Environmental Cost Accounting: Implications on Profitability of Consumer Goods Companies in Nigeria

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Abstract

The primary aim of business enterprises is to make profit but they ought to be accountable for the effect of their activities on the environment. The study investigated the effect of environmental cost accounting on the profitability of consumer goods companies in Nigeria. Two research questions guided the study and two null hypotheses were tested at 0.05 level significance. The study covered a period of ten years 2013-2022. The study adopted an ex post facto research design. Sixteen consumer goods companies participated in the study. The findings of the study indicated that environmental cost had a positive effect on net profit margin and returns on capital employed.

Keywords: *Environmental cost accounting, profitability, net profit margin, return on capital employed, firm size*

Introduction

Business enterprises are crucial to the development of an economy as they offer products and services to meet society`s needs and provide employment and revenue to the Government. The environment in turn offers the location and natural resources for business enterprises to carry out their activities. The environment is the sum total of conditions that surround people at a given point in time and space (Oscar Education, 2013). It consists of the atmosphere, lithosphere, hydrosphere and biosphere. The environment is made up of water, air, soil, organisms and solar energy. Businesses cannot survive without the environment. This entails that business enterprises ought to take responsibility for their environment. Ray (2017) averred that responsibility towards the environment has become one of the most crucial areas of social responsibility leading to the advent of environmental cost accounting.

Environmental cost accounting (ECA) is a specialized accounting approach that involves the systematic identification, collection, analysis, and reporting of costs related to an organization's environmental impact and performance (Obiora, Onuora & Okoye, 2022). It aims to provide a comprehensive understanding of the economic consequences associated with environmental aspects, such as pollution control, waste management, energy efficiency, and sustainability efforts (Oraka & Egbunike, (2016). According to Iliemena, Amedu and Uagbale-Ekatah, (2023), ECA entails the collection and analysis of environment-related data, and the integration of this

information into a business financial statement or sustainability reports to inform decision-making. As cost accounting uses accounting record to directly allocate costs to products and processes, under ECA, environmental costs are accounted for by their specific causes. It is simply geared towards determining the impact of a company's activities on the environment and taking responsibility for them. Taking responsibility has financial implications hence, companies need to know the type of impact environmental cost accounting will have on its profitability since its primary goal is to make profit.

Profitability is the ability or propensity of a business to make a profit. Nishanthini and Nimalathasan (2013) defined profitability as the ability of a given investment to earn a return from its use. It entails the ability or capacity of a given investment to earn a return from its use. The profitability of a business is paramount and companies are eager to know the impact of their decisions on the profitability of their businesses. Corporate profitability refers to a financial measure of how well a business enterprise conducts its corporate activities in an economically efficient manner. Profitability shows how effectively a company can utilize its assets from its primary business operations to generate revenue (Okafor, 2018). The need to measure corporate profitability is rooted in management's obligation to provide an account of their stewardship to the shareholders. Profitability ratios are used to ascertain the profitability of a business by measuring the company's bottom line and its return on investment. Profitability ratios include among others net profit margin and return on capital employed. Several factors can also affect the profitability of a company. Kihamba (2017) identified firm size and leverage as having the ability to affect profitability of a company. Hence, there is need to control these variables in this study. The magnitude of a firm holds a central role in assessing a company's performance, largely due to the concept of economies of scale, as seen in the traditional neoclassical perspective of the firm (Efuntade & Akinola, 2020). Larger firms tend to wield more competitive prowess when compared to their smaller counterparts in the competitive landscape. Irom, Okpanachi, Ahmed and Tope, (2018) asserts that firm leverage encompasses the combination of equity and liabilities that a company employs to fund its assets. In financing its investments, a company has the option to utilize debt, equity, or even preference capital (regardless of the company's rate of return on assets, the interest rate on debt remains fixed.

Net profit margin

Net profit margin (NPM) is a financial ratio that measures a company's profitability by calculating the percentage of revenue remaining after deducting all the expenses, including taxes, interest, and operating costs (Mahdi &Khaddafi, 2020). The net profit margin indicates how much profit a company earns for every naira of revenue it generates (Rika, 2016). A higher NMP implies that a company is more efficient at controlling its expenses and generating profit, while a lower NPM may indicate that a company is struggling to control its costs or facing competitive pressures. Net profit margin provides insight into how well a company generates profit from its operations, and how efficiently it manages its costs (Wahyu& Mahfud, 2018). Accounting for environmental costs may lead to an initial increase in a company's operating costs. However, with proper

management and control measures, operating costs will be reduced and more revenue will be generated.

Net profit margin is an important metric for investors and analysts because it helps them to understand how much profit a company makes on each naira of sales (Sunaryo, 2020). A higher net profit margin is generally seen as a positive sign because it indicates that a company earns more profit from its operations. Although, it is important to note that a high net profit margin does not necessarily mean a company is doing well. For example, a company may have high-profit margins, but if its revenue is declining, it may still be in financial trouble. On the other hand, a lower profit margin does not always indicate poor performance. For example, a new company that invests heavily in research and development may have a lower net profit margin because it is not yet generating significant revenue, but it may be laying the foundation for future growth and profitability. The formula for calculating net profit margin is:

Net Profit Margin = (Net Profit / Revenue) x 100

Where: Net Profit = the amount of profit left over after deducting all expenses; Revenue = the total amount of sales generated during the same period.

Returns on capital employed

Returns on capital employed (ROCE) is an essential financial ratio that measures a company's efficiency in generating profits from its equity and non-current liabilities (Casielles, 2019). It provides insights into how effectively a company uses its capital employed to generate revenue and profits (Murtala, Ibrahim, Lawal &Abdullahi, 2018). ROCE is calculated by dividing the company's net income before interest by its total capital employed. Net income before interest is the total profit earned by the company before deducting all interest and taxes, while total capital employed represents the value of all equity and noncurrent debts owed by the company.

A higher ROCE indicates that the company is generating more profits from its resources. This implies that the company is utilizing its borrowed funds and shareholders' equity efficiently to generate revenue and profits, which is beneficial for its long-term financial stability. ROCE is a crucial measure for investors as it indicates how much return they can expect to receive from their investment in the company (Umobong &Agburuga, 2019). A company with a higher ROCE is more attractive to investors, as it implies that the company is generating more profits per unit of capital employed.

In terms of debt, ROCE also provides valuable insights into its performance in the capital structure. A higher ROCE suggests that the company is generating enough profits to cover the interest payments on its debts, which is a positive sign. However, a lower ROCE may suggest that the company's debt is too high, and its profitability is being negatively impacted by interest payments or cost of capital. Generally, ROCE is a crucial financial ratio that helps investors and companies evaluate a company's efficiency in generating profits from its capital employed (Casielles, 2019). Companies need to monitor their ROCE regularly to ensure that they utilize their capital employed

effectively and their financial leverage is working for them and not against them. According to Nishanthini and Nimalathasan (2013) a return on capital employed of 1% to 12% is considered normal for industrial activities.

The formula is as follows:

Return on capital employed Ratio: $\frac{\text{Net profit (PBIT)}}{\text{Capital Employed}} \times 100$

Where capital employed =average debt liabilities + average shareholders' equity

The following research questions guided the study:

1. What is the effect of environmental costs on the net profit margin in consumer goods companies in Nigeria?
2. What is the effect of environmental costs on return on capital employed in consumer goods companies in Nigeria?

Two hypotheses were tested at 0.05 level of significance:

1. Environmental costs do not have significant effect on net profit margin of consumer goods companies in Nigeria.
2. Environmental costs do not have significant effect on net returns on capital employed of consumer goods companies in Nigeria.

Method

The study adopted an ex post facto research design. The participants for the study were 16 consumer goods companies listed on the Nigerian Stock Exchange as of January, 2023. Only listed firms between 2013 to 2022 who uploaded their annual reports for those years online were included in the study. The data was collected from published annual reports of the consumer goods companies uploaded on the companies' official websites. Pearson product-moment correlation and Panel Least Square Regression analysis were used to analyze data for the study using STATA 13 statistical software. Pearson Correlation was used to answer the research questions, while regression analysis was used to test the hypotheses. The correlation coefficient (r) measures the strength and direction of the linear relationship between two variables (Emerson, 2015; Obilor &Amadi, 2018; Schober, Boer & Schwarte, 2018). The study adopted panel least square regression using environmental cost disclosure as the main predictor alongside firm size and firm leverage as the control variables. Panel least square regression or alternatively called Pooled OLS utilized all available data points across both cross-sectional units (individual entities or observations) and time periods (Basumatary & Devi, 2022). These results are more efficient estimations of the regression coefficients compared to separate cross-sectional or time-series regressions. Pooling data across multiple units and time periods, panel least square regression provides greater statistical power to detect relationships and estimate coefficients accurately (Wooldridge, 2010).

In this study, a positive correlation indicates that as environmental costs increase, the profitability index tends to increase as well, while a negative correlation would suggest the

opposite. The p-value is used to determine the statistical significance of the correlation coefficient (Sedgwick, 2012). It tells us whether the observed correlation is statistically significant or if it could have occurred by random chance.

When the correlation coefficient (r) is: ±0.01 to 0.20 = Very weak; ±0.41 to 0.60=Moderate; ±0.61 to 0.80 =Strong; ±0.81 to 1.00 =Very strong. + = implies that an increase in one variable leads to an increase in the other variable; _ = implies that an increase in one variable leads to a decrease in the other variable; Zero (0) = implies no relationship; Unit (1) = implies a perfect relationship.

The estimated model is as follows:

$$NPM_{it} = \beta_0 + \beta_1 EC_{it} + \beta_2 FS_{it} + \beta_3 LEV_{it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

$$ROCE_{it} = \beta_0 + \beta_1 EC_{it} + \beta_2 FS_{it} + \beta_3 LEV_{it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where: NPM_{it} = Net Profit Margin of company *i* in period *t;* $ROCE_{it}$ = Returns on Capital Employed of company *i* in period *t;* FS_{it} = Firm Size of company *i* in period *t;* LEV_{it} = Leverage of company *i* in period *t*; μ_{it} = component of unobserved error term of company *i* in period *t*; β_0 = constant term; β_1, β_2, and β_3 = slopes to be estimated of company *i* in period *t*; *i* = company identifier (16 companies)

t= time variable (2013, 2014,2015…….2022)- (Ten years)

The independent variable is Environmental Costs (EC), the dependent variables are: operating profit margin (OPM), net profit margin (NPM), earnings per share (EPS), returns on equity (ROE), returns on capital employed (ROCE) and returns on assets (ROA) while the control variable are: firm size (FS) and leverage (LEV).

Results and Discussions

The result of the findings of the study is presented in the tables below:

Table 1: Correlation of the effect of environmental cost on net profit margin

Correlation (*r*)	
Variable	Net Profit Margin
EC	0.1230
p-value	0.1338

Source: Stata 13 Analysis Output (2023)

Table 1 shows the correlation of the effect of environmental cost on net profit margin. The correlation coefficient is positive (0.1230). This implies that a weak positive relationship between environmental costs and net profit margin. This means that, on average, as environmental costs increase, there is a tendency for the net profit margin to increase slightly.

Table 2: Correlation of the effect of environmental cost on returns on capital employed

Correlation (*r*)	
Variable	Returns On Capital Employed
EC	0.2886*
p-value	0.0002

Source: Stata 13 Analysis Output (2023)

Table 2 shows the correlation of the effect of environmental cost on operating profit margin. The correlation coefficient is positive (0.2886), indicating a moderate to strong positive relationship between environmental costs and return on capital employed. This suggests that, on average, as environmental costs increase, there is a tendency for return on capital employed to increase significantly.

Hypothesis I

Environmental costs do not have significant effect on net profit margin of consumer goods companies in Nigeria.

Table 3: Regression analysis of the effect of EC on NPM

Sources	**SS**	**Df**	**MS**	**F**	**Sig.**	**Decision**
Model	.883	3	.2944	12.56	0.000	Significant
Residual	3.422	146	.0234			
Total	4.30	149	.029			
	Coefficient	**SE**	**Beta**	**T**	**Sig.**	**Decision**
EC	.0141	.0346	.037	0.41	0.294	Not Significant
FS	.0577	.0235	.219	2.45	0.015	Significant
Lev	-.0144	.0026	-.401	-5.42	0.000	Significant
Constant	-.3843	.1755		-2.19	0.030	Significant

Source: Stata 13 Analysis Output (2023)

Table 3 shows the result of the regression analysis conducted to test the null hypothesis that environmental costs do not have a significant effect on the net profit margin of consumer goods companies in Nigeria. The F-statistic tests the overall significance of the regression model. In this analysis, the F-statistic is 12.56, and the associated probability (p) is 0.0000< 0.05, which indicates that the overall regression model is statistically significant. The R-squared value is 0.205, representing the proportion of the variance in the net profit margin that is explained by the independent variables in the model. Thus, the model explains approximately 20.52% of the variance in net profit margin.

The coefficient for the environmental costs variable (EC) is 0.014. This coefficient represents the estimated change in the net profit margin (NPM) for a one-unit change in environmental costs, holding other variables constant. Therefore, an increase in EC by a margin will increase NPM by 0.014. The p-value associated with the environmental costs variable is 0.683. This p-value is

greater than the conventional significance level of 0.05, indicating that the coefficient for environmental costs is not statistically significant at the 0.05 significance level. Since the *p*-value for EC is greater than 0.05, the null hypothesis was accepted. It can be concluded that environmental costs have a positive but non-significant effect on the net profit margin of consumer goods companies in Nigeria (β = 0.014, *p*-value = 0.683). As for the control variables, while firm size has a significant positive effect on NPM, firm leverage has a significant negative effect at 5% level of significance.

The findings of the study showed that EC has positive effect on NPM. This is partly in agreement with the finding of Oshiole, Elamah, and Amahalu (2020) and Iheduru and Chukwuma (2019) who also found out from their study that EC had a positive but significant relationship with NPM. The positive but non-significant effect of environmental costs on the net profit margin of consumer goods companies in Nigeria aligns with the notion that environmentally responsible practices can lead to cost savings and operational efficiencies. Integrating sustainable initiatives into operations, such as recycling programs or eco-friendly packaging, companies not only appeal to environmentally conscious consumers but also reduce expenses associated with waste disposal and resource consumption. Consequently, their net profit margins increase as they simultaneously contribute to environmental conservation.

Hypothesis II

Environmental costs do not significantly affect returns on capital employed of consumer goods companies in Nigeria.

Table 4: Regression analysis of the effect of EC on ROCE

Sources	**SS**	**Df**	**MS**	**F**	**Sig.**	**Decision**
Model	1.608	3	.536	10.16	0.000	Significant
Residual	8.233	156	.053			
Total	9.841	159	.062			
	Coefficient	**SE**	**Beta**	**T**	**Sig.**	**Decision**
EC	.112	.049	.195	2.26	0.025	Significant
FS	.063	.0237	.232	2.66	0.009	Significant
Lev	-.012	.004	-.233	-3.12	0.002	Significant
Constant	-.324	.170		-1.91	0.058	Not Significant

Source: Stata 13 Analysis Output (2023)

According to Table 4, a regression analysis was conducted to test the hypothesis that environmental costs (EC) do not have a significant effect on the return on capital employed (ROCE) of consumer goods companies in Nigeria. The F-statistic was used to measure the overall significance of your regression model. The F-statistic is 10.16, and the associated p-value is very close to zero (0.0000), indicating that the regression model as a whole is statistically significant. This suggests that at least one of the independent variables has a significant effect on the dependent

variable (ROCE). The R-squared value (0.1634) represents the proportion of the variance in the dependent variable (ROCE) that is explained by the independent variables in the model. The model explains approximately 16.34% of the variance in ROCE. While this suggests some degree of explanatory power, it also implies that there are other factors not included in the model that affect ROCE.

The coefficient for environmental costs (EC) is 0.112. This coefficient represents the estimated change in the dependent variable (ROCE) for a one-unit change in the independent variable (EC), holding all other variables constant. Thus, a one-unit increase in environmental costs is associated with an estimated 0.112 unit increase in ROCE. The p-value (P>|t|) associated with the coefficient for EC is 0.025. This p-value indicates the statistical significance of the coefficient. Since it is less than the significance level of 0.05, it shows that environmental costs (EC) have a statistically significant effect on ROCE in the model. The *p*-value for EC is less than 0.05, hence, do not accept the null hypothesis and it can be concluded that environmental costs have a positive and significant effect on return on capital employed of consumer goods companies in Nigeria ($\beta = .112$, *p*-value = 0.025). As for the control variables, while firm size has a significant positive effect on ROCE, firm leverage has a significant negative effect on ROCE at 5% level of significance.

The finding of the study showed that environmental costs had a significant positive effect on return on capital employed (ROCE). This finding aligns with Iliemena, Amedu and Uagbale-Ekatah (2023) and Nzekwe (2022) that environmental costs positively affect ROCE. This highlights the financial benefits associated with responsible environmental management. Making environmentally conscious investments enables consumer goods companies to reduce their capital requirements, enhance operational efficiency, and optimize resource utilization. This, in turn, leads to higher ROCE as a reflection of the efficient utilization of invested capital to generate profits.

Limitations of the study

Only consumer goods companies were studied. Other sectors were not part of the study therefore, the outcome of the study cannot be generalized to companies outside the sector.

Implication of the Study

The positive impact on profitability can also be attributed to the ability of environmentally responsible companies to attract investors with a strong focus on sustainability. Since investors are increasingly considering environmental factors when making investment decisions, companies with robust sustainability programs for the environment are viewed as less risky investments and hence have easier access to capital at favorable terms. This implies an influx of investment that can provide companies with the financial resources needed to expand operations, innovate, and further improve their sustainability efforts, creating a virtuous cycle of financial and environmental progress.

Recommendation

Consumer goods companies in Nigeria should optimize their supply chain operations to reduce waste, implement energy-efficient technologies, and explore partnerships for recycling and waste

reduction. Such efforts can lead to higher net profits, making it advisable to allocate resources to environmentally responsible practices.

Conclusion

In conclusion, environmentally responsible practices contribute to the sustainability of the environment. It enhances the profitability of consumer goods companies in Nigeria which is driven by factors such as increased consumer demand for sustainable products, cost savings from efficiency improvements, and the ability to attract investors who prioritize environmentally responsible businesses.

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