that corporate environmental performance (CEP) enable business to build strong corporate image and reputation, thus leading to improved firms financial performance. However studies relating to the relationship between CEP and firm risk are scarce. They stated that the study bridged the gap in the literature by examining whether CEP helps firms to reduce their financial risk. Result of the ordinary least squares regression with fixed effects provides strong evidence that environmental performance is negatively associated with firm/volatility and firm downside risk. The results are robust after controlling for moderating effect such as financial institutional and environmental management.

Robert (2015) examined environmental management systems as a source of competitive advantage. The study using theory base framework stated that little attention has been devoted to addressing the implication of environmental management system (EMS) as a contributing factor to firm competitive advantage. Contrary to an often – expressed view, environmental management systems are a corporate paradox. They can be major contributing factors to the isolating mechanisms that firms see such systems as costs, not opportunities. The result is that they invest only enough to meet regulatory requirements, the paper explores the events leading up to the developments of EMS and low EMS can bring about a competitive advantage. Moreover, it attempted to resolve the paradox by developing a theory based framework, which shows that the benefit of an EMS are the result of endogenous and exogenous factors that impact a firms awareness of those strategic benefits. Finally recommends that EMS policy should be developed.

John &Seetharaman (2013) wrote on "Role of waste and performance management in the construction industry". The purpose was to seek the most effective waste management method that can help the companies to reduce their cost and thus increase their corporate profit using survey method, stating that companies generate waste everyday but do not manage them properly. That waste management is now important to companies' profitability and that if a company manages it waste properly, reduction in waste can help the company to reduce its cost. Using survey method, the study found that to dispose waste properly, recycle or reuse have residual value. Therefore proper waste management policy to improve performance should be made.

Conrad (1999) examined "Resource and waste taxation in the theory of the firm with recycling activities". The purpose was to show how prevention recycling and disposal of waste could be part of a theory of the firm. Using dual cost function approach to develop a theory of the firm under solid residual management, the study first derives efficient production functions from production processes with waste as a by-product. Stating that waste obtained as new scrap can partially be recycled by using additional input in order to cut back the purchase of virgin material. Waste not completely recyclable will leave the firm as disposal which also entails cost to the firms. An incentive to recycle is a tax on resource or on waste. The result of the comparative analysis showed that resource and waste taxation reduces the market volume, the number of firms, resource saving effort and also profit. Recommend that virgin material should be use in effort to produce in a resource saving manner.

Robert et al (2010) examined "the cost of municipal waste and recycling programs" the paper estimated the cost function for both municipal solid waste collection and disposal services and curbside recycling programs cost data are obtained from a national survey of randomly selected municipalities. Results suggest, perhaps unsurprisingly that both marginal and average costs of recycling system exceed those of waste collection and disposal system. Economics of scale were estimated for all observed quantities of waste collection and disposal. Economics of scale for recycling disappear at high level of recycling – marginal and average cost course for recycling take on the usual U-shape. They concluded that waste and recycling cost should be function of factor cost and program attribute.

Graziano and Fabrizio (2012) studied "Business innovation and waste management sustainability: the case of door –to door collection". The paper analyzed the economic sustainability of advanced recycling programs based on door-to-door collection service, estimating their impact on the cost and profit of firms entrusted with waste collection. By using a panel of around 70 Italian firms specialized in waste management observed in the period 2008-2011, they estimated a short-run cost and profit function system, where recycling rate depends on the adopted collection schemes, results showed that cost increase of environmentally friendly programs while they decrease when recycling rate

increase, possibly due to savings from the disposal side. Recommend that there should be implementation of greener collection techniques with enhanced mark-up.

Lester etal (2015) assessed "Municipal solid waste recycling issues" stating that municipal solid waste recycling has been found to be costly for most municipalities compared to land fill disposal. That recycling is a good policy only if environmental impacts and the resource used to collect, sort, and recycle a material are less than the environmental impact and resources needed to provide equivalent virgin material plus the resources needed to dispose of the past consumer material safety. The result of the survey analysis reviewed that for most communities' curbside recycling is only justifiable for some postconsumer waste such as aluminum and other metals. Recommended that alternative to curbsides recycling – collection should be explored.

Karen et al (2005) analyzed Long-run growth and recycling: A material balance approach. The study analyzed the importance of recycling in the strive for sustainable development. Using survey method, the study showed that even in the absence of environmental policy long-run development is sustainable and that waste is a valuable resource, not recycling part of it, cannot be optimal in the long-run, therefore policy on recycling should be made.

Chen (2014) examined "An evaluation of optimal application of government subsidies on recycling of recyclable waste" The purpose was (1) to find out the criteria for voluntary recycling by a for-profit recycler and for state intervention with recycling for a particular recyclable waste (2) to present models to determine the private and social optimal recycling rates respectively, and (3) to determine optimal implementation policy by providing economic incentive to motivate recycling. The result of the survey analysis conclude that (1) an increase in conversion efficiency, the price of secondary material, and carbon taxes will lead to an increase in recycling rates, (2)the subsiding based on secondary material recovered will result in a higher recycling rate and will improve recovery technology more than a subsidy for recyclable waste collection and sorted.

Munaza etal (2014) examined "Impact of Corporate Social responsibility on the firm's financial performance." The study tries to explore the relationship between corporate

social responsibility and financial performance by taking the data from 15 companies listed on Karachi Stock Exchange, using correlation analysis which is used to find the cause and effects of the relationship. Their result showed that there is a considerable positive relationship between the corporate social responsibility and financial performance of the firm, and firms spending on corporate social responsibility not only benefits from continous long term sustainable development but also enjoy enhanced financial performance.

Muhammad (2013) examined impact of corporate social responsibility on firm's performance". The study revolves around the investigation and analysis of the impact of the corporate social responsibility on the firms' performance through the influence of employee performance, and increased customers' satisfaction. The study was quantitative in nature and questionnaire instrument was applied for the collection of data from the selected number of respondents working in the private sector of Pakinstan. SPSS was used for the analysis of the data. The finding reflected that corporate social responsibility positively impacts on the firms' performance.

Sukanya, Rebeka and Yadhivir (2015) studied the impact of corporate social responsibility on firms' financial performance in South Africa. The objective was to ascertain if corporate social responsibility (CSR) activities are beyond a firms' legal obligations and potentially require a sacrifice in short-term profit, and why do firm promote CSR. The relationship was examined for the period from 2004 to 2013 in South Africa. They assess the short-term impact of CSR announcements on financial returns of firms included in or excluded from Johannesburg securities exchange socially responsible investment index and determine whether there is a difference in the long term corporate financial performance between these two groups for the entire period. The event study methodology showed that investors were rewarded in 2004 and 2012, when the firms entered the index, and were penalized in 2013, when firm exist the index. When using regression analysis, the various industries provided mixed results between corporate social responsibility and corporate financial performance for firms over the long term. Based on these results, the study found that corporate social responsibility activities lead to no significant difference on financial performance.

Joe and Kechi (2013) examined implications of corporate social responsibility for the performance of Nigerian firms. The study seek to examine the effect of corporate social responsibility activities on the financial performance of firms operating in some of the industries that have the greatest impact on the environment in Nigeria using an inferential research design, a cross sectional study was carried out to test the effect of corporate social responsibility represented by the test corporate social performance variable of waste management, pollution abatement, social action and fines and penalties on the financial performance of firms, measured by return on capital employed. It was found that waste management and pollution abatement are both significantly and positively associated with firm performance, while social action and fines and penalties are strong, but negatively related, the study finally recommended that firms should actively invest in proper waste management and pollution abatement while social action should be approached with caution.

Barine (2015) examined corporate social responsibility costs and corporate financial performance of listed firms in Nigeria. From analysis of data on actual corporate social responsibility costs (CSRs) and corporate profit (CPRFT) of 13 listed firms in Nigeria using the ordinary least square (OLS) equation shows that there exists a significant positive relationship between CSRC and CPRFT with 18 at 13,99, and the person correlation coefficient positive and significant at 0.577 necessitating listed firms in Nigeria to be increasingly socially responsibility to their host communities to attract the host communities patronage, reduce antagonism towards the firm by host communities, non-governmental organization and labour, maintaining uninterrupted firm operation, increased turnover and profit.

Abdellah, Mohsen and Asghar (2013) studied the effect of research and development costs on the profitability of pharmaceutical companies. The study examined the effectiveness of research and development costs on the profitability of 20 large and multinational worldwide pharmaceutical companies, based on these companies' sale. Since the cost of research and development studies for large and multinational pharmaceutical companies reaches up to 24% of their annual income; many management consider research and development as a waste of resources

and are aware of their term usefulness and benefits. The result of linear regression showed that there existed significant relationship between research and development costs and the profitability of pharmaceutical companies.

Borje and Hans (2008) examined the impact on firms' research and development (R&D) strategy on profit and productivity. The study investigated how a firm's R & D strategy influences the firm performance as measured by productivity and profitability A. production model is introduced to define and interpret alternative ways of measuring the impact of R & D. studying 1, 767 randomly selected firms from the sure dish manufacturing sector, the main findings with the application of simple ordinary square and quartile regression are:

- i. Firms which apply persistent R & D perform better than firms with occasional as well as no R & D.
- ii. Occasional R & D is associated with lower performance than no R 7 D and
- iii. In quartile regression the positive effect from R & D persistency is lacking for low productivity firms (lowest quartile) indicating a non-linear response.

Walter and Dennis (1994) in their article titled "environmental disclosures regulatory costs, and changes in firm value" examined the market reaction of chemical firms other than union carbide's chemical leak in Bhopal India during December 1984 that resulted in approximately 4,000 death and 200,000 injuries to the catastrophe. Evidence in their study indicated that a significant negative intra-industry reaction occurred. However, firms with more extensive environmental disclosures in their financial report prior to the chemical leak experienced a less negative reaction than firms with less extensive disclosures. Their result suggested that investors interpreted such disclosure as a positive sign of the firm managing its exposure to future regulatory costs.

Goo and Connors (2011) in a study titled "corporate environmental performance disclosure and leverage: An integrated approach" analyzed the effect of environmental performance and disclosure on the capital structure of U.s firms in the electric utility industry. The hypothesized relationships account for endogenueity in the three factors of strategy and are estimated using a simultaneous equations model. Their results suggested

that firms with lower toxics emissions exhibit higher leverage and voluntary disclosure associated with disclosure.

Jalaludin, Sulaima and Ahmad (2010) in a work titled "Environmental Management Accounting: An empirical investigation of manufacturing companies in Malaysia", said that Environmental management practices and the implementation of environmental management system have spurred interest in the adoption of environmental management accounting. They further said that environmental management accounting integrates environmental information with economic information and that through environmental management accounting, the accounting systems will explicitly identify, generate, analyze and use financial and non-financial environmental related information. The study described environmental management accounting in two aspects that is monetary environmental management accounting and physical environmental management accounting adopted among manufacturing companies in Malaysia. The study also explained the association between environmental management accounting environmental performance and economic performance. The relationship was tested with a survey questionnaire that was administered to Accountants and Environmental Managers of manufacturing companies in Malaysia. The results suggested that the adoption of environmental management accounting is not at an encouraging level. The low adoption of monetary environmental management accounting and the moderate adoption level of physical environmental management accounting signal the likelihood that the manufacturing companies in Malaysia may view environmental management accounting as a less significant aspect of their internal management system. Additionally, the Accountants, when compared with the Environmental Managers, seem to be more reluctant in incorporating environmental management accounting as part of the organizations' management systems. However, the results also showed that there are significant positive correlations between the environmental management accounting adoption level and environmental performance. The study finally suggested that the adoption of environmental management accounting improves environmental and economic performance.

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On the other hand, Sarker and Burritt (2008) in a work titled "An Empirical Examination of the Role of Environmental Accounting Information in Environmental investment Decision-Making", used an experiment to investigate two important factors associated with environmental investment decision-making by managers; the regulatory regime in which the firm operates and the nature of environmental information used as a decision aid. They examined two regulatory regimes, a command and control regulatory regime and a voluntary self-regulatory regime. They contrasted two accounting systems that is environmental management accounting and conventional management accounting thereby provided a 2 x 2 experimental design for the empirical study. They considered environmental investment decision-making by different types of managers working in the Australian offshore petroleum industry. Their result indicated that environmental accounting information has a more significant influence on the willingness of managers to incorporate environmental consideration into investment decisions and to avoid future environmental risks, than does the type of regulatory regime.

Moorthy and Jacob (2013) in a study titled "Green Accounting: cost measures" highlighted the issues surrounding the firms green accounting in financial reporting. They outlined a set of green accounting measures that are to be addressed in environmental management accounting system of a firm. The study stated that the adoption of basic elements of green accounting will portray the role of environmental in the economy as well as render easier the analysis of macroeconomic questions with the help of green accounting measures and thus, will lead the economy to a viable path. They further stated, that despite the fact that the corporate environmental expenses increase not only in importance but also in monetary units, some enterprises continue to underestimate and enter environmental costs in accounts as general expenses. The study stated that some companies try to connect environmental cost with products or service but the methods of allocation cost used are inappropriate.

The study revealed that when no proper allocation method is used, the manager of an enterprise does not relieve re liable in formation with regard to the real costs and profit in order to maintain or change the products and/or processes. Also, that the situation

prevents the effective following up of yield of an enterprise as the right pricing of products and the important activities for the maintenance of competitiveness of an enterprise. They suggested that there should be specialized personnel as well as proportional international accounting model with practice environment planning that will reduce environmental cost.

H.cho, Fredman & Partten (2012) analyzed the corporate corporate disclosure of environmental capital expenditures; A test of alternative theories. Their purpose was to examine the three potential explanation for t he corporate choice to disclose environmental capital spending amount. They said that in the United State, material disclosures of capital expenditures for pollution controls are mandated by Securities and Exchange Commission (SEC). However, only a limited number of firms impacted by pollution controls actually disclose environmental capital spending. The study further revealed that based on quantitative measures of materiality, an overwhelming majority of these firm disclose amounts appear to be immaterial in nature. They state that, while their finding appear to support the GAO (2004) argument that non disclosing companies may not be disclosing due to a lack of material spending, it also suggested that the firms disclosing this information must be doing so in an attempt to gain strategies value.

The examination of two competing theories of discretionary environmental disclosure, voluntary disclosure theory and legitimacy theory provide evidence supporting the later justification of GAO 2004. They showed that while both disclosing and non-disclosing companies are improving their pollution performance over their period of examination, the disclosing firms do not outperforms non disclosing counterparts. They suggested that interpreting disclosing environmental information careful understanding of the underlying motivations should be required.

Jalaudin, Sulaiman & Nik Ahmed (2009) in their article titled "Environmental Management Accounting: An empirical Investigation of manufacturing companies in Malasia". This study describes Environmental Management Accounting (Monetary Environmental Management Accounting (MEMA) and Physical Environmental Management Accounting (PEMA) adoption among manufacturing companies in Malasia.

According to the study, the Monetary Environmental Management Accounting MEME systems are actually an extension of conventional management accounting system. The study cited that in MEMA system, management accounting tools are used to track, trace and treat costs and revenue incurred in relation to the company's impact on the environment. In summary, they said that MEMA provides the link between a company's environmental-related activities with its past, present and future financial stocks and follows. That through MEMA strategic operational planning will include the environmental aspects of the company's activities, as such, decision making will involve environmental related target and achievements.

On the other hand, the study stated that, the physical Environmental Management Accounting for the ecological impact pertaining to a company's activities in physical units such as kilowatt hours, decibel, kilograms and tones. Again, in PEMA systems, consideration is given to information regarding of energy, water, materials and waster. They said that through PEMA the ecological strengths and weakness of the company are clearly highlighted and consequently will lead to better measurement and control of environmental quality and consequences.

Finally, their results suggest that the adoption of EMA that is Environmental Management Accounting is not at an encouraging level. And that the low adopting of MEMA and the moderate adoption level of PEMA signal the likelihood that the manufacturing companies in Malaysia may view EMA as less significant aspect of their internal management system. Also, that the accountants, when compared with the environmental managers, seemed to be more reluctant in incorporating EMA as part of the organization's management systems. Their result also show that there are significant positive correlations between the EMA adoption level and environmental performance, that positive correlation are also observed between the EMA adoption level and economic

performance. Therefore, they suggested that the adoption of EMA will improve environmental and economic performance.

Muza & Magadi (2014) studied "Environmental Management Accounting implementation in Zimbabwe mining sector. The purpose of their study was to evaluate the implementation of environmental management accounting focusing on sustainable development and also strategies being adopted by the mining sector in the development and implementation of environmental management accounting system. The study revealed that environmental cost Management Accounting is critical in Zimbabwe in the mining sector considering the phenomenal growth being witness in the sector over the past years. Management accounting is intended for internal users and is not bound by the externally imposed rules of financial reporting it tends to be more subjective and uses both financial and non financial measure thereby providing more detail than financial accounting.

The study further revealed that the area of environmental cost management is part of the internal control system of the organization which is not visible from outsiders or intended for external stakeholders. The mining sector usually does not disclose their environmental management accounting (EMA) activities, which leaves a question whether they are being done or not. The study employed description survey design and an open ended questionnaire was use to solicit information on the implementation of environmental management accounting. The study findings show that the application of environmental policies that enhance a set of plan of action of the companies, regarding the environment, has revealed advantages for the green companies.

Shraddha & Siddiqui (2014) reported "A review on Environmental and Health impacts of cement manufacturing Emissions. The purpose the purpose of the study was to review the role of cement industry in causing impact on environment and health. They said that climate change is considered as major environmental challenges for the world. Emissions from cement manufacturing are one of the major contributors in global warming and climate change. That cement manufacturing is highly energy intensive process, which

involves intensive fuel consumption for clinker making and resulting in emissions. They said that beside fuel, the calculating process is a major source of emission such as Nox, Sox, co_2 , particulate matters etc.

The study further revealed that these emissions are not only deteriorating air quality but also degrading human health. Emission have local and global environment impact resulting in global warming ozone depletion, acid rain, biodiversity loss reduced crop productivity etc. That scientific evidence indicates that air pollution from the combustion of fossil fuels causes a spectrum of health effects from allergy to death. The main environment and health concerns identified are significant amount of fine dust and gaseous emission. The study recommends that for sustainable development, focus should be on effective emission control technology, energy efficiency, adoption of state of art technology and global synergy in environment friendly technologies.

Berhe, Alemayehu & Fortuin (2014) Studied on Environmental Impact Study of Cement Factory using a Munity- Criteria Analysis; Evidence from Messebo Cement Factory Ethiopia". The aim of their study was to analyses the local environmental impacts of the Messebo cement factory in Tigray, Northern Ethiopia, and to identify the consequences of these impacts.

A Muit- criteria analysis and community perception survey analysis were used. Primary data were collected through key informant interview with three purposively selected external experts helped to estimate the weighting factors. Sixty employees, who were selected through contend random sampling for scoring the identified impact, and 120 randomly selected households, were investigated for the perception survey analysis. The study also used secondary data from supplementary documents to complement the primary data.

The study revealed that cement is a pillar to develop infrastructures in Ethiopia. Messebo cement factory (MCF) is one of the biggest cement factories in Ethiopia located in Mekelle. The factory is founded in 2000 with a daily production capacity of 2000 ton clinker per day. The factory expanded its capacity to 5000 ton clinker in 2011 aiming to

satisfy the domestic cement market. They said that according to the company report, the factory uses a heavy oil clinker furnace and recently introduced coal to boast energy. And that recent studies indicated that the dust emitted from the factory is affecting the physic chemical properties of the soils in the surrounding area. The surrounding communities have been complaining about health and environmental impact of the factory.

The study further identify eleven activities, seven environmental aspects such as dust emission, noise, material spillage, stock emission and oil leakage, and their potential impacts under the CRM processing resulted in dust emission and noise. Moreover, the checklist of activities takes place under COK processing unit for coal preparation as a source of energy during clinker production in MCF. Base on the interview with managerial bodies, site visits and six environmental aspects such as coal dust emission, noise, odor, material spillage, oil leakage, stack emission and their potential impacts under COK for coal preparation. Dust emission, noise and odor resulted almost from all activities. Besides the checklist of activities that can be performed under COK processing unit for clinker production in MFC.

The finding the study shows that the preparation of raw material and coal, and clinker production at the factory are to major source of environmental impacts. Additionally, most environmental impacts of the activities in the crushing and raw milling and coal and kiln processing units are substantial and affect the surrounding communities and local environmental. Finally the study recommends among others that the factory is better to implement reduction and prevention program that include introduction of effective dust emission control mechanism.

Ahmed (2012) Research titled "Environmental Accounting & Reporting practice; Significant and issues. A case from Bangladeshi companies" aimed at critically evaluating the Environmental practices in the selected companies in Bangladesh. That since the 1990s the Government of Bangladesh (GOB) has started to pay attention to the environmental management of the country. That in the wake of increased public protests at various places in Bangladesh, environmental degradation due to increased industrial activities, pressure on a global scale to check environmental pollution and pressures from the donor agencies to improve the environmental condition, the Government of Bangladesh passed the Bangladesh Environmental protection Act 1995. He said that under this Act, companies may be asked to disclose environmental information as and when required. The Act also required environmental clearance before the establishment of a new industry.

The study using frequency and percentages for analysis further revealed that the Environmental Accounting Reporting can uphold the green image of companies. They can make their annual reports more informative by providing environmental information with the following reasons;

- 1. It would aid the discharge of the organization's accountability and increase its environmental transparency.
- 2. It helps examining of the concept of environment and determining the company's relationship with the society in general and the environmental pressure groups in particular. This helps an organization in emerging issue with its stakeholders.
- **3.** Companies may be successful in attracting funds from 'environmental individuals and groups'.
- 4. Companies producing environmental friendly products may take competitive marketing advantage.
- 5. Companies may show their commitments towards innovation and change by making environmental disclosures.
- 6. Environmental reporting may be used to combat potentially negative public options.

Finally, the study made the following recommendations based on the findings.

- This study indicated that the companies have already given much effort in the field of environmental protection. However, the current accounting system does not reflect such efforts for its stakeholders. So, companies should take the initiative showing such activities in their accounts.
- Environmental expenditure incurred by companies should be classified into capital expenditures.

- **3.** Regulatory bodies should develop a standard to guide the practices of Environmental Accounting and Reporting.
- **4.** Research and studies should be encouraged in the field of Environmental Accounting and Reporting.
- 5. Companies should maintain the provision for environmental liability.
- 6. Companies should show data on environmental expenditure, environmental costs charge to income in the notes to the account in their annual reports.
- 7. Companies should show fines and penalties paid by the company, environmental liabilities of the company, environmental provision and environmental cost capitalized in the notes to the accounts in their annual reports.

Muller, Mendelsohn and Norohaus (2011) examined "Environmental Accounting for pollution in the United States Economy". The study presented a framework to include environmental externalities into a system of national account. It developed an accounting framework and presents empirical estimate of the external costs of air pollution in the framework of the national economic accounts. The analytical section shows that there is a natural extension of current national – accounting principles to include pollution and argues that emission should be valued by the damages they cause. The suggested approach measures the gross external damages caused by each industry as the marginal external damages times the quality of pollution at each source location. The accounts would require an adjustment of value added by industry by subtracting net external damages, which equals gross External damages (GED) minus the cost of pollution permits or any effluent charges. Under the current regulatory context, where permits tend to have zero cost to firms, net external damages (NED) equal Gross external damages (GED). The proposed frame work captures the full costs of production to society of each industry. We estimate GED from air pollution for each industry in the United States. Because pollution damages per unit of value added vary a great deal from one industry to the next, the integrated accounting frame work provides more accurate accounting of each industry's net contribution to national output.

The study noted several qualifications. First, the study estimates are accounting measures and not measures of economic welfare. The economy has many existing distortions other than those from air pollution such as taxes, distortion from market power, and other externalities and existing accounts do not attempt to incorporate those ones. Second, they noted that although GED exceeds value Add (VA) for some industries, this does not necessarily imply that sensitive analysis these industries should be shut down. On a formal level, it signifies that a one – unit increase in output of that industry has additional social costs that are higher than the incremental revenues. At an institute level, it indicates that the regulated levels of emissions from the industry are too high. Thirdly, the study's estimate of GED, do not include any accounting costs of emission allowances. Forth, this study includes only the impact of air pollution and excludes other externalities such as those involving water, soil, and radiation. Fifty, the study noted that the uncertainties are particularly large for four elements; the value of mortality risks, the relationship of this value to age, the mortality affect of fine particulates, and the social cost of CO_2 emissions. The study found that it is possible to develop national accounts that include pollution and suggested that it would be feasible to extend the analysis to water pollution, solid waste and hazard waste pollution.

Alam, Ahmed and Munna (2010) examined "Environmental Impact Assessment of oil and gas sector; A case study of Magurcherra gas field" The study focused on the environmental impact assessment of Magurcherra gas field through environmental, social- economical and meteorological study. The major activities involved are seismic activities, drilling activities, exploration and production. Environmental impact assessment of drilling and pipe line activities was predicted for Magurcherra gas field exploration in oil and gas sectors. The study used check list method and identified the impact through three different dimensions of environment physical, ecological and socio – economic. The effects are stronger on the ecological and socio-environment rather than physical environment. The effect on plane land is evaluated on low and hilly terrain medium. Most of the components of physical environment are evaluated as insignificantly effected. Ecological environment of the study area is seriously affected by the gas field's explosion. In the study area, a huge amount of forest are distracted and got high grade in evolution. The effects on wild life and migrated birds are evaluated as low medium, respectively. Distribution of wet land is also considered by the gas field. In socio –economic environment agriculture sector, crops and plantations, and farming are affected and the effects are evaluated as medium. The workers of the gas field and irrigations are affected highly by the gas field explosion. Other important component of socio-economic environment like industrial, residential, commerce and industry, household, land communications, social structure are also affected and the effect are evaluated as low.

Finally, the study suggested that water used by the construction force have to be tested to ensure that it meet the quality standards of Bangladash for drinking water, or it should be chlorinated so that the tested chlorine residual is 0.2mgl or greater, after 10 min of contact time. Again, that there should be implementation of waste disposal plan including, proper disposal of solid waste generated by the construction activities. Soil erosion has to be minimized with the measures for conserving soil during stream crossing and during trenching activates.

Van (2000) wrote on environmental accounting; A new challenge for the accounting system. One of the primary aims of this study was to explore the tendencies of the development of environmental accounting. Stating that the root of environmental accounting manifests themselves in social accounting. During the first relevant period of development phases, (The 1970's) social accounting develops much more significantly than environmental accounting, which functions as a subordinate of the former. Nothing that annual reports place the same emphasis on communicating information regarding employees. That is the second period (1980's) attention towards environmental matters increase, contains fewer normative observation, and more and more articles are written dealing with the philosophical background. The demand for the environmental economics in particular has a great impact on the development of environmental accounting.

The study further reveled that in the third period (1990s), environmental accounting undergoes dramatic, development, new areas are created; new research and new results have stimulating effect. The communication of employee related information is relegated to the background, with the focus shifting to environmental information. The other goal of the study was to examine the significance and regulation of the new system. Environmental accounting currently, function as an auxiliary sub- system to the traditional accounting system, the primary objectives of which is to provide information on environmental measures within the organization and the external environmental impact it is responsible for. Finally the study suggested that focus should shift to the prevention of negative output on the environment.

Mba and Ogbuagu (2012) studied the "Environmental and social –Economic impact of oil Exploration on the Niger delta region. A case study of Ibeto, Nigeria, the study seek to investigate the extent at which the oil company has assisted in the infrastructural development, impact of exploration on the socio-economic wellbeing and the effect of oil exploration on the ecosystem of the host community. The study revealed that most environmental pollution in Niger Delta region occurs during production distribution or transportation of petroleum products. That the gaseous and liquid component evaporates, some get dissolved in water and even oxidize, and yet some undergo bacteria changes and eventually sink into the bottom by gravitation of the volatile lower molecular weight components effected life. This does not undermine other environmental pollution such as gas flaring, toxic disposals and halluemization of land by heirs. Nothing that the costs of degradation of environment and the health of the people of the producing communities were incalculable.

Finally, the study found that despite of the negative impact on the ecosystem of the host communities, there are some evidence of positive impact of multinational companies on in fractural development and socio-economic wellbeing of the host communities. And recommends among others that irrespective of the infrastructural development from the multinational companies, the Government should provide conducive environmental for the host communities by building good road network to the villages to justify huge taxes received since oil constitute the main fiscal basis and source of capital accumulation for the government.

Okafor & Ezejiofor examined "Mega- Accounting and Reporting: An Appraisal of Social and Environmental Accounting in manufacturing sectors in Nigeria. Their study attempts to assess the impact of mega-accounting reporting on corporate operation and environmental responsibility. Data were collected from both primary and secondary sources. The questionnaire was distributed to environmental officials and the residences that have embarked on environmental issues. Data were analyzed with Regression analysis and Z-test analytical tools. The study found out that active measures have been taken to encourage the Nigerian manufacturing sector to ensure good environmental protection. Policies have been made including fines and penalties to ensure compliance by the manufacturing sector in preserving the environment as they embark on their operations. The paper concludes by reiterating that although reports rightly respond to key events and risks, it is essential also to domesticate a steady and integrated sustainable development into the company's operations and processes.

Hossen and Ali (2015) studied the effects of Green Accounting in the society. They said that in today's global economy, organizations are increasingly called upon to demonstrate sound business management that includes concern for economic, social and environmental issues. The challenges created by global competition make it imperative for enterprises to continually rationalize and improve all resources and processes. Separation of responsibilities for the processes that underpin organizational outputs is unsustainable in today's competitive environment. They asserted that recent achievement prove that ISO's management system standards have a global relevance of and a capacity to benefit from the very largest to the very smallest organizations in both public and private sectors. An Environmental Management System (EMS) provides a solid framework for meeting environmental challenges and realizing the above benefits. Most environmental legislation now originates at the European level, where the main legal instruments are EU directives and regulations. Traditionally, environmental regulation has covered the environmental media. From the early 1990's, a more integrated approach has been taken across all media with integrated pollution control (IPC) and, more recently, the Integrated Pollution Prevention and control (IPPC) European Directive. They describe in their research the main types of environmental standards used across

Europe and their impact on business performance. In conclusion they suggested the further key areas the environmental legislation is likely to be developed in two include companies.

Anni and Samakovlis (2009) examined "Green Accounting", Air pollution and Health". They stated by saying that human capital is an important component of economic growth. The article extends a theoretical model for comprehensive national accounting to the welfare effects of pollution on human capital. The model includes a production externality in the form of a flow of air pollutants that causes both direct disutility and indirect welfare effects by negatively affecting the productivity of labour. They found that defensive medical expenditures or health care cost allocated to mitigating the disutility of air pollution should not be deducted from conventional net national product (NNP), whereas the value of the perceived disutility of illness episodes caused by pollution should be subtracted from NNP. They derive a marginal cost benefit rule for an optimal level of pollution given its negative health effects. The rule can also be use as they said for determining an optimal tax recommends that a scheme for empirical comprehensive accounting and for estimation of an emissions tax should be outlined.

Heba and Yousef (2012) examined Green Accounting: A proposition for Environmental Accounting/Environmental Reporting Conceptual Implementation Methodology. They asserted that many countries have their own policies for the implementation of environmental reporting. However, no country has regulations in place requiring companies to issue a company wide, stand alone report on environmental performance that can affect zonal, regional and global communities.

Their article explores the concepts of environmental accounting and the possibility of broadening the applicability of the environmental reporting concept to be utilized by governments to make businesses more responsible for their externalities. The first part discusses the importance of environmental accounting as apart of the accounting education, overviews the past and the current regulatory and mandatory status of environmental accounting and its relationship to different professions. The second part
proposes a mandatory environmental filling system and explores its potential characteristics and benefits. They found that the ultimate purpose of the filing system is to follow the whole life cycle of each major resource and to measure the effect of businesses on its hosting society.

Hamitton et al 2014 examined "The policy implications of Natural Resource and Environmental Accounting. They stated that increasing concern about environmental degradation, resource depletion and the sustainability of economic activity have made the development of natural resource and environmental accounts an area of significant activity. Yet little attention has been devoted to asking exactly what ends do these accounts ultimately serve. The primary goal of their paper was to examine, through a series of country case studies, the linkages between the development of these new elements of national accounts and the proposed or actual policy used that these accounts are designed to meet. Their case studies revealed a variety of motivations which underlie attempts by governmental departments or national statistical offices to incorporate environmental concern into national accounting practice. They followed up by an assessment of the empirical experiment obtained from a number of existing studies. They concluded with some general inferences regarding the lessons to be learnt regarding future green accounting efforts in both the developed and the developing world.

Ligi (2012) wrote on Green Accounting; A way to sustainable development. Stating that in the last sixty years, GDP has come to be seen as the primary indicator of the state of national economies and social well being and a key guide to policy makers and investors. That it reflects about the growth made by the nation, GDP growth does not reflect many vital aspects of national wealth and well being, such as changes in the quality of health, the extent of education, or the quality and quantity of natural resources. Asserting that GDP growth is too narrow a measure of economic growth and not a measure of national wealth, experts have proposed a Green Accounting Framework for India and its union territories. That decision makers need the right indicators to ensure that policies and investments maximize wellbeing for current and future generation. The citizens need access to such information to hold their governments to account for robust and transparent information, which are prerequisites for public empowerment and encouragement. That there is a need to develop system of national accounting that fully incorporate the capital stock that determines earnings. The better macro economical and societal indicators are needed to reflect the contribution of biodiversity and ecosystem service to human well-being. Concluding that one approach that is gaining momentum across the globe is Green Accounting whereby national accounts are adjusted to include the value of nature goods and services.

Bartelmus (2014) examined green accounting for a sustainable economy, stating that statisticians avoid getting involved in data analysis, leaving data users on their own in interpreting the results of their work. This, he said is particularly unfortunate in a new area of applied statistics such as environmental accounting with which few are really familiar. He asserted that earlier this year data producers and users explored, in a national seminar, possible policy application of the result of a green accounting project in the Philippines. The main findings of the author's contribution to the seminar, on which his paper is based, are that environmental accounts: (1) present evidence of sustainable economic performance in the country during the relatively short-time period of 1988-1994; (2) provide information for environmental cost internalization; (3) May guide investment to environmentally sound production processes; (4) help to specify and monitor policies of natural wealth conservation, distribution and management; and (5) reveal major data gaps. The researcher found that environmental accounts help to assess the sustainability of economic growth on terms of broadly defined capital maintenance. He recommends that sustainability of development would have to be measured by alternative or supplementary physical indicators linked to quantifiable standards or targets.

Caraiani et al (2015) examined Green Accounting initiatives and strategies for sustainable development. They stated that in today's society, environmental concerns are at the forefront of entrepreneurial decision making and planning. With increased attention on an organization's environmental impact, researchers and business leaders strive to provide the best methodologies and strategies for effective environmental reporting and accountability. Found that Green Accounting Initiative and strategies for sustainable development presents the latest scholarly research on the economic, social and environmental objectives essential to the planning and support of future organizations and communities. They assert that their publication stands as an essential reference source for academicians, researchers, advanced level students, and professionals interested in designing business models and financial plans with consideration for environmental and social liabilities.

Finally, that their publication features timely, research based chapters on economic, social and environmental policies including, but not limited to, green performance measurement, triple bottom line reporting, sustainable societies, environmental protection and risk and adaptive management.



Figure 2.4 Green Accounting characteristics on firms' profit performance Conceptual Model

Source: Researcher, 2017 The model shows that Green Accounting characteristics have effect on firm's profit performance.

Table 2.3 Summary of Empirical Studies

Summary Table of Empirical Studies

S/N	Author(s)	Topic Method		Year	Findings	Recommendation
1	Thomas	Pollution	Instru-	2015	That the source of economic benefits	That public policy
	Brobay and	Prevention: The	mental		that EMS. And Pro-activities	effort should be
	Per-clov.	Role of	variable		Provided forms are having a	made more cost-
	Marklimd.	Environmental	model		mitigation effect on stock market	effective.
		Management and			reaction to Toxics Release inventing	
		Information			and that Pollution Prevention Pays	
					are valid	
2	Robert E.	An Economic	Neo-classical	2016	That the polluting firms emissions	
		Model of	production		which result from its use of a toxic	
		Pollution	function and		input can be reduced by substituting	
		Prevention	linear activity		other inputs and by switching to a	
			analysis		non-polluting process.	
3	James Boyd	Searching for the	Economic,	2008	The evidence contradicts the view	That with an
		profit in pollution	financial and		that firms suffer from organizational	environmental
		prevention: Case	accounting		weaknesses that make them unable	policy reforms, Pz
		studies in the	analysis		to appreciate the financial benefits of	innovation should
		corporate			PZ investments.	be promoted.
		evaluation of				
		environmental				
4	Dawl I	Dramatina	Environment	2010	Found that which was non-	
4	Paul L.	Promoting	Environment	2010	Found that whichever perspective	
		Pollution in	al value		been highly profitable	
		Small Dusinassi	mathod		been nighty promable.	
		Costa and	method			
		Costs allu Bonofits of the				
		"Enviroclub"				
		initiative				
5	Abdoul G.	Impact of	Two way	2009	Among others, that Pz adoption	
C		Government	fixed parson	2007	reduces environmental violation in	
		Sponsored	model		these industries while increasing	
		Pollution			violation in two others.	
		Prevention				
		Practices on				
		Environmental				
		Compliance and				
		Enforcement				
5	Madhu and	Adoption of	Treatment	2009	The threat of anticipated regulation	
	Donna R.	Pollution	effect model		and the presence of complementary	
		Prevention	with panel		assets is important for creating the	
		Technique: The	data		incentive and on internal capacity to	
		Role of			undertake incremental adoption of	
		Management			pollution prevention techniques	
		System and				
		Regulatory				
		Pressures.				

6	Nor M.	Effect of corporate Environmental Performance on Financial outcome, relevance and costs: Evidence from Ezechi Transition Economy.		2014	That better environmental performance improves profitability by driving down cost more than it drives down revenue.	
7	Noor et al	The Impact of Corporate Environmental Performance on Market Risk: The Australian Industry Case,	Ordinary least square method	2015	That environmental Performance is negatively associated with firms' volatility and firms' down side risk.	
8	Robert E.	Environmental Management System as a source of Competitive advantage.	Theory based frame work	2015	That the benefit of EIUS is the result of endogenous and exogenous factors that impact firms' awareness strategic benefits.	That EMS policy should be developed.
9	John and See- tharamon	Role of Waste and Performance Management in the Construction Industry.	Survey method		That to dispose waste properly, recycle or re-use have residual value.	waste management policy to improve performance should be made
10	Conrald K.	Resource and Waste Taxation in theory of the Firm with Recycling Activities	Dual cost function approach	1999	That Resource and Wastes Taxation reduces the market volume, the number of firms, resource saving effort and also profit	That *** materials should be used in effort to produce in a resource saving manner
11	Robert et al	The cost of Municipal Waste and recycling programe.	National Survey	2010	Suggest, perhaps that both marginal and average cost of recycling system exceed those of waste collection and disposal system.	Waste and recycling cost should be function of factor cost and programme attribute.
12	Graziano and Fabrizio	Business Innovation and Waste Management Sustainability: The case of door- door- collection.	Panel Report	2012	That cost increase following the implementation of environmentally friendly program while the decrease when recycling rate increases	Implementation of greener technique with enhanced mark-up

13	Lester et al	Municipal Solid	Survey	2015	That for most communities, curbside	That alternative to
		Waste Recycling	analysis		recycling is only justifiable for some	curbside recycling.
		issues.	5		post consumer waste such as	collection should
					aluminum and other metals.	be explored.
14	Karen et al	Long-Run	Survey		Showed that even in the absence of	Policy on recycling
		Growth and	method		environmental policy, long-run	should be made.
		Recycling: A			development is sustainable	
		Material Balance			L.	
		Approach				
15	Chen	An evaluation of	Survey	2004	Among others, that and increase in	
		optimal	analysis		conversion efficiency, the price of	
		application of	2		secondary materials and carbon taxes	
		Government			will lead to an increase in recycling	
		subsidies on			rates.	
		Recycling of				
		Recyclable Waste				
16	Munaza et	Impact of	Correlation	2014	There is a considerable positive	
	al	corporate social	analysis		relationship between the corporate	
		responsibility on			social responsibility and financial	
		the firms'			performance	
		financial				
		performance.				
17	Muhammad	Impact of	SPSS tools	2013	That corporate social responsibility	
		corporate social			positively impact on the firm	
		SPSS tools			performance.	
		responsibility on				
		firms				
10	C 1	performance	Essent starlar	2015		
18	Sukanya,	The impact of	Event study	2015	I hat corporate social responsibility	
	Kebeka &	corporate social	methods		lead to no significant different in	
	ruduir	firma' financial			financial performance.	
		norformance on				
		South A frice				
		South Anica				
19	Joe and	Implications of	Cross	2013	That waste management and	That firms should
17	Kechi	corporate social	sectional	2010	pollution abatement are both	actively invest on
		responsibility for			significantly and positively	proper waste
		the performance			associated with firm performance.	management and
		of Nigerian firms.			L L	pollution
		U				abatement.
20	Barine	Corporate social	Ordinary	2015	There exist a significant positive	That listed firms
		responsibility	least square		relationship between CSRC and	should be socially
1		costs and			CPRFT with 13 at 13.99, and the	lose communities
1		corporate			Pearson correlation coefficient	
1		financial			significant 0.577.	
1		performance of				
		listed firms in				
1		Nigeria				

21	Abdellah Mohson and Asghor	Effect of research and development costs on the profitability of pharmaceutical companies.	Linear regression	2013	That there existed significant relationship between research and development costs and the profitability of pharmaceutical companies	
22	Borje and Hans	The impact of firms' research and development (R & D) strategy on profit and productivity	Productive model	2008	That firms which apply persistent R & D perform better than firms with occasional as well as R &	
23	Walter and Dennis	Environmental disclosure, regulatory costs and changed in firms values	Content analysis	1994	Found that firms with more extensive environmental disclosures in their financial report prior to the chemical lease experienced a less negative reaction than those with less extensive disclosure	That investors should interpret such disclosure as a positive sign of the firm managing its exposure to future regulatory costs.
24	Gao and Conners	Corporate environmental performance, disclosure and leverages! An integrated approach	Simultaneous equation model	2011	Found that firms with lower toxic emission exhibit higher leverages and voluntary disclosure and that leverages negatively associated with disclosure	That firms with lower toxics emissions exhibit higher leverage and voluntary disclosure associated with disclosure.
25	Jalakudin Suluima Almad	Environmental management accounting and empirical investigation on manufacturing companies in Malaysia	Survey questionnaire	2010	That there are significant positive correlation between the environmental management accounting adoption level and environmental performance	That the adoption of environmental management accounting should be used to improve environmental and economic performance.
26	Sarker and Burritt	An empirical examination of the role of environmental accounting information on environmental investment making decision	Content analysis	2008	Found that environmental accounting information has more influence on the willingness of management to incorporate environmental consideration into investment decisions and to avoid further environmental risks.	
27	Moorthy and Yacob	Green Account: cost measures	Description survey design	2013	They study revealed that when no proper allocation method is used, the manager of an enterprise does not receive reliable information with regard to the real cost and profit in	They suggested that there should be specialized personnels as well as proportional

					order to maintain or change the product and/or process	international accounting model with proactive environmental planning that will reduce environmental cost.
28	H. che, Fred man & patter	Corporate disclosure of environmental capital expenditures: A test of alternative theories	Descriptive survey design	2012	The study revealed that based on qualitative measures of materiality, an over whelming majority these firms disclose amount appear to be immaterial in nature.	They suggested that interpreting disclosed environmental information a careful understanding of underlying motivation should be required
29	Jalaludin, Sulaiman & Nik Ahmed	Environmental management Account: An Empirical investigation of manufacturing companies in Malaysia	Description survey design	2009	Their result among other thing show that there are significant positive correlations between the environmental management accounting adoption level and environmental performance, that positive correlation are also observed between the environmental management accounting adoption level and economic performance	They suggested that the adoption of environmental management accounting will improve environmental and economic performance
30	Muza &Magadi	Environmental management Account implementation in Zimbabive mining sector	Descriptive survey design	2014	They found that the application of environmental policies that enhances a set of plans of action of the companies, regarding the environment has revealed advantaged for the green companies	
31	Shraddha & Siddigui	A review on environmental health impact of cement manufacturing emissions.	11	2014	The study food among other things that emission are not only determining air quality but also degrading human health.	The study recommends that for sustainable development, focus should be on effective emission control technology, energy efficiency, adoption of state of out technology and global synergy in environment friendly technology.
32	Berhe, Alemaghu	Environmental impact study of	Multi criteria analysis and	2014	The study found among other things that the preparation of raw material	The study recommends

	& fortuin	cement factory using a multi- criteria analysis; evidence from messebo cement factory Ethiopia	community perception analysis	2012	and coal, and clinker production at the factory are the major source of environment impact	among other thing that the factor is better to implement reduction and prevention program that include introduction of effective *** emission control mechanism.
33	Ahmed	Environmental Accounting & Reporting practices: significance and issues: a case from Bangladesh: companies	Frequency and percentages	2012	The study found among other things that the environmental accounting reporting can uphold the green image of companies.	The study recommends among other things that the environment expenditure incurred by companies should be classified into capital expenditure.
34	Muller, Mendelsohn & Nordhous	Environmental Accounting for pollution in the united state economy	Descriptive survey design	2011	The study found that it is possible to develop national accounts that include pollution and suggested that it would be feasible to extent the analysis waste, and hazardous waste pollution.	
35	Alam, Ahmed & Munna	Environmental impact assessment of oil and gas sector: A case study of margurcherra gas field	Check list method	2010	Identified among other things that the impact through three different dimensions of environment physical, ecological and socio-economic noting that the effects are stronger on the ecological and socio-economic environmental.	Suggested among other things that water used by the construction force have to be tested to ensure that it meets the quality standard of Bangladesh for drinking water.
36	Van	Environmental accounting: A new challenges for the accounting system	Descriptive survey design	2000	Found among other things that in the third period environmental accounting undergoes dramatis development; new area are created: new research and new result have a stimulating effects	Suggested that focus should shift to the prevention of negative impact on the environmental
37	Mba & Ogbuagu	Environmental and socio-economic impact of oil exploration on the Niger delta Region: A case study of Ibeto, Nigeria		2012	Found that despite the negative impact in the ecosystem of the host communities, there are some evidence of positive impact of multinational companies on unfractural development and socio-economic wellbeing of the host communities	recommends among other that the government should provide conducive environment for the host communities by building good road

						net-work to the
						villages to justify
						huge taxes received
38	Okafor &	Mega- Accounting	Regression	2013	found out that active measures have	that it is essential
	Ezejiofor	and Reporting: An	analysis and		been taken to encourage the Nigeria	to domesticate a
	-	appraisal of social	Z-test		manufacturing sector to ensure good	steady and
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		sectors in Nigeria				the company's
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						processes.

Source: field survey 2017

2.4 Summary of Reviewed Literature

The study reviewed related literature under conceptual, theoretical and empirical framework. Environmental accounting was first constructed in several European countries working independently of each other though Norway was one of the first followed by Dutch and France. In Nigeria however, some States especially oil producing states are already exploiting the benefit of environmental accounting. Green accounting play both internal and external role in every organization especially in the manufacturing sectors. Theories of Ecological Modernization, Resource Dependence theory and Stakeholders theory were highlighted in this work. However, the theory of Ecological modernization upon which this research work is anchored on explained that modern society witness ecological restructuring. That is, ecological inspired and environment induced process of transformation and reform. It means that economic process of production and consumption are increasingly analyzed and judged as well as designed and organized from an economic and an ecological point of view which, invariably affects, the financial performance of cement industries and oil and gas sector in Nigeria. Nonetheless, the researcher notes that despite the plethora of works reviewed for this study, none was seen to focus on the topic and the period of the present study. Consequent upon this observed gap, the researcher's interest and perceived urgent need to continue with the study has remained sustained.

CHAPTER THREE

METHODOLOGY

3.1. Research Design

The researcher employed ex-post facto research design. This design involves the collection of data after all the event of interest have occurred (Ebubechukwu 2002). Basically, data where obtained from the annual reports of oil and gas industries and cement industries in Nigeria. The researcher adopted this design as it yields useful information concerning what goes with green accounting characteristics, what conditions, what sequence and pattern that affect profit performance of these firms.

3.2 Population and Sampling Technique

The population includes all cement manufacturing firms and all Oil and Gas firms listed on the Nigerian Stock Exchange (NSE).

The population of cement manufacturing firms listed in Nigerian Stock exchange (NSE) is four in number. The whole population is adopted as our sample size.

Table 3	3.1:	The sam	ple size	for the	e cement	Industry	is	tabulated	below:

S/N	Companies
1	Dangote Cement Plc
2	Ashaka Cement Plc
3	Lafarge WAPCO Plc
4	Cement Company of North, Nigeria Plc

Source: Nigeria Factbook 2014/2015

The population of Oil and Gas firms listed in Nigerian Stock Exchange (NSE) is fourteen in numbers. But nine were selected as sample size because of lack of consistent financial report of Amino International Plc, Capital Oil Plc, Navitus Energy Plc, Rak Unity Pet. Comp. Plc and Seplat Petroleum Development Company Plc within the year of study.

S/n	Companies
1	Beco Petroleum product plc
2	Conoil Plc
3	Eternal Plc
4	Forte Plc
5	Japaul oil and maritime Plc
6	Mobil Oil Nigeria Plc
7	MRS Oil Nigeria Plc
8	Oando Plc,
9	Total Nigeria Plc

 Table 2: The sample size for the Oil and Gas sector is tabulated below:

Source: Nigeria Factbook 2014/2015.

3.3 Method of data collection

The study used secondary data and data collection was based on a content analysis of corporate annual reports over a period of six years, from 2010 to 2015. The content analysis method was adopted because it is one of the most systematic, objective and quantitative method of data analysis technique employed in other prior research studies involving corporate environmental disclosures practices (Wiseman, 1982; Deegan & Gordon, 1996; Hackston and Milne, 1996).

The study has adopted the use of corporate annual reports of listed firms as our main source of data. This is due to the fact that annual reports are readily available and accessible. According to Gray, Kouhy, and Lavers (1995), annual reports should be used in determine environmental account because such information is produced regularly and will be in the public domain. The annual reports for the period 2010-2015 will be used due to increased interest and the high level of awareness and pressure from stakeholders within these periods. To achieve this objective the content analysis method of data analysis will be used in eliciting data from the annual report. This is due to the fact that the content analysis method is the most commonly used method of measuring corporate social environmental disclosure in annual reports (Milne and Adler, 1999). In addition, it allows corporate social environmental information to be systematically being classified and compared. However, this study attempts to examine green accounting mechanism in terms of themes and evidence, using Hackston and Milne's (1996) operational definitions and framework for green accounting measures index. Green accounting is measured in the categories of environment, energy, product, community, and employee health. Evidence is measured in the categories of monetary quantitative and non-monetary quantitative disclosures.

The green accounting mechanism index framework contained 28 attributes. Consequently, a firm could score a maximum of 28 points and a minimum of 0. The formula for calculating the reporting scores by using the green accounting mechanism index is expressed in a function form:

$$RS = \sum_{i=1}^{28} di$$

Where: RS = Reporting Score di = 1 if the item is reported; 0 if the item is not reported i = 1, 2, 3... 28

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Source: Researcher's computation, 2017

4.1b Regression coefficient for pollution prevention cost on firms' profitability

Model	В	Beta	T = test
Constant	4.031		T=.167, P=.882
Air pollution	.104		T=.074,p=.947
Water pollution	.572	081	T=.483, p=.677
Conservation of natural resources	.449	.381	T=.176, p=.876
		.178	

Note:  $r^2 = .34$ , f (3,2) = .087, p= .961

a. Predictors: (Constant), conservation of natural resources, air pollution, water pollution. *Source: Researcher's computation, 2017* 

Table 4.1c: Anova result for pollution prevention cost on firms' profitability See Appendix II

Mo	del	Sum of Squares	Df	Mean Square	F
	Regression	2.075	3	.692	.087
1	Residual	15.961	2	.7.981	
	Total	18.037	5		

a. Dependent Variable: Return on capital employed

b. Predictors: (Constant), Conservation of natural resources, Water pollution, Air pollution

# Source: Researcher's computation, 2017

Environmental pollution prevention cost explains 34 per cent of variation experienced in firms profitability, but the result is not significant f(3,2) = .0, P > 0.05.

# Decision

Based on the analysis above, the alternative hypothesis (HI) is rejected while the null hypothesis (H0) is accepted, which state that pollution prevention cost has no significant effect on firms' profitability.

# Hypothesis Two

Ho: Environmental protection cost does not have significant effect on firms' profitability

4.2a Summary of data collected for analysis on the effect of environmental protection cost on firms' profitability. See Appendix I

	2010	2011	2012	2013	2014	2015
return on capital employed	3.13	3.95	3.93	3.18	8.09	3.41
Energy saving measure	14.00	13.00	13.00	15.00	8.00	11.00
Global warming reduction	21.00	22.00	22.00	21.00	21.00	23.00
cost						

Source: Researcher's computation, 2017

4.2b Regression coefficient for environmental protection cost on firms' profitability

Model	В	Beta	T = test
Constant	34.799		T=4.635, P=.019
Energy saving measure Water pollution Global warming reduction measure	.702 1.009	.925 .333	T=.6.468,p=.007 T= 3.032, p=.056

Note:  $r^2 = .94$ , F(2,3) = .940, P = 0.01

a. Predictors: (Constant), Global warming reduction measure, Energy saving measure

Source: Researcher's computation, 2017

4.2c.Anova result for environmental protection cost on firms' profitability.

Mod	del	Sum of	Df	Mean	F
		Squares		Square	
	Regression	16.948	2	8.474	23.355
1	Residual	1.089	3	.363	
	Total	18.037	5		

Source: Researcher's computation, 2017

a) Dependent variable: Return on capital employed

b) Predictors: (Constant), Global warming reduction measure, Energy saving measure

Environmental pollution protection cost explains 94 per cent of variation experienced in firms' profitability, and this result is significant f(2,3) = .940, P < 0.05.

# Decision

Based on the analysis above the null hypothesis (H0) is rejected while alternative hypothesis (Hi) is accepted which states that environmental protection cost has significant effect in firm's profitability

# **Hypothesis Three**

Ho: Cost of resource recycling does not have significant effect on firms' profitability. 4.3a Summary of data collected for analysis on the effect of cost of resource recycling on firms' profitability.

	2010	2011	2012	2013	2014	2015
return on capital employed	3.13	3.95	3.93	3.18	8.09	3.41
Disposal of industrial waste	10.00	12.00	12.00	11.00	12.00	13.00
Recycling industrial waste	10.00	13.00	13.00	6.00	4.00	7.00

Source: Researcher's computation, 2017

**Table 4.3b**: Regression co-efficient for environmental recycling cost on firms' profitability. See

 Appendix 1

Model	В	Beta	T = test
Constant	1.451		T= .144, P=.894
Disposal of industrial waste	.434	.248	T=.517,,p=.641
Recycling industrial waste	.257	.509	T=.1.062, p=.366

Note:  $r^2 = 31$ , f (2,3) = .679, p= .571

a. Dependent variable: return on capital employed

Source: Researcher's computation, 2017

**Table 4.3c:** Anova result for environmental recycling cost on firms' profitability.See Appendix II

Mo	del	Sum of Squares	Df	Mean Square	F
	Regression	5.618	2	2.809	.679
1	Residual	12.419	3	4.140	
	Total	18.037	5		

Source: Researcher's computation, 2017

- a) Dependent variable: Return on capital employed
- b) Predictor (constant), Disposal of industrial waste, Recycling industrial waste

Environmental recycling cost explains 31 per cent of variation experienced in firms' profitability, and this result is significant f (2,3) = .679, P > 0.05.

# Decision

Based in the analysis above the alternative hypothesis (Hi) is accepted while the null hypothesis (H0) is rejected which states that cost of resources recycling has significant effect on firm's profitability.

# Hypothesis Four

Ho: Environmental restoration cost does not have significant effect on firms' profitability

4.4a Summary of data collected for analysis on the effect of environmental restoration cost on firms' profitability.

	2010	2011	2012	2013	2014	2015
Return on capital employed	3.13	3.95	3.93	3.18	8.09	3.41
Eliminating soil	10.00	12.00	16.00	15.00	18.00	21.00
contamination						
Eliminating water	17.00	16.00	18.00	18.00	15.00	17.00
contamination						

Source: Researcher's computation, 2017

**Table 4.4b:** Regression co-efficient for environmental restoration cost on firms' profitability. See Appendix 1

Model	В	Beta	T = test
Constant	23.230		T=2.524, P=.086
Eliminating soil contamination	.133	.275	T=.872,p=.447
Eliminating water contamination	1.246	.767	T=2.406, p=.095

Note:  $r^2 = .69$ , f(2,3) = 3.442, p = .167

a. Dependent variable: Return on capital employed *Source: Researcher's computation, 2017* 

Table	<b>4.4c:</b>	Anova	result	for	environmental	restoration	cost	on	firms'	profitability.	See
Appen	dix II										

Model		Sum of	Df	Mean	F
		Squares		Square	
	Regression	12.562	2	6.281	3.442
1	Residual	5.475	3	1.825	
	Total	18.037	5		

a) Dependent variable: Return on capital employed

b) Predictors (constant): eliminating soil contamination, eliminating water contamination

# Source: Researcher's computation, 2017

Environmental restoration cost explains 69 per cent of variation experienced in firms' profitability, and this result is significant f(2,3) = 3.442, P > 0.05.

# Decision

Based on the analysis above the null hypothesis (Ho) is rejected while the alternative hypothesis (Hi) is accepted which states that environmental restoration cost has significant effect on firm's profitability.

# **Hypothesis Five**

Ho: Corporate social responsibility cost does not have significant effect on firms' profitability 4.5a Summary of data collected for analysis on the effect of corporate social responsibility cost on firms' profitability.

	2010	2011	2012	2013	2014	2015
Return on capital employed	3.13	3.95	3.93	3.18	8.09	3.41
Health and safety	23.00	21.00	20.00	24.00	22.00	24.00
Social amenities	13.00	12.00	14.00	14.00	12.00	15.00

Source: Researcher's computation, 2017

**Table 4.5b:** Regression co-efficient for corporate social responsibility cost on firms' profitability See Appendix 1

Model	В	Beta	T = test
Constant	16.576		T=1.254, P=.299
Health and safety	.011	.010	T=.018,p=.987
Social amenities	.903	.576	T=.1.101, p=.351
			_

Note:  $r^2 = .33$ , f (23) = .762, p= .540

a. Dependent variable: Return on capital employed

Source: Researcher's computation, 2017

Model		Sum of Df Squares		Mean Square	F
	Regression	6.074	2	3.037	.762
1	Residual	11.963	3	3.988	
	Total	18.036	5		

a) Dependent variable: Return on capital employed

b) Predictors (constant) : Health and safety, Social amenities

# Source: Researcher's computation, 2017

Corporate social responsibility cost explains 33 per cent of variation experienced in firms' profitability and this result is not significant f(2,3) = .762, P > 0.05.

# Decision

Based on the analysis above the alternative hypothesis (Hi) is accepted while null hypothesis (H0) is rejected which states that corporate social responsibility cost has significant effect on firm's profitability

# Hypothesis Six

Ho: Research and development cost do not have significant effect on firms' profitability.

4.6a Summary of data collected for analysis on the effect of research and development cost and firms' profitability.

	2010	2011	2012	2013	2014	2015
	2010	2011	2012	2013	2011	2013
Return on capital employed	3.13	3.95	3.93	3.18	8.09	3.41
Environmental solution	16.00	15.00	15.00	15.00	16.00	17.00
business cost						
Environmental technology	16.00	16.00	17.00	15.00	14.00	16.00
design and development						
cost						

Source: Researcher's computation, 2017

Table 4.6b: Regression co-efficient for research and development cost on firms' profitability See Appendix 1

Model	В	Beta	T = test
Constant	25.559		T=1.782, P=.173
Environmental solution business cost	.069	.056	T=.137,p=.900
Environmental technology design and development	1.287	.700	T=1.704, p=.184
cost			

Note:  $r^2 = 49$ , f(2,3) = 1.461, p = .361

a. Dependent variable: Return on capital employed

Source: Researcher's computation, 2017

**Table 4.6c:** Anova result for research and development cost on firms' profitability.

See Appendix II

Model		Sum of Df		Mean	F
		Squares		Square	
	Regression	8.898	2	4.449	1.461
1	Residual	9.139	3	3.046	
	Total	18.037	5		

a) Dependent variable: Return on capital employed

b) Predictors (constant): Environmental solution business cost, Environmental technology design and development cost

#### Source: Researcher's computation, 2017

Research and development cost explains 49 per cent of variation experienced in firms' profitability and this result is not significant f (2, 3) = 1.461, P > 0.05.

### Decision

Based on the analysis above the alternative hypothesis (Hi) is accepted while null hypothesis (H0) is rejected which states that Research and development cost have significant effect on firm's profitability

## 4.3 Discussion of Findings

The results of this investigation are interpreted and discussed along the lines of the objectives of the study. The study found out that environmental pollution prevention cost has no significant effect on firms' profitability. This shows that environmental pollution prevention cost has significant effect on firms' profitability. This finding is in support of Thomas and Per-choi (2015) who wrote on pollution prevention, the role of environmental management and information. They found out that the source of economic benefits (through the demand side and supply side) that EMSS and pollution prevention activities provided from having a mitigating effect on stock market reactions to Toxics Release Inventory (TRI) and pollution prevention pays are valid. They also found that provision of information about the volume and toxicity of toxic release, pollution prevention activities and environmental management system (EMS) are effective in achieving reduction in waste generation using innovative methods. Based on this finding, they recommended that public policy effort should be made more cost effective if redirected to rewind actual outcomes of voluntary initiative rather than participation alone. Also, Robert (2016) in his attempt to define an economic model on pollution prevention found out that the polluting firms emission, which results from its use of a toxic impact and/or by switching to a non polluting process. In attempt to search for the profit in pollution prevention, James (2008) found a contradictory view though with a very limited sample that firms suffer from organization weakness that make them unable to appreciate the financial benefits of pollution investments. Despite the findings, it was

recommended that with an environmental policy reforms, pollution prevention innovation should be promoted. It reduces environmental violations (Abdoul, 2009).

This study found that environmental protection cost has significant effect on firms' profitability. This shows that environmental protection cost has significant effect on firms' profitability. Environmental pollution protection cost explains 94 percent of variation experienced in firms' profitability and this result is significant as we can see that f (2, 3) = 940 P> 0.05. These findings are in line with Noor (2004) findings. He studied the effect of corporate environmental performance on financial outcomes profits, revenues and costs in a transition economy. The study found out that better environmental performance improves profitability by driving down cost more than it deriving down revenues. Also, Noor, Frank, Krishna and Sazali (2015) studied the impact of corporate environmental performance on market risk. They found out using ordinary least squares regression with fixed effects that environmental performance is negatively associated with firm volatility and firm downside risk. Environmental management systems are a corporate paradox (Robert 2015) and can be major contributing factors to the isolating mechanisms that firms see such systems as costs and not opportunities. The benefit of EMS can never be over-emphasized and the result can be seen from endogenous and exogenous factors that impact a firm's awareness of those strategic benefits. Waste management is important to companies' profitability and that if a company manages its waste properly, reduction in waste can help the company to reduce its cost (John and Seetharaman, 2013). Proper disposal of waste, recycle and reuse have residual value. For this reason, its management policy to improve performance should be instituted. Many scholars studied in this direction and each came up with findings for example, Conrald (1999) studied resource and waste taxation in theory of the firm with recycling activities. Using dual cost function approach, the study found that resources and wastes taxation reduce the market volume, the number of firms, resource saving effort and also profit. By so doing, the study recommended that the materials should be used in effort to produce in a resource saving manner. Marginal and average cost of recycling system exceeds those of waste collection and disposal system (Robert et al, 2010). They should be functions of factor cost and programme attribute.

The study found that cost of resource recycling has significant effect on firms' profitability. This is an indication that environmental recycling cost affect firms' profitability. Resource recycling cost explains 31 percent of variation experienced in firms' profitability and this result is not significant f(2, 3) = .679, P> 0.05. This study is not in support of Grazinno and Fabrizio (2012) who studied business innovation and waste management sustainability; The case of door-to-door collection service. It was found that cost increases as a result of environmentally friendly programs while they decrease when recycling rate increases, possibly due to savings from the disposal side. Solid waste recycling has been found to be costly compared to land fill disposal (Lester et al, 2015). Recycling is a good policy only if environmental impacts and the resource used to collect, sort and recycle a material are less than the environmental impact and resources needed to provide equivalent virgin material plus the resources needed to dispose of the past consumer material safety. Waste is a valuable resource and recycling part of it cannot be optimal in the long-run. Optimal application of government subsidies on recycling of recyclable waste involves an increase in conversion efficiency, the price of secondary material and carbon taxes which leads to increase in recycling rates.

The study also found that environmental restoration cost has significant effect on firms' profitability. This is an indication that environmental restoration cost affects firms' profitability. Environmental restoration cost explains 69 percent of variation experience in firms' profitability and this result is not significant f (2, 3) = 3.442 P>0.05.

This finding is in line with Robert (2015) and Conrald (1999). The later used dual cost function approach and found out that resource and wastes taxation reduces the market volume, the number of firms, resource saving effort and also profit. He therefore recommended that virgin materials should be used in effort to produce in a resource saving manner. Not surprising, the Federal Republic of Nigeria enacted a law under section 20 that "the state shall protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria". With this law, NESREA act of 2007 became the major statutory regulation or instrument guiding environmental matters in Nigeria. This act provided for solid waste management and its administration and

prescribes sanction for offences or acts which run contrary to proper and adequate waste disposal procedures and practices. All the 36 states of the federation including the federal capital territory have joined in protecting their environments. Industries and facilities generating waste regulations are not left out in this environmental management.

The fifth finding was that corporate social responsibility cost has significant effect on firms' profitability. This is to say that corporate social responsibility cost affects firms' profitability. Corporate social responsibility cost explains 33 percent of variation experienced in firms' profitability and this result is significant f(2, 3) = .762, P>0.05. This finding is in support of Munaza, Farida, Shaguftan and Shahid (2014). The main purpose of this study was to establish a relationship between corporate social responsibility and financial performance. They found out that there is a considerable positive relationship between the corporate social responsibility and financial performance of the firm. Also, the study of Muhammad (2013) supports this finding. He investigates the impact of the corporate social responsibility on the firms' performance through the influence of employee performance and increased customers' satisfaction using questionnaire. The study found out that corporate social responsibility impacts positively on the firms' performance. In another study in South Africa, Sukanya, Rebeka and Yadhivir (2015) studied on the impact of corporate social responsibility on firms financial performance. Their intention was to ascertain if corporate social responsibility (CSR) activities are beyond a firms legal obligations and potentially require a sacrifice in short-term profit and why do firms promote CRS. The study found that corporate social responsibility activities lead to no significant difference on financial performance. The study is also in line with Joe and Kechi (2013) who wrote on the implication of corporate social responsibility for the performance of Nigeria firms. The study found that waste management and pollution abetment are both significantly, positively associated with firms' performance, while social action and fines and penalties are strong but negatively related. They recommended that firms should invest actively in proper waste management and pollution abetment while social action should be approached with caution. Barine (2015) supports the finding. Using ordinary least square (OLS equation

on 13 listed firms in Nigeria found that there exists a significant position relationship between corporate social responsibility cost and corporate profit.

Finally, the study found that research and development cost have significant effect on firms' profitability. This shows that research and development cost affects firms' profitability. Research and development cost explains 49 percent of variation experienced in firms' profitability and this result is significant f(2, 3) = 1.461, P>0.05. This finding is in line with Abdellah, Mohsen and Asghar (2013). These researchers wrote on the effect of research and development costs on the profitability of pharmaceutical companies. Using linear regression, it was found that there existed significant relationship between research and development cost and the profitability of pharmaceutical companies. The finding supports the findings of Boye and Hans (2008) who wrote on the impact of firms' research and development strategy on profit and productivity. The intention was to investigate how research and development strategy can influence the firms' performance in terms of productivity and profitability. The study found among other things that in quartile regression, the positive effect from research and development persistency is lacking for low productivity firms (lowest quartile) indicating a non-linear response. It is clear that the findings of this research study are in support of the previous research studies. Where they are not in support, reasons were presented as different problems yield different solutions.

#### **CHAPTER FIVE**

# SUMMARY OF THE FINDINGS, CONCLUSION, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDIES

In this chapter, the researcher presents summary of the findings, conclusion, recommendations and suggestions for further studies.

### 5.1 Summary of the Findings:

The following are the summaries of the findings:

- 1. Environmental pollution prevention cost has no significant effect on firm's profitability
- 2. Environmental protection has significant effect on firms' profitability
- 3. Resource Recycling cost has significant effects on firms' profitability.
- 4. Environmental restoration cost has significant effect of firm's profitability
- 5. Corporate social responsibility cost has significant effect on firms' profitability.
- 6. Research and development cost has significant effect on firms' profitability.

#### 5.2 Conclusion

This research study titled "effect of green accounting characteristics on Profit performance of selected firms in Nigeria" is aimed at determining the effects of green accounting characteristics on profit performance of oil and gas firms and cement industries in Nigeria. Green accounting characteristics include pollution prevention cost, environmental protection cost, resource recycling cost, environmental restoration cost, corporate social responsibility cost, and research and development cost. The effect of each of these characteristics was determined on firms' profitability. Six research questions and six hypotheses were formulated to guide the study. Relevant literatures

were reviewed to sharpen the researcher's focus on the study. Oil and gas firms and cement manufacturing firms quoted on Nigeria Stock Exchange (NSE) market for the period of 2010 and 2015 were selected. The choice for these firms was based on the nature of their production, nature of disposal of wastages, environmental pollution and environmental conservation. The study would help corporate stakeholders, companies and production managers to be motivated in identifying ways of reducing or avoiding these costs while at the same time improve environmental quality.

Data collection was based on content analysis of corporate annual reports over a period of six (6) years (ie 2010-2015) the sample size consisted of four (4) cement industries and nine (9) oil and gas sector. Hypotheses were tested using multiple linear regression and analysis of variance (ANOVA), with the aid of SPSS 20.0 software. The hypotheses were tested at 0.05 level of significance.

The study concludes that green accounting characteristics has significant effect on firms' profitability.

## 5.3 Recommendations.

Based on the finding of this study, the researcher recommends as follows:

- 1. That firms should make policies that will prevent environmental pollution
- 2 That firm should reduce their spending on environmental protection or make it cost effective in other to increase firms' profitability
- 3. That environmental resource recycling cost should be decreased for better environmental protection and also increase profitability.
- 4. That implementation of greener technique i.e environmental restoration enhanced markup to protect the environment and increased firms' profitability.
- 5. That firms are encouraged to decrease their corporate social responsibility cost in order to increase firms' profitability.
- 6. That firms should improve on research and development cost in order to widen their scope and innovation despite all odds.

## 5.4 Contribution to knowledge

This dissertation has contributed to knowledge in so many ways:

Firstly, this work tends to be the first attempt by any researcher to exclusively determine the effect of Green Accounting Characteristics on firms' profitability.

Secondly, the result of this study have provided strong empirical validation that green accounting characteristics significantly affect the profitability of cement and oil and gas firms in Nigeria.

Thirdly, this study exclusively determined the effect of six different characteristics of Green Accounting on both cement and oil and gas firms, while prior research studies have either studied one or two of the characteristics in relation to one of the firms.

## 5.5 Implication of the Finding:

The findings of this study imply:

- i. That environmental pollution prevention cost has no significant effect on firms profitability. This implies that environmental pollution prevention-cost does not affect firms profitability.
- That environmental protection cost has significant effect on firms' profitability. This finding implies that environmental protection cost has significant effect on firms' profitability.
- iii. That environmental recycling cost has significant effect on firms' profitability. This implies that environmental recycling cost affects firms' profitability.
- iv. That environmental restoration cost has significant effect on firms' profitability. This implies that environmental restoration cost significantly affect firms' profitability.
- v. That corporate social responsibility cost has significantly effect on firms' profitability. This is an indication that corporate social responsibility cost has significant effect on firms' profitability.
- vi. That research and development cost have significant effect on firms' profitability. This shows that research and development cost have significant effect on firms' profitability.

## 5.5 Suggestions for Further Studies:

The researcher hereby suggests the followings:

- i. The sample size and period of study should be increased to allow for more sophisticated findings.
- ii. Research of this nature requires scholarly research grants which will enable researcher to handle more variables, more sample and period of study.
- iii. Enough time should be allowed to the study of this nature so as to give better and more comprehensive findings.
- iv. Firms should disclose their environmental activities in their financial report annually so that the public can have access to them and for academic purposes.
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# **APPENDIX 1A**

## Dangote Cement Plc Content analysis of environmental cost.

Year 2010

## Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
	control.					
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	4	3	5	4

#### Dangote Cement Plc Content analysis of environmental cost. Twenty eight testable environmental disclo

Year 2011

# Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration c	Recycling	R& D	CSR
	control.					
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	0 Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	4	4	3	5	5

# Dangote Cement Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	5	3	5	5

## Dangote Cement Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties.
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	4	3	5	5

## Dangote Cement Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration c	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	3	5	1	4	5

## Dangote Cement Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	3	5	1	4	5

## Ashaka Cement Plc Content analysis of environmental cost. Year 2010 Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	4	3	5	5

#### Ashaka Cement Plc

## Content analysis of environmental cost.

#### Year 2011

## Twenty eight testable environmental disclosure items study

	Pollution control	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	4	3	5	5

## Ashaka Cement Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	5	3	5	5

## Ashaka Cement Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	4	1	5	5

#### Ashaka Cement Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	3	5	2	4	5

## Ashaka Cement Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	5	2	4	5

## Lafarge WAPCO Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	4	3	5	5

## Lafarge WAPCO Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	4	4	3	5	5

## Lafarge WAPCO Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env Protection	Restoration	Recycling	R& D	CSR
	control.	Env.i rotection	Restoration	Recyching	KG D	CSK
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	5	3	5	5

Year 2013

#### Lafarge WAPCO Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

score

#### **Env.Protection** Restoration R& D CSR Pollution Recycling control. 1 Environmental Conservation of Recycling Environmental Received awards Air emission energy in the plant of waste Information Policies education or Penalties. product conduct of 1 1 1 business 1 0 Operations 0 2 Water pollution Firms Discussion of Waste energy Investment in research Reducing or information policies the company's management on renewal technology eliminating efforts to reduce hazards in the 1 1 energy 1 1 work environment Consumption 1 Health and Safety 3 Installation of Disclosing energy Reduction in Recycling Research on new Effluent Arrangements Savings consumption of Technology method treatment plant 1 finite 0 of production 1 natural 1 1 resources 1 4 Conservation of Reduction in Internal Providing information Establishment of Natural resources Energy environmental for Educational Consumption audits Conducting Institution 1 safety the research on 1 1 company's products 5 Environmental Minimising standards on Environmental research Provision of social Performance exposure of our amenities to host environmental 1 Indicators employees and the management in communities communities line with 1. we work in to 1 International environmental, Organisation for health and safety Standardisation risks (ISO) guideline on 1 environmental management system. 1 1 5 5 4 5 5 Total

## Lafarge WAPCO Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	5	2	4	5

## Lafarge WAPCO Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	3	5	2	4	5

## Cement Company of North, Nigeria Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	4	3	5	5

## Cement Company of North, Nigeria Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	4	4	3	5	5

## Cement Company of North, Nigeria Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 1	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	5	3	5	5

## Cement Company of North, Nigeria Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	4	2	5	5

## Cement Company of North, Nigeria Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	3	5	1	4	4

## Cement Company of North, Nigeria Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 1
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	5	5	5	2	4	5
## Beco Petroleum product plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 0	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1.
Total score	3	1	2	1	2	3

## Beco Petroleum product plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 0	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1.
Total score	3	1	2	1	2	3

## Beco Petroleum product plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 0
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0.
Total score	2	2	3	1	2	1

## Beco Petroleum product plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 0	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1.
Total score	3	1	3	1	2	3

## Beco Petroleum product plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 0	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1.
Total score	3	1	2	1	2	3

## Beco Petroleum product plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 1	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 0	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1.
Total score	3	1	2	1	2	3

## Conoil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 0	Environmental Policies 0	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 0	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0
Total score	2	1	1	2	2	2

## Conoil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations	Recycling plant of waste product 0	Environmental education 0	Received awards or Penalties.
2	Water pollution information 0	Firms energy policies 0	0 Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 0
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution O
5	Environmental Performance Indicators 0	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1.
Total score	1	2	2	1	1	2

## Conoil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 0	Environmental Policies 0	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 0	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0
Total score	2	1	1	2	2	2

## Conoil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 0	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0
Total score	2	2	1	2	2	2

#### Conoil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 0	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0
Total score	3	2	2	2	2	2

## Conoil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration c	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 1	Recycling plant of waste product 0	Environmental education 0	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0
Total score	2	2	3	1	2	2

## Eternal Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 1	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 0	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1.
Total score	3	3	2	1	2	3

## Eternal Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 0	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 1	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	4	4	1	2	2	3

## Eternal Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 0
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	4	3	1	2	3	2

## Eternal Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 0	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	3	3	2	2	2	3

## Eternal Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
	control.					
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	3	2	2	1	3	3

## Eternal Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 1	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	4	3	2	2	3	3

## Forte Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 0	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1.
Total score	2	2	1	1	3	3

## Forte Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 0	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0
Total score	2	2	2	2	2	2

### Forte Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 0	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1.
Total score	2	2	1	1	2	3

### Forte Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 0	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1.
Total score	2	2	3	1	2	3

### Forte Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0
Total score	3	2	1	2	2	2

### Forte Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	4	3	1	2	3	3

### Mobil Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0
Total score	3	2	1	2	2	2

### Mobil Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 0
Total score	3	2	2	2	4	2

## Mobil Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 1	Environmental Policies	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1
Total score	4	1	1	2	4	3

## Mobil Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
	control.					
1	Air emission Information 0	Environmental Policies O	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	2	1	2	2	3	3

## Mobil Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	4	2	3	1	2	4

### Mobil Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1
Total score	4	2	3	2	3	4

## MRS Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 0	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	2	2	1	1	3	3

## MRS Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 0	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 0
Total score	2	2	1	1	2	2

## MRS Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 0	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 0
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 0	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1
Total score	3	1	2	1	3	2

## MRS Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	<b>control.</b> Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 0	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 0	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1
Total score	1	3	2	1	3	3

## MRS Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	control. Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	3	3	1	1	2	3

## MRS Oil Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 1	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution 0
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1
Total score	3	2	2	1	4	4
### Oando Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	3	3	1	1	3	3

### Oando Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	3	3	1	2	3	4

### Oando Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties.
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1
Total score	4	2	3	2	4	4

### Oando Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties.
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 1	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	3	3	2	2	3	4

### Oando Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 1	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	4	2	3	1	3	4

### Oando Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 1	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 1		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 4	Provision of social amenities to host communities 1
Total score	4	2	3	2	4	4

### Total Oil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 0	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 0	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 0
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	2	1	2	1	2	3

### Total Oil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 0	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 0	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 0	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 0
4	Conservation of Natural resources 0	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	2	2	1	2	3	3

### Total Oil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 0
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 0
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	3	2	2	2	3	2

### Total Oil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 0	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 0	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 1	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 0	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	2	1	2	2	3	4

### Total Oil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings O	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 1	Provision of social amenities to host communities 1
Total score	3	3	2	1	4	4

### Total Oil Plc Content analysis of environmental cost. Twenty eight testable environmental disclosure items study

	Pollution control.	Env.Protection	Restoration	Recycling	R& D	CSR
1	Air emission Information 0	Environmental Policies 1	Conservation of energy in the conduct of business Operations 0	Recycling plant of waste product 0	Environmental education 1	Received awards or Penalties. 1
2	Water pollution information 1	Firms energy policies 0	Discussion of the company's efforts to reduce energy Consumption 1	Waste management 1	Investment in research on renewal technology 0	Reducing or eliminating hazards in the work environment 1.
3	Installation of Effluent treatment plant 1	Disclosing energy Savings 0	Reduction in consumption of finite natural resources 0	Recycling Technology 0	Research on new method of production 0	Health and Safety Arrangements 1
4	Conservation of Natural resources 0	Reduction in Energy Consumption 1	Internal environmental audits 0		Providing information for Conducting safety research on the company's products 1	Establishment of Educational Institution O
5	Environmental Performance Indicators 1	Minimising exposure of our employees and the communities we work in to environmental, health and safety risks 1	standards on environmental management in line with International Organisation for Standardisation (ISO) guideline on environmental management system. 1		Environmental research 0	Provision of social amenities to host communities 1
Total score	3	3	2	1	3	4

# APPENDIX II

#### TOTAL OIL

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	5,436,638	3,813,202	1,210,904	1,145,825	5,290,458	4,047,051
	8,929,188	10,026,215	12,447,738	11,301,914	15,930,170	16,242,481
	= 0.608	= 0.380	= 0.097	= 0.101	= 0.332	= 0.249

#### MOBIL OIL

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	3,885,610	3,754,676	3,617,730	3,480,785	6,392,790	4,872,929
	5,958,683	6,828,597	8,183,114	9,537,631	13,549,480	15,363,401
	= 0. 652	= 0. 549	= 0. 442	= 0. 364	= 0. 471	= 0. 317

### OANDO OIL

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	14,374,966	3,446,643	10,786,317	1,396,926	183,893,186	49,689,877
	94,089,750	3,666,730	10,424,491	1,414,462	33,035,055	36,851,707
	= 0.152	= 0.939	= 1.034	= 0.987	= 5.566	= 1.348

# FORTE OIL

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	1,776,471	4,208,382	938,842	4,896,234	4,456,617	5,794,055
	9,854,111	25,378,780	7,582,842	13,043,317	12,438,120	14,471,119
	= 0.180	= 0.165	= 0.123	= 0.375	= 0.358	= 0.400

#### **BECO PETROLEUM**

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	316,448	260,917,315	1,637,792,969	142,308,650	344,130,072	243,219,361
	2,935,614	652,949,636	1,302,963,657	1160655007	816,524,935	988,589,971
	= 0.107	= 0.399	= 1.256	= 0. 122	= 0. 421	= 0.246

# **APPENDIX II CONTINUE**

### CONOIL

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	2,789,977	2,997,314	487,220	3,070,091	834,421	2,307,558
	15,260,152	16,681,194	15,661,295	18,037,434	16,096,047	17,709,653
	= 0.182	= 0.179	= 0.031	= 0.170	= 0.051	= 0.130

#### MRS OIL

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	1,847,327	615,624	205,121	634,418	746,404	935,625
	18,528,746	18,988,685	19,054,010	19,629,147	20,218,121	20,977,324
	= 0.099	= 0.032	= 0.010	= 0.032	= 0.036	= 0.044

#### ETERNAL OIL

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	722,737	1,211,156	950,160	703,196	1,289,565	1,278,073
	5,834,979	4,623,820	6,397,011	7,110,587	8,420,042	9,884,173
	= 0.123	= 0.261	= 0.148	= 0.098	= 0.153	= 0.129

#### DANGOTE CEMENT

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	105,322,429	125,478,962	146,016,119	210,262,754	185,814,123	213,171
	211,509,215	297,053,675	412,141,104	571,562,826	638,543,114	748,479
	= 0.497	= 0.422	= 0.354	= 0.367	= 0.290	= 0.284

### ASHAKA CEMENT

	2010	2011	2012	2013	2014	2015
	=N='000	=N='000	=N='000	=N='000	=N='000	=N='000
ROCE	3,004,694	2,614,338	3,124,848	2,824,311	4,566,667	2,764,527
	16,146,282	18,088,784	49,514,245	47,162,040	51,261,632	53,015,238
	= 0.186	= 0.144	= 0.063	= 0.059	= 0. 089	= 0.052

# **APPENDIX II CONTINUE**

#### LAFARGE CEMENT

	2010 =N='000	2011 =N='000	2012 =N='000	2013 =N='000	2014 =N='000	2015 =N='000
ROCE	4,881,363	8,654,720	14,611,259	28,022,200	28,360,146	29,657,773
	48,306,431	56,109,454	68,274,284	92,641,665	276,664,338	302,601,869
	= 0.101	= 0.154	= 0.214	= 0.302	= 0.102	= 0.098

#### CEMENT COMPANY OF NORTHERN NIGERIA

	2010	2011	2012	2013	2014	2015
	=N='000	=N=	=N=	=N=	=N=	=N=
ROCE	1750288726	23,04516057	1,196,061,395	1661181013	2040713854	1138947049
	7321154195	7003598421	7638709969	8284619000	9445658415	10144768246
	= 0.239	= 0.329	=0.156	= 0.200	= 0.216	= 0.112