Application of Triple Bottom Line Reporting Model by Oil, Gas and Plastic Production Firms and Infrastructural Development in Niger Delta Region of Nigeria

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Abstract: The study evaluated the application of triple bottom line reporting model by oil, gas and plastic production firms and the effects on infrastructural development in the Niger Delta region of Nigeria from 2011-2023. Triple bottom line reporting focuses on providing information on economic, social and environmental activities of the companies. Specifically, three objectives were formulated. Purposively, eleven (11) oil and gas and 23 plastics production companies constituted the sample size of this study between 2011 and 2023. Ex-Post facto research design and content analysis were adopted while secondary data were extracted from the annual reports and accounts of the sampled companies and were analysed using E-Views 10.0 statistical software. This study utilised descriptive statistics and inferential statistics via Pearson correlation and Panel Least Square (PLS) regression analysis. Findings from the empirical analysis showed that economic bottom line reporting has a significant and positive effect on infrastructural development ($\beta1$ = 0.139780; p-value = 0.0000); Social bottom line reporting has a significant and positive effect on infrastructural development ($\beta2$ = 0.189075; p-value = 0.0001); Environmental bottom line reporting has a significant and positive effect on infrastructural development ($\beta3$= 0.647667; p-value = 0.0000) of oil and gas and plastics production companies in Nigeria at 5% level of significance. The study concludes that the elements of

triple bottom line reporting considered in this study are important variables in explaining cash flow return on investment of quoted oil and gas firms in Nigeria. It was recommended among others that corporate firms should undertake more social responsibility and environmental responsibility in order to strengthen their relationship with stakeholders and then improve corporate image and market competition.

Keywords: Economic Bottom Line Reporting, Social Bottom Line Reporting, Environmental Bottom Line Reporting and infrastructural development.

1. INTRODUCTION

Business entities operate within society; they interact with their local communities. Their employees, customers and suppliers are all members of the society in which the entity operates. Hence, there exist a social contract between a company and the society in which it operates. This is based on the view that members of society give legal recognition to a company; they allow the company to exist and act as a legal person within society and also allow a company to use land and properties and hire members of the society as employees. The company, therefore, has an obligation to pursue the objective of making profits only in ways that will also enhance the material well-being of society as a whole. Profit-making must be ethical and a company must consider the interests of society in the decisions and actions that it takes. However, managers of many companies have not gained a holistic understanding of the inextricable relationship between sustainability efforts and continued existence.

The Niger Delta Region has benefited from the activities of oil, gas and plastic manufacturing firms that operate in it. However, the region has also been adversely affected for the actions of some of these organisations. Billions of Naira are spent annually by government and non-government organisations to contain urban waste which essentially is made up of discarded remains or packages of products from business organisations. Toxic materials discharged from factories into streams and rivers not only destroy aquatic life but also pollute the source of water supply to the communities along the coastlines. Emissions from factories contribute significantly to air pollution (Akpan, 2004). Geophysicists say that emissions from factories are major causes of the destruction of the ozone layer and a contributory factor to global warming with their attendant negative effects on humans.

Over the years, oil, gas and plastic production firms have negatively impacted on the environment through the depletion of natural resources

(timber, fish, crude oil, coal and so on) and the use of non-renewable resources in production processes and emissions of toxic wastes into the environment. In this regard, responsible business organisations need to take steps to repair the damage done to the environment and preserve it for future generations. For example, the people of the Niger Delta (oil-bearing communities in Nigeria) demand that the companies operating in the region take responsibility (clean up and compensate) for the damage done to their farmlands and fishing areas through oil prospecting and exploitation activities (gas flaring, oil spills and so on). Reducing an environmental impact involves the development and implementation of policies for efficient resource management and alternative resources; implementation of green procurement policies; adoption of waste minimisation and waste management strategies, for example, policies on reducing pollution and waste recycling and the use of renewable resources in production processes. More so, there is an emphasis on the movement towards carbon neutrality, which is when a company can counterbalance its use of carbon products, particularly its carbon dioxide emissions, with activities that reduce the amount of carbon dioxide in the atmosphere such as growing trees or plants (which absorb carbon dioxide from the atmosphere).

In addition, the question of whether or not a business should be socially responsible has generated a lot of arguments. The argument against social involvement was widely corroborated by a renowned economist, Milton Friedman. He maintained that the main objective of a business is to produce goods and services efficiently and effectively and generate returns as much as possible for its economic performance, not social activities. The proponents of this school of thought opined that socially oriented activities weaken the firm's goal of profit maximisation. Each time business income is spent on activities such as community renewal, hiring and training the minorities and hard-core unemployed, among others, profit opportunities are missed. Money spent on such programmes could be better spent on more aggressive advertising and selling or on improving production efficiency, which will increase profit earning capacity. As long as a business goes about its operations orderly, legally and morally, it is socially responsible, since the goods and services it provides are in the interest of society.

The term 'triple bottom line was coined in 1994 to encourage companies to recognise social and environmental issues in their business models and reporting systems (Institute of Chartered Accountants of Nigeria, 2021). This method of reporting is encouraged by the Global Reporting Initiative (GRI),

an internationally recognised non-profit body that promotes sustainability reporting. The 'triple bottom line' reporting model emphasises the reporting of companies' performance not simply in terms of profit only but three aspects of performance namely; environmental, social and economic. Many companies in Nigeria only report their performance in terms of economic indicators (profits), while ignoring the environmental and social indicators since the regulatory authorities are less interested in them. However, in advanced economies of the world, companies are expected to report their economic, environmental and social performances (triple-bottom-line reporting). In that way, regulatory bodies could monitor the social responsibility activities of companies. It is against this background that the study evaluates the application of triple-bottom-line reporting model by oil, gas and plastic production firms and infrastructural development in Niger Delta Region of Nigeria

1.1.   Problem Statement/Justification

A considerable number of people in the Niger Delta Region of Nigeria depend majorly on farming and fishing to earn a living. However, the persistent environmental degradation through oil exploration, gas flaring and oil spillage has reduced the economic value of farmlands and water resources. Sadly, oil, gas and plastic production companies have failed to give proper attention to the people of the Niger Delta who are suffering from the negative impact of environmental degradation due to gas flaring, oil spillage and indiscriminate dumping of plastic cans. The repeated oil spillages witnessed in the area have adversely affected aquatic resources and the only source of survival and livelihood of the populace. These companies through their operations discharge toxic industrial materials into the ocean and rivers thus, exposing the inhabitants to diverse communicable diseases that have increased the mortality rate in the area. For many, their source of livelihood, fishing ponds and farmlands have been destroyed. Water and air in the area have been polluted thereby, constituting threats to the lives of Niger Deltans. On the other hand, the companies have counted their losses due to neglect of corporate social responsibilities. There have been reported cases of pipeline vandalisation, crude oil theft, kidnapping of experts, bombing of oil installations, among others by the youths of the area as a way of expressing their frustration. These companies are often exposed to the risk of losses from payment of ransom, production stoppages, damage to oil installations and other activities of militants.

In addition, used cans and other plastic remains from industries have constituted a no mean threat in the area. Used cans and other plastic waste often obstruct the free flow of water in drainages and other water channels. This unfortunate development has increased the incidence of flooding and the resultant destruction of properties and lives in recent times. If this ugly situation is not urgently addressed, the Niger Delta Region and its people will continue to face the consequence of environmental degradation, deteriorating standard of living and poor socioeconomic development. This is gradually pushing the region to extinction. This provided a fertile ground for the evaluation of the application of triple-bottom-line reporting model by oil, gas and plastic production firms and infrastructural development in Niger Delta region of Nigeria.

1.2. Objectives of the Study

The main objective of the study was to evaluate the application of triple-bottom-line reporting model by oil, gas and plastic production firms and infrastructural development in Niger Delta Region of Nigeria.

(i)   Examine the effect of social reporting by oil, gas and plastic production firms on infrastructural development in Niger Delta Region of Nigeria.

(ii) Determine the effect of environmental reporting by oil, gas and plastic production firms on infrastructural development in Niger Delta Region of Nigeria.

(iii) Evaluate the effect of economic reporting by oil, gas and plastic production firms on infrastructural development Niger Delta region of Nigeria

RESEARCH QUESTIONS

The following research questions guided the study

(i)   How does social reporting by oil, gas and plastic production firms affect infrastructural development in Niger Delta Region of Nigeria?

(ii) How does environmental reporting by oil, gas and plastic production firms affect infrastructural development in Niger Delta Region of Nigeria?

(iii) What is the effect of economic reporting by oil, gas and plastic production firms affect infrastructural development in Niger Delta Region of Nigeria?

1.4. Hypotheses of the Study

(i) Effect of social reporting by oil, gas and plastic production firms on infrastructural development in Niger Delta Region of Nigeria is not significant

(ii) Effect of environmental reporting by oil, gas and plastic production firms on infrastructural development in Niger Delta Region of Nigeria is not significant.

(iii) Effect of economic reporting by oil, gas and plastic production firms on infrastructural development in Niger Delta Region of Nigeria is not significant.

2. LITERATURE REVIEW

This section contains conceptual review, theoretical framework and empirical review of related literature.

2.1. Conceptual Review

With the shift in societal focus toward environmental sustainability, businesses are encouraged to look at the big picture and see their impact on the world around them. A fundamental philosophy propagated today is how imperative it is that businesses address all values in reporting in order to lessen the chance that their activities will cause harm to global resources, not only for today's population but for future generations (WCED, 1987). Triple bottom line or sustainability accounting was first culled by John Elkington in 2004 (Sustain Ability, 2012). It is a framework that measures the performance of companies from three perspectives namely; social, environment and economic. The Global Reporting Initiative defines sustainability reporting as 'the practice of measuring, disclosing and being accountable to internal and external stakeholders for performance towards the goal of sustainable development. Sustainable development is a broad term meaning the same as other terms used such as triple bottom line, corporate responsibility reporting, and so on to describe economic, environmental and social impacts. It is a US-based initiative that encourages companies worldwide to publish sustainability reports that are prepared using a common reporting framework. The Global Reporting Initiative (GRI) aims at reducing pollution of the air, land, rivers and seas; at developing a sustainable business, whereby all the resources used by the company are replaced; cutting down the use of non-renewable (and polluting) energy resources such as oil and coal and at increasing the use of renewable

energy sources (water, wind); and recycling of waste materials. Triple bottom reporting is an accounting performance measurement technique designed to go beyond the report on financial information and bring about a report on the impact of an organisation's activities on the planet and the people dwelling in it.

Triple-bottom-line reporting is the process of disclosing the performance of firms as regards the practice of sustainable development to both internal and external stakeholders (Emeka-Nwokeji, 2019). Likewise, Aggarwal (2013) opined that triple bottom line reporting is the disclosure of an integral approach to sustainable issues which is driven by stakeholders' pressure, legislative and ethical reasons. According to Slaper and Hall (2011), triple-bottom-line reporting is the practice that encompasses a company's value, governance model and its approach towards creating a sustainable global economy. In the same vein, Aggarwal (2013) explained that triple-bottom-line reporting is the reporting system that enhances transparency, the reputation of the firm and meets the interests of the stakeholders.

Triple Bottom Line (TBL) reporting is a method used in business accounting to further expand stakeholders' knowledge of an entity. It goes beyond the traditional, financial aspects and reveals the entity's impact on the world around it. There are three main focuses of TBL: profit, environment and people (Global Reporting Initiative, 2006). It is a "concerted effort to incorporate economic, environmental and social considerations into a company's evaluation and decision-making processes" (Wang & Lin, 2007). This type of reporting establishes principles by which a company should operate to concentrate on the total effect of their actions (both positive and negative). Ngwakwe (2008) reported that triple bottom line accounting has a capacity for long-term financial performance, investment return, and also value creation which refers to achieving sustainable sufficient profits. One of the best ways of evaluating a sector's financial performance is by the use of financial ratio analysis like Earnings Per Share (EPS) of the firms. TBL reporting, therefore, goes beyond reporting to shareholders through financial statements to encompass reporting of the impact of the firm economically, socially and environmentally wise. It is aimed at providing information on profit, people and planet.

Therefore, sustainability reporting refers to the disclosure of non-financial information in respect of economic, social and environmental. This is shown in Figure 1 below.
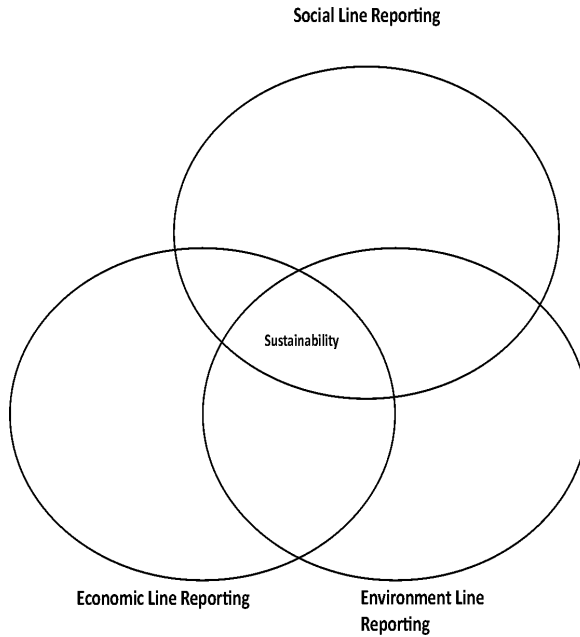
Social Line Reporting

Sustainability

Economic Line Reporting   Environment Line
                                           Reporting

Figure 1: Triple Bottom Reporting Model

Source: Authors' conceptualisation (2023)

The model above shows that when a firm's report focuses on social, economic and environmental perspectives, sustainability will be achieved.

2.1.1. Environment (Planet)

Bala and Yusuf (2003) declared that present practices reveal that no track for environmental costs was available, as it was altered arbitrarily. There is need for proper allocation of environmental cost. The Environment/Ecological line of TBL according to Goel (2010) and Amos *et al.* (2016) referred to engaging in practices that do not jettison the environmental resources of future generations. The US Environmental Protection Agency – EPA (1995) and Hamid (2002) took the stance that accounting should be responsible for measuring, evaluating and the disclosure of environmental performance in financial statements or in its attachments. Measuring environmental performance depends on accounting systems but also needs more data other than the conventional accounting data, such as pollution ratio. Monetizing environmental issues may not be totally accurate, but economists and accountants have to give best estimates according to the current level of knowledge and techniques used. The environment or ecological line is evaluated according to (1) air quality (2) water quality (3)

energy used (4) waste produced (solid and toxic waste) (5) use of recycled materials and (6) water sources significantly affected by an organization's use of water.

It focuses on reducing greenhouse gas emissions, the efficient use of energy resources, and minimizing the ecological footprint and so on. Schnake (1991), Onyx and Bullen (2000) and Stoddard, Pollard and Evans (2012) likens environmental line to natural capital/resources because natural resources such as clean air, clean water, oil and gas, forests, minerals, fish, and soil are all embedded in the environment and as such report that provides how a firm deals with these items in protecting and otherwise is very important to the survival of the firm and the future generation and hence the need to the concept of TBL.

2.1.2. Economic (Profit)

The economic/financial line has measurement indicators such as (1) sales, revenue, profits and returns on investment or shareholder value (2) taxes paid and (3) monetary flow models. Industrial specific models can also be used in this regard. For example, in hotel industry heads in beds can be used, in the banking industry Interest generated can be used to measure the economic line of TBL. To buttress on the three concepts and their measurements Elkington (1997), Slaper and Hall (2011) and Amos, Uniamikogbo and Atu (2016) among others contend that financial bottom line also known as economic bottom line upon which the traditional financial reporting bottom line of profitability values are based, is concerned about the short and long runs economic well-being of the stakeholders. That is the impact of the firm's activities on the economic system resulting in value creation for the stakeholders (Elkington, 1997). The economic line links the growth of a firm to the growth of the economy and how well it contributes to support it. In other words, it deals with the present financial and economic value added to the stakeholders that support the future generation. Financial performance can as well be expressed in forms of liquidity and profitability performances.

Measurement of firm financial performance can be achieved in two ways; first through the internal mechanism of a financial statement where metrics such as sales revenue, operating income, cash flow from an operation, the total unit of sales. Furthermore, the growth rates, such as gross and net profit margin, returns of Assets, return on equity and finally, through Market-based mechanism in which the market price per share is used to determine the aggregate value of a firm (Kenton, 2020). Market-based valuations are usually

based on the forces of demand and supply of a firm's shares as reflected by divergent information of the firm's performance or otherwise coming to the market from the firm. Another measure is the Tobin's Q which is expressed as the market value of a company divided by its asset's replacement cost (Hayes, 2019). Measures such as gross profit, return on equity, and investment has a direct link with profitability. However, Liquidity performance is measured through indices such as ratios for instance quick, current, leverage, solvency, cash, and working capital ratios are measures of liquidity.

2.1.3. Social (People)

According to Goel (2010) social equity practices provide value to society and "give back" to the community. He further gave examples of these practices to include employment and providing health care coverage among others. Therefore, social performance concentrates on the association that exist between the organization and the community and covers issues connected to community participation, employees and fair wages. Sauvante (2001) stated that the social dimension of TBL also called social capital consists of two components of human capital and investment. Human capital includes employees, contractors, suppliers, and advisors while investment is made up of the social systems that support the business such as scholarships, philanthropies and so on. According to GRI the following indicators are mostly used to measure the social aspect of TBL: (1) Labour practices (2) community impacts (3) human rights, and (4) product responsibility. Goldsworthy (2000) added employee retention rates, job satisfaction levels and investment per employee in sickness and physical damage prevention as part of a model for measuring social line of TBL.

2.2. Theoretical Framework

The following theories formed the framework of the study.

2.2.1. Stakeholder Theory

The stakeholder theory of corporate governance is that a company's directors owe a duty to all major stakeholders in the company, including not just employees and customers, but also communities and society as a whole. According to the normative view, a company has a moral duty to consider the concerns of various stakeholder groups. This concept of governance can be linked to a deontological approach of business ethics. This approach argues that all individuals have a basic moral right to be treated by business entities in a

way that respects their interests and concerns. Employees should not be treated simply as a means to achieving the end of higher company profits. The rights of stakeholders can be analysed in terms of stakeholder groups (employees, customers, shareholders and so on) rather than considering each stakeholder individually. The possession of intrinsic moral rights by stakeholders creates corresponding ethical duties for a company to respect those rights.

2.2.2. Legitimacy Theory

The legitimacy theory holds that companies seek to operate within what is viewed as desirable in society. What is regarded as appropriate practices modifications over time and the company ought to be prepared for variants in the environment taking ethical elements into account. Legitimacy may also additionally be viewed as a generalized perception or assumption that the movements of an entity are desirable, appropriate or appropriate within some society-built system of norms, values, beliefs and definitions (Abubakar, Garba, Sokoto & Maishnu, 2014). Abdulsam, Abdulrahaman, Garba, Mohammed and Abubakar (2020) stated that legitimacy theory, one of many social theories which is supported by way of the idea of the social contract has been long identified as a fantastic explanatory tool concerning the cause of environmental reporting through business groups

EMPIRICAL REVIEW

John (2021) studied the relationship between triple bottom financial reports and the firms performance of companies in Ghana from 2011-2019. The study employed the *expost facto* design where secondary data were obtained from annual reports. Correlation and panel least square regression techniques were employed. The result revealed a positive and non-significant relationship between triple bottom financial reports and earnings per share. Waymond, Mouza and George (2021) examined the relationship between sustainability and firm performance in Nigeria from 2011-2019 using Algorithmic Pathways in the analysis. The study was carried out using OLS multiple regressions for the analysis and the study reported a positive and non-significant relationship between a firm's sustainability and net profit margin. Mbonu and Amahalu (2022) ascertained the effect of Corporate Social Responsibility Costs on Financial Performance of Deposit Money Banks listed on Nigeria Stock Exchange for a ten year period ranging from 2011- 2020. Thirteen (13) Deposit Money Banks were purposively selected from a population of Fourteen (14) listed Deposit Money

Banks. Burhan & Rahmanti (2012) studied 32 companies listed on Indonesian Stock Exchange (ISE) between 2006 to 2009, and examined the relationship between the whole, and each of the 'bottom lines', and companies' performance. The independent variables - TBL Reporting, economic (financial) performance, social performance, and environmental performance were measured by using disclosure index score, adopted from Sustainability Reporting (SR) Guideline from Global Reporting Initiative (GRI). The dependent variable, company performance, was measured by Return on Assets (ROA). Their findings, however, revealed the SR influences company performance.

Similar studies was carried out in China by Haixia and Jianping (2023), but focused on 531 heavy polluting enterprises from 2008 to 2019. The data were obtained from the case companies' annual reports, from *Wind* database, and *Cninto* websites. This finding reveal a significant relationship between 'environmental Disclosure (ED) and financial performances of companies. Asoalu *et al.* (2011) also undertook a study in Nigeria that assessed TBL reporting in the Nigeria oil and gas sectors. This research used content analysis of annual reports to examine the extent of the sampled companies' reporting compliance with global best practices. The finding however revealed an 'arbitrage' and 'incompatible SR indicators among the sampled companies in Nigeria. Similar studies and methodology was carried out, and utilized, respectively, by Folashade *et al.* (2016), but with Lafarge Africa Plc as a case. It found no single disclosure of human rights matters; 3% disclosure of environmental matters; and a total of 30% disclosures when scaled against GRI's G4 version, and 169 indicators used. However, Asuquo *et al.* (2018) adopting methodology, but with a different sampled case - selected quoted Brewery Firms in Nigeria (Guiness Nig. Plc, Champion Breweries plc, and Nigeria Breweries Plc) - for the five years period between 2012 – 2016 found to the contrary, that Economic Performance Disclosure (ED), Social Performance Disclosure (SD), and Environmental Performance Disclosure (EE) have no significant effect on corporate performance (as measured by ROA).

Dilling (2010) examined for any significant difference with regards to companies' performance (measured by size, financial welfare, capital structure, and corporate governance) between those that publish their TBL reports in line with GRI's guidelines – G3 version, to those that do not. It undertook this by analyzing the quantitative and qualitative variables of 124 randomly sampled G3 reporting and non-G3 reporting companies from selected 25 countries. It found that, companies with the feature of being geographically domiciled

in Europe, active in the energy and manufacturing sector, and earn a higher returns, are more likely to comply with GRI G3 guideline, in dishing out a sound TBL reports. Arvidsson (2011) is also a study in Sweden that utilized the questionnaire survey design with 22 sampled Investor-Relation Managers (IRMs) from 27 OMXS30 index large companies listed on Stockholm Stock Exchange (SSE) as respondents. It aimed to analyze management teams' view as it relates to the diverse components of disclosure of Non-Financial Information (NFI) in the annual reports. It found, among others, an increased focus on corporate NFI disclosure (especially as it relates to intangible assets). Onyali (2014) utilized similar methodology (and had 56 registered chartered Accountants at Awka District society, Nigeria, as respondents) to examine for a relationship between 'TBL Accounting' and sustainable corporate performance. She found such 'nexus' to exist, and indicated that the disclosure of TBL would ensure the identification, measurement, and allocation of environmental and social cost within an organization. Also, Carreira, Damiao, Abreu and David (2014) carried out a research that assesses the items published in the annual reports of firms listed on Lisbon Euronext Stock Market (LESM) between 2007 – 2009, and had similar finding as Arvidsson (2011), of an improved 'Environmental Disclosure Index' for each firms over time. TBL reporting was also assessed among six randomly selected food and beverage firms in Nigeria by Isa (2014). He utilized content and cross sectional analysis, as data were obtained and the annual reports and accounts of the sampled firms. The finding revealed a poor and insignificant (approximately 2% of the total) disclosures in the firms' annual reports. Of this, it revealed that 20.40% represented environmental activities related disclosure; and 12.84% represented human rights (social activities) related disclosures. The finding also revealed the TBL disclosure rate is dependent to the size of firms.

Kolk (2003) equally examined the trends in TBL reporting by the Fortune Global (250). The presentation of their trend and panel data in 1998 and 2001 revealed a significant progress in TBL reporting, especially in Japan and Europe. It was discovered that TBL reporting is more common with majorly large multinationals (for example, Autos, Chemicals, Oil and Gas, Electronics, and Pharmaceutics), which is attributed to their high impact and visibility; as against trade and retail, services, and media and communication outfits, that reported less than average TBL for 1999, 2002, and 2005 focus years. Fauzi *et al.* (2010), carried out similar study on impact of triple bottom line accounting on profitability of multinational companies in Nigeria. The study is an empirical

investigation which sampled six (6) multinational companies in Nigeria from 2003-2012 using annual report and with the use of simple regression analysis revealed that there is a significant relationship between expenditure on social responsibility and profitability of multinational companies in Nigeria. Piper *et al* (2012) carried out similar study on effect of Environmental regulations on financial performance of manufacturing companies in Tanzania. Using regression analysis with a sample of five (5) selected listed manufacturing companies. The findings indicated that Environmental compliance has no significant effect on the financial performance of listed financial companies in Tanzania. Bebbington (2017) carried out a research on the effect of sustainability reporting on firm's profitability. The study was carried out using secondary data. Data collected were analyzed using ordinary least square regression analysis and revealed that sustainability reporting has a significant effect on firms' profitability. It was recommended that organizations should ensure that there report their social, economic, environmental activities for increase in profitability.

METHODOLOGY

The research design employed in this study is *ex-post facto* research design. The population of this study consisted of all the twelve (12) oil and gas companies listed on the Nigerian Exchange (NGX) Group as at 31st December, 2022 and 37 plastics companies in Niger Delta. The oil companies include: 11 Plc (formerly Mobil Oil Plc); Anino International Plc, Capital Oil Plc, Conoil Plc, Eterna Plc, Ardova Plc (formerly Forte Oil Plc), Japaul Oil & Maritime Services, MRS Oil Nigeria Plc, Oando Plc, Rak Unity Petroleum Company Plc, Seplat Petroleum Development Company Plc and Total Nigeria Plc. The plastics companies included Soms Nigeria Limited, E & I Plastic Manufacturing Company, Alpha Plastics, Chikason Group, TURN Plastic Recycling Foundation, Lustre Plastics, Luyah Global Resources, Nampet Ventures Limited, Osadebey Plastic Industries Ltd, Rubber Estates Nigeria Limited (RENL), Edo State Plastic Manufacturing Company, Elson Plastics, Omek Plastics, Ultimate Plastics Ltd, Primepak Industries Nigeria Limited, Excel Plastics, Fynfield Nigeria Ltd, Akonit Nigeria Limited, Geo-Tech Plastic Industries, Vitaplast Nigeria Limited, Caltech Nigeria Limited, Poly Products Nigeria Plc, Ondo Plastics, Sureplast, PlastiKraft Ondo, GreenTech Plastics, Tricor Packaging Nigeria Limited, Bayelsa Plastics Industry, Kemexyl Nigeria Ltd, Naficat Plastic Manufacturing Company, Mikano Plastic Industries, Plastex Plastics Nigeria Ltd, Diamond Plastics, Progressive Plastics Limited and Emzol Plastic Industry Ltd.

The sample size of this study comprised of eleven (11) listed oil and gas firms on the Nigerian Exchange (NGX) Group from 2011 to 2023 and 23 plastics companies. Purposive sampling technique was adopted to select oil and gas companies that consistently filed their annual reports with the Nigerian Exchange (NGX) Group for the study period (2011-2023), these are: 11 Plc (formerly Mobil Oil Plc); Anino International Plc; Capital Oil Plc; Conoil Plc; Eterna Plc; Japaul Oil & Maritime Services; MRS Oil Nigeria Plc; Oando Plc; Rak Unity Petroleum Company Plc; Seplat Petroleum Development Company Plc; Total Nigeria Plc. In addition, the 23 plastic companies included Lustre Plastics, Luyah Global Resources, Nampet Ventures Limited, Osadebey Plastic Industries Ltd, Rubber Estates Nigeria Limited (RENL), Edo State Plastic Manufacturing Company, Elson Plastics, Omek Plastics, Ultimate Plastics Ltd, Primepak Industries Nigeria Limited, Excel Plastics, Fynfield Nigeria Ltd, Akonit Nigeria Limited, Geo-Tech Plastic Industries, Vitaplast Nigeria Limited, Caltech Nigeria Limited, Poly Products Nigeria Plc, Ondo Plastics, Sureplast, PlastiKraft Ondo, GreenTech Plastics and Tricor Packaging Nigeria Limited This study basically utilized secondary data that were extracted from the annual reports and statements of account of the sampled

Table 1: Variables Definition and Measurement Units

Variable	Indicators	Measurement Unit	Variable symbols	Variables Explanation
Independent Variables (Triple Bottom Line Reporting)				
	Economic Bottom Line Reporting	Operating Costs Disclosure	OCD	Total operating score disclosed Maximum number of operating disclosure score that a firm could disclose
	Social Bottom Line Reporting	Community Investments Disclosure	CID	<u>Total community investments disclosed</u> Maximum number of community investments disclosure score that a firm could disclose
	Environmental Bottom Line Reporting	Effluent Disclosure	EFD	<u>Total effluent score disclosed</u> Maximum number of effluent disclosure score that a firm could disclose
Dependent Variable (Infrastructural Development)				
	Infrastructural Development Indicators		IDI	Number of Infrastructure provided

Content analysis was adopted in this study. A content analysis was performed on the sample sustainability reports to study how organizational boundaries are set for the whole report and how operational boundaries are set for specific triple bottom line indicators. Any data using fair standard meanings for a specific group of people can be subjected to content analysis (Stanton, 2017). This study adopted the Global Reporting Initiative (GRI) framework disclosures according to the G4 guidelines for the purpose of developing the triple bottom line reporting indices. Triple bottom line reporting was evaluated by 4 indicators for economic reporting; 12 indicators for environmental reporting and 10 indicators for social reporting (refer to Appendix A). For each of these triple bottom line reports, all the 26 indicators were scored as follows:

–   a score of 0 for an item not referred to in a report;
–   a score of 1 when the report only briefly mentioned something pertinent to the item or provided only qualitative statements;
–   a score of 2 when the report provided detailed information with some numerical support; and rarely
–   a score of 3 was given when a report provided extensive numerical support with data on goals achieved or fully accomplished.

So, a total score for triple bottom line reporting could reach the maximum score of 78.

Therefore,

TBLDI =TDP/MP

Where;

TBLDI = Triple Bottom Line Disclosure Index

TDP = Total Disclosure Points of a Firm

MP = Maximum Points for a Firm

3.1.   Model Specification

This study adapted the model of Okafor, Egbunike and Amahalu (2022):

$$ROCE = \beta o + \beta 1 EFD + \beta 2 CMD + \beta 3 EMD + \varepsilon \qquad (1)$$

Where:

ROCE = Return on Capital Employed

EFD = Effluent Disclosure

CMD = Community Disclosure

EMD = Employment Disclosure

ε = error term

Sequel to the adapted model, the following equation construct was modeled:

$$IDI_{it} = \beta_0 + \beta_1 OCD_{it} + \beta_2 CID_{it} + \beta_3 EFD_{it} + \mu_{it}$$

Where:

β_0 is the intercept of the regression.

$\beta_1, \beta_2, \beta_3$ are the coefficients of the regression

IDI_{it} = Infrastructure development indicators of firm í in period t

OCD_{it} = Operating Cost Disclosure of firm í in period t

CID_{it} = Community Investment Disclosure of firm í in period t

EFD_{it} = Effluent Disclosure of firm í in period t

í = individual firms (1,2,3...11)

t = time periods (2011, 2012 ... 2022)

μ_{it} = Error term

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

Table 2: Pearson Correlation Matrix

	IDI	*OCD*	*CID*	*EFD*
IDI	1.0000			
OCD	0.3741	1.0000		
CID	0.0730	0.2012	1.0000	
EFD	0.0886	-0.5338	-0.6291	1.0000

Source: E-Views 10.0 Correlation Output, 2024

Interpretation of Correlation Matrix

The result of the Pearson Coefficient analysis in Table 2 indicates that IDI positively correlates with OCD, CID and EFD at correlation coefficients of 0.3741, 0.0730 and 0.0886 respectively.

Model Evaluation

Table 3: Panel Least Square Regression Analysis testing the effect of Triple Bottom Line Reporting on model by oil, gas and plastic production firms and infrastructural development in Niger Delta Region of Nigeria.

Dependent Variable: IDI

Method: Panel Least Squares

Date: 22/09/24 ime: 13:13

Sample: 2011 - 2022

Periods included: 12

Cross-sections included: 12

Total panel (balanced) observations: 121

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IDI	0.217839	0.014247	15.28997	0.0000
OCD	0.139780	0.017255	8.100840	0.0000
CID	0.189075	0.045031	4.198804	0.0000
EFD	0.647667	0.096990	6.677679	0.0000

R-squared	0.387304	Mean dependent var	0.109292
Adjusted R-squared	0.371595	S.D. dependent var	0.024746
S.E. of regression	0.019617	Akaike info criterion	-4.992365
Sum squared resid	0.045024	Schwarz criterion	-4.899943
Log likelihood	306.0381	Hannan-Quinn criter.	-4.954829
F-statistic	24.65315	Durbin-Watson stat	1.627315

Source: E-Views 10.0 Panel Regression Output, 2024

Interpretation of Regression Result

Table 3 reveals an adjusted R^2 value of 0.371594. The adjusted R^2, which represents the coefficient of multiple determinations imply that 37.16% of the total variation in the dependent variable (IDI) of quoted Oil and Gas and plastic companies in Nigeria is jointly explained by the explanatory variables (OCD, CID and EFD). The adjusted R^2 of 37.16% did not constitute a problem to the study because the F- statistics value of 24.65315 with an associated Prob.>F = 0.000000 indicates that the model is fit to explain the relationship expressed in the study model and further suggests that the explanatory variables are properly selected, combined and used. The value of adjusted R^2 of 37.16% also shows that 62.84% of the variation in the dependent variable is explained by other factors not captured in the study model. This suggests that apart from OCD, CID and EFD, there are other factors that mitigate IDI of quoted Oil and Gas plastic companies in Nigeria. The results in Table 3 illustrated that OCD has a positive and significant relationship with IDI measured with a beta coefficient. (β_1) = 0.139780, t- value of 8.100840 and p- value of 0.0000 which

is statistically significant at 5%; CID has a significant positive relationship with IDI as reported by the beta coefficient (β_2) = 0.189075, t- value = 4.198804, p-value = 0.0001 which is statistically significant at 5%; EFD has a positive and significant relationship with IDI considering the beta coefficient (β_3) = 0.647667, t- value =-6.677679, P-value = 0.0000.

Thus, the estimated model is:

IDI = 0.217839 + 0.139780OCD + 0.189075CID + 0.647667EFD + μ

This beta coefficient revealed that if OCD, CID and EFD increase by one unit, then the sampled firms IDI would increase by 13.98%, 18.91% and 64.77% respectively. In addition, Durbin-Watson test is implied to check the auto correlation among the study variables. The Durbin-Watson value is 1.627315 which is less than 2 provide an evidence of no auto-correlation among the variables, since the value at 1.627315 is not more than 2.0 approximately.

Decision

The empirical evidence that suggests that OCD, CID and EFD have a significant positive effect on IDI of quoted Oil and Gas firms in Nigeria at 0.5 level of significance, thus, the alternative hypotheses of the study are therefore accepted.

5. FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1. Summary of Findings

Based on the analysis of this study, the following findings emerged:

(i)   The application of economic bottom line reporting by oil and gas and plastic production companies has significant and positive effect on infrastructural development in Niger Delta region of Nigeria at 0.05 level of significance $(\beta_1$ = 0.139780; P-value = 0.0000).

(ii) The application of social bottom line reporting by oil and gas and plastic production companies has significant and positive effect on infrastructural development in Niger Delta region of Nigeria at 5% level of significance $(\beta_2$ = 0.189075; p-value = 0.0001)

(iii) The application of environmental bottom line reporting by oil and gas and plastic production companies has significant and positive effect on infrastructural development in Niger Delta region of Nigeria at 5% level of significance $(\beta_3$ = 0.647667; p-value = 0.0000).

5.2. Conclusion

This study ascertained the effect of the application of triple bottom line reporting by oil and gas and plastic production companies on infrastructural development in Niger Delta region of Nigeria from 2011-2022. Panel data were sourced from the annual reports and accounts of the sampled firms. Inferential statistics using correlation analysis and panel least square regression were employed via E-Views 10.0 statistical software. Data analysis revealed that economic bottom line reporting has a significant and positive effect on infrastructural development (β_1 = 0.139780; p-value = 0.0000); Social bottom line reporting has a significant and positive effect on infrastructural development (β_2 = 0.189075; p-value = 0.0001); Environmental bottom line reporting by oil and gas and plastics production companies has a significant and positive effect on infrastructural development (β_3 = 0.647667; p-value = 0.0000) in Nigeria at 5% level of significance. The study concludes that the elements of triple bottom line reporting considered in this study are important variables in explaining infrastructural development by oil and gas and plastics production companies in Niger Delta region of Nigeria.

5.3. Recommendations

The following recommendations were made in line with the findings and conclusion of this study:

As a result of the positive relationship between economic bottom line reporting and infrastructural development, companies should adopt reporting mechanism that helps make organizations' decision-making processes more efficient and, in turn, enables them to reduce risk across their supply chain; a process that reduces waste and yields significant cost savings.

Considering the positive relationship between social bottom line reporting and infrastructural development, companies should undertake more social responsibility and environmental responsibility in order to strengthen their relationship with stakeholder and then improve corporate image and market competition.

Companies should produce environmental report that focuses companies' attention on environmental performance. Typically, this will result in improved performance, which should lead to cost savings. Producing an environmental report can bring a competitive advantage by demonstrating a business' awareness of its environmental responsibilities. It may also help improve relationship with key stakeholders, such as investors, suppliers and the wider local community.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix 1

Category	Aspects	
Economic	• Economic Performance • Market Presence •Indirect Economic Impacts • Procurement Practices	
Environmental	• Materials • Energy • Water • Biodiversity • Emissions • Effluents and Waste • Products and Services • Compliance • Transport • Overall • Supplier Environmental Assessment •Environmental Grievance Mechanisms	
Social	• Community Investment • Non-discrimination • Freedom of Association and Collective Bargaining • Child Labor • Forced or Compulsory Labor • Security Practices • Indigenous Rights • Assessment • Supplier Human Rights Assessment • Human Rights Grievance Mechanisms	

Source: GRI G4 Sustainability Reporting Guidelines, 2023