INFLUENCE OF GREEN PROCUREMENT ON PERFORMANCE OF PRIVATE OIL AND GAS FIRMS IN KENYA: MODERATING ROLE OF GOVERNMENT REGULATIONS

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ABSTRACT

Globally, the oil and gas industry account for the major environmental tragedies leading to creation of reliability issues from policy makers and trust concerns from the community. Kenya's carbon dioxide and greenhouse gas emissions increased from 7.82 million tonnes to 16.15 million tonnes, recording the highest levels of carbon dioxide and greenhouse gases in the country in 2021. Kenya's private oil and gas sector, churns out 60 million litres of waste oil annually but only 5% of the waste is handled and disposed of properly. The purpose of this research was to establish the influence of green procurement on performance of private oil and gas firms in Kenya. Rationale of the study was to mitigate the adverse effects of private oil and gas activities on the environment through adoption of green procurement. The guiding theories included; the resource-based view and the natural resource-based view. The study was guided by the positivist philosophy. The research utilized a descriptive design. Target population was one thousand eight hundred and fifty employees working for the seventy-two private oil and gas firms in Kenya. The study used stratified random sampling that gave a representative sample. Primary information was gathered using a sample size of four hundred and seventy employees, using self-constructed questionnaires which were dropped and collected after two weeks. A pilot test was conducted at National oil corporation of Kenya, using ten percent of the sample size. Validity was ensured by the experts' review. Reliability of the tools was tested using Cronbach's alpha value. An alpha value of 0.7 or above gave a suitable and satisfactory reliability. To test the strength of the relationship amongst variables, the Pearson's product moment correlation was employed. Quantitative data was analyzed using both descriptive (minimum, maximum, mean, standard deviation, skewness, kurtosis) and inferential statistics. Simple linear regression analysis measured direct effects of variables. Hierarchical regression analysis tested the moderation effect of variables. Analyzed information was presented through statistical parameter estimates and tables. The study findings showed that green procurement bore a positive and significant influence on firm performance. The study concluded that private oil and gas firms should invest in green procurement to enhance performance. The study recommended that private oil and gas firms should adopt green procurement to improve their environmental performance.

Keywords: Green Procurement, Environmental Management, Private oil and gas firms, Factor Analysis, Greenhouse gases, Firm performance.

INTRODUCTION

Organizational performance refers to a guideline to making decisions on business investment anddevelopment in the future, apart from showing the current position and its effectiveness in the sector (Clarke, 2015). It is how well an establishment attains its market, financial goals and objectives. Both financial and non-financial measures are

utilized to measure performance (Hill, 2017). Performance as well as effectiveness of organizations are influenced by processes, the structure as well as the external environment (Hrebiniak and Joice, 2015).

Green procurement (GP) is a procedure of formally presenting and incorporating ecological issues and features into the buying process, aiming to purchase materials and services that have a low ecological effect, that is, goods which are ecofriendly and made by incorporating ecofriendly procedures. Green procurement includes ecofriendly practices which decrease the origin of the waste as well as enhance regeneration for bought out materials. Ecofriendly buying ensures responsibility for green issues in several processes, acquiring procedures, and plans. Therefore, ecological procuring gives assurance that bought items achieve sustainable characteristics, like non injurious elements, recyclability as well as reusability (Foo *et al*., 2019). Environmental buying is majorly collaborating with vendors. Integrating environmental thinking into the buying process permits organizations to offer design specifications to providers which, at a minimum, should contain ecological concerns for ecofriendly bought materials (Shao & Ünal, 2019).

To enhance performance, green purchasing liaises with suppliers to manufacture green and ecofriendly goods. It is vital to buy from the organizations that are adopting Green Supply Chain Management practices. In addition, supplier pre-qualification is an essential way for establishments to lessen ecological effects of business activities (Tseng & Chiu, 2013).

When green procurement practices are well implemented, they improve performance of private oil and gas firms in Kenya in many ways including; improving the environmental footprint through reduction of GHG emissions and pollution, minimizes wastes, reduces costs of operation and improves profits and leads to customer satisfaction and firm reputation (Tseng *et al.*, 2019).

The private oil and gas firms are performing poorly in the area of environmental management. Globally, emissions from oil and gas grew by 2.5% (or 268 Mt) to 11.2 Gt in 2022. Energy-related CO2 emissions grew by 0.9% to over 36.8 Gt in 2022. Total transport emissions increased by 2.1% (or 137 Mt). Total energy-related greenhouse gas emissions increased by 1.0% to an all-time high of 41.3 Gt CO2-eq. CO2 emissions from energy combustion and industrial process accounted for 89% of energy-related greenhouse gas emissions in 2022. Emissions from Asia's emerging market and developing economies, including Kenya, but excluding China, grew more than those from any other region in 2022, increasing by 4.2% or 206 Mt CO2 emanating from fossil fuels. Over the past ten years, Kenya's carbon dioxide emissions have increased from 7.82 million tonnes to 16.15 million tonnes, recording the highest levels of CO2 in the country in 2021(IEA, 2021). Kenya's private oil and gas sector, churns out 60 million litres of waste oil annually but only (5%), that is, about 3 million litres of the waste, is handled and disposed of properly (GoK, 2019). The Herfindahl-Hirschman index (HHI)

for the oil and gas sector in Kenya decreased from 0.162 to 0.0902 between 2011 and 2019, resulting from the entry of independent oil firms that triggered unfair competition and product adulteration (GoK, 2020).

Abba et al (2021) studied green procurement practices on performance of listed oil & gas companies in Nigeria moderated by internet of thing. Study was quantitative instead of a mixed methodology. PSL-SEM model used to test hypotheses instead of inferential statistics. Study addressed variables; cooperation with customers, internal environment management, investment recovery, eco-design and internet of thing as a moderator while current study uses green procurement practices. Gunarathne (2021) did research on the impact of green procurement practices on performance of the industrial sector in Sri Lanka. PLS-SEM used instead of inferential statistics to test hypotheses. Sample size of 150 participants used instead of 470 participants. Study employed quantitative instead of mixed methodology for current study. Saad et al (2021) conducted a study on the effect of green procurement practices on environmental performance in the hydrocarbon industry of Bahrain: Testing the moderation of green innovation. The smartPLS 3 technique tested hypotheses as opposed to inferential statistics. These studies create methodological, theoretical and moderation gaps. It is against this background the current study is conducted to establish the influence of green procurement practices on performance of private oil and gas firms in Kenya.

H_{O1}: Green procurement does not have a statistically significant influence on performance of private oil and gas firms.

Government regulation indicators for this study include, compliance, policy guidelines, legal regime and enforcement. Regulatory compliance refers to the practice of setting up procedures that are important in observing regulations and laws including guidelines which manage the activities of business. Compliance refers to being compatible to the rules, for example specifications as well as policy and standards including the law. Compliance is integrating standards to fit into particular requirements. Environmental policy refers to the measures put in place by entities concerning the impact of human undertakings on the ecology specifically measures meant to safeguard as well as minimize the dangerous impacts of organizational undertakings on the ecologies. Enforcement is the process of making organizational to obey the law or the rule. Legal regime refers to a system or framework of rules or a body of legal rules, norms and standards applicable in businesses across the globe. Regulations pressure organizations to safeguard the environment as a way of sharing the cost of engaging in business (ISO, 2017)

H_{O2}: Government regulation does not have a statistically significant moderating effect on the relationship between green distribution and private oil and gas marketing firms.

THEORETICAL LITERATURE REVIEW

Resource Based view (RBV) theory was proposed by Penrose in 1959, who cited those unused managerial resources as the primary driver of growth. The theory was published by Wernerfelt in 1984. The theory postulates that organizations can create sustainable competitive edge by utilizing distinctive internal strategic resources and enhance performance. Enterprise resources are viewed to include both tangible and intangible resources. The theory considers internal strategic resources to be a significant foundation for building a continuous competitive edge in an enterprise (Namjoo & Keramati, 2018). Ownership of skills as well as capabilities in the entire value chain to go green is a significant component in embracing environmentally friendly strategies such as green procurement (Agyapong, 2019). Application of green procurement using distinctive internal strategic resources as postulated by the resource-based view confers a continuous competitive advantage in an enterprise (Namjoo & Keramati, 2018).

This theory is to examine how the organizations' assets affect GSCM practices as well as performance of a company, bearing in mind that the enterprises' assets depend on their internal capabilities and capacity to support their survival. It is relevant in the oil and gas sector because it can help firms put into use existing resources like human resource expertise and skills, incomes, green innovations, modern equipment and clean technologies, supplier collaboration and funding from parent companies in the case of multinationals to add to their capacity to build competitive advantage of the firm.

The Natural Resource Based View (NRBV) Theory was developed by Hart in 1995. The theory states that a firm develops a competitive edge by relating to the biophysical ecosystem. This means that competitive advantage is created through the relationship between internal capacities and the external environment (Chandler, 2012). The connection between the external and internal environment of a firm creates cost leadership as well as quality differentiation (Porter, 2015). It further asserts that if an asset or a group of resources can make a firm to build competitive advantage, then that resource cannot be substituted, is rare and valuable, not replicable and is not possessed by other firms (Hart, 2015).

NRBV highlights that the company's competitiveness is achieved through abilities supporting ecologically sustainable development. For the oil and gas industry to gain environmental efficiency, then it should be anchored by NRBV of the firm- a theory of competitive advantage based upon the firm's relationship to the natural environment. The NRBV is composed of three interrelated strategies and capabilities which include, pollution prevention capability which minimizes emissions and waste, product stewardship capability that minimizes lifecycle costs of products and sustainable development capability that minimizes the environmental burden that results from company growth and development. In the private oil and gas industry these capabilities are the environmental drivers to lower costs, pre-empt competitors and securing the future position of a firm to gain competitive advantage through environmental

sustainability. GSCM practices like environmental purchasing and many more can be studied through NRBV elements. The theory is also relevant in acquiring environmentally-friendly raw materials since the natural world is a major success component in oil & gas industry.

EMPIRICAL LITERATURE REVIEW

Green Procurement on Performance

Augustine (2020) assessed the influence of green procurement on performance and established that green purchasing was an important enabler of firm success at Bayport savings & loans as well as Ghana's water company limited. Further, it established that there was no clear uniqueness among ecofriendly purchasing strategies at the companies as far as performance is concern, vendor partnerships as well as challenges. The study used objectivism philosophy and was quantitative in nature. Both descriptive and explanatory study designs were employed. Target population was allthe staff of the two companies from which a sample size of 160 participants were drawn, 80 staff from each company. The convenient sampling method was employed. A structured questionnaire was utilized to gather primary information from 160 respondents. Previous information was gathered from the companies' archives. SPSS analyzed the collected data. However, study was quantitative and not mixed methodology Study used a small sample of 160 as opposed to 470 for current study. Study used a convenient sampling technique as opposed to stratified random sampling. Multiple regression was not employed. The current study utilizes multiple variables, inferential statistics to test hypotheses, multiple regression analysis, a moderating variable and a mixed methodology. The study addressed one variable, green procurement. The study concluded that green purchasing has a significant positive relationship with performance. The study recommended that the administration of the two companies should embrace continuous improvement on the green strategies application to enable effectiveness as well as efficiency on the firms' operations.

A study conducted in Kenya by Omusebe *et al* (2017) looked at impact of green procurement on the performance as well as effective purchasing administration in the public Sector, and established that implementing green purchasing improves performance in areas of costs, lead time as well as quality that are critical in purchasing administration in organizations. The study was majorly a review of literature on the said indicators. However, the study did not use multiple regression. Study was not physical research. Did not test hypotheses using inferential statistics. Did not use a moderator. The current study utilizes multiple variables, inferential statistics to test hypotheses, multiple regression analysis, a moderating variable and a mixed methodology. Overall, the study concluded that the literature reviewedshowed that sustainability continues to be a critical corporate consideration today and in the future. The study recommends that purchasing administrators should continue implementing green purchasing as far as the present guidelines permit, as they continue lobbying for ecofriendly policies to be enacted.

Additionally, in-depth research is required to be carried out to originate the precise empirical influence of implementing green purchasing strategy on effective purchasing administration in the community.

Karim *et al* (2017) did a study in Saudi Arabia entitled, does green procurement improve organizational performance? The research utilized a conceptual model where information was gathered by a questionnaire survey. The study was quantitative in nature. It employed correlationas well as multivariate regression-based path analysis to explore the association between systematicrandom sample of 400 purchasing managers placed in public as well as private entities across manyfields. The result showed that combined sustainable procurement (SP) practices exhibited a significant relationship with the firm's performance. Further, the findings showed no evidence of significant direct effect combinedmeasures of SP ecofriendly practices on the financial performance but there was an indirect effect of SP practices through the company nonfinancial performance on financial performance which showed a statistically significant relationship. However, the study used quantitative method as opposed to a mixed methodology. Used path analysis to test hypotheses as opposed to inferential statistics. Sample was small 400 as compared to 470 for current study. The current study utilizes multiple variables, inferential statistics to test hypotheses, multiple regression analysis, a moderating variable and a mixed methodology. The study concluded that for sustainability in procurement to prevail, stakeholders should be part and parcel of the whole purchasing process toenable sustainable purchasing program to proceed ahead. The study recommended that the government should solve difficulties arising from lack of finance, guidelines as well as policy. That individual stakeholders should raise awareness on sustainable progress through simple purchasing guidelines, programs, adverts as well as journals.

Sarhaye and Marendi (2017) conducted a study on the role of green procurement and performance of industrial production companies. Coca-Cola being the case study. It was a qualitative study with a descriptive study design. The target population was 642 participants from which a sample size of 64 staff working for Coca-Cola were drawn through a stratified random sampling technique. Data was collected through an open ended as well as closedended questionnaire. An analysis was performed by SPSS version 23. The study was qualitative in nature and examined through content analysis. Findings revealed existence of a positive link between recall flows and Coca-Cola's performance. However, study was qualitative in nature as opposed to a mixed design methodology. The sample used is small 64 participants as opposed to 470 participants. Study used open ended and closed ended questionnaires as opposed to structured questionnaires. The current study utilizes multiple variables, inferential statistics to test hypotheses, multiple regression analysis, a moderating variable and a mixed methodology. In conclusion it is imperative to select supplier based on their capacity to contain pollution that leads to a safe ecosystem. The research recommended that Coca-Cola organization implement ecofriendly purchasing strategies throughout their activities as well as processes.

Kimira, Getuno and Kiarie (2016) assessed the impact of green procurement practices on performance and the competitiveness of industrial conversion companies utilizing Unilever limitedas a case. The study employed a descriptive design. A census study due to a small population of 60 participants were used. Primary information was gathered through a questionnaire. Both inferential as well as descriptive statistics were utilized for analysis. The results showed that a statistically significant association between company competitiveness and ecofriendly procurement existed. However, the study used as small sample of 60 participants as opposed to 470 participants for current study. The study employed census design and a case study. The current study utilizes multiple variables, inferential statistics to test hypotheses, multiple regression analysis, a moderating variable and a mixed methodology. In conclusion, the study showed that adoption of green purchasing leads to enhanced performance and improved competitiveness of manufacturing organizations. The study recommended that suppliers should be looped into and developed by companies into strategic green partners in the value chain.

Pembere (2016) conducted research on green procurement practices and organizational performance of Nairobi Security Exchange (NSE) listed firms in Nairobi. There were 64 NSE listed companies in Nairobi. Thestudy was census in nature. Primary information was gathered utilizing a data gathering tool, the questionnaire. Sixty-four questionnaires were distributed to 64 NSE firms and only 47 were duly filled and returned. Examination was done through SPSS software. Regression examination was employed to ascertain the link between ecofriendly purchasing and supply chain success. Findingsshowed that embracing green purchasing enhances value chain performance in organizations as seen in better services to clients, reduced ordering expenses as well as inventory reduction. However, the study was census and case study which used a small sample of 64 participants as opposed to a sample of 470 for current study. The current study utilizes multiple variables, inferential statistics to test hypotheses, multiple regression analysis, a moderating variable and a mixed methodology. The study recommends that top management personnel of the NSE firms adopt ecofriendly purchasing innovations to enable them benefit the direct impact of the value chain performance. In addition, the study suggests similar studies to be conducted in other sectors of the economy within Kenya.

A case study conducted in the East African Breweries Limited (EABL) in Kenya by Nderitu and Ngugi (2014) examined the influence of green procurement and organizational performance of the industrial production companies. Thestudy employed a descriptive design with both primary as well as secondary data utilized. The target population was 122 participants from which a sample size of 37 respondents were drawn. Descriptive as well as inferential techniques were employed for examination Multiple linear regression analysis was performed to ascertain the relationship. Results showed that ecofriendly purchasing features contribute to enhanced firm performance as well as employees training on green concepts helped improve performance. However, study was a case study with a small sample of 37 as opposed to current sample of 470

participants. The current study utilizes multiple variables, inferential statistics to test hypotheses, multiple regression analysis, a moderating variable and a mixed methodology. The study concluded that firms should develop ICT infrastructure, retain competent professional employees, invest in vendor management systems and be strategic in their investments to green purchasing for them to gain positive impacts of ecofriendly purchasing. A comparable study should be conducted in other sectors of the economy in Kenya.

Conceptual Framework

The conceptual framework refers to a graphical depiction explaining the major objects studied, such as the key factors, variables/concepts as well as the presumed relationships amongst the variables (Wanjohi, 2016). It is a concise explanation of concepts being studied and conveyed through a graphical or pictorial representation of the key variables of the research (Mugenda, 2008). Its aim is to assist the person reading to easily find the suggested relationships among the variables and how they relate to the research study. Variables are the characteristics or properties that are to be studied. The conceptual framework is generally developed based on the literature review of existing studies and theories about the topic. The hypothesized framework resulting from the studied literature is as presented in Figure 2.1 below.

Conceptual Framework

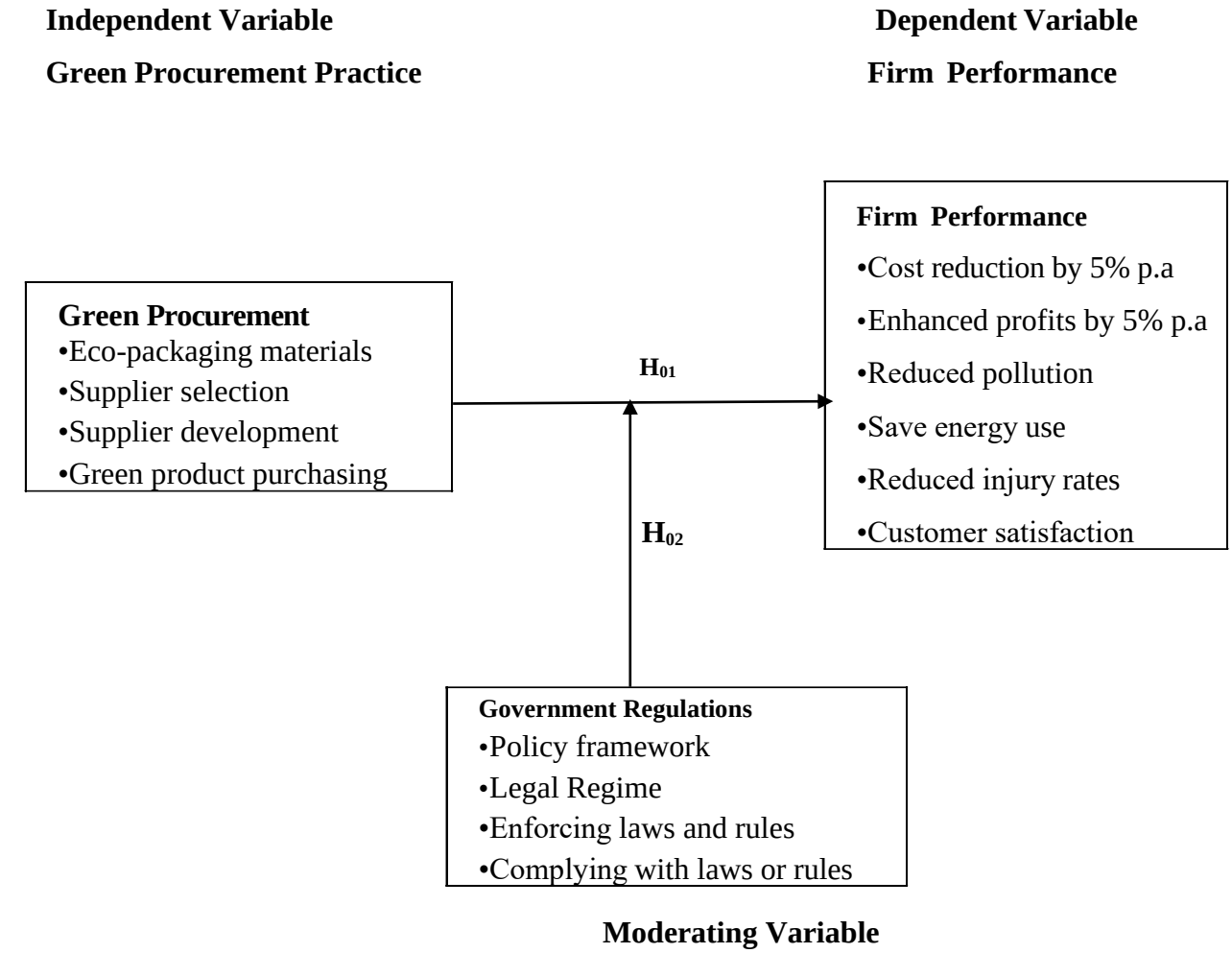

Figure 2.1: Conceptual Framework
Source: Researcher, 2021

RESEARCH DESIGN AND METHODOLOGY

This study was guided by the positivist philosophy. The study was deductive in nature, theory testing as well as theory generating and was purposed at generalizing the outcomes (Kivunja & Kuyuni, 2017). Studies inclined towards this study philosophy are intended to test hypotheses that are drawn from the literature (Halfpenny, 2015). The study applied the descriptive research design to establish the influence of government regulation on the connection between green procurement practices on performance of private oil and gas firms in Kenya.

This research targeted 72 private oil and gas firms approved and registered by Energy and Petroleum Regulatory Authority (EPRA, 2019), in Kenya. The location of the study was at the Nairobi City County, the capital of Kenya. The private oil and gas firms whose investors need returns, require their management to embrace performance

improvement practices such as green procurement practices. The selected area was suitable because it offered relative ease of data collection from the study variables, since all the private oil and gas firms have their headquarters in the Nairobi City County. The area was also chosen because it experiences as well as is influenced by the same operations and ecological conditions surrounding the County, thus, approximately homogeneous, considering its climate, social-political and economic functions including population as well as cultural orientations.

Saunders, Lewis and Thornhill (2008) note that sampling is a significant procedure in a study since it is not easy to carry out research on the whole target population due to cost implications and time constraints. Sampling design is determining a representative number of participants from a target population for the research (Saunders *et al*., 2012) A sample is a number of subjects or observations included in research. Sekeran (2003) notes that a researcher has to take a decision whether to utilize the whole population or a sample when carrying out research. The sample size ought not be very big or very small to satisfy requirements of reliability and efficiency including flexibility as well as representativeness. This study used a sample size computed as per Yamane, Taro (1967) formula below;

$$n = \frac{N}{1 + Ne^2}$$

Where
n = sample size
N = target population
e = sampling error
Confidence level was set at 95% or the outcome accuracy level at 5%. Hence the sample size was;

$$n = \frac{1850}{1 + 1850(0.05)^2}$$

$$= 329$$

Calculating for non-response;
The above sample size might lead to a non-response bias. To calculate for non-response and avoid errors, 30% non-response rate was added to the sample size (Knaub, 2017). If 329 was taken to be 70%, then 100% was equal to 329/0.7 = 470.

The study used a sample size of 470 respondents from the target population. The unit of analysis was the 72 oil and gas firms while the unit of observation was 470 respondents. This collaborated well with Barasa (2015) who utilized the Yamane, Taro formula with a stratified sampling technique to arrive at the sample size 398 respondents. He used stratified sampling. Kitonga *et al*., (2016) utilized the Yamane formula with a stratified sampling technique to get a sample size of 328 respondents in a study in strategic leadership on firm performance.

The study used questionnaires to gather descriptive information for analysis. The questionnaires for this study were both structured and semi-structured to enable capturing of primary data from the variable of this study. This questionnaire was prepared to look at a specific objective and test the hypothesis (Frezatti et al., 2014). Primary data is the original field information collected from the target population The questionnaire is important due to its flexibility to permit pretesting and reliability including consistency and addressing issues of time and cost.

The validity of the instrument is the capability of the tool to quantify an anticipated conception (Al-Shboul et al., 2017). The researcher used content validity to ascertain whether the research tool measured the content of the concept. The key purpose of validity examination was to offer a study tool which permitted the investigator to achieve the goals of the research. This study used internal consistency to measure the reliability. This is because internal consistency measures the degree to which various test objects that investigate similar concepts produce similar outcomes (Toke & Kalpande, 2018). A pilot study on the instruments was carried out. Its findings helped refine the questions in the questionnaire.

Green procurement was conceptualized as eco-friendly packaging materials, supplier selections, supplier development and purchasing of green products. Performance is conceptualized as cost reduction by 5% p.a, enhanced profitability; reduced pollution, reduced energy use, reduced customer complaints and reduced injury rates. Government regulations as a moderating variable was conceptualized as complying with laws or rules, policy framework, legal regime and enforcing laws and rules.

The research used both descriptive and inferential statistics. Data analysis was performed by the help of SPSS version 22.0 (Hayes & Montoya, 2017). Under descriptive statistics maximum, minimum, mean, standard deviation, skewness and kurtosis were used. The data was presented using tables and statistical parameter estimates. Correlation analysis was conducted to establish the direction as well as the strength of associations amongst the variables to be measured. This examination allowed the valuation of the degree to which an explanatory variable was linearly connected to the criterion variable. The explanatory variable was assessed at confidence level of 95% or the outcome accuracy level at 5%. Varimax rotation which is part of the principal component analysis (PCA) was done to group the concepts derived from the survey into various factors. KMO is a test to examine the strength of the partial correlations between the variables.

DATA ANALYSIS AND PRESENTATION

Diagnostic tests of linearity, normality, multicollinearity, homoscedasticity and heteroscedasticity were performed prior to data analysis. Data preparation commenced with inspection of the tools that included removal of undesirable questionnaires that reveal incompleteness, small variances, missing pages and unqualified respondents.

Data editing corrected objectionable, incomplete and inconsistent responses. Data coding arranged data into different themes. For data analysis, the study used SPSS, version 22. After coding, data were entered (transcribed) into a computer program. Data cleaning reviewed data consistency since the inconsistencies might originate from faulty logic, unnoticed as well as extreme values. Quantitative data was analyzed by using descriptive and inferential statistics.

The feedback from the questionnaire was entered into SPSS for initial scrutiny. To minimize the objects in the questionnaire which were not valid as well as reliable with the concepts, factor analysis was carried out. Additionally, to understand the inconsistency as well as the interdependence within the subscales as a consequence of factor analysis, descriptive measurements comprising the means, the standard deviations and reliability coefficients includinginter-correlations, were worked out.
Linear regression examination was used to establish the effect of the explanatory variable on the dependent variable. Cheng (2014) notes that the variable being predicted is the criterion variable while the variables utilized for the prediction of the criterion variable are explanatory variables. Simple linear regression model was used to determine the effect of green procurement practices on performance of private oil and gas firms as shown below;

$$Y = \beta 0 + \beta 1\ X1 + \varepsilon.$$

Where
Y= firm performance
β_0 = regression intercept
β_1 is the coefficient of green procurement
X_1 is green procurement
ε = error term

RESULTS AND DISCUSSION

The researcher distributed four hundred and seventy (470) questionnaires to the targeted respondents. Out of these, three hundred and seventy-six (376) were answered and returned. This represented 80% of the total questionnaires distributed. Ninety-four (94) respondents did not return their questionnaires. This represented 20% of the total number of questionnaires distributed. Eighteen (18) questionnaires were incomplete and thus, were not used in the analysis. This represented 3.8% of the total questionnaires given out to respondents. The number of questionnaires used in the analysis were three hundred and fifty-eight (358) which represented 76.2%. This was a good response rate for the study. Babbie (2013) notes that a response rate of 70% and above is considered sufficient for the study.

Green Procurement

The study assessed green procurement used by private oil and gas firms whose outcome is described in Table 4.4.

Table 4.4 Descriptive Statistics Results for Green Procurement (N = 358)

Statements	Min	Max	Mean	Std. Dev.	Skewness	Kurtosis
Use of recyclable packaging materials is encouraged by your company	1	5	4.22	1.096	-.104	-.656
Company buys from suppliers who comply with environmental rules and laws.	1	5	4.17	1.122	-.040	-.644
Company provides design guidelines on green requirements to suppliers for bought items	1	5	4.26	1.148	-.214	-.743
Company cooperates with suppliers to enable achieve green goals through supplier collaboration and green trainings	1	5	4.14	1.075	-.014	-.727
Company develops green training materials and trains staff handling procurement in the company.	1	5	4.23	1.120	-.041	-.749
Company purchases fuel efficient devices and equipment	1	5	4.10	1.082	-.045	-.558
Company selects suppliers with ISO certification and conduct green audits amongst them.	1	5	4.18	1.116	-.012	-.702
Overall Score			**4.19**	**1.108**	**-0.0671**	**-0.6830**

Source: Field Data, 2022

The study findings indicated that the respondents were in agreement that use of recyclable packaging materials was encouraged by their companies (M=4.22, SD=1.096). Additionally, the respondents agreed that the companies bought from suppliers who complied with environmental rules and laws (M=4.17, SD=1.122). Further, the majority of respondents agreed and pointed out that the companies provided design guidelines on green requirements to suppliers for bought items (M=4.26, SD=1.148). Still, other respondents were of the view that the companies collaborated with suppliers to enable them achieve green goals through supplier relationship and green trainings (M=4.14, SD=1.075). More other respondents held the view that companies developed green training materials and trained staff handling procurement in their companies (M=4.23, SD=1.120). Furthermore, those who responded stated that the companies purchased fuel efficient devices and equipment (M=4.10, SD=1.082).

Similarly, some respondents agreed that the companies selected suppliers with ISO certification and conducted green audits amongst them (M=4.18, SD=1.116).

Results in table 4.4 further indicated that all the skewness values were within the range -2 and +1 which meant that the data did not have outliers or excessive skewness and therefore, the data was normally distributed. The results also showed that the data were normally distributed with skewness aggregate score value of -0.0671, which indicated that there was a slightly longer tail to the left than to the right. The implication was that the answers tending towards one were few than the ones towards five. Thus, the observations were approximately symmetrical. In regard to kurtosis, the results did not present outliers or extreme kurtosis since the kurtosis values fell within the range of -2 and +1 indicating the data was normally distributed. The findings further showed that the kurtosis overall score value of -0.6830 was below 3, implying that the distribution was light tailed containing a platykurtic shape. This also meant that there were less excessive values or no outliers in the data. Thus, the data was approximately symmetrical. From the study outcome, it was noted that the standard deviation overall score value of 1.108, showed that all the green procurement sub-variables were not spread. This indicated that there was a high internal consistency that could measure the same concept (green procurement).

Generally, the various items in the study on green procurement objective showed an aggregate mean score of 4.19 and the standard deviation of 1.108. An overall score standard deviation value of 1.108, disclosed that there were differences in the opinions of respondents (1.148, 1.096, 1.120) as to what extent green procurement had been adopted. The aggregate mean score of 4.19 revealed that the private oil and gas marketing firms had adopted green procurement practices, which influenced their firm performance.

The study findings collaborate with Foo *et al* (2019) who noted that green procurement ensures responsibility for green issues in several processes, acquiring procedures and plans, therefore, green purchasing gives assurance that bought items achieve sustainable characteristics, like non injurious elements, recyclability as well as reusability. The outcome is also in line with the findings of Tseng & Chiu (2013) who observed that firms should engage in supplier pre-qualification as an essential way for establishing to lessen ecological effects of business activities. Further, they stated that to enhance performance, green purchasing organizations should liaise with suppliers to manufacture green products, and, that it is essential to purchase from organizations that are adopting GSCM practices and are complying with government laws on environmental issues.

Esfahbodi *et al* (2016) support the results by observing that during the selection stage of the suppliers, the buyer gives eco-design requirements to suppliers for the procured goods, so that the bought items contain green features for the intended project. Laosirihongthong *et al* (2013) support the results by observing that green purchasing

includes procuring of materials which have environmental footprints as well as the collaboration with suppliers for environmental goals. They further noted that for the suppliers' environmental objectives to be realized, it requires the purchasing firms to cooperate with vendors in sharing data, have joint research as well as conduct trainings together.

Additionally, the results resonate well with that of Esfahbodi *et al* (2016) who noted that it is easier to incorporate green elements into various procurement phases if the suppliers are compliant and are certified by ISO 14001, ISO9001 as well as EMS bodies. Environmental buying is majorly collaborating with vendors. Shao and Ünal (2019) support the results by noting that integrating ecological thinking into the buying process permits firms to offer design specifications to suppliers which, at a minimum, should contain environmental concerns for green bought materials.

Firm Performance

The study examined performance of private oil and gas firms. The study outcome is as described in Table 4.3

Table 4.3 Descriptive Statistics Results on Firms Performance (N = 358)

Statements	Min	Max	Mean	Std. Dev.	Skewness	Kurtosis
The company's annual operations costs have reduced by 5% per annum in the last three years.	1	5	4.20	1.05	-.009	-.592
The company's annual profits have improved by 5% per annum in the last 3 years.	1	5	4.06	1.01	.020	-.523
The carbon footprint of the company activities has been improving over time.	1	5	4.15	1.04	.019	-.484
The company is increasingly using other possible types of energy than electricity for example, biogas, geothermal, solar, or wind for lighting facilities.	1	5	4.17	1.03	-.099	-.492
Company is progressively implementing the environmental management system (EMS) to create a greener workplace	1	5	4.27	1.06	-.064	-.696
The organization treats customers respectfully and is committed to sustainable deliveries of their products	1	5	4.13	1.04	-.183	-.524
Overall mean score			**4.16**	**1.03**	**-0.0527**	**-0.5528**

Source: Field Data, 2022

Findings in table 4.3 showed that respondents agreed that the company's annual operations costs had reduced by 5% per annum in the last three years (M=4.20, SD=1.05). Those who responded held the view that the companies' annual profits had improved by 5% per annum in the last 3 years (M=4.06, SD=1.01). Additionally, the respondents agreed that the carbon footprint of the companies' activities had been improving over time (M=4.15, SD=1.04). Further, some who responded stated that the companies were increasingly using other possible types of energy than electricity for example, biogas, geothermal, solar, or wind for lighting their facilities (M=4.17,

SD=1.03). Majority respondents agreed that the companies were progressively implementing the environmental management system (EMS) to create a greener workplace (M=4.27, SD=1.06). Those who responded felt that the organizations treated customers respectfully and was committed to sustainable deliveries of their products (M=4.13, SD=1.04).

Further, the results in table 4.3, showed the skewness values fell between -2 and +1, revealing that there were no outliers or excessive skewness in the data and hence the data was normally distributed (Hair et al, 2017). The result also showed that the data were normally distributed with skewness of an aggregate score value of -0.0527, which indicated that there was a slightly longer tail to the left than to the right. The implication was that the answers tending towards one were few than those tending towards five. Thus, the observations were approximately symmetrical. In relation to kurtosis, the results did not display outliers or excessive kurtosis since the kurtosis values fell within the range of -2 and +1, indicating that the data was normally distributed. The findings also showed that the kurtosis overall score value of -0.5528, was less than 3, implying that the distribution was light tailed and had a platykurtic shape. This also meant that there were less excessive values or no outliers in the data (Garson, 2020). Consequently, the data was approximately symmetrical. The outcome of this analysis further showed that with the standard deviation aggregate score value of 1.03, all the firm performance sub-variables were not dispersed. This meant that internal consistency was high and could measure the same concept (firm performance).

Generally, the study sub-variables on private oil and gas marketing firms' performance objective showed an overall mean score of 4.16 and standard deviation of 1.03. The standard deviation aggregate score value of 1.03 showed that there were disparities in the opinions of respondents (1.01, 1.06. 1.03) as to what extent firm performance had been achieved. The overall mean score value of 4.16 indicated that green procurement practices had been adopted as well as had influence on performance of private oil and gas firms in Kenya.

These results further showed that private oil and gas firms have adopted some green procurement practices. It implied that these firms understood their challenges and had turned to adoption of green procurement practices to improve their performance.

The result collaborated with Small (2017) who observed that if the firms in the private oil and gas sector institute appropriate organizational practices that include green procurement practices, then, they have the capacity to gain improved economic value through minimization of operating costs. Findings from the analysis are in line with Ngugi and Kihara (2019) who observed that major oil companies realized their expenses increased due to their failure to adopt green practices leading to low profitability. Gunarathne (2021) agrees with the results by establishing that there was a significant positive connection amongst green strategies on performance of the production industry. The outcome of the analysis is also in agreement with Kirat (2015) who noted that

adoption of green practices and a commitment towards decarbonization in all the private oil and gas activities enhance environmental efficiency. The results also collaborate well with Al-Odeh and Smallwood (2012) who observed that organizations should use renewable energy (solar, hydro or wind) to power production and warehousing storage facilities than using electricity to optimize assets, since renewable energy minimizes energy use and pollution. Other scholars who agree with these findings indicated that environmental performance in the oil and gas firms is reflected through minimization of energy consumption, decreasing waste, reducing pollution as well as emissions (Yang et al., 2013; Laari, 2016) and decrease in the rate of accidents occurring at the work place (Das, 2018), while environmental efficiency measures support enhancement of an organization's environmental state (Esfahbodi et al., 2016). Kamol et al (2019) supports the findings by noting that issues such as compliance, the rate of accidents and fire explosions, ill health and injury rates, for instance, worker physical injuries in Turkana, Kenya, are prevalent and dangerous in the private oil and gas sector.

FACTOR ANALYSIS

Principal Component Analysis for Green Procurement

The study validated data for green procurement using factor analysis utilizing SPSS version 22. The outcome of the factor analysis through extraction by principal component technique as well as rotating through varimax were defined as indicated in table 4.11 below.

Table 4.11 Factor Analysis for Green Procurement

Rotated Component Matrix[a]		
		Component
		1
Use of recyclable packaging materials is encouraged by your company		.748
Company buys from suppliers who comply with environmental rules and laws.		.748
Company provides design guidelines on green requirements to suppliers for bought items		.755
Company cooperates with suppliers to enable achieve green goals through supplier collaboration and green trainings		.755
Company develops green training materials and trains staff handling procurement in the company.		.711
Company purchases fuel efficient devices and equipment		.777
Company selects suppliers with ISO certification and conduct green audits amongst them.		.704
Total Variance Explained		
Initial Eigen value	3.864	
% of Variance	55.193	
Cumulative %	55.193	
KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.908
Bartlett's Test of Sphericity	Approx. Chi-Square	921.816
	df	21
	Sig.	.000
Extraction Method: Principal Component Analysis.		
Rotation Method: Equamax with Kaiser Normalization.		
a. 1 component extracted		

Source: Field Data, 2022

Results in table 4.11 showed that the 7 items for green procurement had factor loadings that were above 0.5 and were all put through principal component analysis by use of SPSS version 22. Before carrying out the process of principal component analysis, measurements of data suitability for factor analysis were conducted. Any item which had factor loadings exceeding 0.5 was retained. Results in table 4.11 further showed that the 7 items had their factor loadings exceeding 0.5 and were all retained. The retained items were subjected to further analyses.

The results further revealed that Kaiser- Meyer-Olkin (KMO) measure value for sampling adequacy was 0.908. The KMO statistic value was more than the proposed value of 0.6 (Kaiser 1970, 1974). According to Bartlett (1954) the results in table 4.11 following Bartlett's Test of Sphericity, was significant, having a corresponding p-value = .000, that was smaller than the significance level of 0.05 (Bartlett's test= (921.816, P<0.05), indicating that the data for the green procurement variable was suitable for factor analysis.

Similarly, the findings showed that Principal component analysis had one component with Eigen value of 3.864 that was above 1 and accounted for 55.19% of the variance. Sub-variables fit into a component when the loading matches to that specific component as well as being relatively bigger as compared to the loadings generated by the other components. The total variance explained by the one component was 55.19 %.

Green Procurement on Firm Performance

The first specific objective was to assess the influence of green procurement on performance of private oil and gas firms in Kenya. It was predicted that green procurement did not have a statistically significant influence on performance of private oil and gas firms in Kenya. Hence, a simple linear regression model was utilized to assess the association between green procurement and firm performance. The hypothesis was tested by the model below;

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon. \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{ i}$$

Where,

Y= firm performance

β_0 = regression intercept

β_1 is the coefficient of green procurement

X_1 is green procurement

ε = error term

Table 4.23a presents a model summary that gives R, R^2, adjusted R^2 as well as the Standard error estimates that could be utilized to fix how good the study model fits the research information. Further, table 4.23a presents the model summary of the influence of green procurement on firm performance.

Table 4.23a the Model Summary for Green Procurement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.668[a]	.446	.445	.49778

a. Predictors: (Constant), Green procurement

b. Dependent Variable: Firm performance

Source: Field Data, 2022

The outcome in table 4.23a, showed that the coefficient of determination R^2=.446, showed that green procurement accounted for 44.6% of the change or variation in performance of private oil and gas firms (Response variable) while 55.4% of the change in performance was explained by other factors. The ANOVA outcome is shown in table 4.23b. ANOVA is an instrument used to establish the fitness of a model in predicting the connection between the criterion variable and the explanatory variable.

Table 4.23b ANOVAa for Green Procurement

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.087	1	71.087	286.894	.000[b]
	Residual	88.210	356	.248		
	Total	159.296	357			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Green procurement

Source: Field Data, 2022

In table 4.23b, the ANOVA model disclosed the model fitness for the effect of green procurement on firm performance, which was statistically significant (F=286.894, P<0.05). This result was confirmed by the use of F values. Computed F=286.894, was greater than the critical F= 3.85 (1, 357), at $\alpha = 0.05$, and had p-value of 0.000<0.05, was fit to predict the effect of green procurement on performance of private oil and gas firms.

Table 4.23c Coefficients a for green procurement

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.331	.108		12.272	.000
	Green procurement	.573	.034	.668	16.938	.000

a. Dependent Variable: Firm performance

Source: Field Data, 2022

Tables 4.23c shows that β_0 =1.331, denoting that if all other factors were kept constant, performance of private oil and gas firms would be 1.331. Additionally, coefficient of green procurement was 0.573, meaning that a unit increment in green procurement having other factors constant at zero, would lead to 0.573 increase in performance of private oil and gas firms in Kenya. Further, the outcome showed that green procurement showed a significant coefficient of estimate founded on β_1=.668 (p-value =.000<0.05). Consequently, the study rejected the null hypothesis. This led to the conclusion that

green procurement exhibited a significant influence on the performance of private oil and gas firms in Kenya. This implied that there was up to .668 unit increase in green procurement for each unit increase in firm performance. Similarly, the influence of green procurement practice was greater than 16 times the effect ascribed to the error that was indicated by the t-test figure of 16.938. From the results in table 4.23c, a simple linear regression model below was formulated.

$Y= 1.331 +.573X_1$

Government Regulation, Green Procurement on Firm Performance

The research sixty objective was to examine the moderating influence of government regulation on the relationship among GSCM practices and performance of private oil & gas firms in Kenya. To do this as well as establish a moderating influence of government regulation the following steps were followed. Step 1; the research constructed a regression model. This was model 1 which predicted the response variable using GSCM practices (green procurement, green distribution, green manufacturing, reverse logistics and waste management). The influence and the model in general (R^2) are supposed to be significant.

Step 2; the study added an interaction influence (government regulation) to preceding models (model 2,3,4 as well as 5) then inspected for a significant (R^2) variation and a significant influence through an introduction of an interaction term. When established that the two are significant, then moderation is taking place. When the two, the explanatory variable and the moderator variable are not significant with the introduced interaction term, then, complete moderation had not taken place. Marsh *et al* (2013) observed that when the explanatory variable as well as the moderator variable are significant with the introduced interaction term, then, the moderation has taken place, nonetheless, the key effects will also be significant.

Table 4.29a Model Summary Government Regulation, Green Procurement on Firm Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.711[a]	.506	.504	.47031	.506	364.182	1	356	.000
2	.793[b]	.629	.627	.40802	.123	117.979	1	355	.000

a. Predictors: (Constant), Green procurement

b. Predictors: (Constant), Green procurement, Government regulation

Source: Field Data, 2022

The hierarchical multiple regression outcome in table 4.29a, showed two different simple linear regression models produced (models 1 and 2). The most significant of the two models, is the simple linear regression model 2, because of an interaction term introduced between green procurement and government regulation. The simple linear regression model 1, did not have

an interaction term added. The simple linear regression model 2 indicated a strong significant association between green procurement, government regulation and firm performance. This meant that green procurement and government regulation accounted for 62.9% (R^2=.629) of the variation in private oil and gas firms' performance.

Further, the results indicated that green procurement by itself, accounted for 50.6% (R^2=.506) of the change in private oil and gas marketing firm performance. When government regulation was introduced to green procurement in model 2, they jointly accounted for 62.9% (R^2=.629) of the change in performance of private oil and gas firms in Kenya. The impact of the influence exerted by the moderating variable (government regulation) on firm performance was 12.3% (62.9%-50.6%).

Table 4.29b ANOVAa Government Regulation, Green Procurement on Firm Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	80.553	1	80.553	364.182	.000[b]
	Residual	78.743	356	.221		
	Total	159.296	357			
2	Regression	100.195	2	50.097	300.914	.000[c]
	Residual	59.102	355	.166		
	Total	159.296	357			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Green procurement

c. Predictors: (Constant), Green procurement, Government regulation

Source: Field Data, 2022

Result in table 4.29b, that is, the ANOVA model above, showed that green procurement and government regulation being statistically significant (F=300.914, p-value<0.05). Hence, this model is fit to predict the moderation influence of government regulation on the association between green procurement and performance of private oil and gas firms in Kenya. This result is confirmed by use of F values. The computed F =300.914, was greater than critical F = 3.00 (2, 356), at α = 0.05. Hence, there was enough evidence that government regulation is a significant moderator on the association between green procurement and performance of private oil and gas firms in Kenya. Consequently, $H_{0(6a)}$ was rejected. Below are coefficients of the projected model meant to solve the issues of objective (6a).

Table 4.29c Coefficients for Government Regulation, Green Procurement on Firm Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.231	.102		12.106	.000
	Green procurement	.583	.031	.711	19.084	.000
2	(Constant)	.612	.105		5.832	.000
	Green procurement	.407	.031	.497	13.118	.000
	Government regulation	.378	.035	.411	10.862	.000

a. Dependent Variable: Firm performance

Source: Field Data, 2022

The regression model output in table 4.29c showed that government regulation positively moderated the connection between green procurement and firm performance. The results also indicated a unit improvement in green procurement mediated by government regulation led to an improvement in private oil and gas firms' success by .411, p-value<0.05. Using this outcome, the following model was formulated.

$Y = 0.612 + 0.378X_1M + \varepsilon$

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Influence of Green Procurement on Performance of Private Oil and Gas Firms in Kenya

This objective sought to assess the influence of green procurement on performance of private oil and gas firms in Kenya. The hypothesis for this objective was green procurement did not have a statistically significant effect on performance of private oil and gas firms in Kenya. The research output of the multiple regression examination of this objective, indicated that private oil and gas firms' performance, in Kenya, was positively as well as significantly influenced by green procurement. The clarifications for the research deductions of this objective were anchored on descriptive information, the resource-based view, natural resource-based view as well as previous literature reviews.

The outcome further indicated that private oil and gas firms had adopted and applied green procurement practices to incorporate environmental thinking into the buying process to increase performance. This implied that these firms had comprehended the importance of combating their operational challenges by embracing green procurement as a technique to increase their performance. The research attributed this finding with the desire of private oil and gas firms' leadership to realize the goals and objectives set by their firms.

The output of the descriptive analysis showed that respondents agreed that the sub-variables of green procurement such as ecofriendly packaging materials, supplier prequalification, supplier development and green product purchasing, had an influence on performance of private oil and gas firms. The outcome of the descriptive analysis further established that green procurement had been adopted by private oil and gas firms in Kenya. The research results, in addition, indicated that firm performance was positively as well as significantly influenced by green procurement. The correlation analysis disclosed that there was a strong, positive and significant relationship between green procurement and performance of private oil and gas firms in Kenya. This finding implied that green procurement influenced performance of private oil and gas firms in Kenya. The research also carried out regression analysis to assess the numerical significance on the association between green procurement and firm performance. The results confirmed that green procurement positively and significantly influenced performance of private oil and gas firms, and was a significant predictor on firm performance. Hence, the study rejected the null hypothesis (H_{OI}).

The study findings showed that government regulation positively and significantly moderated the relationship between green procurement and performance of private oil and gas firms. The implication is that government regulation was important in moderating any result for private oil and gas firms' performance. The inferential statistics showed that government regulation positively and significantly moderated the relationship between green procurement and performance of private oil and gas firms. Thus, the study rejected the null hypothesis.

Conclusion and Recommendations

In regards to green procurement, the research results showed evidence that green procurement positively and significantly influenced performance of private oil and gas firms. This suggested that for the private oil and gas firms to improve their performance, they should embrace greening practices such reusable packaging materials, supplier pre-qualification and selection, supplier development and green product purchasing, in their entire supply chain network. For this reason, the research concluded that green procurement strategies positively affected firm performance.

This research found out that green procurement practices positively and significantly predicted performance of private oil and gas firms. Consequently, the study recommends that management in private oil and gas firms in Kenya should map out green procurement practices and align them to particular areas in their supply chains to allow their firms embrace greening activities to enhance efficiency and effectiveness of their operational activities, as a result, improving private oil and gas firms' performance. These green procurement initiatives will significantly enhance performance of firms as found in this research.

In relation to government regulation as a moderating variable, the research results indicated that government regulation moderated the association between green procurement and performance of private oil and gas firms. This implied that government regulation could and is a mediating factor in the relationship between green procurement and firm performance. Therefore, the study concluded that government regulation was a moderating factor in the relationship between green procurement and performance of private oil and gas firms in Kenya.

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