

# Environmental Cost and Economic Performance of Nigerian Shipping Lines

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## ABSTRACT

This study investigated relationship between environmental cost and economic performance of Nigerian shipping lines. In order to actualize this objective, the study employed expo-facto research design and purposive sampling technique was used to determined sample size of 10 registered companies out of 25 study's population. The research instrument used in this study is made up of primary source and secondary source. The primary sources included questionnaires, while the secondary sources include textbooks, internet, journals, published and unpublished articles and government publications. This study used both descriptive and panel estimation of regression to achieve the stated objective as well as relevant diagnostics. The correlation analysis revealed that all of the variables— CERPC, CELCP and DCCC—had correlation coefficients that were either positive or negative and less than 0.9. The Hausman test result showed that the Hausman null hypothesis of random effect model is not appropriate and to be rejected as the Hausman test is statistically significant (0.0085) at 5 per cent level of significant with chi-square value of 9.887246. The result of Pooled OLS and Random Effect showed that the t-statistics (p-value) calculated for CERPC was greater than the critical value of 5%, while Fixed Effect model regression showed that the t-statistics(p-value) calculated for CERPC was greater than the critical value of 5%, this means that cost expended by the company on environment remediation and pollution control was significant on economic performance of Nigerian shipping lines. DCCC and CELCP do not have significant effect on economic performance of Nigerian shipping lines due to their t-statistics(p-value) calculated were greater than the critical value of 5%. The study concluded that environmental cost has significant effect on economic performance of Nigerian shipping lines on the basis of CERPC, but do not on the basis of DCCC and CELCP. Therefore, it was recommended that the company should spend more on the Cost of Environmental Remediation and Pollution Control since, they have positive effect on economic performance of Nigerian shipping lines than on Cost of Environmental Laws Compliance and Penalty and Donations and Charitable Contributions Costs.

## INTRODUCTION

The conveyance of natural resources within and across the countries and incessant emissions of greenhouse gases in Nigeria are on the increase, and stakeholders are agitating increased information on organizations' interactions with the environment. Most environmental degradations and emissions are anthropogenic, an advent traceable to the industrial revolution of late 18th century where economic activities in many communities moved from agriculture to manufacturing. Production shifted from its traditional locations in the home and the small workshop to factories. The overall amount of goods and services produced expanded dramatically (Festus, & Akinselure, 2017). New groups of investors, businesspeople, and managers took financial risks and reaped great rewards. In the long run the industrial revolution has brought economic improvement for most people in industrialized societies. Many enjoy greater prosperity and improved health. There have been costs, however. Industrialization has brought factory pollutants and greater land use, which have harmed the natural environment (Wang, Duan, & Wang, 2020). The field of environmental accounting has made great strides in the past two decades, moving from a rather arcane endeavor to one tested in dozens of countries and well established in a few. But the idea that nations might integrate the economic role of the environment into their income accounts is neither a quick sell nor a quick process; it

has been under discussion since the 1960s (Lawal, 2016). Malyan and Duhan (2018) indicated that there is growing awareness and concern on the impact of human activity on the ecosystem. This concern at global level about the impact of the human activities on the environment and the need for mitigating the effects led to codification of “soft law” on environment which began with the United Nations Stockholm conference on Human Environment and the launch of United Nations Environmental Programme (UNEP) in 1972. The principles such as polluter pays, absolute liability, no fault liability, precautionary principle, inter-generation equity and good neighbourliness began to take roots into international and national environmental regulations (Lawal, 2016).

Accountants, as the basic custodians and light bearers of economic development can no longer shut their eyes to the effect of environmental issues on business management, accounting, audit and disclosure system. Protection of environment and the potential involvement of accountant is becoming a common subject of discussion among the accountant all over the world (Okafor, 2018). Accountants are expected to take a proactive role in the environmental protection process with the advent of liberalization, remove of trade barriers makes it logical that the costs of environmental degradation due to industrial activities should be internalized in corporate account to the extent possible, that is why environmental accounting and reporting therefore is of paramount importance today (Pellegrino & Lodhia, 2012). According to Holt (2012), there is an increasing trend to judge an enterprise in relation to the community in which it operates. The impact of activities of the organization on the environment with respect to pollution of water, air, land and abuse of natural resources are coming under the scrutiny of government, shareholders and citizens. Unless proper accounting work is done either by the individual organizations or by the government itself, it cannot be determined that both have been fulfilling their responsibilities towards the environment (Holt, 2012). Therefore the need of environmental accounting has emerged. In the early 90’s the UNEP and the World Bank set out to examine the feasibility of physical and monetary accounting in the area of natural resources and the environment and to develop alternative macro indicators of environmentally adjusted and sustainable income and product. Simultaneously, the Statistical division of the United Nations (UNSTAT) also developed methodologies for a System of integrated Environmental and Economic Accounting (SEEA). Environmental accounting at organizational level aims to address the needs of organization to measure the economic efficiency of their environmental conservation and the business activities of the company as a whole (Riyadh, 2020). Environmental accounting includes environmental management accounting. In environmental management accounting, there is a particular focus on material and energy balance aspects and environmental cost information. This accounting is further classified into Segment environmental accounting which is an internal environmental accounting tool to select an investment activity, or a project, related to environmental conservation from among all processes of operations, and to evaluate environmental effects for a specified period (Gray, Owen & Adams, 1996).

According to Clarkson, Li, Richardson and Vasvari (2008), disclosure and transparency are critical elements of a robust corporate governance framework as they provide the basis for informed decision-making by shareholders, stakeholders and potential investors with respect to capital allocation, corporate transactions and financial performance monitoring. High quality disclosure, through its influence on investors and lenders who must assess risks and returns and decide where best to place their money, strengthen the efficiency of capital allocation as well as offer the benefit of reducing the costs of capital. Furthermore high quality corporate disclosure provides clarity on the extent to which companies meet legal and ethical requirements (Gerwanski, Kordsachia, & Velte, 2019). When environmental costs are not adequately allocated, cross-subsidization occurs between products. In most cases, different products are made by different processes, and each process tends to have a different environmental cost (Christ & Burritt, 2013). The author illustrates using example of two processes, A and B that use the same number of direct labor hours for a batch of product. Process A, however, uses hazardous chemicals whereas process B does not. The facility incurs environmental costs from the use of the hazardous chemicals in a number of ways: specification and procurement of the chemical which includes evaluation of material safety data sheets; design of the process to minimize worker exposure; shipping costs associated with transporting hazardous chemicals; monitoring, reporting, and permitting to meet applicable regulations; employee training in handling and emergency response; storage and disposal costs; and liability for the chemical from purchase

to grave. In addition, there may be less tangible costs such as tarnished corporate image and inability to meet delivery or quality requirements (Christ & Burritt, 2013).

### **Problem Statement**

Accounting reports in shipping lines have been found to be deficient over time in the sense that they lack vital information that will enable stakeholders make informed decisions (Akeem, Memba, & Muturi, 2016). The mandatory and voluntary disclosure of financial information in corporate annual reports and their determinants have attracted considerable research attention in developed countries rather than developing ones (Akhtaruddin, 2005; Barako, 2007). Discoveries in the developed countries most especially in the European Union (EU) have aided the government to revamp the compliance mechanisms. They have also assisted the government in issuing out directives that facilitate the harmonization process and invariably bring all community companies up to a reasonable level of disclosure. According to Bassey, Effiok and Okon(2013), environmental accounting helps the firm to record all environmental costs incurred by the business thereby finding a way of reducing the cost (environmental expenses) so that the business can increase profit. Also environmental accounting helps to disclose to the outside world their ability to be environmental friendly.

The deficient adoption is expected to influence the quality of disclosure. Ali, Ahmed, and Henry(2004) opined that the government regulatory bodies and the accountancy profession of emerging nations suffer from structural weaknesses and often take a lenient attitude towards default of accounting regulations. Consequently, private and institutional investors (local and foreign) are hesitant in investing in such emerging economies due to lack of transparency. Lack of proper use of International Accounting Standards in affected countries (of which Nigeria is a part) hinders “transparency” in the financial statements of corporations. As a result of this, financial statements fail to provide useful information, on a timely basis. Since current requirement for reporting on environmental issues is voluntary, it is observed from most financial statements of corporate organizations that it has engendered disclosures of information which totally exclude environmental issues. However, the studies failed to investigate a comprehensive set of adoption of environmental accounting and how it affects the economy of Nigerian citizens. This is the research gap that this study wishes to bridge. It is for this reason that the study intended to investigate the effect of environmental cost and reporting on the economic performance of shipping lines in Nigeria. The objective of this study is to examine the effect of environmental costs on economic performance of shipping companies

### **Research question**

This study will provide answers to the following research questions.

1. To what extent do Cost of Environmental Remediation and Pollution Control influence economic performance of Nigerian shipping lines?
2. Is there any relationship between economic Cost of Environmental Laws Compliance and Penalty and economic performance of Nigerian shipping lines?
3. Do Donations and Charitable Contributions Costs have effect on economic performance of Nigerian shipping lines?

### **Objectives of the Study**

The main objective of this study is to investigate the relationship between environmental cost and economic performance of Nigerian shipping lines. Other specific objectives include:

1. To determine relationship Cost of Environmental Remediation and Pollution Control and economic performance of Nigerian shipping lines.
2. To examine relationship economic Cost of Environmental Laws Compliance and Penalty and economic performance of Nigerian shipping lines.

3. To evaluate the effect of Donations and Charitable Contributions Costs on economic performance of Nigerian shipping lines.

### Research Hypotheses

$H_{01}$ : Cost of Environmental Remediation and Pollution Control do not influence economic performance of Nigerian shipping lines

$H_{02}$ : There is no relationship between economic Cost of Environmental Laws Compliance and Penalty and economic performance of Nigerian shipping lines.

$H_{03}$ : Donations and Charitable Contributions Costs do not have effect on economic performance of Nigerian shipping lines

### Significance of the Study

The study is of use to the Policy makers who need the information on the various ways to analyze the financial statements and their importance for planning, bench marking and drawing comparisons. The analysts use the information to develop reviews for investors and lenders. The accounting information helps in precondition for decision making, explaining and predicting environmental failure. The study is of importance to the investors as they need information to make an informed investment decision upon analysis of the various financial statements, and this they use to protect their investments. The study is of use to the government and other regulatory authorities as they the need information to ensure that companies are complying with regulations set at all levels, determine the levels of taxes and that the public is accurately informed about the financial position at all times. The shareholders use the information to understand the performance of their shares in order to make their investment decision going forward. This also equips them with the necessary information required while arriving at investment decision. The study is of value to Scholars as they use the research gaps identified in this study to progress further academic discourse on environmental accounting

## LITERATURE REVIEW

Environmental accounting is an emerging and dynamic field. It is a fruitful attempt to identify and bring to the light the resources exhausted and cost rendered reciprocally to the environment by the business houses (Moid, 2017). The study of Nagle (1994), on environmental accounting reveals that corporate managers are placing high priority on environmental accounting. Environmental accounting is usually involved in several areas, such as: energy accounting, waste accounting, environmental criteria in capital expenditures, target setting for efficiency improvements (Wycherley, 1997). Environmental accounting system is part of a larger corporate environmental policy, which aims to prevent and reduce environmental impact, through life-cycle analysis, integration of environmental values into the supply chain, eco-design of products and services and environmental monitoring and auditing (Scur & Barbosa, 2017). Environmental accounting as a prevalent subject in the international community is not yet a priority in Nigeria. According to the US Environmental Protection Agency (1995a), Green accounting or Environmental accounting is defined 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 the negative environmental effects of activities and systems'. Inyang, Eyo, and Otuagoma (2021). opined that environmental accounting is not only part of a reporting system. It is also a very effective communication tool, since all environmental remedial strategies implemented by managers must be accompanied by disclosure to have any effect on external parties. That is, information is necessary to change perceptions. Remedial action which is not publicized will not be effective in changing perceptions. Environmental accounting is about making environmental related costs more transparent with corporate accounting systems and reports. In other words, environmental accounting is a system that attempts to make the best possible quantitative assessment (in terms of either monetary or physical units) of the costs and benefits to an enterprise due to

the environmental preservation activities that it undertakes. Modupe, (2020) defines environmental accounting as: ‘the generation, analysis and use of monetarized environmentally related information in order to improve corporate environmental and economic performance’. In the opinion of Modupe, environmental accounting does not only focus on internal and external environmental accounting but links environmental and financial performance more visibly. Environmental accounting assists in getting environmental sustainability embedded with an organization’s culture and operations. The aim is to provide decision makers with the information that enable the organization to reduce costs and business risks and add value. Environmental accounting in the context of national income accounting refers to natural resource accounting, which can entail statistics about a nation’s or region’s consumption, extent, quality, and value of natural resources, both renewable and non-renewable. Environmental accounting in the context of financial accounting usually refers to the preparation of financial reports for external audiences using Generally Accepted Accounting Principles. Environmental accounting as an aspect of management accounting serves business managers in making capital investment decisions, costing determinations, process/product design decisions, performance evaluations, and a host of other forward-looking business decisions.

Gray, Bebbington and Walter (1993) defined environmental accounting in the following terms: “it can be taken as covering all areas of accounting that may be affected by the business response to environmental issues. Major functions of environmental accounting are: (i) recognizing and seeking to mitigate the negative environmental effects of conventional accounting practices; (ii) separately identifying environmentally related costs and revenue within the conventional accounting systems; (iii) taking active steps to set up initiatives in order to ameliorate existing environmental effects of conventional accounting practices; (iv) devising new forms of financial and non financial accounting system, information systems and control systems to encourage more environmentally management decisions; (v) developing new forms of performance measurement, reporting and appraisal for both internal and external purposes; (vi) identifying, examining and seeking to rectify areas in which conventional (financial) criteria and environmental criteria are in conflict; (vii) experimenting with ways in which sustainability may be assessed and incorporated into organizational orthodoxy. Broadly, environmental accounting involves the identification, measurement and allocation of environmental costs, the integration of these costs into business, identifying environmental liabilities, if any, and finally communication of this information to the company’s stakeholder as part of general purpose financial statements.

## Theoretical review

This study is anchored on the stakeholder theory of organization management and business ethics which deals with values and morals in managing an organization. It has its main underpinning on the emphasis placed on the role of stakeholders of a firm in the pursuit of its objectives. “Stakeholder theory attempts to articulate a fundamental question in a systematic way: which groups are stakeholders deserving or requiring management attention, and which are not?” (Mitchell, Agle & Wood, 1997). It acknowledges the dynamic and complex relationships between organizations and their stakeholders and that these relationships involve responsibility and accountability (Gray et al., 1996). “Stakeholder analysis enables identification of those societal interest groups to whom the business might be considered accountable, and therefore to whom an adequate account of its activities would be deemed necessary” (De Silva Lokuwaduge, & De Silva, 2022). The stakeholders of a firm are viewed as being a critical factor to the survival of the organization. According to Friedman and Miles (2002), the concept is about how the organization should be and how it should be conceptualized.

They state that the organization should be thought of as “a grouping of stakeholders” and its purpose should be to manage the interests, needs and viewpoints of the stakeholders. Managers must manage the organization for the benefit of the stakeholders, ensuring that their rights are taken care of and those they participate in decision making processes (Friedman & Miles, 2006). The scholars argue that this is critical to the long term survival of the corporation. In a broader view, the concept of stakeholder view can be expressed in the sense that the role and purpose of the organization is not anymore guided by profit making and maximization of shareholders’ wealth; but also to defend an image and values respecting the special

relationships that arise and develop between it and all its stakeholders (Friedman & Miles, 2006). The theory is much concerned with active management of the business environment, relationships and the promotion of shared interests in order to develop business strategies. The relevance of this theory to this study is that management should try and build a framework that will be responsive to the concerns of managers who were being buffeted by unprecedented levels of environmental turbulence and change.

### **Empirical review**

Inyang, Eyo, and Otuagoma (2021) investigated green proficiency accounting and yields of the oil and gas consortiums: Nigeria's outlooks. The survey explicitly measured the effect of oil emission cost, oil waste controlling cost and gas diffusion cost on the return on equity nominated oil consortiums in Nigeria. The study embraced the ex-post facto design and obtained data from the yearbooks of the carefully chosen consortiums. The pane method was useful in valuing the studies constraints and strictures. The results from the pane regression valuation indicated that oil emission cost has adverse and substantial influence on the profit after tax of oil consortiums in the upstream subdivision; gas spreading cost has a negative and irrelevant influence on the profit after tax of oil consortiums in the upstream sector and oil waste management cost has a negative and irrelevant effect on the profit after tax of oil consortiums in the upstream sector. Based on their findings, it was recommended that oil and gas consortiums should develop an antispillage strategy to enhance the prevention and/or timely detection of oil spillage to reduce the allocated cost for spillage relate activities and so enhance profitability and return on assets. Also, oil consortiums should formulate policies to reduce gas flaring through adequate inspection and monitoring of exploration activities to reduce the allocated cost for gas flaring and lastly, adequate controlling of oil waste should be energized and encouraged to congeal the petroleum products and augment profitability and the causative power of the assets of the oil consortiums in Nigeria. Modupe (2020) examined the effect of environmental accounting on the life of the citizen and also on sustainable development in Nigeria. This study was narrowed to the 3 selected manufacturing companies (Portland Paint and Product, Bevpak and Premier Feed Mills Nigeria ltd) located in Ibadan metropolis, Oyo State.

The primary source of data was used and out of two hundred (150) questionnaires that were distributed, 136 were received and only 124 fully filled were used in data analysis with the use of simple percentage and Chi-Square statistical tool. The major result of the hypothesis tested showed that environmental accounting as a significant effect on sustainable development with ( $X^2_{cal} (16.65) > X^2_{tab} (16.65)$  at significant level 0.05) and also enhance the life of the citizen with ( $X^2_{cal} (16.65) > X^2_{tab} (16.65)$  at significant level 0.05). Findings from the analysis of the data indicated that environmental accounting has enhanced sustainable development by reducing the environmental impact while increasing the value of an enterprise, satisfying human needs, contributing to the quality of life, and resource intensity. To this end, it is recommended that there is need for government to impose a restriction on the release of a toxic substance into the environment and stipulating the requirement which industries and facilities generating waste must meet. Lawal, A. B. (2016) established the effect of environmental accounting on the quality of accounting disclosure of shipping lines in Nigeria. This study adopts both descriptive design and correlation analysis and the population of the study is the employees of the 101 registered shipping lines in Nigeria. The target population of this study was restricted to three departments which comprises of the legal department, finance and account department and technical and marine department of the shipping lines. The sample size for this study was 384 which were derived from Cochram's model. Primary data was collected through administering of questionnaires to the staff of the shipping lines in Nigeria. Multiple regression models were used to establish the relationship between the dependent variable and the independent variables. The relationship among variables was tested using ANOVA, pearson correlation, multivariate regression and F- statistic. Data analysis was done using Statistical Package for Social Sciences (SPSS) generating both descriptive and inferential statistics including Pearson's bivariate correlation. The findings of this study show that environmental accounting influences quality of disclosure on shipping lines in Nigeria. The study concluded that there exists a positive significant relationship between environmental accounting and quality of accounting disclosure on shipping lines in Nigeria.

Based on the findings of this study, it is highly recommended that companies are to decide in their discretion which expenditure or cost should be included under the environmental expenses or cost. Environmental costs should be capitalized or expensed as the most controversial subjects for accountants as well as financial analyst. Companies should capitalize environmental cost if they are considered to be a cost of the expected future benefits from the assets regardless of whether there is any increase in economic benefits. Companies should recognize liability in the balance sheet when it is probable that an outflow of resources embodying economic benefits will result from the settlement of a present obligation. Bassey, Sunday and Okon (2013) examined the impact of environmental accounting and reporting on organizational performance with particular reference to oil and gas companies operating in the Niger Delta region of Nigeria. The study contrast significantly with the present study which examined the effect of environmental accounting on the quality of accounting disclosure of shipping lines in Nigeria. Another area of contrast is the methodology adopted for this study. The current study employed the use of multiple regressions in order to establish the relationship between the variables. Under the present study, elements were selected by means of purposive sampling technique while the study adopted the random and stratified sampling technique. Uwiegbe and Olayinka (2011) investigated the level of corporate social environmental disclosure among listed companies in the brewery and building material industry in Nigeria.

This study contrast significantly with the current study which investigated the effect of environmental accounting on the quality of accounting disclosure of shipping lines in Nigeria. The present study employed the use of multiple regression analysis to establish the relationship between the dependent and independent variables on shipping lines in Nigeria. The present study find out whether there is a significant difference in the effect of environmental accounting on the quality of accounting disclosure of shipping lines in Nigeria while the study seeks to find out whether there is a significant difference in the level of corporate social environmental disclosures between the brewery and building material industry in Nigeria. The sample size was another area of contrast. The study used a small number of five as the sample size. The current study makes use of larger number of sample size to have a valid generalization of the conclusion. The study adopted the use of secondary data as the only source of data while the current study adopt the use of both primary and secondary data and evaluate the effect of environmental accounting on the quality of accounting disclosure of shipping lines in Nigeria.

## METHODOLOGY

The study employed expo-facto research design and purposive sampling technique was used to determined sample size of 10 registered companies out of 25 study's population. The research instrument used in this study is made up of primary source and secondary source. The primary sources included questionnaires, while the secondary sources include textbooks, internet, journals, published and unpublished articles and government publications. This study used both descriptive and panel estimation of regression to achieve the stated objective as well as relevant diagnostics.

### Summary of Measurement of Variables

Dependent variables	Measurement
Return on Assets (ROA)	$\frac{\text{Profit after tax}}{\text{Total Asset}} \times 100$
Independent Variables	
Cost of Environmental Remediation and Pollution Control (CERPC),	Log of actual amount on costs of pollution and control.
Cost of Environmental Laws Compliance and Penalty (CELCP),	Log of actual amount on costs of compliance and penalties
Donations and Charitable Contributions Costs (DCCC)	Log of actual amount of donations

Source: Author's Compilation (2022)

## Model specification

Model 1

$$ROA = f(CERPC, CELCP, DCCC) \tag{1}$$

$$ROA_{it} = \beta_0 + \beta_1 CERPC_{it} + \beta_2 CELCP_{it} + \beta_3 DCCC_{it} + \varepsilon_{it} \dots \tag{2}$$

Where:

*ROA* = Return on Assets

*CERPC*= Cost of Environmental Remediation and Pollution Control,

*CELCP*= Cost of Environmental Laws Compliance and Penalty

*DCCC*= Donations and Charitable Contributions Costs

$\varepsilon$  = Stochastic or disturbance term.

*t* = Time dimension of the Variables

*i* = Cross Sections of company

$\beta_0$  = Constant or Intercept.

$\beta_1 - \beta_3$  = Coefficients of parameters for model

## DISCUSSION AND FINDINGS

**Table 1 Descriptive Statistics**

	ROA	CELCP	CERPC	DCCC
Mean	6.773203	6.685778	4.607111	5.155889
Median	4.722500	6.605000	4.830000	3.145000
Maximum	26.49350	8.600000	5.970000	43.58000
Minimum	-7.610800	-6.100000	0.280000	0.040000
Std. Dev.	7.474556	1.817384	1.003223	7.833814
Skewness	0.853482	-3.909247	-1.434144	3.340699
Kurtosis	3.316809	28.23538	5.876223	14.78941
Jarque-Bera	11.30286	2617.324	61.87400	688.6174
Probability	0.003512	0.000000	0.000000	0.000000
Sum	609.5883	601.7200	414.6400	464.0300
Sum Sq. Dev.	4972.339	293.9568	89.57465	5461.810
Observations	90	90	90	90

From the descriptive statistics table 1 above revealed that the results of mean, median, maximum and minimum value, and the distribution of the sample measured by the skewness, kurtosis and the Jaque-Bera statistics for 10 firms as well as the observations of the variables. It was discovered that the firms had on the average, a positive value of 6.773203 for ROA, 6.685778 for CELCP, 4.607111 for CERPC, 5.155889 for DCCC and the total number of observations in all situations is 90. The median was also computed and arrived at with ROA having a positive value of 4.722500, CELCP had positive value of 6.605000, CERPC had positive value of 4.830000 and DCCC had positive value of 3.145000. This revealed that there was no



much variation in the median from the mean of the selected companies which implied that all variables included are fit for the study. It was also revealed that the maximum value of ROA is 26.49350 while the minimum value being negative was -7.610800, CELCP had a maximum value of 8.600000 while the minimum value was -6.100000, CERPC had a maximum value of 5.970000 while the minimum value was 0.280000, DCCC had a maximum value of 43.58000 while the minimum value was 0.040000. The standard deviation of the companies which measures the extent to which they are scattered around the mean stood at 7.474556 for ROA, 1.817384 for CELCP, 1.003223 for CERPC, 7.833814 for DCCC respectively. The results do not reveal serious variation from the means, this implied that all variables included are fit for the study. Skewness on the hand measures the asymmetry of the distribution of the values around the mean which was arrived at as positive values at 0.853482 for ROA, negative value at -3.909247 for CELCP, negative value at -1.434144 for CERPC, positive values at 3.340699 for DCCC.

Also, the kurtosis which measures the peakness or the flatness of the distribution of a series in which 3.0 is the standard for normal distribution series; ROA, CELCP, CERPC and DCCC with values of 3.316809, 28.23538, 5.876223 and 14.78941 are all greater than 3.0 then the distribution is peaked relative to the normal, Being peaked means that very few observations within the region where the median resides. Where CELCP was the most peaked variable, ROA was the least peaked variable. Jarque–Bera is another statistical instrument that was used for the measurement of variables and is a test that is used for knowing whether a series is normally distributed or not and it also measures the difference between the Skewness and kurtosis of the series with that of the normal distribution. The statistical and p–values implied the presence or absence of normality in the distribution of all the variables. In this set of variables that was measured, all have values that is significantly greater than the p–value ( $p > 0.05$ ). In conclusion, Table 1 shows that all the series display a high level of consistency being that their mean and median values are within the maximum and minimum values of the series. Also the deviation of the actual data from their mean value are very high, this is indicated by the relatively high value of the standard deviations. The statistics show that the series are positively skewed meaning that the distribution has a long right tail and in term of the peakness of flatness of the distribution of the series measured by the kurtosis, the table shows that the series are peaked relative to the normal. The probability that the Jarque-Bera statistics exceeds the observed value is low for all the series.

**Table 2 Correlation Matrix**

	ROA	CELCP	CERPC	DCCC	VIF
ROA	1.000000				NA
CELCP	-0.046825	1.000000			1.039983
CERPC	0.123363	0.235551	1.000000		1.015768
DCCC	-0.087250	0.054137	0.310251	1.000000	1.047032

Whereas the descriptive output tells us about each set of data (i.e., the mean, standard deviation, and number of values for each variable), the correlation matrix in the output tells us how the variable are related. The table 2 above shows the correlation matrix between the variables and whether there is any relationship between them. This is necessary because the independent and dependent variables needs to be tested for multicollinearity. The table shows that the all the variables i.e. (ROA, CELCP, CERPC, and DCCC) had correlation coefficients that were very low and they are less than 0.9 having either positive or negative values. This result showed that the variables are independent of each other and this means that the variables can be included and used in a regression analysis as independent variable without getting spurious results. According to the correlation matrix, ROA correlates positively with CERPC but negatively with CELCP and DCCC, this implied that the higher the Cost of Environmental Remediation and Pollution Control, the higher the Return on Assets. ROA correlating negatively with CELCP and DCCC implied that Cost of Environmental Laws Compliance and Penalty; and cost of Donations and Charitable Contributions will reduce the Return on Assets. CELCP positively correlates with CERPC and DCCC, this implied that the

higher Cost of Environmental Remediation and Pollution Control, the higher the Cost of Environmental Laws Compliance and Penalty; and cost of Donations and Charitable Contributions. Also, CERPC positively correlates with DCCC, this implied that an increase in Cost of Environmental Remediation and Pollution Control will be bring about an higher increase in cost of Donations and Charitable Contributions.

**Table 3 Regression Analysis**

Variables		Pool OLS	Random Effect	Fixed Effect
C	Coef.	11.08118	17.62505	<b>20.66949</b>
	t-Sat	2.542464	2.705996	<b>2.910488</b>
	p-val	0.0128	0.0082	<b>0.0047</b>
	Coef.	0.757954	2.268633	<b>2.852721</b>
CERPC	t-Sat	0.880798	1.958635	<b>2.163165</b>
	p-val	0.3809	0.0534	<b>0.0336</b>
	Coef.	-0.052106	-0.053332	<b>-0.075496</b>
DCCC	t-Sat	-0.485797	-0.385667	<b>-0.492193</b>
	p-val	0.6283	0.7007	<b>0.6240</b>
	Coef.	-0.081867	-0.018701	<b>-0.054479</b>
CELCP	t-Sat	-0.181023	-0.042002	<b>-0.117474</b>
	p-val	0.8568	0.9666	<b>0.9068</b>
	<b>R<sup>2</sup></b>	0.018247	0.046326	<b>0.559476</b>
	F –stat	0.532794	1.392509	<b>8.149317</b>
	P-val	0.661010	0.250581	<b>0.000000</b>
	<b>Hausman Test</b>	<b>9.887246</b>		
	<b>P-val</b>	<b>(0.0085)</b>		

Source: Author’s Computation (2022)

According to the Hausman test result that is presented in the Table 3, the Hausman null hypothesis of random effect model is not appropriate and to be rejected as the Hausman test is statistically significant (0.0085) at 5 per cent level of significant with chi-square value of 9.887246. From the table 3 which is the result of Pooled OLS , Random Effect and Fixed Effect model regression, the results showed that, the t-statistics(p-value) calculated for CERPC at 0.3809, 0.0534, respectively was greater than the critical value of 5%, while the fixed effect results showed 0.0336 for the t-statistics (p-value) which is less than criticalvalue . This implied that cost expended by the company on environment remediation and pollution control was not significant on economic performance of Nigerian shipping lines according to OLS and Random

effect result, but cost expended by the company on environment remediation and pollution control was significant on performance of Nigerian shipping lines according to Fixed Effect model regression, since Breusch Pagan lagrange multiplier test suggested Pooled OLS is more appropriate than Random effect, while Fixed effect is more appropriate than Pooled OLS (Trevor Breusch & Adrian Pagan, 1979), Fixed effect result will be accepted, therefore the null hypothesis will not be accepted. This result also showed that the t-statistics (p-value) calculated for DCCC at 0.6283, 0.7007 and 0.6240 respectively was significantly greater than the critical value of 5%, which therefore, implied that cost expended by the company on Donations and Charitable purposes do not significant have effect on the return on assets which stand in for the economic performance of Nigerian shipping lines, therefore the null hypothesis will not be rejected. Likewise, the he t-statistics(p-value) calculated for CELCP at 0.8568, 0.9666 and 0.9068 respectively was significantly greater than the critical value of 5%, which implied that Cost of Environmental Laws Compliance and Penalty has no significant effect on the economic performance of Nigerian shipping lines, therefore the null hypothesis will not be rejected. Regression coefficient result shows that CELCP, CERPC, and DCCC at 0.757954, -0.052106, and -0.081867 respectively, this implies that if this was that a unit increase in CELCP might lead to a more than a unit increment in the economic performance of Nigerian shipping lines due to the positive result. While, CERPC and DCCC which are negative this this was that a unit increase might lead to a more than a unit reduction in the reported ROA (economic performance) of Nigerian shipping lines. Regression coefficient result shows that CELCP, CERPC and DCCC at 0.757954, -0.052106, and -0.081867 respectively, this implies that if this was that a unit increase in CELCP might lead to a more than a unit increment in the economic performance of Nigerian shipping lines due to the positive result. While, CERPC and DCCC which are negative this this was that a unit increase might lead to a more than a unit reduction in the reported ROA (economic performance) of Nigerian shipping lines. This overall statistical significant (F- statistic) showed that model one of return on assets (ROA) is statistically significant which suggest that the overall model estimates in model can be relied on in explaining return on assets in the Nigerian shipping lines.

## SUMMARY OF THE FINDINGS

The main objective of this study was to investigate relationship between environmental cost and economic performance of Nigerian shipping lines. In order to actualize this objective, the study employed expo-facto research design and purposive sampling technique was used to determined sample size of 10 registered companies out of 25 study's population. The source of data for the study was secondary data which were obtained from the annual financial reports of sampled companies over the period 2011 – 2021. This study used both descriptive and panel estimation of regression to achieve the stated objective as well as relevant diagnostics. The correlation analysis revealed that all of the variables— CERPC, CELCP and DCCC—had correlation coefficients that were either positive or negative and less than 0.9. This finding demonstrated the variables' independence from one another, which allows them to be used as independent variables in a regression analysis without producing misleading results. The Hausman test result showed that the Hausman null hypothesis of random effect model is not appropriate and to be rejected as the Hausman test is statistically significant (0.0085) at 5 per cent level of significant with chi-square value of 9.887246. The result of Pooled OLS and Random Effect showed that the t-statistics(p-value) calculated for CERPC was greater than the critical value of 5%, while Fixed Effect model regression showed that the t-statistics(p-value) calculated for CERPC was greater than the critical value of 5%, since the result of fixed effect is the most appropriate (Trevor Breusch & Adrian Pagan, 1979), which implied that cost expended by the company on environment remediation and pollution control was significant on economic performance of Nigerian shipping lines. DCCC and CELCP do not have significant effect on economic performance of Nigerian shipping lines due to their t-statistics(p-value) calculated were greater than the critical value of 5%.

## CONCLUSION

The study's findings revealed a significant relationship between environmental cost and economic performance of Nigerian shipping lines. In light of the findings, the following conclusions were made: According to the correlation result, the Cost of Environmental Remediation and Pollution Control have positive significant effect economic performance (ROA) of Nigerian shipping lines. This is may be as a result of costs of recycling products, training staff, treating toxic waste and maintaining pollution equipment, and carrying out environmental studies among others enabling the companies perform better economically. Cost of Environmental Laws Compliance and Penalty; and cost of Donations and Charitable Contributions has no significant effect on economic performance (ROA) of Nigerian shipping lines. Also, Hausman test showed a statistical significant relationship, Fixed effect result showed that cost expended by the company on environment remediation and pollution control was significant on economic performance of Nigerian shipping lines. While, DCCC and CELCP do not have significant effect on economic performance of Nigerian shipping lines due to their t-statistics(p-value) calculated were greater than the critical value of 5%.

## RECOMMENDATION

Therefore, the study recommended that the company should spend more on the Cost of Environmental Remediation and Pollution Control which include costs of recycling products, training staff, treating toxic waste and maintaining pollution equipment, and carrying out environmental studies, since, they have positive effect on economic performance of Nigerian shipping lines than on Cost of Environmental Laws Compliance and Penalty and Donations and Charitable Contributions Costs.

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