

JUSTIFICATION OF ENVIRONMENTAL ACCOUNTING REPORT IN PRODUCT AND PROCESS DESIGN OF MANUFACTURING COMPANIES

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ABSTRACT

This paper argues for the necessity of environmental accounting report of companies' products and processes; and the need to ensure that companies' product and process design are considered with a view to reducing environmental cost. The paper undertook an extensive review of literature to unravel the positions, arguments and reports of prior studies; and determined that companies operations have negative impact on the environment, hence, argues in favour of environmental cost accounting of firms' operations. The paper argues that proper environmental accounting report have the capacity to reduce environmental cost of from the acquisition of raw materials, production and disposal at end-of-life. Therefore, this paper concludes that environmental cost accounting is a sine qua non to companies' performance; and recommends that companies must take cognizance of environmental accounting report in their product and process designs so as to reduce the cost of their operations on the environment and also improve their performance.

Keywords: Environmental accounting, environmental accounting report, product life cycle and environmental policy

INTRODUCTION

Due to a growing concern related to resource consumption and the generation of post-consumption waste, environmental legislations are increasingly changing focus from end-of-pipe approaches, with focus on the manufacturing processes, to a life cycle perspective with focus on developed products. The life cycle perspective focuses on minimizing environmental impacts across the entire products' life cycle, from raw material extraction and manufacturing to use and disposal at end-of-life (Daniela et al., 2016). Smith and Wright (2004) report that product quality refers to the extent to which products meet the customers' expectations, and argues that product quality improvement should lead to customer satisfaction and higher sales. Product quality typically takes product design and customer requirements as well as the environmental attributes of products into consideration. Hence, this study seek to review the justification of

environmental accounting report on product process and product design with regards to reducing environmental cost of consumer's post end products. The objectives of the study are to:

- a) Provide a brief historical overview of the development of environmental accounting report and need for environmental accounting report;
- b) Examine justification of environment accounting report in line with product process and design; and
- c) Discuss environmental accounting report with respect to reducing environmental cost of disposal of end product liabilities on product process and product design

CONCEPT OF ENVIRONMENTAL ACCOUNTING

The term environmental accounting has many meanings and uses. It can support national income accounting, financial accounting or internal business managerial accounting. At all times, it is important in decision making to provide accurate costs formation. The consciousness and need to protect the environment will make for environmental costs to be identified, accurately measured and reported. Besides, certain environmental costs have previously been reported conventionally along with companies' overheads before allocation to products or processes. Sometimes they have been totally left out of financial reporting because they constitute external social costs which did not form part of bottom line financial reporting. Adverse effect on the society known as environmental social costs, or externality costs is a critical issue for consideration.

Hansen and Mowen (2000) define environmental costs as "costs associated with the creation, detection, remediation and prevention of environmental degradation." The US EPA (1995) defined environmental accounting as "identifying and measuring the costs of environmental materials and activities and using this information for environmental management decisions." The purpose is to recognize and seek to mitigate negative environmental effects of activities and systems. Howes (2002) defines environmental accounting as "the generation, analysis and use of monetized environmentally related information in order to improve corporate environmental and economic performance. In this respect, environmental accounting does not only focus on internal and external environmental costs, but also links environmental and financial performance more visibly (Howes, 2002). Environmental accounting assists in getting environmental sustainability embedded within an organization's culture and operations. The aim is to provide decision makers with information that enable the organization reduce costs and business risks and to add value.

The awareness of the environment and man's ability to cause damage to it could be traced back to the 19th century (Asuquo, 2012). This concern had been repeatedly expressed in series of international summits and consensus right since the 1960s. The starting point of this concern is ascribed to the organized thought and celebrated public action of the club of Rome entitled "Limits to Growth" that initiated a worldwide debate of economic growth at the expense of the natural environment (Shil & Iqbal, 2005). The world conference held in Stockholm on global environment in June 1972, where heads of the states all over the world came together for the first time, was the pivotal event in the growth of global environment movement (Asuquo, 2012).

Nagle (1994) reveals that corporate managers are placing high priority on environmental accounting; and that environmental accounting has become a prevalent subject in the international community. Field and Field (2002) explain pertinent aspect of environmental degradation and costs as those including emission into air, water, and land. Also aspect of

untreated domestic waste outflows into rivers and coastal ocean, quantities of solid waste that must then be disposed of, perhaps through land spreading or incineration. Pollution include airborne Sulfur dioxide (SO₂) emission from power plants by stack-gas scrubbing which leaves a highly concentrated sludge and degradation which incorporates midnight dumping, and illegal dumping in remote areas.

Field (2001) evaluated the economics of natural resources and in this instance explored the approach of benefit-cost analysis through discounting of future based input and output values of environmental projects and activities. Measuring benefit-cost analysis has been essentially through regulatory Evaluation Impact Assessment (EIA) study on the environment. Enaharo (2009) in his investigation with the federal ministry of environment, EIA study conducted by the oil and gas (exploration and producing), manufacturing, and other companies having activities that impact on the environment has been accepted as a regulatory requirement in Nigeria. Achieving effective EIA is however fraught with uncertainties in Nigeria since the objective estimation of input and output values is not so reliable. Besides, there is excessive fluctuation in the discount factor for purpose of benefit-cost analysis. Non-available market values for certain natural resources costs and benefits such as the fauna, fishing pods or rivers, among others, makes it extremely difficult to place monetary value on the factors of measurement.

Environmental costs are one of the many different types of costs businesses incur as they provide goods and services to customers. Environmental costs and performance deserve management attention for the following reasons:

- a) 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 processes/products. Many environmental costs (e.g. wasted raw materials) may provide no added value to a process, system, or product.
- b) Environmental costs may be obscured in overhead accounts or otherwise overlooked.
- c) Firms have discovered that environmental costs can be offset by generating revenues through sale of wastes and by-products or transferable pollution allowances or licensing of clean technologies.
- d) Management of environmental costs can result in improved environmental performance and significant benefits to human health as well as business success.
- e) Understanding environmental costs and performance of processes and products can promote more accurate costing and pricing of products and aid companies in the design of more environmentally friendly processes and products for the future.
- f) Competitive advantage can result from processes and products that can be demonstrated to be environmentally friendly.

ENVIRONMENTAL ACCOUNTING REPORT

Environmental Protection Agencies' (EPAs) work with key stakeholders leads it to the belief that, as businesses more fully account for environmental costs and benefits, they will clearly see the financial advantages of pollution prevention practices. Environmental costs often can be reduced or avoided through pollution prevention practices such as product design changes, input materials substitution, process redesign, and improved operation and maintenance practices.

Within the domain of environmental accounting reporting, several studies have been done in both developed and developing countries, each with its focus on a particular industry. Some of these studies include the study of Jerry et al. (2014) which focused on “environmental accounting disclosure practice of Nigerian quoted firms.” The study analyzed environmental accounting disclosures practices of Nigerian quoted firms, to see how it varies from one company to another since there are no mandatory disclosure guidelines. A sample of 8 quoted companies was selected from consumer goods companies listed on the Nigerian Stock Exchange. Content analysis was used to obtain data from published annual reports of 2013 of the selected firms; while the data obtained, were analyzed using one way analysis of variance to test the hypothesis. It was discovered that the non-existence of standard leads to lack of uniformity in disclosure and variations among companies.

Arong et al. (2014) in their examined environmental cost management and profitability of oil sector firms in Nigeria. The aim of the study was to ascertain the effects of environmental cost management on the profitability of oil sector in Nigeria from 2004 to 2013. Data were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin; and was analyzed using multiple regression technique. The result revealed the existence of a significant relationship between environmental cost management and profitability of oil sector firms in Nigeria. It was also discovered that there are established standards in Nigeria guiding environmental cost management in the oil & gas sector. However, there is a lacuna in external reporting of environmental cost data in Nigeria.

In another study, Onyali et al. (2014) assessed environmental information disclosure practices of selected Nigerian manufacturing companies. The study focused on assessing the extent, nature and quality of environmental information disclosure practices by manufacturing firms in Nigeria. Content analysis was adopted in analyzing the annual report of the selected firms with regards to their environmental disclosure practices. In addition, a survey was carried out in order to ascertain whether the environmental disclosure practice of firms in Nigeria has improved. The findings of the study indicated that environmental disclosure practices of firms in Nigeria is still ad hoc and contains little or no quantifiable data.

In a similar study, Makori and Jagongo (2013) examined environmental accounting and firm profitability. The study collected data from annual reports and accounts of 14 randomly selected quoted companies in Bombay Stock Exchange in India. The data were analyzed using multiple regression models. The key findings of the study shows that there is significant negative relationship between environmental accounting and return on capital employed (ROCE) and Earnings per Share (EPS) and a significant positive relationship between environmental accounting and net profit margin and dividend per share. In the study of Bassey et al. (2013) on the impact of environmental accounting and reporting on organizational performance of selected oil and gas companies in Niger Delta Region of Nigeria, it was found that environmental costs have a significant relationship with firm’s profitability; and that environmentally friendly firms will significantly disclose environmental related information in financial statements and reports.

Okafor et al. (2013) conducted a study on environmental cost accounting and cost allocation of selected manufacturing companies in Nigeria. The study sought to determine the extent to which Nigerian firms embrace environmental cost accounting in cost allocation. The study relied on a survey of 105 Accountants from twenty-five (25) quoted manufacturing companies; and found that majority of firms have not embraced environmental cost accounting. They still lump all

indirect costs under overhead. It was also found that significant differences exist among firms on the method of allocating environmental costs to products/processes.

ENVIRONMENTAL COST DISCLOSURE

Corporate organizations are engaging more actively in environmental disclosure in their annual financial statements. This is peculiar with more financially successful companies in both the U.S.A and the U.K. In the United State of America, SEC regulations and accounting standards requires American companies to disclose environmental information in annual reports. Disclosure entails the release of information relating to a company's past, current and future environmental activities, performance and financial implications. It also comprises information about the implications resulting from corporate environmental management decisions and actions. These may include issues such as expenditures on operating costs for pollution control equipment and facilities present or potential litigation, air, water or solid waste releases; description of pollution control processes or facilities. Soona (2006) observes that the main environmental issues in financial reporting are summarized as:

- a) Environment costs, whether to expenses or capitalize.
- b) Classification of environmental costs
- c) Treatment of environmental related financial impacts on assets
- d) Treatment of liabilities and contingent liabilities and how to recognize these.
- e) Disclosure conditions and or / breakdown about environmental costs.
- f) Measurement of liabilities and contingent liabilities.
- g) Environmental reserves, provision and charges to income
- h) Impact of accounting rules (GAAP) on corporate behaviour.
- i) Environmental information to be disclose in greater details.

Generally, the cost centres frequently covered in environmental cost accounting include product lifecycle cost, lifecycle cost assessment, private costs, social costs, cost allocation and capital budgeting. Product lifecycle cost is a holistic view to identifying environmental consequences of a product, process, or activity through its entire life cycle and to identifying opportunities for achieving environmental improvements. US EPA (1990) specified four major stages in the life cycle of a product, process, or activity as raw materials acquisition, manufacturing, consumer use/reuse/maintenance and life cycle/waste management. By itself, life cycle assessment focuses on environmental impact and not costs.

Life cycle cost assessment is a term that highlights the costing aspect of life cycle assessment. It is regarded as a systematic process for evaluating the life cycle costs of a product, process, system, or facility by identifying environmental consequences and assigning measures of monetary value to those consequences. Private costs involve costs for which a business is held responsible. They are the costs incurred by a business which directly affect the business bottom line. These are also referred to as internal costs. Social costs are also known as external costs. They are costs impacted on the environment which results from company's production activities. These costs do not directly affect companies' bottom line. Societal costs are also known as external costs or externalities. Costs allocation refers to accounting procedures and systems for identifying, measuring and assigning costs for internal management purposes; while capital budgeting which is also known as investment analysis is the process of determining a company's planned capital investments.

The different environmental impacts of business activities have given birth to different administrative approaches to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants. Firms on their have responded by instituting various initiatives including (1) *process/product design* which refers to the process of developing specifications for products or processes while taking environmental costs and performance into consideration; (2) *upfront costs* which include pre-acquisition or pre-production costs incurred for processes, products, systems or facilities e.g. R & D costs; (3) *voluntary costs* which represents costs incurred which are not required or necessary for compliance with environmental laws. These go beyond compliance. Others are (4) *gray zone costs* which refer to costs that are not clearly or wholly environmental in nature but may be health and safety costs, risk management costs, production costs, operations costs etc.; (5) *renewable natural resources* which are products of non-geological and short-term resource cycles. They are renewable because they are continuously reproduced if the ecosystem remains viable; and (6) *non-renewable natural resources* which are natural products of much longer resource cycles. This natural resources are used up once in a geological time.

ENVIRONMENTAL POLICY

McCormick (2001) defines environmental policy as a commitment to the laws, regulations, and other policy mechanisms concerning environmental issues and sustainability; and explains that environmental policies can be deliberately taken to direct and oversee human activities and thereby prevents harmful effects on the environment surrounding us including biophysical environment and natural resources which make sure that changes in the environment do not have harmful effects on humans. Environmental policy is also a “course of action or principle adopted or proposed by a government, party, business or individuals to protect the environment. Environmental policies focus on problems arising from human impact on the environment; and which in turn, have negative impact on human health. The issues of environment generally addressed by environmental policy is vast area including but not limited to air and water pollution, waste management, ecosystem management, biodiversity protection, the protection of natural resources, wildlife and endangered species, and the preservation of these natural resources for future generations.

According to Knill and Liefferink (2012), the first environmental action program was adopted by national government representatives in July 1973 during the first meeting of the Council of Environmental Ministers in the European Union. After that council meeting an increasingly dense network of legislation has developed, which now extends to all areas of environmental protection including air pollution control, water protection and waste policy but also nature conservation and the control of chemicals, biotechnology and other industrial risks. Today, environmental issues are given so importance that EU environmental policy has become a core area of European politics. Organizations are becoming more aware of their environmental risks and performance requirements. The ISO-14001 standard has set up environmental policies suitable for individual organizations and outlines environmental objective and performance of organization (Jordan et al., 2003).

There are different types of environmental policy instruments used by governments to implement environmental policies. These include:

- a) Economic Incentives and Market-based Instruments:

- b) Voluntary Agreements
- c) Regulatory Instruments
- d) Mixed Instruments
- e) International Framework

NIGERIA'S ENVIRONMENTAL POLICY

Environmental policy in Nigeria is contained in the 1999 Constitution of the Federal Republic of Nigeria. Pursuant to section 20 of the Constitution, the State is empowered to protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria. In addition to this, section 2 of the Environmental Impact Assessment Act of 1992 (EIA Act) provides that the public or private sector of the economy shall not undertake or embark on or authorize projects or activities without prior consideration of the effect on the environment. In this regard, the Federal Government of Nigeria has promulgated various laws and regulations to safeguard the environment. The National Environmental Standards Regulation Agency (NESREA) Act 2007, pursuant to the Federal Environmental Protection Agency Act, provides for the National Environmental Protection (Effluent Limitation) Regulations:

- a) National Environmental Protection (pollution abatement in industries and facilities generating wastes) Regulations; and
- b) National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations.

NESREA has the responsibility to protect and develop the environment's, biodiversity conservation and sustainable development of Nigeria's natural resources, environmental technology, including coordination and liaison with relevant stake holders within and outside Nigeria on matters of enforcement of environmental standards, regulations, rules, laws, policies and guidelines. The NESREA Act allows each State and Local Government in the country to set up its own agency for the protection and improvement of the environment within the State. Each State is also empowered to make laws to protect the environment within its jurisdiction.

Other regulatory agencies with oversight functions and responsibility over specific industries also issue guidelines to regulate the impact of such industries on the environment such as the Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN) 2002, published by the Department of Petroleum Resources (DPR).

Other measures taken by the government of Nigeria to protect the environment includes:

- a) Environmental Impact Assessment Act of 1992 (EIA Act).
- b) Harmful Wastes (Special Criminal Provisions etc.) Act of 1988 (Harmful Wastes Act).

CONCLUSION AND RECOMMENDATIONS

It is evident that no company can operate successfully without taking cognizance of the environment. This is because every product or process comes at a cost to the environment. Environmental accounting report serves as measurement for environmental cost on product life cycle of both assets and liabilities which needs to be integrated in product and processes of business organizations. Therefore, this paper concludes that environmental cost accounting is a sine qua non to companies' performance; and recommends that companies must take cognizance

of environmental accounting report in their product and process designs so as to reduce the cost of their operations on the environment and also improve their performance.

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