



The relationship between corporate social responsibility, environmental investments and financial performance: evidence from manufacturing companies

Malik Shahzad Shabbir¹ · Okere Wisdom²

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Abstract

The primary objective of this research is to ascertain the relationship between corporate social responsibility, environmental investments and financial performance in Nigerian manufacturing firms. The hypotheses are tested on internal environmental investments and external environmental investments on firm's financial performance. It further determines if there is a significant difference between the profitability of environmentally conscious and environmentally non-conscious firms in Nigeria. Descriptive analysis is used to explain the variables applied and panel regression analysis is used to find out if there exists a relationship between internal environmental investments (employee benefits, staff training cost), external environmental investments (donations) and firm's financial performance. The results indicate a positive and significant relationship exists between internal environmental investments and firm's financial performance. It is also found a positive but insignificant relationship between external environmental investments and firm's financial performance. Furthermore, paired sample *t* tests are used to reveal that there was a significant difference between the profitability of environmentally conscious and environmentally non-conscious firms. The finding of this study explains that firms with higher environmental investments have a higher profitability level than environmentally non-conscious firms.

Keywords Environmental investments · Financial performance · Nigerian manufacturing firms

JEL classification D50 · E10

Introduction

There has been a longstanding debate on the significance of environmental investments. The globalization has conveyed to light another marvel called environmental investments. The corporate bodies are craving to accomplish reasonable advancement and enhance their personal satisfaction, and execute operations in such conduct that guarantee the security of the environment without however forsaking profit making (Rondinelli and Vestag 1996; and Berkowitz et al. 2000). It

is reasonable that maintainable business practice is moderately new as far as enforceable standards (Uwuigbe and Egbide 2012). Over the previous decade, Nigeria has seen gigantic monetary and social changes. Place that the operational exercises of associations have immediate or backhanded effect to the stakeholders. Consequently, Shabbir et al. (2020) clarifies that the communications between organizations and its environment represented some social and monetary difficulties that if not legitimately taken care of could unfavourably influence the smooth operations of organizational interaction with its environment. As of now, companies are confronted with a developing open request and even claim for sustainable management, which likewise shows up in a lot of non-legislative associations and in addition social enterprise concentrating on manageability and particularly environmental insurance (Uwuigbe 2012a, b; Goyal et al. 2013).

As of late, environmental accounting has been pulling in expanding consideration all through the World, because of increment in the financial outcomes of corporate

Responsible Editor: Nicholas Apergis

✉ Malik Shahzad Shabbir
Mshahzad786.pk11@gmail.com

¹ University of Lahore, Lahore, Pakistan

² Covenant University, Ota, Nigeria

Environmental effects Saleem et al. (2019a). Accordingly, firms appear to be worried with expanding expenses of ignoring ecological issues. The specified worldwide development comes up from the developing mindfulness for the ecological effects of the hugely quickened human exercises in the previous decades. Concentration on environmental issues has extended from being restricted towards quite recently the idea of pollution control to incorporate a bigger arrangement of administration choices, projects, apparatuses and advances that fuse environmental issues into useful contemplations. As indicated by Saleem et al. (2019b), little was perceived of the natural consumption and debasement to the environment until understood that it was not great having awesome corporate benefits in the event that they come at the cost of the biological community by which we are supported. Organizations may make social ventures with the aim of making shared money related, social and natural advantages since it implies corporate assets will probably be invested on the long run and that society will profit by the abilities of an organization putting resources into a way identified with its centre business. Environmental investment is about the business movement of formulating, commercializing and offering environmental solutions for commercial gain. It is viewed as firms' endeavours to lessen its natural effect, which may likewise adjust the firm's intensity as far as change in profitability and pretty much productive utilization of energy (Shanshan et al. 2015).

Industrialization has achieved economic improvements, production line pollution and more noteworthy land utilization, which have harmed the natural environment (Mastrandrea and Schneider 2008). For sure, the utilization of natural resources including energy is crucial to monetary advancement (Akinbami and Adegbulugbe 1998) and not without environmental consequences as traceable to the ecological debasement and climatic contamination experienced in Nigeria. However, this depends on the possibility that financial and environmental performance can be mutually enhanced (Porter 1991; Porter and Van der Linde 1995). Studies on environmental investments and firm performance can be categorized into two genres.

The first genre of these studies focuses on assessing impacts of environmental regulation. The argument over the effect of environmental regulation has been and still remains a critical subject since the suggestion of Porter speculation. The Porters theory says that more stringent environmental regulation could start firm development and enhance profitability—in a word, environmental regulation would expand benefits, diminish costs and consequently upgrade firm aggressiveness (Porter and Van der Linde 1995). The second kind of environmental investments concentrate for the most part on the connection amongst CSR and financial performance. Shabbir and Yaqoob (2019) sets that corporate social obligation ought to be dealt with as an investment, not as a cost or expense where it demonstrates a connection between

company and the stakeholders. Slowly environment is turning into a substantially more dire monetary, social and political issue. Furthermore, while from one viewpoint it is contended that environmental regulations which order environmental compliance prompt enhanced economic performance driven by expanded proficiency, different researchers have contended that controls create expenses to the firm that are unrecoverable (Russo and Fouts 1997) and subsequently the firm is basically less successful.

Most organizations concentrate on protecting brand and reputation and not the people or communities in which corporations operate. Hence, this study will focus on global workforce and local communities in relation to environmental investments of organizations. Customarily, just extensive multinational organizations have the ability to put resources into staff and community. However, there are considerable organizations; does that mean doing great and adding to social greatness is not essential to them? Human social responsibility implies that association of all sizes, as convener of individuals, will take their lead from employees and their individual human social contracts.

In the light of the above research problem, the relevant research questions are described as follows: What relationship exists between internal environmental investments and firms performance in Nigeria? What degree of relationship exists between external environmental investments and firm's performance in Nigeria? To what extent (if any) does the profitability of environmentally conscious firms differ from that of the environmentally non-conscious firms in Nigeria? The central objective of this study is to provide empirical evidence on the relationship between environmental investments and firms performance in Nigeria. Specifically, the objectives of this study are as follows: evaluate the influence of external environmental investments on the performance of firms, examine the relationship between internal environmental investments and firms performance, determine the difference between the profitability of the environmentally conscious firms and non-conscious firms in Nigeria.

This research work focuses on the impact of environmental investments on firm's performance in Nigeria. Consequently, it focuses on the corporate social responsibility aspect of environmental investments and finds a gap within which is the human social responsibility aspect because companies as well as researchers are not focusing on it. According to US EPA (1995), environmental costs can be divided into conventional costs, potentially hidden costs, contingent costs and image and relationship costs. It is to this length that this study will focus on environmental costs related to individuals whose organizational activities have direct impact on them. The secondary data would be sourced from the annual report of selected companies listed on the floor of the stock exchange market. Nigeria as the geographical scope of this study, the population size is 64 manufacturing listed companies in Nigerian Stock

Exchange (NSE 2017) (Appendix Table 9). The target population was made up of the manufacturing companies that were active on the Nigerian Stock Exchange as at March 3, 2017. With the use of a simple random sampling technique, these companies would be randomly selected to form the sample. The period to be covered is 8 years (2011–2018). The choice of this period is based on availability of data. The research work would focus on the manufacturing companies listed on the Nigerian Stock Exchange because the manufacturing sector has received much attention, given its relatively high impacts on the environment, and higher innovation potential.

This study will be useful to accounting standard setters such as Financial Accounting Standard Board (FASB) and International Accounting Standard Board (IASB) as it would gauge the importance of the environmental accounting and provide an insight into the strengths and weaknesses of environmental investments by an organization. This insight would, of course, help these standard setters in making necessary amendment to its measurement base and introducing human social responsibility variables which have not been used in prior studies, to measure environmental investments in Nigeria economy to bring about an enhancement of the quality of financial accounting information. It will also be useful to users of the financial statement as it would provide them with adequate information on a firm's interaction and investments within its environment. The outcome of this study will also serve as a reference point for future researchers in this field of research. The findings and recommendations of this research work would also help broaden the frontier of knowledge as it is a new area in accounting. This study is different from others because it focused solely on human social responsibility variables in corporate social responsibility paving way for a new area in research and offering results for a switch from corporate social responsibility to human social responsibility. This study will bring light to environmental protection through cost-efficient compliance with environmental regulations and self-imposed environmental policies such as planning and implementing pollution control investments or projects.

Literature review

Human social responsibility is a move from corporate social responsibility to a more people and community-centric effort (Hutchison 2016). Corporate social responsibility puts emphasis on the corporation and not on humans (Shabbir 2019). Hutchison (2016) posits that focus on corporate is actually limiting. Human social responsibility means that organizations of all sizes, as conveners of people, will take the lead from the employees and their individual social contracts. She also emphasizes that people are the centre of every organization, no matter why it exists. We, as humans, bring life to the vision and purpose of any organization. Corporations that have recently been exposed about their misconducts such as

BP, Volkswagen and Sports Direct have shown us that trying to rebuild a reputation as a responsible business can almost be impossible once the irresponsibility has become part of their identity. The move is important to commend the general population who convey an incentive to the organization. Additionally, there is a generalization that organizations are just out to profit. This is consistent with some degree since they should be beneficial so as to remain in business. Nonetheless, this generalization is one-dimensional and does not include the vital component of community engagement.

Regardless of whether social direction fortifies market development instead of exclusively social advancement (or any development whatsoever) is the focal topic of the argument encompassing the Porter hypothesis propounded by Michael Porter in the mid-1990s. But numerous firms in Congress and industry have posited that these regulations would “trample U.S. competitiveness” and are devising means to block the environmental protection agency from applying their methods. The considered literature reviewed will, to a limited extent, try to illuminate the Porter hypothesis and discuss with a review of the empirical proof. There are different meanings of environmental regulation. In any case, the study will adhere to the exceptionally bland definition distributed by the OECD. Such mediation in the market is supported to boost aggregate welfare, as well as achieve some distributive objectives.

Regulation and control can change along three measurements identified with performance—flexibility, information and stringency—in spite of the fact that not all directions will change along every one of the three. *Flexibility* depicts the quantity of execution ways firms have accessible for compliance. *Information* measures whether a regulation prompts more or less complete information in the market. *Stringency* measures how large the extent is to which a regulation demands compliance and innovation and imposes a compliance burden on a firm, industry or market. Corporate social responsibility (CSR) investments have expanded over the previous decade attributable to the more noteworthy number of stakeholders who consider such while picking firms to support.

Greatly contended that the advantages of environmental investments are greater than the expenses and more stringent regulatory standards will in fact promote innovation. He further argued that improved environmental performance is a potential channel for competitive advantage and following this are improvements in productivity, increased profitability and lower cost of compliance. In response to Porter's hypothesis, Palmer et al. (1995) argued that compliance with environmental regulations will always be costly driving firms to face a trade-off between social benefits and private costs. Hence, the gap in this study is to introduce human social responsibility existing as a subset of corporate social responsibility using variables that more people or communities centred. This study will focus on global workforce and local

communities using variables such as staff training cost, employees benefits, donations and community benefits.

Environmental costs

Environmental costs incurred are costs arising because poor environmental quality exists or have to be prevented, reduced or remedied. Hansen and Mowen (2000) have defined environmental costs as ‘costs associated with the creation, detection, remediation and prevention of environmental degradation’. They classified environmental costs into four categories of:

1. prevention costs,
2. detection costs,
3. internal failure costs and
4. external failure costs

The main additional market failures under discussion, as summarized in Brännlund and Lundgren (2009) and Ambec et al. (2013), include information asymmetries, imperfect competition, and research and development spillovers. Information asymmetry may prevent firms from investing in innovation and maximizing profits, since managers and other employees do not share the same objective functions with firm owners (Aghion et al. 1997; Gabel and Sinclair-Desgagné 1998), or because consumers cannot easily distinguish “green” products from less environmentally friendly goods (Rege 2000; Constantatos and Herrmann 2011).

On the other hand, successful patent applications did not increase with environmental compliance expenditures. Subsequent studies, all using industry-level data for manufacturing industries in developed economies, continue to employ pollution control expenditures to measure environmental stringency. Babalola (2012) recommended that Nigerian Government should build up some rules and regulations regarding CSR, so that every company will be bound to do social accounting and socially responsible activities. Shabbir et al. (2019) while writing on “does corporate social responsibility increase profits?” maintains that most executives believe that corporate social responsibility reporting can improve profits. Internal environmental investments are costs that directly impact on the income statement of the company and are related to stakeholders within an organization. Based on this study, only individual specific costs are considered and the variables here are employee benefits (EMB) and staff training costs (STC). External environmental investments are costs that are related to external stakeholders (community, public) of an organization which companies embark on for commercial gains. Based on this study, only individual specific costs are considered and the variables here are donations (DONs), and other community benefits (CMB) such as training costs of individuals in the society.

Research methods

The study employed content analysis in examining financial reports of Nigerian manufacturing listed firms to determine those that contain the relevant data for this research work. This study also made use of judgmental sampling method using longitudinal research design. The longitudinal design was considered suitable for this study because data on the variables were based within a selected period of time. In this study, both the independent and dependent variables exist and are observed at the same time because the effect of the former on the latter took place before this time. The study also used descriptive analysis in presenting the results which come in the form of tables, charts and diagrams.

The population for the purpose of this study consists of all the sixty-four manufacturing firms and fifteen money deposit banks which are listed on the Nigerian Stock Exchange (CBN 2017). Saleem and Shabbir (2020) posits that it is generally accepted to use 10% of the population as sample size in research studies, because having a sample size of 10% of the whole population has been a factful recommendation to be sufficient to embark on a research work. The annual report was analysed for a total of 15 selected companies and for the period of eight firm years. For companies to be selected as part of the sample population, the following initial conditions were selected. The firm was listed and active on the Nigerian Stock Exchange. Listed firms have their financial statements available for public use. The availability of financial statements was during the entire test period.

This research engages secondary data. The sources of data include annual reports and accounts of companies selected for this study between the 8-year period of 2011 and 2018. The choice of this period is based on the availability of data. Other sources include textbooks, journals and the Internet. Data was obtained from corporate environmental reports from the websites of the sample firms. The web page version was preferred over the printed version in order to ensure that the reports were expeditiously gathered. Comparison of hard copy and web reports from the subsample of companies exposed no substantive differences in the content of the reports. These financial statements are validated by the acceptance of the statement by the Securities and Exchange Commission being the singular most authoritative financial medium that has consistently over the years published the financial reports of firms in Nigeria for over 19 years with close monitoring (Bessong and Charles 2012). With respect to this, information from Stock Exchange Market are considered reliable for financial and environmental measurement of the companies. This study used two main variables such as financial performance and environmental investment variables.

The statistical tool used for analysing the data collected for the purpose of this study is the panel ordinary least square regression and the paired sample *t* test method of analysis. The panel data methodology is based on combined time series

and cross-sectional data. Consequently, hypothesis 3 was achieved using paired sample t test on SPSS software to see the significant difference in the profitability of environmental conscious firms and environmental non-conscious firms. This study also used the paired t test because it is used to draw a comparison between the means of two sets of observations. Furthermore, the paired sample t test formula makes use of the means of the two groups, and the standard deviation of the two groups as well as the number of members of the two groups. Simply put, it is used to determine the significant difference between the two means. The paired t test is usually used when the sample size is < 30 .

Firms that report up to 50% of the above listings are grouped as ‘environmentally responsible’ while firms reporting less than 50% are grouped under ‘environmentally irresponsible’. Fifteen firms were randomly selected from the manufacturing sector because they passed the test of environmental responsibility which was done by proper content analysis of the financial statements to find out if they passed the 50% benchmark to make them environmentally responsible. Fifteen firms were also selected from the banking sector which entails the fifteen deposit money banks listed on the Nigerian Stock Exchange because they did not pass the 50% benchmark for environmental responsibility. For the purpose of this study, performance is measured by return on total assets (ROTA), which is profit before interest and tax divided by total assets.

To achieve the objectives, the descriptive analysis was used, which involves the use of tables, charts and graphs to present relevant data computed from the annual financial report of the selected listed manufacturing companies in Nigeria. Furthermore, panel regression analysis was employed to achieve objectives 1 and 2 while a paired sample t test to achieve objective 3 which is to find the significant difference in the profitability of environmental conscious firms and environmental non-conscious firms.

This study address the following hypothesis. In order to achieve the objectives of this study, the following hypotheses stated in null form would be tested.

- H01: There is no relationship between internal environmental investments and firm performance.
 H02: There is no relationship between external environmental investments and firm performance.
 H03: There is no significant difference between the profitability of environmentally conscious firms and non-conscious firms in Nigeria.

Model specification

In order to test for the relevance of the hypotheses regarding the relationship between environmental investments and financial performance of manufacturing companies listed on

the Nigerian Stock Exchange, this study employed a modified version of the econometric model of Duke II and Kanpang (2013). The econometric model of Duke II and Kanpang (2013) is therefore seen below as:

$$CORPERF = X_1 WASTMGTCOS + X_2 POLLABATCOS + X_3 SOCICOS + X_4 FINESPENCOS + \mu$$

where CORPERF represents the overall performance recorded by the firms as a result social responsibility-related costs; WASTMGTCOS represents the annual waste management cost; POLLABATCOS represents the annual cost of pollution abatement; SOCICOS represents the annual social cost incurred by firms; FINESPENCOS represents the annual cost incurred by firms on fines and penalties relating to environmental factors; μ is the error term for the model; and X_1 , X_2 , X_3 and X_4 are the coefficient of the social responsibility cost elements in the model.

Based on the fact that the study employed different environmental investments and performance proxies, the above model is therefore modified to determine the relationship between the dependent variable (financial performance) and two or more regressors or independent variables (internal environmental investments and external environmental investments). In doing this, we, therefore, developed a simple definitional model to guide our analysis. This model follows as:

$$Perf = f \left(\begin{array}{l} \text{internal environmental investments} \\ \text{, external environmental investments} \end{array} \right) \quad (1)$$

$$ROA = \beta_0 + \beta_1 STC + \beta_2 EMB + \beta_3 DON + \mu \quad (2)$$

Where ROA = returns on assets

STC = natural logarithm of staff training cost

ERB = natural logarithm of employees benefits

DON = natural logarithm of donations

μ is the error term capturing other explanatory variables not explicitly captured in the model.

β_0 is the intercept of the regression.

β_1 , β_2 , β_3 and β_4 are the coefficients of the regression

Data analysis

The data analysis of the secondary data was gathered from the annual financial statement of quoted manufacturing firms in Nigeria and the Nigerian Stock Exchange Fact Book. The data collected are presented using tables and charts for easy data presentation and understanding.

Descriptive statistics

In this section, descriptive statistics is organized along a cross-section of industries in the Nigerian manufacturing

environment. The 7 subsectors of the manufacturing industries include consumer goods, industrial/domestic products, healthcare, building materials and chemicals, breweries, packaging and automobile and tyre.

Generally, from the 120 observations as seen in Table 1, descriptive statistics of dependent variable (firm’s performance), independent variables (donations, employee benefits and staff training cost) and control variables were run to determine the data spread, mean and deviations (Table 1). The results obtained from the descriptive statistics give the average ROA for the whole sample to be 0.122617, with maximum and minimum of 0.40 and – 0.12 respectively. The standard deviation was 0.096. This shows the stability of ROA earned across the firms under consideration. The

STC has a mean of 14.62484, a maximum and minimum of 18.9 and 11.3 respectively and a standard deviation of 1.67. The EMB has a mean of 14.03568, a maximum and minimum of 18, 3 and 11.51 respectively and a standard deviation of 1.33. The DON has a mean of 16.16561, a maximum and minimum of 20.97 and 11.5 respectively and a standard deviation of 1.67. From the analysis, it can be seen that the standard deviation values are close to 0 meaning the mean values are reliable and there is very little volatility in the sample. Also it can be seen that DONs have the highest standard deviation which depicts the lowest contribution to the model, while returns on asset has the lowest standard deviation which indicates its significant contribution to the research model (Table 2).

Table 1 Environmental costs in firms

Potential hidden costs regulatory	Upfront	Voluntary (beyond compliance)
Notification	Site studies	Community relations/outreach
Reporting	Site preparation	Outreach
Monitoring/testing	Permitting	Studies/modelling
Research and development	Training	Remediation
Engineering and procurement	Audits	Record keeping
Procurement	Qualifying supplies	Plans
Installation conventional costs	Reports, e.g. annual environmental report	Training inspections
Insurance	Manifesting	Capital equipment
Planning	Labelling	Materials
Feasibility studies	Preparedness	Labour
Remediation	Protective equipment	Supplies
Recycling	Medical surveillance	Utilities
Environmental studies	Environmental insurance	Structures
Research and development	Salvage values	Habitat and wetland
Financial assurance	Protection	Pollution control
Landscaping	Spill response	Closure/decommissioning
Other environmental projects	Storm water management	Disposal inventory
Financial support to waste management	Post-closure care	Environmental groups
Taxes/fees	Site surveys	
Contingent costs		
Future compliance cost remediation	Legal expenses	Penalties/fees
Property damage	Natural resource damages	Resources to future
Personal injury damage	Releases	Economic loss damage
Image and relationship costs		
Corporate image	Relationship with professional staff	Relationship with lenders
Customers	Relationship with workers	Relationship with host communities
Relationship with investors	Relationship with suppliers	Relationship with regulators
Relationship with insurers		

Source: US EPA (1995)

ROA = annual net income / average total assets

Table 2 Descriptive statistics for the model

	ROA	STC	EMB	DON
Mean	0.122617	14.62484	14.03568	16.16561
Maximum	0.400000	18.94392	18.33602	20.96521
Minimum	-0.120000	11.32829	11.51293	11.51293
Std. dev.	0.095675	1.673551	1.330381	2.217588
Observations	120	120	120	120

Source: author's computation

Data analysis—advance (inferential analyses)

While the regression analysis was used to determine the relationship between environmental investments (STC, EMB, DON) and firm's performance (ROA), the paired sample *t* test statistics was used to ascertain whether there is a significant difference in the profitability of environmental and non-environmental conscious firms.

From Table 3, it can be seen that there is a positive and mild relationship (correlation of 0.127288 = 13%) between the staff training cost and ROA (profitability). That is, as the investment in staff training increases, the profitability level increases. Also, the relationship between employee benefits and profitability shows a positive and weak correlation of 0.084344 (8%) which explains that as employees receive more benefits, the profitability level of the firm increases (which is a measure of corporate performance). Consequently, the table shows a positive relationship between donations and ROA (profitability) of manufacturing firms with a correlation of 0.427043 (43%). Considering that the results shown are quite far from 0.8, we conclude that there is no problem of multicollinearity amongst the variables and the independent variables are fit to be estimated together on the same regression model.

Regression analysis

In this section, the study employed panel data regression analysis to investigate the relationship between environmental investments and firm's financial performance proxies by return on asset.

Table 3 Correlation coefficients matrix from E-views

	ROA	STC	EMB	DON
ROA	1.000000	0.127288	0.084344	0.427043
STC	0.127288	1.000000	0.489136	0.082479
EMB	0.084344	0.489136	1.000000	0.132650
DON	0.427043	0.082479	0.132650	1.000000

Source: author's computation

Table 4 Hausman test

Description	Chi-sq.		
Test summary	Chi statistics	d.f.	prob.
Cross-section random	12.779304	3	0.0051
Correlated random effects—Hausman test			
Equation: untitled			
Test cross-section random effects			

The Hausman test was carried out to determine which model is appropriate for the panel regression (Table 4). The Hausman test rule is as follows:

- If the *p* value is statistically significant, accept the alternative hypothesis (fixed effect model)
- If the *p* value is not statistically significant, accept the null hypothesis (random effect model)

From the analysis, it is seen that the *p* value (0.0051) < 5% significance level, so the null hypothesis is rejected and the alternative accepted which is a fixed effect model (Table 5).

Discussion of panel regression result

This study looks at the relationship between environmental investments and financial performance of Nigerian manufacturing firms. The result in the table shows the estimation of the relationship between environmental investments and financial performance of Nigerian manufacturing firms measured by the natural logarithm of environmental investment variables (donations, employee benefits and staff training costs) and firms' financial performance (measured by

Table 5 Regression result for panel data

Variable	Coefficient	Std. error	t-statistic	Prob.
STC	0.026530	0.006860	3.867313	0.0002
EMB	0.007605	0.002168	3.507829	0.0007
DON	0.000152	0.002482	0.061286	0.9513
C	-0.374569	0.121112	-3.092749	0.0026
Weighted statistics				
R-squared	0.770147	Mean dependent var	0.156663	
Adjusted R-squared	0.731838	S.D. dependent var	0.114779	
S.E. of regression	0.062056	Sum squared resid	0.392791	
F-statistic	20.10360	Durbin-Watson stat	1.186420	
Prob (F-statistic)	0.000000			

Source: author's computation

Cross-section fixed (dummy variables)

returns on asset). The result for the goodness-of-fit test as presented in the table shows a coefficient of determination of $R^2 = 0.77$ (77%) and adjusted R^2 is 0.73 (73%); this shows that 73% of the total variation in the dependent variable (ROA) is explained by the independent variables (donations, employee benefits and staff training cost).

The p value of the F -statistics is 0.000000 which is significant at 5% explaining that the null hypothesis should be rejected. Consequently, the F -test results as depicted in the table indicate clearly the fairness and non-biasness of the model. It shows simultaneously that the independent variables altogether are significantly associated with the dependent variable. The high and statistically significant value of the F -statistic confirms the overall significance of the model and the predictive power of the independent variable. The Durbin Watson is 1.186420 which falls within the acceptable region and shows the presence of low auto-serial correlation which is common in time series data. This confirms the statistical reliability of the model. Therefore, the model shows that there is a significant relationship between environmental investments and financial performance of Nigerian manufacturing firms. It equally finds consistency with the earlier conclusion of Glautier and Underdown (1998) and Duke II and Kanpang (2013) that effective management of environmentally related costs can have a significant positive impact on the profit and contribution maximization of firms. This implies that environmental investments towards employees made significant contribution to financial performance compared to investments towards community. That is, investments towards employees will account for significant variance/contribution towards financial performance than environmental investments towards the community.

The expected a priori sign affirms the theoretical position that performance of environmental investments on premise of employee benefits, staff training costs and donations was an indicator that is positively associated with corporate performance. However, donations were found to be non-significant with corporate performance.

Hypotheses testing

In chapter 1, the study formulated three testable hypotheses on the relationship between environmental investments and financial performance of Nigerian manufacturing firms, on which this research is rested. In this section, we subject these a priori expectations to empirical testing drawing from the results of our descriptive and inferential statistical analyses. Our decision rule is based on the significances of the t -statistics which are represented by the p values flagged by the statistical packages used. This is based on the fact that the existence of a significant relationship can be inferred from a significant t -statistic (Uwuigbe 2011a, b).

Hypothesis 1

H01: there is no relationship between internal environmental investments and firm’s financial performance.

From the regression analysis, internal environmental investments were captured using employee benefits and staff training costs, while firm’s financial performance was proxied with returns on asset. From the analysis, the correlation between employee benefits and ROA has a coefficient (r) of 0.007605, indicating a positive correlation between the two variables with a p value of 0.0007 significant at 5%. This indicates a positive effect of internal environmental investments on the financial performance of the listed manufacturing firms. On the premise of these results, due to its significance, we, therefore, reject the null hypothesis and accept the alternate hypothesis which states that there is a significant relationship between internal environmental investments and firm’s financial performance. This invariably means that the employee’s benefits must be considered while taking financial decisions. The result, therefore, supports the stakeholder’s theory that supports taking care of the interests of the stakeholders.

Consequently, from the analysis, the correlation between staff training costs and ROA has a coefficient (r) of 0.026530, indicating a positive correlation between the two variables with a p value of 0.0002 significant at 5%. This indicates a positive effect of internal environmental investments on the financial performance of the listed manufacturing firms. This shows that there is conclusive evidence about the significance of the association between the variables; we therefore reject the null hypothesis and accept the alternate hypothesis which states that there is a significant relationship between internal environmental investments and firm’s financial performance. This invariably means that investments in staff must be considered while taking financial decisions. The result, therefore, supports the stakeholder’s theory that supports taking care of the interests of the stakeholders. From the variables capturing internal environmental investments, it can be seen that there is a positive relationship between internal environmental investments and firm’s performance. This result is in line with the

Table 6 Paired samples statistics

	Mean (%)	N	Std. deviation (%)	Std. error mean (%)
ROAM	12.04101	119	9.301616	0.852678
Pair 1				
ROAB	5.1251	119	36.64350	3.35910

ROAM = return on asset for manufacturing companies, ROAB = return on asset for deposit money banks

Source: author’s computation

Table 7 Paired samples test

		Paired differences			Confidence interval of the difference		<i>t</i>	df	Sig. 2-tailed
		Mean (%)	Std. deviation (%)	Std. error mean 95% (%)	Lower (%)	Upper (%)			
Pair 1	ROA M	6.915882	37.180042	3.408289	0.166543	13.665222	2.029	118	.045
	ROA B								

works of Simpson and Kohers (2002), Orlitzky et al. (2003) and Berrone et al. (2007).

Hypothesis 2

H02: there is no relationship between external environmental investments and firm's performance.

The result shows that there is a positive and non-significant relationship between donations and ROA. Donations have correlation coefficient value of 0.000152. This implies that a unit increase in donations will lead to 0.015% increase in the financial performance in the sampled manufacturing firms. The *p* value of 0.9513 (which is greater than 5% significance level) shows that there is inconclusive evidence about the significance of the association between the variables, and the null hypothesis should be accepted and the alternative hypotheses rejected. From the analysis, it can be said that external environmental investments have a positive relationship with Nigerian manufacturing firm's performance but not a significant one. Also, the claim of the stakeholder's theory that when a firm satisfies its stakeholders, will lead to an enhanced financial performance is not supported by the findings of the study. This is in line with Aupperle et al. (1985) argument that, no sound theory exists to potentially create the implausible effect, and that this can lead to no effect. It could also be that the company's CSR participation is relatively in the introduction stage and that few stakeholders know what the company does and stakeholder will enforce

environmental responsibility upon the company without legislation imposed (Carlsson and Akerstom 2008).

Hypothesis 3

H03: there is no significant difference between the profitability of the environmentally conscious firms and environmentally non-conscious firms in Nigeria.

From Table 6, it shows the mean and the standard deviation of the two groups. It can be seen that mean for environmentally conscious firms is higher than that of environmentally non-conscious firms and the variance is large. This explains that the profitability level of environmentally conscious firms is higher than that of environmentally non-conscious firms (Tables 7 and 8).

Discussion of findings

The main purpose of this study was to investigate the relationship between environmental investments and financial performance of manufacturing firms in Nigeria. The study investigated 3 research objectives. The findings of this work are discussed in this section. From the table, the descriptive statistics show that the means of all the variables under investigation are positive. From the regression analysis, it can be seen that there is a positive and significant relationship between environmental investments and financial performance of Nigerian manufacturing firms. The result showed that the goodness-of-fit test as presented in the table shows a

Table 8 Analysis of null hypotheses

Null hypotheses	Accept	Reject
H01: there is no relationship between internal environmental investments and firm's financial performance.		✓
H02: there is no relationship between external environmental investments and firm's performance.	✓	
H03: there is no significant difference between the profitability of the environmental conscious firms and environmental non-conscious firms in Nigeria.		✓

coefficient of determination of $R^2 = 0.77$ (77%) and adjusted R^2 is 0.73 (73%); this shows that 73% of the total variation in the dependent variable (ROA) is explained by the independent variables (donations, employee benefits and staff training cost). Hypothesis 1 showed a positive and significant relationship between internal environmental investments and firm's financial performance while hypothesis 2 showed a positive and not significant relationship between external environmental investments and firm's financial performance. Hypothesis 3 which was tested using a paired sample *t* test showed that there is a significant difference between the profitability of the environmentally conscious firms and environmentally non-conscious firms in Nigeria.

Conclusions, and recommendations

The study was undertaken to examine the relationship between environmental investments and financial performance of manufacturing firms in Nigeria. The specific research objectives are to investigate the impact of external environmental investments on the performance of firms, examine the relationship between internal environmental investments and firm's performance and investigate if there is any significant difference between the profitability of the environmental conscious manufacturing firms and environmental non-conscious manufacturing firms in Nigeria. This study used secondary data in examining the association between environmental investment variables and financial performance of the 15 manufacturing firms quoted on the Nigerian Stock Exchange. The secondary data were obtained from the published financial statement of manufacturing firms listed on the Nigerian Stock Exchange. Journals, textbooks and other relevant materials especially the Nigerian Stock Exchange Fact Book 2018 and the Central Bank of Nigeria Statistical bulletin were similarly reviewed.

The regression analyses were used to examine whether there is an effect between the variables that were measured (internal environmental investments, external environmental investments and financial performance) and also to examine if the effect is significant or insignificant. On the other hand, the paired sample *t* test was used to determine if there is any substantial difference between the profitability of the environmental conscious firms and environmental non-conscious firms in Nigeria. However, for hypothesis 3, the study made use of some sustainable indicators to ascertain the extent of environmental responsibility of Nigerian firms. However, 15 firms were randomly selected from the manufacturing sector because they passed the test of environmental responsibility which was done by proper content analysis of the financial statements to find out if they passed the 50% benchmark to make them environmentally responsible. Fifteen firms were also selected from the banking sector which entails the fifteen

money deposit banks listed on the Nigerian Stock Exchange because they did not pass the 50% benchmark for environmental responsibility.

There were a total of three hypotheses which were tested using parametric statistical technique. Hypotheses 1 and 2 were tested with the use of panel least square regression analysis while hypothesis 3 was tested with the use of a paired sample *t* test analysis. The results of these analyses showed that, for hypothesis 1, the study accepted the alternative hypothesis and rejected the null hypothesis which states that there is a positive and significant relationship between internal environmental investments and firm's financial performance while hypothesis 2 showed a positive and not significant relationship between external environmental investments and firm's financial performance in Nigerian manufacturing firms. Furthermore, in hypothesis 3, the study accepted the alternative hypothesis and rejected the null hypothesis which states that there is a substantial difference between the profitability of the environmental conscious firms and environmental non-conscious firms in Nigeria.

Generally, this study shows that environmental investments affect financial performance. Data were gathered through the annual financial statements of the sample companies and the Nigerian Stock Exchange Fact Book 2008–2015. Furthermore, the social gains of environmental investments, with reference to workforce and community, often seem to largely surpass their costs. The results from the study show a positive and significant relationship between internal environmental investments and firm's financial performance. Also, the study revealed that there was a positive and non-significant relationship between external environmental investments and firm's financial performance. The study also, based on analysis, found out that the profitability level of environmentally conscious firms was higher than that of environmentally non-conscious firms in Nigeria. This research work extends the current body of knowledge in the area, particularly in human social responsibility by focusing on environmental investment variables such as global workforce and local communities.

Policy implications and recommendation

In light of promoting integrated reporting, this study can assist the government in formulating policies that would promote a win-win solution for the government, and companies as well as the public at large based on an organization's compliance to government's environmental policies. The study recommends that companies should be more environmentally conscious and pay more attention to the welfare of their workforce and community they dwell in. This study has increased the knowledge base of environmental investments by introducing human social responsibility variable which is a proxy for corporate social responsibility and made use of environmental

investment variables that are related to human workforce and local communities in which organizations dwell in. Application of a wider set of longitudinal data as well as broader industry coverage would provide a better result for environmental investments consideration.

1. There is the crucial demand to establish a strong corporate body saddled with the responsibility of

collecting and collating environmental investment inclined data and formulating the appropriate indices to facilitate environmental investment study in Nigeria.

2. In order to promote harmonized sustainable development, environmental regulation needs to be strengthened.

Appendix

Table 9 Population of the study

1 7 UP BOTTLE	21 ELLAH	41 NIG ENAMELWARE	61 VONO PRODUCTS
2 ABPLAST	22 ETERNA OIL	42 NIG ROPES	62 W/A GLASS IND
3 ADSWITCH	23 EVANS MED	43 NIG WIR & CA	63 WA ALLUM
4 AFRIK PHAR	24 FIRST ALLUM	44 NIG WIRE IN	64 WAPCO
5 ALLU EXTRU	25 FLOUR MILL	45 NIG-GERMA	
6 ALUMACO	26 GLAXOSMIT	46 OANDO PLC	
7 ARBICO	27 GUINNESS	47 OKOMU OILPALM	
8 ASHAKA	28 INTER BRE	48 P. DEKO PLC	
9 AVON CROWNCAPS	29 INTERLINKED	49 POLY PRODUCTS	
10 BERGER PAI	30 IPWA	50 PREM BREW	
11 BOC GASES	31 J. BERGER	51 PREMIER PA	
12 CADBURY NI	32 JOS INT BRE	52 PRESCO PLC	
13 CAPP & D'A	33 M&BAKER	53 PZ INDUSTR	
14 CAPS	34 MOBIL OIL	54 ROADS NIG	
15 CCNN	35 MORRISON	55 ROKANA	
16 CHAMPION	36 N. NIG FLOUR	56 STOKVIS	
17 CHELLRAMS	37 NAT SALT CO	57 TOTAL NIG	
18 CONOIL PLC	38 NEIMATH	58 UAC NIG	
19 CUTIX PLC	39 NESTLE NIG	59 UNLIVER	
20 DN MERYER	40 NIG BREW	60 UTC NIG	

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