GREEN INVESTMENT AND ORGANIZATIONAL PERFORMANCE: EVIDENCE FROM THE NIGERIAN PULP AND PAPER INDUSTRY

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ABSTRACT

Being "green" is socially desirable, yet whether it pays to be "green" is unclear. This question has become more important to industries particularly in developing economies. Empirical studies have provided evidence of positive relationship between green investment and organizational performance nexus from developed countries for specific industries. However, there is an acute dearth of evidences on same nexus in Africa. Hence, if organizations identify the specific financial and operational benefits of green innovation, they will adopt it.

From this background we quantitatively examine the green investment and organizational performance nexus in the Nigerian pulp and paper industry through mediated hypothesized structural equation model. Data was collected using survey methodology from 324 pulp and paper companies in Nigeria. Hypothesized relationships were tested by structural equation modelling in AMOS.

Contrary to arguments in literature for developing economies, the findings from the study provide strong evidence of positive relationship between green investment and organizational performance for the Nigerian pulp and paper companies, thus it pays to be "green". Moreover, these firms surprisingly, are investing in them to a degree uncommon in most developing countries.

The findings from the study further shows that the driver for green investment in developing economies is profitability rather than environmental policy. Evidence from the study have implications for environmental regulators in tropical developing countries characterized by lack formal regulatory framework and enforcement mechanisms, limited institutional capacity and inadequate information on emissions. The findings suggest that environmental education about the economic benefits of cleaner technologies could enhance compliance with minima cost to regulators.

Hence, the study provides some valuable managerial insights into the relationship between the nexus of greenovation, environmental regulation and organizational performance in Sub Saharan Africa. Hence, the urgent need for a paradigm shift within the industry in developing economies.

Theme: Green industial policy

Key words: green investment, environmental benign technologies, environmental compliance, organizational performance, pulp and paper industry, developing economies, Nigeria

INTRODUCTION

Green investment is an operational innovation being adopted by many organizations as ways to address environmental issues. Hence, they can take advantage of the win-win opportunities where environmental and economic performance of firms are improved. It is widely believed that green investment encourages efficiency and assists in reducing waste, boosting environmental performance, and achieving cost savings. Competitive advantage and corporate image are expected to be enhanced by this. However, if Africa's developing economies are to adopt green investment practices, it is important that a demonstrable link between improved economic performance and competitiveness and such measures in known. Song and Hu (2017) formulate that if organizations identify the specific financial and operational benefits of green innovation, they will adopt it. Hence, there is a clear research need to determine the possible link between economic performance and green supply chain initiatives, to motivate organizations especially in developing economies to green their supply chains.

Several studies have linked green investment, financial performance and environment-benign technologies in developed nations and in some developing economies in South-East Asia (Hart and Ahuja, 1994; Russo and Fouts, 1997). However, very little is known about their role in tropical developing economies. Hence, exploring the relationship between green investment and organizational performance becomes a novel research area especially in developing economies where such studies are very scarce.

Green investment is critical to the pulp and paper industry because it is part of the traditional manufacturing industry that has adopted significant environmental benign technologies in its production process both in developed and developing economies. In the case of Nigeria, raw material scarcity has also led the firms to invest in greenovation especially the three Rs (Reduce, Reuse and Recycle) to enhance their triple bottom line because long and short-fibre pulp cost accounts for about 70% of their production cost. Moreover, the pulp and paper industry are known to generate significant emissions including recalcitrant waste.

Some empirical studies have provided evidence from developed countries on the connection between green investment and firm behaviour with qualitative case studies. These studies analyse specific industries but lack statistical generalization (Blanco, et al, 2009; Shrivastava, 1995). Other studies also provide evidence on the positive correlation between green investment and organizational performance (Jabbour and Jabbour, 2009) in developed economies using quantitative techniques.

However, and surprisingly very little has been reported on this topic in developing economies. Worst still, there is an acute dearth of quantitative evidence from Africa. We know little, however, about green investment, environmental compliance and organizational performance nexus in tropical developing countries. Hence, there is a research gap and opportunity related to analyzing the green investment and organizational performance nexus in developing economies especially for Africa. This occurs because of the emergence of green investment as one of the major innovation issues in the field of environmental sustainability. This gap in studies stays in the theme's state-of-the-art, while studies on green investment advances.

In the developed world, the existing system of environmental policy drives green investment and eco-innovation (USEPA, 1992; UNEP, 1993). However, in tropical developing countries where environmental policy normally exists as conventional command-and-control, we conjectured the case might be different. These nations are characterized by their nearly zero government-imposed "price of pollution", inadequate information on emissions, limited institutional capacity, inadequate or lack of official environmental regulatory frameworks and enforcement system and highly pollution-intensive conditions.

Environmental legislation did not exist in Nigeria, till the year 1988 when the Federal Environmental Protection Agency (FEPA) was established and commissioned to put in place regulatory and institutional policies for environmentally sustainable development due to harsh and critical media reaction to the discharge of toxic wastes of Italian origin. Hence in this context, the factors motivating the decision for green investment might be different from the characteristic factors among developing countries. It is against these backgrounds that we examine the effect of green investment on organizational performance in the Nigerian pulp and paper industry with a mediating effect of environmental compliance and controlling for firm size and ownership structure Therefore, the overarching research question for the study is: Does green investment relate positively to organizational performance in the Nigerian Pulp and Paper Industry? Additionally, there are two sub-questions as follows: (1) Does green investment relate positively to organizational performance in the Nigerian Pulp and Paper Industry; and (2) Does environmental compliance positively mediate the effect of green investment on organizational performance in the Nigerian pulp and paper industry?

THE MOTIVATION FOR THE ADOPTION OF QUANTITATIVE RESEARCH TECHNIQUES

The quantitative study enables us to confirm the plausibility of some hypothesis to understand the statistically examined relationships between green investment and organizational performance.. The data for the quantitative phase was examined through the uses of structural equation modelling. This aspect of the study established the existence of causal relationships between organizational performance and green investment in the pulp and paper industry in Nigeria.

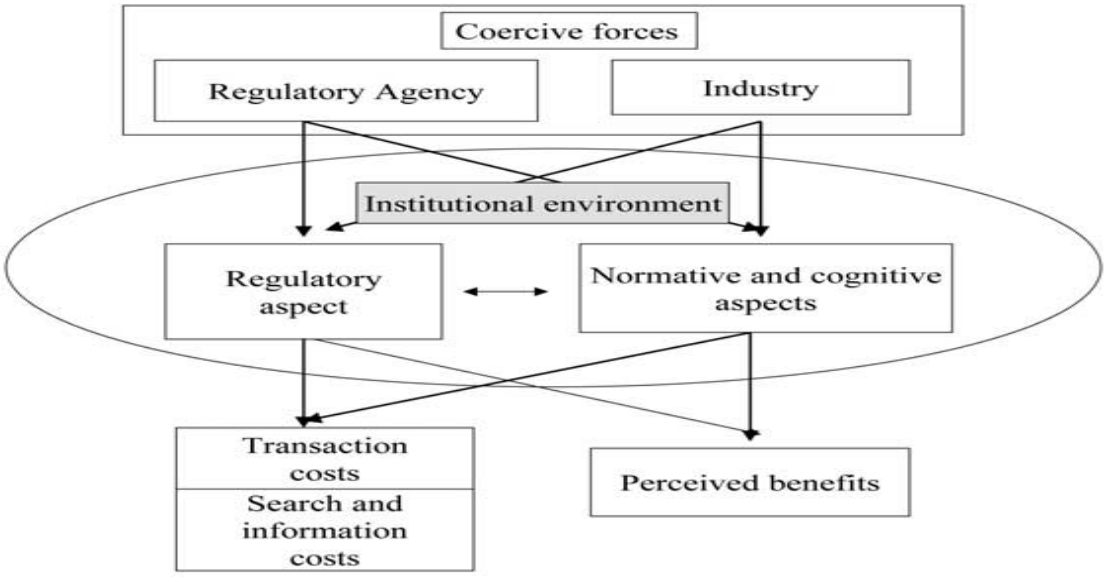
Qualitative findings were used to guide the development of quantitative survey instrument based on previous research findings. The quantitative methodological approach enabled us to generate a comprehensive model on the green investment and organizational performance nexus.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Previous theoretical framing has provided base understanding on the adoption of green investment and environmental benign technologies, among them includes the Resource-Based Theory and Institutional Theory. Institutional Theory recognizes the part external forces play in technology adoption (Bansal and Roth, 2000; Bansal, 2005) while the Resource-Based theory states that a company can have a competitive edge in the market through its internal resources (Khanna and Damon, 1999). It has however been suggested by Berrone, *et al* (2007) that a conceptual merger of both theoretical frameworks could advance the adoption of environmental innovation.

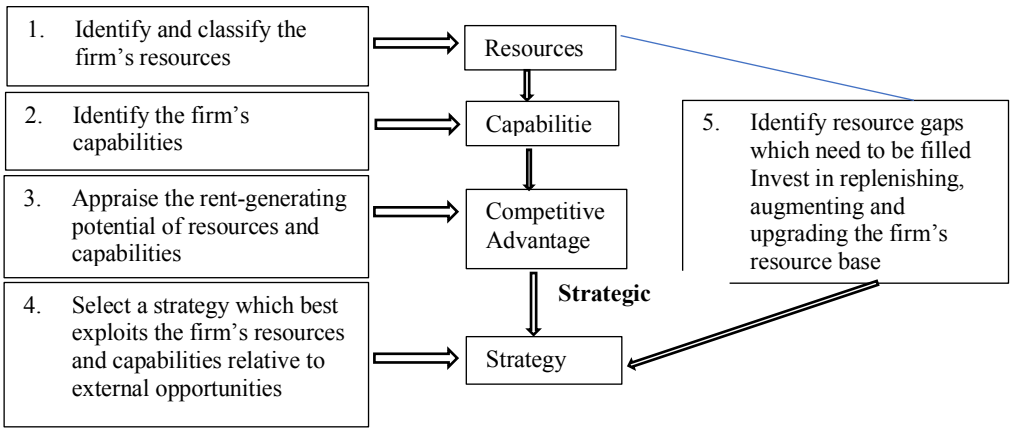
Since 1930, institutional theory has been vastly utilized (Bansal and Clelland, 2004; Hoffman, 1999; Jennings and Zandbergen, 1995) as a means of comprehending corporate rection to the growing pressures for environmental management. Institutional theory predicts that, given the heightened social consciousness of organizational wrongdoing and the explicit environmental demands, companies can obtain legitimacy by exhibiting socially responsible performance and reducing their environmental impact (Bansal, 2005; Bansal and Clelland, 2004).

FIGURE 1
Institutional theory and Mechanisms for Green Innovation (Delmas, 2002)



Resource-Based Theory, however is possibly the most prominent framework in environmental management (Hart, 1995) and it considers the ability of innovation as a competitive edge because innovations are knowledge-based. In order to understand how organizations achieve sustainable competitive advantage, Resource Based View (RBV) analyzes and interprets resources of the organizations. The RBV focuses on the concept of difficult-to-imitate attributes of the firm as sources of superior performance and competitive advantage (Barney, 1991; Hamel and Prahalad, 1996). More complex, environmentally benign technologies, products and processes may be results of environmental innovations. These might ultimately improve corporate financial performance, boost long-term competitive advantage and lower overall company costs, (Christmann, 2000). Empirical evidences reveal that industries faced with strict environmental regulations tend to be more innovative than industries in located in areas or faced with weak environmental regulation (Brunnermeier and Cohen, 2001; Jaffe and Palmer, 1997).

FIGURE 2
Resource-Based Theory and Competitive Advantage (Barney, 1991; Grant, 1991)



A growing body of literatures has tested the relationship between green investment and firm performance, the results indicate both positive and negative outcomes. Some studies find a positive relationship (King and Lenox, 2001; King and Lenox, 2002; Melnyk, et al, 2003) but others indicate negative impact (Cordeiro and Sarkis, 1997; Giley, et al, 2000; Link and Naveh, 2006). Hence, the quantitative study provides peculiar advantage for the research on green investment and firm performance nexus where evidences are not previously well documented or where previous studies yield contradictory or non-conclusive findings (Tashakkori and Teddlie, 2008).

Firms are facing ever increasing pressure to become greener and socially responsible. The possible mediating impacts of environmental dynamics on the link joining green investment and organizational performance are well documented in literatures. Moreover, the environment has long been identified as a crucial contingency in both empirical and conceptual studies of green investment and business performance of manufacturing firms (Skinner, 1969; Jones, 1995).

The origin of the model is traced to Skinner (1969) who worked on manufacturing strategy that prescribed the connections among environmental dynamics and green investment in achieving good business performance. An example of the links between environmental innovation, manufacturing strategy and performance was examined by Swamidass and Newell (1987) and Anand and Ward (2009) who show a positive correlation between manufacturing flexibility and environmental innovations.

These studies establish that manufacturing strategies and performance are affected by environmental innovation using path models. The relationship between environmental dimension, manufacturing strategies and performance is described by Keats and Hitts (1988) who used a covariance structure model. Proof for the performance, model connecting environment and manufacturing strategies is provided by Kim and Lim (1988). Hence, bodies of literatures contain proof of a direct link connecting green investment, operational strategies and business performance in a manufacturing firm. Studies have also connected the relationship to business performance, proposing that the firms that perform highly select manufacturing approaches uniform with their environments (Swamidass and Newell, 1987 and Anand and Ward, 2009).

Looking at things from an empirical viewpoint, an increasing amount of quantitative research has examined the relationship between green investment and firm performance, the results indicate both positive and negative outcomes. Some studies note a positive link (Judge and Douglas, 1998; King and Lenox, 202; Melnyk, et al, 2003), some however indicate a negative effect (Cordeiro and Sarkis, 1997; Giley, et al, 2000; Link and Naveh, 2006).

Pollution prevention might help a company save costs through the "low hanging fruits" of 3Rs (reduce, reuse and recycling) (Hart, 1997; Taylor, 1992). Pollution prevention can furthermore assist companies to achieve a win-win situation where the environment and firm will both reap benefits. This plan, reflects an attitude to the impact the environmental has on profitability and firm competitiveness. It is known as "Porters Hypothesis" (Porter and Van der Linde, 1995). In addition, companies that accept proactive environmental plans might profit from increased sales as well as premium pricing due to improved market legitimacy and better social acceptance. An approval of such can create product differentiation from competitors (Rivera, 2002; Miles and Covin, 2000). However, studies proposing a negative correlation between green investment and firm behaviour argued companies trying to improve green-related performance draw finances from the business which reduces the profit margin (Hull and Rothenberg, 2008; Klassen and Whybark, 1998, Klassen and Whybark ; 1999).

Three evolutionary stages have been described in literature using several environmental taxonomies depending how much of environmental variable is included within the organization (Jabbour and Santos, 2006; Montabon, et al, 2007) . The first stage is a functional specialization phase where the firm respond to the constraint of environmental regulation. At this stage, organizations include pollution control equipment and do not modify their production process. The second stage is the internal integration of environmental management phase. Environmental performance at this stage is not treated as a strategic factor. The last stage is the external integration of environmental management phase. Environmental management at this stage, are fully integrated into the entire business plan of the company. At this stage, companies understand competitiveness factor of environmental innovation through economic benefits. It is then that the company has adopted the "ethical" attitude toward environmental management.

HYPOTHESES DEVELOPMENT

The following hypotheses were generated based on the qualitative data and findings. Figure 3 is a hypothesized research model that represents how green investment, environmental compliance and organizational performance (green-related performance and business performance) are related. These hypotheses are generated and stated as follows:

Green investment is composed of green managerial innovation, green process innovation and green product innovation. Chen and Paulraj (2004) and Olson (2013) considered the green product and organization performance nexus in developed economies. However, they did not consider the effect of green production on organizational green-related performance. Several others studies have examined green supply chain management innovation (Porter and Van Der Linde, 1995; Hart, 1995; Zhu and Sarkis, 2004), they have not explicicitly examined the green investment and

organizational green-related performance. Hence, this study is contributing to literature by exploring the effect of green investment and organizational green-related performance in the context of developing economies of Africa. Hence, this hypothesis is stated as follows:

H1: *Green investment has a positive effect on green-related performance in the Nigerian pulp and paper industry.*

Green investment is one of the key driver of business performance and corporate competitive advantage (Porter and Van Der Linde, 1995). Green product innovation does not only reduce negative impact on the environment but is also capable of increasing organizational business performance (Porter and Van Der Linde, 1995. Several studies have provided evidence of positive relationship between green investment and business performance for specific industries in developed and in some developing economies in South-East Asia (Hart and Ahuja, 1996; Cohen, *et al*, 1995; Russo and Fouts, 1997). However, very little is know about same nexus in developing economies. Hence the need to provide empirical evidence across different industries in developing economies, particularly in Africa. Hence, this hypothesis is stated as follows:

H2: *Green investment relates positively to business performance in the Nigerian pulp and paper industry.*

Environmental regulations could exert a supportive influence on industries and to pressure firms into greener practices both in their processes and products. Hence, environmental compliance is the driver for organizations to implement process and procedures towards green innovations in developed countries (Sroufe, 2003). However, in developing economies the case may be different as the environmental regulation is emerging and the institutional framework for compliance is weak. Such green innovation if adopted are expected to bring by a reduction in the organization's negative impact on the environment. Hence, environmental concerns drive organizations in developed economies to improve green-related performance, to reduce the carbon footprint and design eco-friendly products (Melnyk, et al, 2003). This hypothesis will test such relationships in the developing economies of Africa. Hence, this hypothesis is stated as follows:

H3: *Green investment is positively associated with environmental compliance in the Nigerian pulp and paper industry.*

Environmental management practices (environmental management systems, life-cycle analysis, deisgning for environment and ISO 14001 certification) and the pressure for environmental compliance drive organisations to improve their environmental performance. Researchers identified three evolutionary stages based on the degree to which the environmental variable is integrated within organisations using several environmental taxonomies described in the technical literature (Jabbour and Santos, 2006). The first stage of this evolution is the functional specialization stage where firm do what is necessary to react to the pressure of environmental regulations. This pressure of compliance do drive green-related performance in some industries in developed economies. However, whether this nexus is applicable to industries in Africa has not

been sparingly investigated. This hypothesis will provide evidence toward this hypothesis which is stated as follows:

H4: *Environmental compliance has a positive impact on green-related performance in the Nigerian pulp and paper industry.*

Scholars have suggested what drives the environmental performance of firms is the pressure from environmental regulators which enhances green investment. These green investments may relate positively to business performance (Porter and Van Der Linde, 1995; Rothenberg, et al, 2001). Evidence has been provided by several studies asscociating higher environmental performance with better financial performance. Industrial ecology scholars have argued that there are situations where beyond compliance behavior by firms is a win-win for both environmental performance and organizational performance (Buysse and Verbeke, 2003; Nehrt, (1996), Esty and Porter, 1998). Some of these studies are well established for some industries and for developed and emnerging economies. There is an acute dearth of evidence on this hypothesis in developing economies which this study is attempting to address. Hence, this hypothesis is stated as follows:

H5: *Environmental compliance positively impacts business performance in the Nigerian pulp and paper industry.*

It is well established in literatures that the corresponding pressure from environmental regulations is one main driver to the development of environmental management in industries is (Zhou et al, 2017; Yasamis, 2007; Tyteca, D (1996); Delmas and Toffel, (2004). Hence, green product innovation has been identified as a predictor to improved green-related performance. Hence, companies must devise and implement environmental strategy carefully towards effective compliance to environmental regulations because environmental compliance has been shown to mediate the effect of green investment on green-related performance for selected industries in developing economies (Lee, 2008;Adeel-Farooq and Rana Muhammad (2017). However, there are no sufficient evidence to this claim in developing economies which this hypothesis will be testing. Hence, this hypothesis is stated as follows:

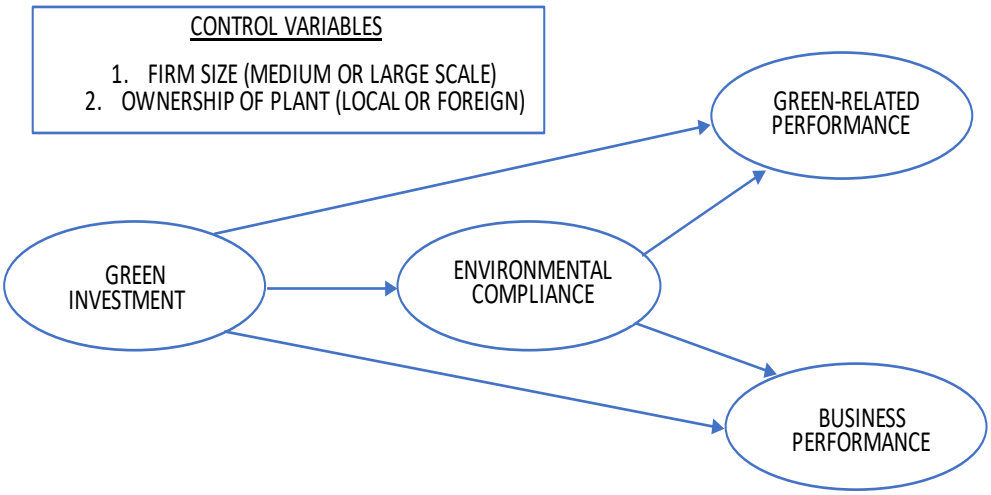
H6*:* *Environmental compliance mediates the positive effect of green investment on green-related performance in the Nigerian pulp and paper industry.*

A study in China suggests that renvironmental regulatory pressure (and compliance mechanism) could mediates the impact of green investment on business performance (Jennings and Zandbergen, 1995; Hull and Rothenberg, (2008),). However, there are limited research investigating the mediation effect of environmental compliance on the green investment and business performance nexus. Empirical findings reveal that environmental regulations (and compliance) result in green investment (Parto and Hebert-Copley, 2007). However, the relationship between such green investment and business performance, may not be linear (King and Lenox, 2001). This research domain remains novel in the context of developing economies, particularly Africa. Hence, this hypothesis is stated as follows:

H7*:* *Environmental compliance mediates the positive effect of green investment on business performance in the Nigerian pulp and paper industry.*

RESEARCH MODEL

FIGURE 3
Research Model for the Study



METHODOLOGY

The research adopts a quantitative research technique. The study was conducted through survey using quantitative methodological approaches. The qualitative phase of the study assisted us in understanding the background of the industry, hypotheses and theory, which the quantitative technique used as a measurement instrument.

Studied Sector and Sample Size

The Nigerian pulp and paper industrial sector is comprised of five classifications including napkins, diapers, sanitary towers, printing and publishing and the pulp and paper products. There are a total of 534 pulp and paper companies in Nigeria**.** 338 companies were selected representing equal percentage from the five classifications in the sector. The industries ownership structure included 66% foreign owned (multi-national and foreign owned industries) and 34% locally owned (fully owned Nigerian industry). The sample size includes medium-scale enterprises which are locally owned and large -scale enterprises which are foreign owned.

In literature, there has been diverse classification of firms into large, medium and small-scale enterprises, based either on persons employed, capital outlay or sales turnover. In Africa, firms employing 200 or more persons are regarded as large scale (Winston, 1981; Liedholm. 1992; Oyelaran-Oyeyinka, 1997; Oyelaran-Oyeyinka, 2002), firms employing 50 to 199 persons are medium-scale and firms employing 10 to 49 persons are usually considered small-scale (Lall, 1992; Lall et al, 1994; Oyelaran-Oyeyinka, 1997).

We concluded intuitively that it is highly unlikely that less than 20 persons would be employed by any of our respondent firms as we were targeting formal sector manufacturing firms. Firms employing 20 to 49 persons are what we define as small-scale firms for the purpose of this study; and we consider those employing 50 to 199

people as medium-scale firms according to Winston (1981) and Liedholm (1992). Companies employing 200 or more people are regarded as large-scale enterprises.

Survey Development and Measurements

The construct/dimensions, definitions, scale items, survey questions and source including construct reliability and source was developed . Multi-item scales was used to test the hypotheses. Measurement items were selected from existing questionnaires found in the literature to ensure face and content validity. A total of four constructs and control variables with 26 items was used for the research. Perceptual measures on a 7-point likert scale will be used to measure responses. Seven items will be used to measure the green production construct. Environmental compliance which is regarded as a driver of green production will measured with five items. The performance of an Organization is multifaceted. The research is interested in two aspects of business performance and green-related performance. Green-related performance alludes to the performance of the organisation with regards to their environmental duties (Brunnermeier and Cohen, 2003). Business performance factors in the organization's duties towards their shareholders, its objective is to maximize profit (Bansal, P. and Roth, K. 2000). Green-related performance was measured using four items while business performance will be measured with six items. The organization performance is measured by capturing respondent perceptions over the past two years and compared to their rivals. In addition, firm size and ownership of firm will be used as control variables in our measures.

Pilot-Testing of Survey Instrument

In order to properly test the hypotheses, the survey items were pre-tested to ensure that the questionnaire was logical and valid.. All the items in the questionnaire were based on a 7-point Likert scales, from 1 (strongly disagree) to 7 (strongly agree) as depicted in Appendix A. All of the measures in the research were adapted from extant literature. The need for Adaptation is due to the questionnaire survey being conducted in a developing economies context especially Africa where the environmental regulation and institutional framework in weak. As such, to improve the understanding some sentence structures and even words are changed. Three academics and three practitioners in the field of eco-innovation, green investment, green economy and business performance reviewed the questionnaire. The choice and use of words were further adjusted. To guarantee the indicators were comprehensible and pertinant to practices in Africa, the revised questionnaire was pilot-tested (Hensley, 1999) with experts in the pulp and paper sector from United Nations Industrial Development Organization), United Nations Development Program, the World Bank Group and OECD during the OECD Global Forum on Eco-Innovation in Paris. Some local experts in Nigeria from the Pulp and Paper Sector at the Manufacturing Association of Nigeria who are not part of the research sample also participated in the pre-testing of the research instrument.

A total of 12 experts participated in the pre-testing exercise. The issues that came out of the pre-testing include comprehension of the technical terms. Hence, the suggestion was to divide the survey into different sections to be completed by specific experts. Hence, Section 1 of the survey was completed by the firms' Human Resources Director, Section 2 by the HSE (Health, Safety and Environment) Director, Section 3 by the Operations Director while Section 4 and 5 were completed by the Managing Director

and/or the Finance Director. Another issue is the "Environmental Policy" construct, the suggestion is that "Enviromental compliance makes the measurement items clearer than "environmental policy". The latter reflecting government enforcement rather than firms' response to the policy. A few other issues emerged including recrafting of some measurement items. The research instrument (survey) and the (construct definition and measurement items) have been revised accordingly.

Data Collection

Data was collected for the for 324 companies in the Nigerian pulp and paper industry between November 2017 and January 2018. The recruitment of the participants was done through the Executive Secretary of the Pulp and Papers Converters Association of Nigeria. Members of the Pulp and Paper Board of the Manufacturers and Converters Association of Nigeria were chosen for this study because their experience in the Pulp and Paper Industrial Sector in Nigeria.

The IRB application for the research was granted an exemption under human subject protection regulations because the data was de-identified. The research survey has an introductory cover letter and an informed consent document which introduce the research topic as attempting to examine the causality between green investment and business performance and also examine different elements of business performance including green-related performance, manufacturing performance and the overall business performance in the Nigerian Pulp and Paper Industry.

The survey consists of questions directed towards green production, environmental compliance, green-related performance and business-related performance in the Nigerian Pulp and Paper Industry. There were also demographic centered questions. This survey was conducted through the Pulp and Paper Board Manufacturers and Converters Association of Nigeria (PPB-MCAN).

The Executive Secretary of PPB-MCAN distributed the survey to representatives of companies who are members of the PPB-MCAN during the weekly meeting in the presence of the Co-Investigator. Completed surveys were returned during the next meeting of the PPB-MCAN to the Executive Secretary of PPB-MCAN within 5 working days. The completed survey were returned in an envelope provided to the Managing Director, who handed it over to the Executive Secretary of the Pulp and Paper Board Manufacturers and Converters Association of Nigeria. (PPB-MCAN).

Confidentiality of all the participants data will be maintained and will never be reported individually but in an aggregate format (by reporting only combined results). The principal investigator and co-investigator listed below will be the only ones to have access to all survey responses as they will be concealed. The data collected are anonymous; the information provided by participants are not be linked to them. The data collected was imported into an excel spreadsheet secure database and subsequently into SPSS and AMOS software for modelling. The data was downloaded by the co-investigator, after which it was deleted by the co-investigator from the excel spreadsheet secure database and the SPSS and AMOS software. Participation in this research study is voluntary and there was no compensation for participatants.

Executives heading different Directorate of each of the companies were asked to complete each section of the survey primarily because of their expertise in each of the domain to have a rich and robust response. A survey research dependent on self-reported data can be met with difficulties from common method bias particularly if same individual reported the independent and dependent variables. In addition, collection of the data from five respondents minimizes the potential for *common method bias* which is associated with single respondents in a survey.

Data Analysis

The data analysis includes descriptive analysis including the means, standard deviation, frequency and percentage distribution, data screening (e.g., missing data, linearity and homoscedasticity, normality, multivariate outliers). Reliability and Validity testing using SPSS and AMOS.

The complete model on the green investment and organizational performance nexus with the mediating effect of environmental compliance was analysed using Structural Equation Modelling. To confirm our hypotheses, the two-step approach was followed (Anderson and Gerbing, 1982). The measurement model was tested in the first step to demonstrate reliability and validity of the scales in our analysis. This include exploratory and confirmatory factor analysis. The testing of the structural relationships in the model was accomplished in the second step. The two-step approach is discussed in the following sub-headings:

Measurement Model, Validity and Reliability

In accordance with Shah and Goldstein's (2006); Hu and Bentler's (1998); and Hu and Bentler's (1999) recommendations, we examined the total fit of the first-order measurement model in accordance. We then assess the multiple fit indices including the goodness of fit index (GFI), comparative fit index (CFI), incremental fit index (IFI), normal fit index (NFI) and the standardized root mean square residual (SRMS). Convergent validity was examined by reviewing the importance of the loading for an item on its posited underlying construct (Anderson and Gerbing, 1982). If the first-order measurement model's loadings shows that all items load considerably on their posited constructs then there is convergent validity. Cronbach Alpha values were also used to assess the reliability of the constructs. A value of more than 0.7 for all constructs will indicate acceptable reliability of the measurement items.

Structural Modelling

We assess the fit indices and structural paths in the structural model. We also assess the structural paths' t-values and parameter estimates within the structural model. The study examines the mediating impact of environmental compliance on green production and organizational performance nexus. Hence, we hypothesized total (or complete) mediation of the impact of green production on organizational performance by environmental compliance. This mediation was assessed using two methods including detailing the direct paths connecting dependent and independent variable as well as the indirect paths from independent variable to mediating variable to dependent variable simultaneously (Judd and Kenny, 1981; James et al, 2006). The test indicates results of

direct model with an extra direct path between green production and organizational performance.

Pre-Analysis Data Screening

The initial analysis focused on one independent variable (green production), one mediating variable (environmental compliance) and two dependent variables (green-related performance and business performance). The descriptive statistics related to each of the variables in the constructs included frequencies, histograms, skewness, kurtosis, scatter plots and box plots. No missing data was detected.

Examination of the skewness and kurtosis indicated that most of the data for the 26 items are non-normal distribution because when a distribution is normal, both the skewness and kurtosis are zero. Kurtosis is related to the peak of a distribution, either too peaked or too flat and skewness is related to the symmetry of the distribution.

The histograms examined for skewness, showed moderate negative skewness for most of the variables. Univariate normality tests were performed using statistical and graphical methods for the variables to determine if this skewness violated normality. The tests included Kolmogorov-Smirnov (KS) and Shapiro-Wilk (SW) tests, Q-Q Probability Plots and Cumulative frequency (P-P) Plots. The results indicated that the kurtosis does not violate normality for most of the variables. However, normality is violated by the skewness for most of the variables. The KS and SW tests for all the variables in the Tests for Normality in the Appendix showed non-normal distributions ($p=.000$). Probabilities < 0.05 mean the data are not normal while probabilities > 0.05 mean the data are normal. Normally distributed data is denoted by large probabilities. The KS and SW test statistics ranges from .153 to .161 and .914 to .912 respectively which shows non-significance.

A normal distribution would produce a QQ plot with cases falling along or very close to the line, but for most of the variables, there are few low extremes that were seen to deviate from the line. Examination of the box plots indicated that most of the variables have some outliers. However, in the extreme values output (Normal Q-Q plot), most of the variables, only one outliers were listed. A subjective decision is could be to remove the outliers from the analysis because the box plots so clearly identified them as such. However, from a practical point of view, it might be useful to retain the outliers because they might have unique individual characteristics. Cohen et al (2003) states that "if outliers are few (less than 1% or 2% of n) and not very extreme, they are best left alone.

Construct Validity

The extent to which the items in a scale measure the theoretical construct is Construct validity (Carmines and Zeller, 1979; Churchhill, 1987). Testing of construct validity focuses on determining whether or not an item loads significantly on the factor it is attempting to measure – convergent – and also on guaranteeing no other factors are measured by it – discriminant (Campbell and Fiske, 1959). The uniqueness of a construct is measured by the discriminant validity and it measures no other constructs. The convergence or similarity among the individual items measuring the same construct is measured by the Convergent validity. Convergent validity is assessed using both Confirmatory factor analysis (CFA) and Exploratory factor analysis (EFA) in this

study. The extraction method used was principal axis factoring (PAF)] using oblique rotation method and promax because of the desire to reveal latent dimensions of the original variables. There is also the desire to seek the least number of factors which can account for the common variance (correlation) of the set of variables.

The emerged dimensions in the combined data shows the Kaiser-Meyer Olkin (KMO) measure of sampling adequacy and Bertett's Test of Sphericity as follows:

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.833
Bartlett's Test of Sphericity	Approx. Chi-Square	2084.943
	df	120
	Sig.	.000

The KMO is a high value of .833. As this value lies between 0.5 and 1.0, the data was found adequate for factor analysis. The KMO of .833 suggests the possibility of grouping the data into a smaller set of underlying factors. The Bartlett Test indicates that the significant level is .000 which is less that .05 and therefore significant. This indicates that there are relationships among the variables in the data set. Both of these statistics (KMO and Bartlett Test's) supports the use of factor analysis on the data.

Factor analysis should only be used as a guide and not a rule for making decisions as it is an exploratory tool. One important decision is the number of factors to extract. By Kaiser's criterion we should extract four factors. However, this criterion is accurate when there are less than 30 variables and communalities after extraction are greater than 0.7. Moreover, research into Kaiser's criterion shows that it gives recommendations for much smaller samples. However, the reliability of factor analysis is dependent on sample size. Correlation coefficients fluctuate from sample to sample, much more so in small samples than in large. Field (2005) reviews many suggestions about the sample size necessary for factor analysis and concludes if the sample size exceeding 300 and the average communality after extraction are greater than 0.5, then we should retain all factors with Eigen values above 1 (Kaiser's criterion).

The communalities of the samples shows none exceeding 0.7. The average of the communalities can be found by adding them up and dividing by the number of communalities (8.589/23 = 0.536). Hence, the extraction of four factors is justified.

We also examined the *Total Variance Explained* to determine the number of significant factors. It is important to note that only extracted and rotated values are meaningful for interpretation. The factors are arranged in the descending order based on the most explained variance. The Extraction Sums of Squared Loadings is identical to the Initial Eigenvalues except that factors that have eigenvalues less than 1 are not shown. These columns shows the eigenvalues and variance prior to rotation. The Rotation Sums of Squared Loadings show the eigenvalues and variance after rotation. The *Total Variance Explained* shows that based on eigen values greater than 1, four factors emerged from the data. These four factors explain 64.8% of the variance which is good. There appears to be no need to force the extraction of additional factors. This is an evidence of discriminant validity.

We used the rotated eigenvalues and scree plot to determine the number of significant factors. The scree plot is shown in the appendix with a thunderbolt indicating the point

of inflexion on the curve. This curve begins to tail off after four factors, before a stable plateau is reached. Hence, four factors could be justified. Given the large sample of 324, it is safe to assume Kaiser's criterion. The Scree Plot validates that a four factor solution is appropriate for eigenvalues greater than 1. A Scree Plot can be also used when the sample size is large (around 300 or more cases).

A model that is a good fit will have less than 50% of the non-redundant residuals with absolute values that are greater than .05. We can also compare the Reproduced Correlation Matrix with the original Correlation Coefficients Matrix. If the model is a good fit, we should expect small residuals between the two matrices. The generated values at the bottom of the Reproduced Correlations table shows the percentage of 'nonredundant residuals with absolute values greater than 0.05' shows that there are 9 (7%) non-redundant residuals with absolute values greater than 0.05. This percentage should be less than 50% and the smaller it is, the better. This indicates a good fit model.

EFA (using PAF and Promax) provides evidence that the constructs are distinct with no evidence of cross loadings between the items. Each of the dimensions are unique from others. Clearly, four factors emerged each with high loading values on the items that load unto each factor. This is evident in the Pattern Matrix. Each factor has at least two high loadings. The loadings for these items of all the factors are above .5. We chose to examine four factor solutions because during our initial examination of the survey questions, it appeared that they would fit well into four constructs. Hence, four factors were extracted. Items with loadings below .5 were deleted. The Pattern Matrix is shown below presents the final factor loading of the retained items on the underlying factors.

TABLE 1
Pattern Marix for the Final Loading Factors

	Factor			
	1	2	3	4
GP3	.933			
GP5	.742			
GP2	.723			
GP4	.721			
GP1	.674			
GP6	.537			
OBP4		.831		
OBP2		.807		
OBP3		.656		
OBP1		.527		
GRP4			.786	
GRP3			.756	
GRP2			.685	
ECP4				.769
ECP2				.739
ECP1				.548

Extraction Method: Principal Axis Factoring
Rotation Method: Promax with Kaiser Normalization

An examination of the loadings above indicates that items load high and uniformly on expected factors hence shows convergent validity. In addition, there is no overlap of factors. Items discriminate between the anticipated factors (and do not cross-load) indicating discriminant validity.

In EFA, a construct is considered to have convergent validity if its eigen value exceeds 1.0 (Hair, et al, 1995). In addition, all the factor loadings must exceed the minimum value of 0.30.

Reliability Analysis

Reliability analysis is a method to measure the precision or lack of distortion of the indicators. Reliability concerns the consistency, precision and repeatability of the indicator (Kline, 1998). The measurement model used must be of high validity and reliability so as to reflect reliability and to ensure that the statistical analysis is meaningful.

A positive test result for reliability is obtained when the method reflects similar results when tested again under the same conditions (Moser and Kalton, 1989). Cronbach (1951) proposed the α – reliability parameter, which is the most commonly used criterion to measure reliability. Reliability was operationalized using the internal consistency method that is estimated using Cronbach's Alpha (Cronbach, 1951; Nunnaly, 1978; Hull and Nie, 1981). Through the value of Cronbach's Alpha, the reliability of each construct and items established in the study are verified.

Cronbach's Alpha ranges between 0.00 (without any reliability) and 1.0 (perfect reliability) inclusive. The larger the Cronbach's Alpha, the better is the consistency in the measurement (Vogt, 1999). Nunnally (1978) suggests that the Cronbach's Alpha should be at least equal to 0.5 and preferably larger than 0.7. Nunnally (1978) suggests that permissible Cronbach's Alpha values can be 0.6 for newer scales. If α is lower than 0.35, the reliability is low; if α is between 0.35 and 0.7, the reliability is intermediate; and if α is higher than 0.7, the reliability is considered high, adequate and suggests that the theoretical constructs exhibit good psychometric properties.

The data for the study was collected in two phases. Data was collected from 206 pulp and paper companies in the first phase and the second phase include 118 companies making a total of 324 companies. Each phase of the data was subjected to pre-analysis data screening and construct validity test with similar results. The emerged constructs for each data collection phase remains the same. Hence, the data for both phases was merged and analysed.

The Cronbach's Alpha and Cronbach's Alpha based on standardized items for the green production (GP), environmental compliance (ECP), green-related performance (GRP) and business performance (OBP) constructs from the first phase of data collection (206 Companies), second phase of data collection and the combined data is shown below:

TABLE 2
The Cronbach's Alpha and Cronbach's Alpha based on standardized items for the Constructs

Factors	Cronbach's Alpha for First Phase Data	Cronbach's Alpha for First Phase Data Based on Standardized Items	Cronbach's Alpha for Second Phase Data	Cronbach's Alpha for Second Phase Based on Standardized Items	Cronbach's Alpha for Combined Data	Cronbach's Alpha for Combined Data Based on Standardized Items	Number of Items
GP	0.866	0.866	0.898	0.898	0.869	**0.869**	**6**
ECP	0.730	0.730	0.672	0.672	0.717	**0.717**	**3**
GRP	0.794	0.794	0.771	0.771	0.782	**0.782**	**3**
OBP	0.823	0.823	0.805	0.805	0.807	**0.807**	**4**

The Cronbach's Alpha values of .869, .717, .782 and .807 for the green production, environmental compliance, green-related performance and business performance constructs respectively shown in Table 4 above indicates that the items are highly correlated and representative of the underlying dimensions/constructs. Moreover, a standardized Cronbach's Alpha values of .869, .717, .782 and .807 for the green production, environmental compliance, green-related performance and business performance constructs respectively shown in Table 4 are fairly large numbers and indicative of internal consistency among the items. We can conclude that our items are reliable measures of the construct.

The Inter-Item Correlation Matrix for the green production, environmental compliance, green-related performance and business performance constructs respectively shown in the Appendix indicates moderate to high correlation. The inter-item correlation shows positive correlation which indicates internal consistencies among the items. Zero indicate no correlation and one indicates high correlation.

Confirmatory Factor Analysis: Assessing Overall Measurement Model Fitness

The confirmatory factor analysis of the model and the path analysis enable us to assess the model fit. The measurement model fitness is presented in table 3 below. In the overall measurement model fitness table shown above, p is the probability value, df is the degrees of freedom, CMIN is the minium discrepancy between the unrestricted sample covariance matrix and the restricted covariance matrix and NPAR stands for the number of parameters.

The results shown in Table 3 below provides an overview of the model fit, which includes CMIN value of 188.617 with its probability value 0.000 and degrees of freedom 98. A relatively small value of CMIN supports the proposed theoretical model being tested. In the model, the CMIN value is 188.617 and when compared to the independence model value (2125.523) it is small. As such, the CMIN value is good. The probability, p value of 0.000 is good. If there is a good model fit, the "Chi-square" (CMIN) statistic and its associated p-value or "probability" should not be statistically significant. However, the chi-square (x^2) statistic **is no longer relied upon as a basis for acceptance or rejection of model** because it is very sensitive to sample size (Schlermelleh-Engel et al. 2003, Vandenberg 2006).

Moreover, when large samples are used, the chi-Square statistic nearly always rejects the model because the chi-Square statistic is sensitive to sample size (Bentler and Bonnet, 1980; Jöreskog and Sörbom, 1993). On the other hand, the chi-Square statistic may not discriminate between good fitting models and poor fitting models where small samples are used due to its lack of power (Kenny and McCoach, 2003). Researchers have sought alternative indices to assess model fit due to the restrictiveness of the Model chi-Square,.

The normed chi-square is another name the relative chi-square is called. This value is obtained by dividing the chi-square index by the degrees of freedom. This index might be less sensitive to sample size. Although there is no consensus regarding an acceptable ratio for this statistic. Across researchers, the acceptance criteria varies, ranging from less than 2 (Ullman, 2007) to less than 5 (Schumacker & Lomax, 2004).

The chi-square/df value for this model is 1.93 which is less than the threshold of 3 indicates a good fit model. The probability (p=.000) shows high significance also indicates a good fit model. The other different common model-fit measures used to assess the models overall goodness of fit is presented in Table 6 below:

TABLE 3
Fit Statistics of the Measurement Model

Fit Statistics	Obtained	Recommendation
x^2	**188.617**	Not Applicable
df	**98**	Not Applicable
CMIN/df	**1.93**	< 3
GFI	**0.934**	> 0.9
AGFI	**0.909**	> 0.9
NFI	**0.911**	> 0.9
RFI	**0.910**	> 0.9
CFI	**0.955**	> 0.95
TLI	**0.945**	> 0.9
PRATIO	**0.825**	> 0.7
PNFI	**0.751**	> 0.7
PCFI	**0.787**	> 0.7
RMSEA	**0.054**	< 0.05 / 0.05 – 0.08
SRMR	**0.0476**	< 0.09
PCLOSE	**0.284**	> 0.05

The first standardized fit index was the goodnessof-fit index (GFI) (Joreskog and Sorbom, 1981). It is same as square multiple correlation (R2) only that the GFI is a sort of matrix proportion of explained variance. Hence, GFI > 0.9 indicates good fit while GFI of 1.0 indicates perfect fit. The GFI for the model is 0.934 indicating good fit. Unlike GFI, AGFI adjusts for the specified model's degree of freedom. AGFI value >0.9 indicates good fit model. The AGFI for the model is 0.909 indicating good fit model.

The relative fit index (RFI) represents a derivative of NFI. RFI value greater than 0.9 indicates good fit model. The RFI for the model is 0.910 indicating good fit model. In theory, the Tucker Lewis Index (TLI) is identical to the NFI, but differs in that it is

actually a comparison of the normed chi-square values for the null and the specified model. A TLI value greater than 0.9 indicates a good fit model. The TLI for the model is 0.945 indicating good fit model.

The Comparative Fit Index (CFI: Bentler, 1990) is an updated form of the NFI which factors in sample size (Byrne, 1998) and even when there is a small sample size it performs well (Tabachnick and Fidell, 2007). This statistic compares this null model with the sample covariance matrix as it assumes that all latent variables are uncorrelated. As an recognizable indicator of good fit is a CFI value ≥ 0.95 (Hu and Bentler, 1999). Being among the measures least affected by sample size, this index is among the most commonly reported indices of fit in SEM (Fan et al, 1999). The CFI for this model is .954 which indicates a good fit.

The Parsimony fit indices adjust for loss of degrees of freedom. Parsimony fit index values are considerably lower than other goodness of fit indices because these indices penalise seriously for model complexity. Hence, PRATIO, PNFI and PCFI should be over .7. From the Parsimony-Adjusted Measures Table above, the values of PRATIO, PNFI and PCFI are .825, .751 and .787 respectively indicating a good fit model.

Its sensitivity to the number of estimated parameters in the model means the Root mean square error of approximation (RMSEA) is one of the most informative fit indices' (Diamantopoulos and Siguaw, 2000). The RMSEA, in other words favours parsimony because it will select the model with the lesser number of parameters. The RMSEA should be between .05 and .08 while PCLOSE should be over .05. The RMSEA value for this model is .054 and the PCLOSE value is .284. These values indicate a good fit model.

The square root of the difference between the hypothesised covariance model and the residuals of the sample covariance matrix are the RMR and the SRMR. The RMR becomes difficult to interpret if a questionnaire contains items with varying levels as the scales of each indicator are the basis upon which the range of the RMR is calculated (Kline, 2005). This problem is roselved by the standardised RMR (SRMR) and as such is much more meaningful to interpret. Values for the SRMR vary from zero to 1.0 as values as high as 0.08 are considered as acceptable (Hu and Bentler, 1999), however well fitting models produce values less than .05 (Byrne, 1998; Diamantopoulos and Siguaw, 2000). The SRMR for the model is 0.0476 indicating good fit model.

Results of the Confirmatory Factor Analysis

The result shows the regression weight and the standardized regression weights for the confirmatory factor analysis for the model respectively. The Critical Ratio (C.R) should be over 2 and we observe that each variable meets that standard as shown in the regression weights for the model. The p value indicates that the loadings for the items are highly significant. The estimates in the standardized regression weight ranges from .503 to .827. Hence, each of the variables loads high.

Validity and Reliability

Establishing convergent and discriminant validity is absolutely necessary as well as reliability when doing a confirmatory factor analysis. Testing the causal model will be

unnecessary if the factors do not demonstrate adequate validity and reliability. The established measures used to establish validity and reliability includes Composite Reliability (CR), Average Variance Extracted (AVE), Maximum Shared Variance (MSV) and Average Shared Variance (ASV). The criteria for Reliability is CR > 0.7, for Convergent Validity is AVE > 0.5 and Discriminant Validity requires MSV and ASV <AVE and the Square root of AVE should be greater than the inter-construct correlations. AVE is a strict measure of convergent validity. AVE is more conservative measure than CR. Hence, one can conclude that the convergent validity of a construct is adequate on the basis of CR alone, even if more than 50% of the variance is due to error (Malhotra and Dash, 2011).

The validity and reliability of the constructs is computed in addition to the factor correlation matrix with square root of the AVE on the diagonal and presented in the table below:

TABLE 4
Validity and Reliability and Factor Correlation Matrix for the Constructs

	CR	AVE	MSV	ASV	OBP	ECP	GP	GRP
OBP	0.811	0.524	0.406	0.140	**0.724**			
ECP	0.722	0.565	0.033	0.020	0.105	**0.752**		
GP	0.875	0.544	0.406	0.140	0.637	0.152	**0.738**	
GRP	0.785	0.549	0.033	0.020	-0.112	0.183	-0.056	**0.741**

The Composite Reliability (CR) of the constructs is greater than 0.7 indicating adequate reliability. The Average Shared Variance (AVE) of the constructs in the study were measured and compared to the inter-factor correlations. Evidence of convergent validity was determined when the AVE of each construct was higher than 0.5 and also higher than its correlation with other constructs. While discriminant validity was determined by assessing the Average Shared Variance (ASV) and the Maximum Shared Variance (MSV), it was found that both were lower than the Average Variance Extracted (AVE) for all of the constructs in the scale. Moreover, the Square root of AVE were found to be greater than the inter-constructs correlations further confirming discriminant validity for the constructs.

Content Validity

The content of validity of an instrument is The extent to which an instrument it provides adequate coverage for the essence of the domain being measured or construct domain (Churchill, 1979). The determination of content validity is judgmental and subjective not numerical (Emory, 1980). The content validity of the instrument was established prior to data collection by grounding it in existing literature including over 100 articles. The measurement instrument is further validated before the collection of data through Pre-testing.

Experts in the pulp and paper sector from United Nations Industrial Development Organisation, United Nations Development Program, the World Bank Group and OECD participated in the pre-testing process during the OECD Global Forum on Eco-Innovation in Paris. Some local experts in Nigeria from the Pulp and Paper Sector at

the Manufacturing Association of Nigeria who are not part of the research sample also participated in the pre-testing of the research instrument.

In their review of the questionnaire, these experts were to focus on its completeness, ambiguity, readability and structure (Dillman, 1978). To The few ambiguities discovered during the process of validation were removed from final survey instrument through some minor changes. These tests indicated that the content of green investment, environmental compliance and organizational performance constructs was represented by the resulting measurement instrument.

Common Method Bias

Common method bias (CMB) refers to a bias in the dataset brought about by something external to the measures. The responses given may have been influenced by something external to the question. For instance, responses may either be deflated or inflated by systematic response bias introduced through the use of single (common) method when collecting data. A study with significant common method bias is one with the possibility og explaining a bulk of the variance by a single factor.

Some authors suggested that common method bias (CMB) occurs when variations in responses are brought about not by the actual predispositions of the respondents that the instrument sets to uncover but by the instrument itself. Consequently, the results obtained is contaminated by the 'noise' stemming from the biased instruments. (Podsakoff, et al, 2003; Podsakoff, et al, 2010). However, another author argue that common method bias, which describes the measurement error could be compounded by the sociability of respondents who want to provide positive answers (Chang and Eden, 2010).

Our survey instrument has five sections. Section 1 was completed by the companies Human Resources Director, Section 2 was completed by the HSE (Health, Safety and Environment Director), Section 3 was completed by Operations Director, Section 4 was completed by the Managing Director while Section 5 was completed by both the Finance Director and/or the Managing Director. Executives heading different Directorate of each of the companies were asked to complete each section of the survey primarily because of their expertise in each of the domain to have a rich and robust response.

Data collection on both the independent and dependent variables that is self-reported from the same respondents at the same time can raise the potential for common method bias as false internal consistency might be present in the data. **Hence, collection of the data for the study from five respondents minimizes the potential for common method bias which is normally associated with single respondents in a survey.**

The common method bias for the study was tested using the Common Latent Factor Method which captures the common variance among all observed variables in the model. A common latent factor (CLF) was added to the AMOS CFA Model and then connected to all observed items in the model. The standardized regeession weights from this model was then compared to the standardized regression weights of the model without the CLF. A large differences (greater than 0.200) indicates that common method bias has effect on the data. If the existence of CMB is proven, then there will

be the need to retain the CLF as composites are either imputed from factor scores, or as the structural model progresses. The common method bias of the model and the path diagram is shown in the Appendix E. The testing of the common method bias using the Latent Factor Method is presented in table 5 below.

TABLE 5
Common Method Bias using the Latent Factor Method

Difference in the Standardized Regression without CLF and with Weights CLF					
			Estimate without CLF	*Estimate with CLF*	*Difference*
ECP1	<---	ECP	0.533	0.5	0.033
ECP2	<---	ECP	0.756	0.728	0.028
ECP4	<---	ECP	0.747	0.737	0.01
GRP2	<---	GRP	0.672	0.649	0.023
GRP3	<---	GRP	0.764	0.739	0.025
GRP4	<---	GRP	0.783	0.772	0.011
GP1	<---	GP	0.784	0.767	0.017
GP2	<---	GP	0.773	0.756	0.017
GP3	<---	GP	0.872	0.854	0.018
GP4	<---	GP	0.701	0.672	0.029
GP5	<---	GP	0.739	0.711	0.028
GP6	<---	GP	0.503	0.476	0.027
OBP1	<---	OBP	0.508	0.469	0.039
OBP2	<---	OBP	0.76	0.742	0.018
OBP3	<---	OBP	0.76	0.74	0.02
OBP4	<---	OBP	0.827	0.816	0.011

The difference in the standardized regression weights above for the model without CLF and with CLF shows that the difference for each of the items in the constructs are less than 0.200 indicating low common method bias (CMB). The data is not affected by Common Method Bias (CMB). Hence, we will not impute common latent factor adjusted variables forward for the structural testing.

Structural Equation Modelling: Assessing Overall Measurement Model Fitness

Structural Equation Modeling (SEM) can be described as a multivariate technique which simultaneously estimates a series of inter-related dependence relationships. The term Structural Equation Modeling conveys that the causal processes under study are represented by a series of structural (i.e. regression) equations, and that to enable a clearer conceptualization of the study, these equations can be modeled pictorially.

The hypothesized model can be statistically tested in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data. If the goodness-of-fit is adequate, the model argues for the plausibility of postulated relations among the variables. The structural model and the path diagram were assessed for fitness and tested for significance.

RESULTS

The results shown in Table 6 below provides the overview of the model fit, which includes CMIN value of 1.288 with its degrees of freedom of 1 and probability value 0.256. A relatively small value of CMIN supports the proposed theoretical model being tested. In the model, the CMIN value is 1.288 and is small compared to the value of the independence model (128.095). Hence, the CMIN value is good. The probability, p value of 0.256 is good. The "Chi-square" (CMIN) statistic and its associated "probability" or p-value should not be statistically significant if there is a good model fit. However, the chi-square (x^2) statistic is very sensitive to sample size and **is therefore no longer relied upon as a basis for acceptance or rejection of model** (Schlermelleh-Engel et al. 2003, Vandenberg 2006).

The chi-square/df value for this model is 1.288 which is less than the threshold of 3 indicates a good fit model. The probability (p=.256) indicates a good fit model. The other different common model-fit measures used to assess the models overall goodness of fit is presented in Table 6 below:

TABLE 6
Fit Statistics of the Structural Model

Fit Statistics	Obtained	Recommendation
x^2	**1.288**	Not Applicable
df	**1**	Not Applicable
x^2/df	**1.93**	< 3
GFI	**0.998**	> 0.9
AGFI	**0.980**	> 0.9
NFI	**0.990**	> 0.9
RFI	**0.940**	> 0.9
CFI	**0.998**	> 0.95
TLI	**0.986**	> 0.9
PRATIO	**0.817**	> 0.7
PNFI	**0.744**	> 0.7
PCFI	**0.780**	> 0.7
RMSEA	**0.03**	< 0.05 / 0.05 – 0.08
SRMR	**0.0165**	< 0.09
PCLOSE	**0.428**	> 0.05

The goodnessof-fit index (GFI) of 1.0 indicates perfect fit and GFI > 0.9 indicates good fit. The GFI for the model is 0.998 indicating good fit. AGFI value >0.9 indicates good fit model. The AGFI for the model is 0.980 indicating good fit model. The relative fit index (RFI) value greater than 0.9 indicates good fit model. The RFI for the model is 0.940 indicating good fit model. The Tucker Lewis Index (TLI) value greater than 0.9 indicates a good fit model. The TLI for the model is 0.986 indicating good fit model.

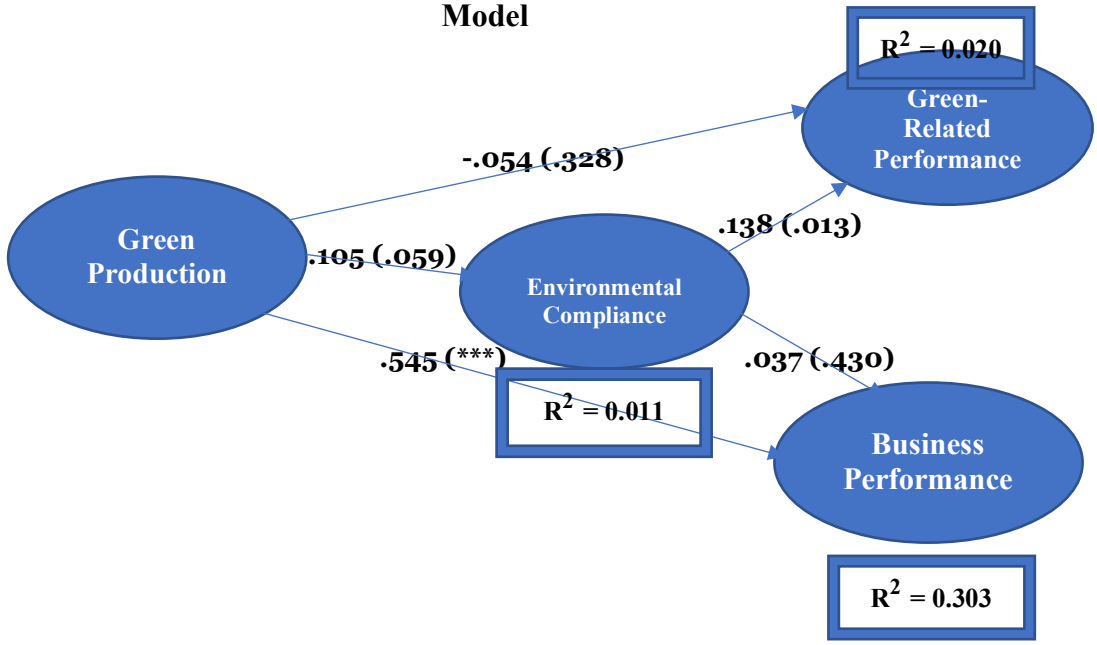
The Comparative Fit Index (CFI) value ≥ 0.95 is recognised as indicative of good fit (Hu and Bentler, 1999). The CFI for this model is .998 indicating a good fit. The Parsimony fit indices adjust for loss of degrees of freedom. Hence, PRATIO, PNFI and PCFI should be over .7. From the Parsimony-Adjusted Measures Table above, the

values of PRATIO, PNFI and PCFI are .817, .744 and .780 respectively indicating a good fit model.

The Root mean square error of approximation (RMSEA) should be between .05 and .08 while PCLOSE should be over .05. The RMSEA value for this model is .03 and the PCLOSE value is .428. These values indicate a good fit model. The RMR and the SRMR are the square root of the difference between the residuals of the sample covariance matrix and the hypothesised covariance model. Values for the SRMR range from zero to 1.0 with well fitting models obtaining values less than .05 (Byrne, 1998; Diamantopoulos and Siguaw, 2000), however values as high as 0.08 are deemed acceptable (Hu and Bentler, 1999). The SRMR for the model is 0.01625 indicating good fit model.

Given the adequate measurement model, the hypotheses can now be tested by examining the structural model. The regression weights and the standardized regression weights for the hypothesized structural model is presented in the appendix. The path analysis which shows the standardized path coefficients and their significance in the structural model is presented in the figure below below:

FIGURE 4
Standardized Path Coefficients and Significance for the Hypothesized Structural Model



The probability values indicate that there is a relationship between the variables. If p is less than .05, then there is a significant relationship. The estimate above suggests that there are two paths that are significant and three paths are not significant. In addition, the mediational effects of environmental compliance is presented in Table below using the Baron and Kenny's approach for mediational hypotheses:

TABLE 7
Mediation Effects of Environmental Compliance on the Structural Model

Relationships	Direct without Mediation	Direct with Mediation	Indirect
GP → GRP	-0.040 (0.475)	-0.54 (0.328)	Not Significant (No Mediation)
GP → BP	0.549 (***)	0.545 (***)	Significant (Partial Mediation)

Hence, an examination of the path analysis above indicates which of the hypotheses are supported as described below:

H1: Green investment has a positive effect on green-related performance in the Nigerian pulp and paper industry.

The path coefficient of the standardized regression weight for this path relationship is -.054 and the probability (p=.328) indicates a non-significant relationship. Hence, Green investment does not have a positive effect on green-related performance in the Nigerian Pulp and Paper Industry. Hence, this hypothesis is not supported.

H2: **Green investment relate positively to business performance in the in the Nigerian pulp and paper industry.**

The path coefficient of the standardized regression weight for this path relationship is .545 and the probability (p=***) indicates a significant relationship. Hence, Green Investment relate positively to business performance in the Nigerian Pulp and Paper Industry. Hence, this hypothesis is supported. This suggests that US$1 investment in green production in the Nigerian Pulp and Paper Industry will increase the business performance of the companies by US$0.55.

H3: Green investment is positively associated with environmental compliance in the Nigerian pulp and paper industry.

The path coefficient of the standardized regression weight for this path relationship is .105 and the probability (p=.059) indicates a non-significant relationship. Hence, Green investment does not associate positively to environmental compliance in the Nigerian Pulp and Paper Industry. Hence, this hypothesis is not supported.

H4: Environmental compliance has a positive impact on green-related performance in the Nigerian pulp and paper industry.

The path coefficient of the standardized regression weight for this path relationship is .138 and the probability (p=.013) indicates a significant relationship. Hence, environmental compliance has a positive impact on green-related performance in the Nigerian Pulp and Paper Industry. This suggests that 1% improvement in environmental compliance in the Nigerian Pulp and Paper Industry will result in 0.14% increment in green-related performance of the companies. Hence, this hypothesis is supported.

H5: Environmental compliance positively impacts business performance in the Nigerian pulp and paper industry.

The path coefficient of the standardized regression weight for this path relationship is .037 and the probability (p=.430) indicates a non-significant relationship. Hence, environmental compliance does not impact business performance positively in the Nigerian Pulp and Paper Industry. Hence, this hypothesis is not supported.

H6: Environmental compliance mediates the positive effect of green investment on green-related performance in the Nigerian pulp and paper industry.

The mediation effects presented in the Table above shows that standardized regression weight and the probability for this path relationship without mediation and with mediation are -0.040 with p= 0.475 and -0.54 with p= 0.328 respectively. This is a non-significant relationship which indicates no mediation. This shows that environmental compliance does not mediate the positive effect of green investment on green-related performance in the Nigerian pulp and paper industry. Hence, this hypothesis is not supported.

H7: Environmental compliance mediates the positive effect of green investment on business performance

The mediation effects presented in the Table above shows that standardized regression weight and the probability for this path relationship without mediation and with mediation are .0.549 with p=*** and 0.545 with p= *** respectively. This is a significant relationship. This indicates partial mediation because of the drop in the standardized estimate. This shows that environmental compliance mediate the positive effect of green investment on business performance in the Nigerian pulp and paper industry. Hence, this hypothesis is supported.

The Square Multiple Correlation (R-Square) of the Structural Model

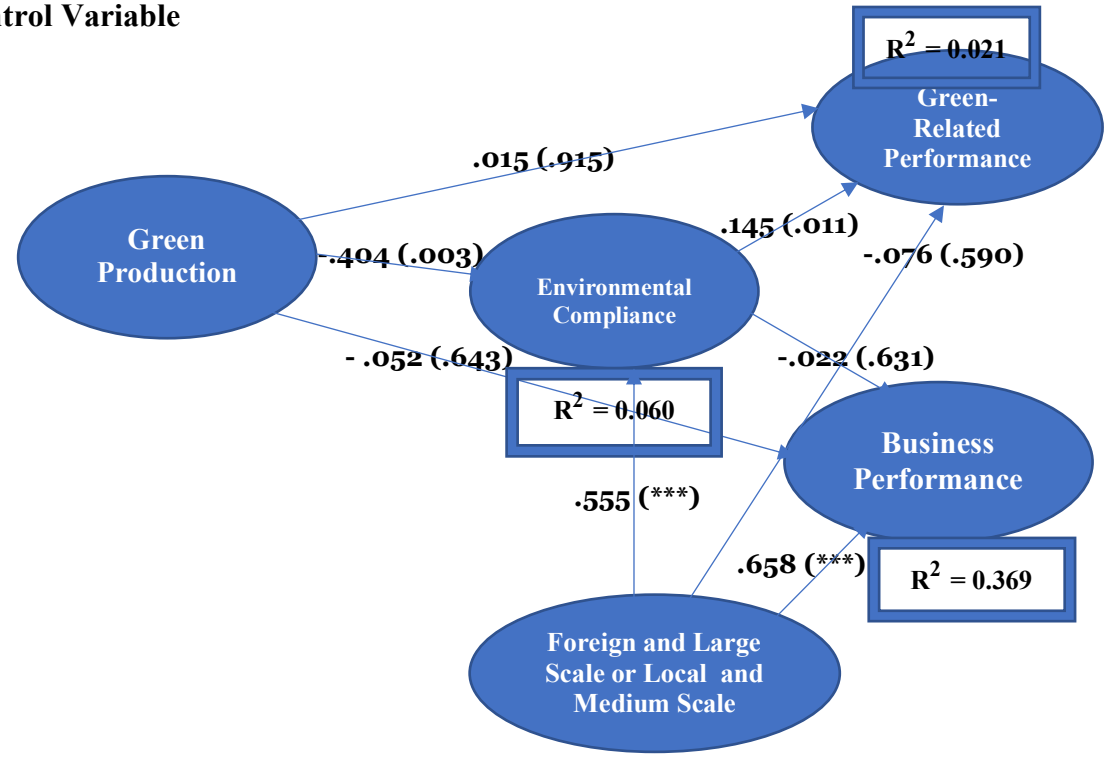
The square multiple correlations (SMC) for the model or the percentage of the variance explained by the predictor variable is presented in the appendix. The square multiple correlations (SMC) indicates that 30.3% of the variance in business performance in the model (green investment and business performance nexus) is explained by the predictor variable which is green production. The SMC also indicates that 2% of the variance in green-related performance in the model (green investment and green-related performance nexus) is explained by the predictor variable which is green production. Moreover, the SMC also shows that 1% of the variance in environmental compliance in the model (green investment and environmental compliance nexus) is explained by the predictor variable which is green production.

Statistical Testing of the Structural Model with Control Variable

The path analysis which shows the standardized path coefficients and their significance weights for the hypothesized structural model with medium scale and local firm is presented is presented in figure 5 below:

FIGURE 5

Standardized Path Coefficients and Significance for the Structural Model with Control Variable



The model for the study in Figure 3 suggests that we should test for two control variables, that is, firm size (large or medium scale enterprises) and ownership structure (foreign or local owned companies) . However, the data collected shows that all foreign owned firms are large scale enterprises and all locally owned companies are medium scale enterprises. Hence, we tested for one control variable which is foreign owned and large scale enterprises or locally owned and medium scale enterprises. The Nigerian Pulp and Paper Industry is peculiar with 70% foreign and 30% local in its ownership structure.

Hence, the probability values in Figure 5 above indicates that there is a relationship between the variables. If p is less than .05, then there is a significant relationship. The p-values above indicates that there is a relationship between the control variable and two endogenous variables. Hence, the probability values above above suggests that there is a highly significant relationship between the control variable and environmental compliance with p = ***. There is also a highly significant relationship between the control variable and business performance with p = ***. Hence, the control variables confound the relationships that we specified in our model. The results suggests that the extent of environmental compliance and business performance to green investment in the specified model is determined by whether a firm is foreign owned and large scale enterprises or locally owned and medium scale enterprises

The Square Multiple Correlation (R-Square) of the Structural Model with Control Variable

Moreover, the square multiple correlations (SMC) with the control variables indicates that 36.9% of the variance in business performance in the model (green investment and

business performance nexus) is explained by the predictor variable which is green production in the medium scale and locally owned Nigerian Pulp and Paper Industry. The SMC also indicates that 2.1% of the variance in green-related performance in the model (green investment and green-related performance nexus) is explained by the predictor variable which is green production. Moreover, the SMC also shows that 6% of the variance in environmental compliance in the model (green investment and environmental compliance nexus) is explained by the predictor variable which is green production in the medium scale and locally owned Nigerian Pulp and Paper Industry. Hence, the variance explained by the predictor variable is higher with the control variables than with the structural model.

DISCUSSION AND CONCLUSION

Firms in developed and developing countries have continually faced increasing pressure to become greener and socially responsible. Empirical studies have provided evidence on the positive relationship between green investment and organizational performance nexus (Jabbour and Jabbour, 2009) in developed economies. However, very little evidence has been reported on same nexus in developing economies. The findings from this research provides evidence using quantitative techniques on the green investment, environmental compliance and organizational performance nexus in Africa.

Our findings challenge existing literatures and conventional empirical evidences which reveal that industries faced with strict environmental regulations tend to be more innovative than industries in located in areas or faced with weak environmental regulation (Brunnermeier and Cohen, 2003; Jaffe and Palmer, 1997). Hence, in contrast to the evidence that that energy intensive industries in developing markets operate amid highly pollution-intensive conditions, within weak or non-existent formal environmental regulatory frameworks and enforcement mechanisms, and with limited institutional capacity, inadequate information on emissions and nearly zero government-imposed “price of pollution”, we found the Nigerian pulp and paper industry is fast adopting green investment that are similar to those in developed countries and emerging economies in Asia.

The findings from the study are consistent with the dynamic rivalry models of industrial organisation theory about positive relationship between green investment and business performance (Paulus 1988). Thiis is also consistent with the Resource-Based theory, (Hart, 1995) which considers firms ability for innovation as a competitive edge because innovations are knowledge-based which might ultimately improve corporate financial performance, boost long-term competitive advantage and lower overall company costs, (Christmann, 2000). Evidence from our study demonstrates a positive relationship between environment-benign technologies and business performance. The firms we studied have invested in environmental benign technologies that offers competitive advantage and profitability.

The findings from the study shows that environmental compliance does not mediates the effect of green investment on green-related performance but rather on business performance neither . This is consistent with literatures with findings that the driver for green investment in developed countries is the environmental regime and compliance mechanism. However, the driver for green investment in developing economies must

be different because the environmental regulatory framework is weak. Hence, green investment in this context is driven by profitability.

Findings from the effects of control variable indicates that firm size and ownership structure has an effect on two endogenous variable, environmental compliance and business performance in the model. This finding supports the conclusion from the qualitative component of the research that shows that one of the drivers of green investment is the environmental policy of the parent body of foreign owned and multinational companies and the size of the companies. Hence, multinationals or foreign owned and large scale firms has more potential for environmental compliance towards green investment than locally owned and medium scale firms. This also determined the level of financial and operational benefits accrued from the green investment.

Hence, contrary to arguments in literatures that green investments may not have positive link with business performance in Africa because of the weak environmental compliance mechanism and institutional framework, our findings provide a strong evidence of positive relationship between green investment and business performance in the Nigerian Pulp and Paper Industry. The findings from this quantitative research is consistent with the findings from the qualitative research.

The findings from the qualitative research suggests that the driver for green investment in the Nigerian pulp and paper industry is raw material scarcity which is related with business performance indicators. This is consistent with the findings from this quantitative study that shows that environmental compliance has a positive impact on green-related performance. However, the environmental compliance in the Nigerian pulp and paper industry is voluntary and driven by raw material scarcity which resulted in both green-related performance and business performance.

Hence, there exist two-way interaction between green investment and business performance. Studies on the green investment and business performance nexus have concentrated on the effect of environmental variables on business performance. However, business performance may also influence green-related performance (Wagner, et al, 2002; Wagner, 2005). This supports the argument of Toffel's (2006) on the treatment effect (the ex-post improvement effect of environmental initiatives on business performance) and a selection effect (the ex-ante selection mechanism where better performing firms have greater propensity to carry out environmental initiatives).

POLICY RECOMMENDATIONS

Our findings have implications for Environmental regulators in tropical developing countries characterized by inadequate information on emissions, limited institutional capacity, lack formal regulatory framework and lack of enforcement mechanisms. Evidence from the study suggest that with minimum cost to regulators, compliance could be enhanced through environmental education regarding the economic benefits of green investments. The findings also have implications for the shareholders of the pulp and paper industries in Nigeria. The study indicates a positive relationship between environment-benign technologies and financial performance.

Even in developing economies, environmental sustainability, we conclude, need not conflict with wealth creation. Some forms of socially responsible investment and environment benign technologies have been identified that may actually improve the present value of a firm's future cash flows, consistent with the wealth maximizing interests of the firm's equity holders (Mc Guire, *et al*, 1988; Pava and Krausz, 1996).

The study suggests that a firm might stay ahead of competitors by investing in green innovation and choosing technologies that offer competitive prices after internalizing the externalities. By installing cleaner technologies—which allow companies to reduce, reuse and recycle waste, manufacturing industries can reduce waste emissions by at least 25 percent without any investment in end-of-pipe technologies.

One of the primary drivers of environmentally benign technologies identified in the qualitative starnd of this study is raw material availability. This has implication for global greenhouse gas emission and climate change because trees in tropical forests typically hold, on average, about 50 percent more carbon per hectare than trees outside the tropics. This means that an investment in cleaner technologies in the form of reduction, reuse and recycling of waste could potentially reduce tropical deforestation.

Land-use change contributes to 20 percent of world global greenhouse gas emission (Stern, 2006). In addition, our study suggests that research and development in alternative raw materials could also contribute to a reduction in global green house gas emission. A demonstration project by the Nigerian Federal Institute of Industrial Research suggests that *"Kenaf",* a weed like sugar cane available in abundance in savannah area of Nigeria could be a potential raw material for the Nigeria pulp and paper industry.

Moreover, the findings from the study will provide a paradigm shift within Nigeria's pulp and paper industry as well as in other developing economies on the adoption of green investment and the interaction with other proactive and strategic environmental policies because this may have strong implication on organizational performance.

LIMITATIONS AND SUGGESTED AREAS FOR FUTURE RESEARCH

The study utilizes large scale survey methodology to provide empirical evidence for the proposed model. However, case studies might also assist the validation as well as extension this research primarily regarding the other aspects like environmental regulations. Case studies that investigate the environmental compliance process might provide additional insights. In-spite of these limitations, the empirical results of this study provides valuable managerial insights.

It would be interesting for future research to consider a meta-analysis about the impact of green investment on organizational performance. Meta-analysis may provide a statistical integration of the accumulated studies and findings on the green investment and organizational performance nexus especially in developing economies. Other green areas for future research include alternative raw material for the pulp and paper industry in developing economies. In addition, empirical analysis of the determinants of environmentally benign technologies in tropical developing countries, reflecting investment in these technologies is a novel research agenda.

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