Influence of Green Distribution on Performance of Private Oil and Gas Marketing Firms in Kenya: Moderating Influence 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 distribution on performance of private oil and gas marketing 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 distribution. 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 1850 employees working for the 72 private oil and gas marketing firms in Kenya. The study used stratified random sampling that gave a representative sample. Primary information was gathered using a sample size of 470 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 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 distribution had a positive and significant influence on firm performance ($F=237.992$, $P<0.05$). The results further showed a significant moderating effect of government regulation on the relationship between green distribution practices and firm performance. The study concluded that green distribution positively influenced performance of private oil and gas marketing firms in Kenya. The study recommended that private oil and gas marketing firms should adopt green distribution to improve their economic, environmental and social performance.

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

INTRODUCTION

Organizational performance refers to a guideline to making decisions on business investment and development 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 distribution is incorporating ecological problems to inter-organizational programs in the value chain. Simply, green transportation is a sustainable delivery of materials as well as services. Ghobakhaloo *et al* (2013) note that green delivery forms part of an important element of GSCM to bring about effective environmental impact during its application. More awareness about the environment has catapulted organizations to embrace green deliveries. Some of these practices range from minimizing usage of fossil fuels as well as greenhouse gases that are inputs for the conversion and delivery processes in order to reduce their effects on the environment. Green delivery is an arrangement for environmental packaging with clients (Hamdy *et al.*, 2018), improving carriage logistics as well as shipping systems (Esfahbodi *et al*., 2016; Laar, 2016) and tracing as well as scanning levels of emissions from product deliveries (Esfahbodi *et al*., 2016).

There are growing concerns from the government as well as the general society about the impact of operational activities of private oil and gas firms on the environment. The problem in the private oil and gas industry, arise from the exploration, extraction, transformation, distribution, marketing as well as the disposal activities. These operational functions cause negative effects on the environment such as solid waste, hazardous toxins, pollution, environmental destruction, exhaustion of raw materials, decrease of natural resources and the concentration of greenhouse gas (GHG) emissions and pollution (Sarkis & Dou, 2017). The private oil and gas marketing firms globally, account for the major environmental tragedies leading to creation of reliability issues from policymakers as well as trust concerns from the community (Mojarad *et al*., 2018). Historically, the oil industry, has not been responsible and accountable for the environmental and social challenges. The continuous and expansive exploration as well as exploitation of the oil and gas resources, frequently cause environmental degradation that leads to sustainable challenges which require urgent mitigation through application of green supply chain management (GSCM) (Ceptureanu *et al*., 2018). The adoption of green distribution practices in the private oil and gas firms is mandatory to enhance environmental efficiency (Mwaura, 2016). The considered green distribution practices range from green packaging materials, renewable powering of storage facilities, green modes of transport and ecolabelling of products. These green distribution practices have been established to have a positive influence on ecological performance.

Statement of the Problem

When green distribution practices are well implemented, they improve performance of private oil and gas marketing 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, protects employees' health and safety, leads to customer satisfaction and firm reputation (Tseng *et al.*, 2019).

The private oil and gas marketing 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 (IEA, 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 (IEA, 2022). 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). These challenges cause negative effects on the environment such as solid waste, hazardous toxins, pollution, environmental destruction, exhaustion of raw materials, decrease of natural resources and the concentration of greenhouse gas (GHG) emissions and pollution that affect communities, the environment, workers, equipment, air, water, wildlands, wildlife habitats and animals that require mitigation through adoption of green distribution (Sarkis & Dou, 2017).

Abba *et al* (2021) studied green distribution practices on performance of listed oil & gas companies in Nigeria moderated by the 'Internet of Thing'. The results showed that green distribution practices had a statistically significant relationship on firm performance. Saad *et al* (2021) conducted a study on the influence of green distribution practices on environmental performance in the hydrocarbon industry of Bahrain moderated by green innovation. The results showed a positive relationship with environmental performance. Panya *et al.,* (2021) studied the effects of green distribution on the organizational performance of sugar sub-sector in Kenya. The results showed that green distribution improved performance of the sugar industry in Kenya in area of cost reduction. Gikonyo *et al* (2022) studied green distribution systems and performance of building and construction manufacturing firms in Kenya. The results showed that green distribution improved performance of building as well as construction manufacturing companies of Kenya. Kirunga, F. & Kihara, A. (2018) conducted a study on the influence of green distribution practices on environmental performance of chemical manufacturing firms in Kenya. The results showed a positive as well as a significant influence on environmental performance of chemical manufacturing firms in Kenya.

Empirical studies conducted on green distribution majorly focused on the manufacturing sector, sugar sector, building and construction sector and not the private oil and gas firms (Panya *et al.,* 2021; Gikonyo *et al.,* 2022; Kirunga, F. & Kihara, A., 2018). Other studies focused on green value chains as well as environmental purchasing but not specifically green distribution (Nasiche, 2014), while other researches focused on other countries (Nigeria; Bahrain) and not in Kenya (Abba *et al*., 2021; Saad *et al*., 2021; Zu'bi *et al*., 2015). Majority of the studies undertaken did not used government regulation as a moderator to influence firm performance, in particular, the Kenyan private oil and gas context (Abba *et al*., 2021; Saad *et al*., 2021). So far, little research has delivered clear empirical evidence on the correct influence the green distribution practices have on the firms' performance, specifically within the Kenyan private oil and gas context. This research consequently established the influence of green distribution practices on performance of private oil and gas firms in Kenya.

Government Regulations

A moderating variable from a meta-analysis research is mostly picked from the control variables found within the empirical literature but not like the standard moderators (Golicic & Smith, 2013). A linear regression analysis will be used to test the moderating effect of government regulation and establish whether the variable strengthens or weakens the association between green distribution practices and private oil and gas performance. A moderator influence can be epitomized as an interaction between an explanatory variable and the criterion variable. The moderator will be supported when the interaction of the explanatory as well as the moderator on the result of the variable is significant (Saad *et al*, 2013). Government regulations in Kenya, govern diverse sections of businesses in the economy including the oil and gas sector which is among the best contributors to GDP and

overall job creation in Kenya. Government regulations indicators for this study included; compliance, policy guidelines, legal regime and enforcement.

Objective of the study

i. To establish the influence of green distribution on performance of private oil and gas marketing firms in Kenya
ii. To establish the moderating influence of government regulation in the relationship among green distribution practices and performance of private oil and gas firms in Kenya.

Hypotheses of the Study

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

Theoretical Review

Resource Based view (RBV) theory was proposed by Penrose in 1959, who cited those unused managerial resources as the primary driver of growth (Penrose, 1959). 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 (Wernerfelt, 1984). 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). Application of green distribution using distinctive internal strategic resources as postulated by the resource-based view confers a continuous competitive advantage in an enterprise (Namjoo & Keramati, 2018).

DiMaggio and Powell introduced institutional theory in the mid-1980s, postulating that organizations endeavor to adjust to the adjacent environment by abiding by legitimacy principles and controls on one part while pursuing communal alignment on the other part. The theory looks at the effect of external forces on an organization. Institutional theory is relevant to this research since the petroleum sector is affected by internal as well as external forces that impact its performance such as pressures from government regulations, customers, suppliers, investors, shareholders, normative forces, mimetic forces, coercive forces, NGOs and the environmental protection movements (Chu *et al*., 2017). Rules and guidelines from the government are classified under the institutional theory which help in the adoption of green distribution practices. The pressure which is being applied by investors and shareholders has forced producers to demonstrate their legitimacy through adoption and implementation of green distribution practices. The institutional theory is one of the instruments to comprehend various types of outside elements that pressure firms to implement or do away with a bundle of undertakings or practices (De Grosbois, 2016). For instance, the rules and guidelines from the government are classified under the institutional theory which help in the adoption of green distribution practices by firms that will lead to environmental efficiency, reduction of wastes, GHG emissions and pollution. The transportation and manufacturing departments in the oil and gas sector will benefit from the foresaid benefits through implementation of green distribution practices.

Empirical Review

A study by Rutere (2020) assessed green distribution and its impact on performance of production organizations of Kenya. From the results firms were advised to focus more on collaboration with suppliers to boost reuse of wrapping materials. The study recommended

that eco-labeling should be embraced by firms to give information on the effects of the product usage on the environment.

A study with survey evidence from Greece by Trivellas, Georgios and Reklitis (2020) established the influence of green distribution management on Sustainable corporate and supply network Performance of Agriculture foodstuff processing industry. The study recommends a comparable study conducted in other industries not included in this research.

Kirunga and Kihara (2018) examined green distribution on environmental performance of chemical production companies in Kenya. The findings of study showed that ecofriendly storage has a positive and significant association with ecological performance of the chemical production companies in Kenya. The study recommends that green packaging practices like recyclable materials, vehicles with fossil fuel efficacy, ecofriendly storage facilities as well as green labelling should be encouraged by both chemical and non-chemical productions firms through heavy investments to green their activities.

A study in Kenya by Mwaura *et al* (2016) looked at the effect of green distribution on performance of foodstuff production organizations within Kenya. The result from the study revealed that ecofriendly distribution practices exhibited a significant influence with the company's competitiveness coupled with decreased cost as well as increased effectiveness. In addition, utilizing ecofriendly packaging sub-variables led to improved sales, the value and distribution of materials cheaply that lead to higher revenue margins. Further, the results showed that technology impacted transportation techniques since more organizations utilized internet as a delivery channel that led to better information provision. The study recommended that to improve ecological sustainability, production companies in Kenya. should be motivated to adopt ecofriendly distribution strategies. Future research should be conducted to establish how green delivery practices impact performance of companies in the service sector.

Conceptual Framework

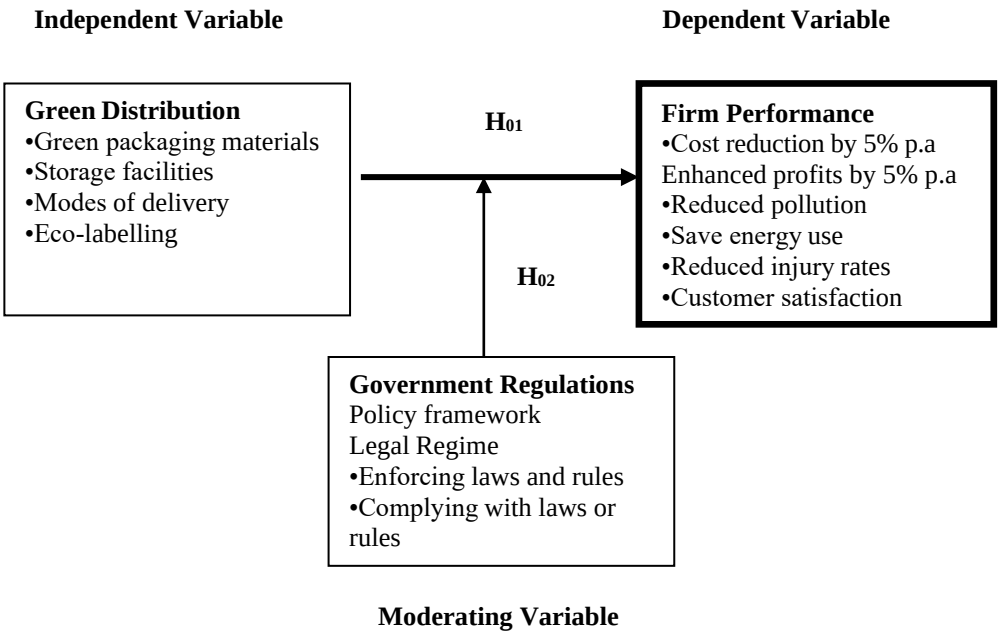

Figure 1: Conceptual Framework
Source: Researcher, 2021

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). The hypothesized framework resulting from the studied literature is as presented in Figure 1 below.

RESEARCH METHODOLOGY

This study was guided by the positivist philosophy. The study applied the descriptive research design to establish the influence of government regulation on the connection between GSCM practices and performance of private oil and gas marketing firms in Kenya.

This research targeted 72 private oil and gas firms approved and registered by Energy and Petroleum Regulatory Authority (EPRA) by 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 GSCM 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.

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. 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.

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. A pilot study on the instruments was carried out. Its findings helped refine the questions in the questionnaire.

Green distribution was conceptualized as green packaging materials, storage facilities, modes of delivery and eco-labelling. 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 distribution practices on performance of private oil and gas firms as shown below;

$Y = \beta 0 + \beta 2\ X2 + \varepsilon$

Where

Y = firm performance

β_0 is regression intercept

β_2 is the coefficient of green distributionX_2 is green distribution

ε is 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.

The study assessed green distribution practices used by private oil and gas marketing firms whose outcome is described in Table 1.

Table 1: Descriptive Statistics Results on Green Distribution (N = 358)

Statements	Min	Max	Mean	Std. Dev.	Skewness	Kurtosis
Company uses ecofriendly packaging materials and distribution containers/ Company uses biodegradable packaging materials.	1	5	4.45	1.190	-.090	-.669
Company storage facilities are certified as ecofriendly through ecological management certification, for example ISO 14000	1	5	4.46	1.220	-.003	-.668
Company ensures that all products are eco-labelled for customers to know whether they are ecofriendly or not	1	5	4.43	1.137	-.098	-.736
Company encourages fuel efficient types of delivery to customers to save energy	1	5	4.50	1.201	-.068	-.709
Overall Score			**4.46**	**1.187**	**-0.06475**	**-0.6955**

Source: Field Data, 2022

The research findings showed that respondents agreed that the companies used ecofriendly packaging materials and distribution containers / biodegradable packaging materials (M=4.45, SD=1.190). Additionally, respondents held the view that the companies' storage facilities were certified as ecofriendly through ecological management certification, for instance ISO 14000 (M=4.46, SD=1.220). Other respondents agreed that the companies ensured that all products were eco-labelled for customers to know whether they were ecofriendly or not (M=4.43, SD=1.137). Further, majority respondents agreed that the companies encouraged fuel efficient types of delivery to customers to save energy (M=4.50, SD=1.201).

The outcome in table 1 further showed that the skewness values were within -2 and +1 indicating that the data did not have outliers or excessive skewness and thus, the data was normally distributed. The result also showed that the data were normally distributed with skewness aggregate score value of -0.06475, which indicated that there was a slightly longer tail to the left than to the right. Implying that the answers tending towards one were few than the ones towards five. Thus, the observations were approximately symmetrical. As regards the 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 also showed that the kurtosis overall score value of -0.6955 was below 3, implying that the distribution was light tailed having a platykurtic shape. This also implied that there were fewer extreme values or no outliers in the data. Thus, the data was approximately symmetrical. The results showed an overall score standard deviation value of 1.187 which indicated that all the green distribution sub-variables were not dispersed. This revealed that

there was a high internal consistency that could measure the same concept (green distribution).

Generally, the various items in the study on green distribution objective showed an aggregate mean score of 4.46 and the standard deviation score of 1.187. An overall score standard deviation value of 1.187 showed that there were differences in opinions of respondents as to what extent green distribution had been adopted. The aggregate mean score of 4.46 disclosed that the private oil and gas marketing firms had embraced green distribution practices in their firms that influenced firm performance.

Ghobakhaloo *et al* (2013) support these results by observing that green delivery forms part of an important element of GSCM to bring about effective ecological impact during its application. More awareness about the environment has catapulted organizations to embrace green deliveries. The result also collaborates with Hamdy *et al* (2018) who noted that green delivery is an arrangement for environmental packaging with clients. Further, Al-Odeh and Smallwood (2012) agree with the findings by observing that enterprises should embrace modes of transport like rail which are ecofriendly, and consider erecting delivery points close to customers to cut down on the distance travelled by fleets to reduce greenhouse gas emission and pollution.

Esfahbodi e*t al* (2016) agree with the results by observing that it is easier to incorporate ecofriendly elements into various procurement and distribution phases if the vendors are compliant and are certified by ISO 14001, ISO9001 as well as EMS bodies. They further noted that green distribution indicators comprise green labeling, ecological collaboration with providers, supplier green audits, seller ecological management accreditation system and second-tier vendor ecological assessment.

The result also collaborates well with Al-Odeh and Smallwood (2012) who noted that organizations should use solar, hydro or wind to power warehousing storage facilities than using electricity to optimize assets since renewable energy minimizes energy use and pollution. They further supported the findings observing that to develop green distribution, organizations should consider fuel efficiency, modes of delivery and the infrastructure of operations. Some of these practices range from minimizing usage of fossil fuels as well as greenhouse gases that are inputs for the conversion and delivery processes in order to reduce their effects on the environment. Simply, green distribution is a sustainable delivery of materials as well as services.

Firm Performance

The study examined performance of private oil and gas marketing firms. The study outcome is as described in Table 2.

Findings in table 2, 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).

Table 2: 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

Further, the results in table 2, 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. 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 as to what extent firm performance had been achieved. The overall mean score value of 4.16 indicated that green distribution practices had been adopted as well as had influence on performance of private oil and gas marketing firms in Kenya.

These results further showed that private oil and gas marketing firms have adopted some GSCM practices. It implied that these firms understood their challenges and had turned to adoption of green 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 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. The outcome of the analysis is also in agreement with Kirat (2015) who noted that adoption of GSCM 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.

Factorial Analysis

Principal Component Analysis for Green Distribution

The study did data validation for green distribution using factor analysis through SPSS version 22. The outcome of the factor analysis through extraction by principal component technique as well as rotating through varimax, are defined in table 3 below.

The outcome in table 3, showed that the 4 items for green distribution had factor loadings that were above 0.5 and were all put through principal component analysis by utilizing SPSS version 22. Preceding the process of principal component analysis, the measurements of data fitness for factor analysis were undertaken. Items which had factor loadings exceeding 0.5 were retained. Results in table 3, clearly showed that the 4 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 0.737. The KMO statistic was more than the recommended value of 0.6 (Kaiser 1970, 1974). Results in table 4.12 indicated that Bartlett's Test of Sphericity (Bartlett, 1954) was significant with p-value = 0.000, which was less than the significance level of 0.05 (Bartlett's test= (201.464, $P<0.05$), showing that data for green distribution variable was suitable for factor analysis.

Equally, the findings showed that Principal component analysis had one component with Eigen value of 2.037 that was greater than 1 and accounted for 50.94 % of the change. The sub-variables are considered as belonging to a factor component when the factor loading corresponds to that particular component and are relatively larger than the factor loadings in the other factor components. The total variance explained by the one component was 50.94 %.

Correlation Analysis output shows that green distribution has a strong, positive and significant relationship ($r=.633$, $n=358$, $p>0.01$).

Table 3: Factor Analysis for Green Distribution

Rotated Component Matrix[a]		
		Component
		1
Company uses ecofriendly packaging materials and distribution containers/ Company uses biodegradable packaging materials.		.715
Company storage facilities are certified as ecofriendly through ecological management certification, for example ISO 14000		.743
Company ensures that all products are eco-labelled for customers to know whether they are ecofriendly or not		.674
Company encourages fuel efficient types of delivery to customers to save energy		.721
Total Variance Explained		
Initial Eigen value	2.037	
% of Variance	50.935	
Cumulative %	50.935	
KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.737
Bartlett's Test of Sphericity	Approx. Chi-Square	201.464
	Df	6
	Sig.	.000
Extraction Method: Principal Component Analysis.		
Rotation Method: Equamax with Kaiser Normalization.		
a. 1 component extracted		

Source: Field Data, 2022

Green distribution on firm performance

This objective was to establish the influence of green distribution on performance of private oil and gas marketing firms in Kenya. The study predicted that green distribution did not have a statistically significant influence on performance of private oil and gas marketing firms in Kenya. Consequently, a simple linear regression model was utilized to assess the association between green distribution and firm performance. The hypothesis was tested by the model below;

$Y = \beta 0 + \beta 2\ X2 + \varepsilon$……ii

Where

Y = firm performance

β_0 is regression intercept

β_2 is the coefficient of green distributionX_2 is green distribution

ε is error term

Table 4a shows a model summary that gives R, R^2, adjusted R^2 as well as Standard error of the estimate that are used to determine how well the study regression model, fits the research information. Further, table 4a displays the model summary of the influence of green distribution on firm performance.

Table 4a: Model Summary for Green Distribution

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.633[a]	.401	.399	.51786

a. Predictors: (Constant), Green distribution
b. Dependent Variable: Firm performance
Source: Field Data, 2022

Findings in table 4a, showed that the coefficient of determination (R^2=.401) specified that green distribution accounted for 40.1% of the change in performance of private oil and gas marketing firms (dependent variable) while 59.9% of the change in performance was explained by other factors.

The ANOVA outcome was illustrated in table 4b. The Analysis of variance is a tool used to discover the fitness of a model in predicting the connection between the response variable and the independent variable.

Table 4b: ANOVAa for Green Distribution

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	63.824	1	63.824	237.992	.000[b]
	Residual	95.472	356	.268		
	Total	159.296	357			

a. Dependent Variable: Firm performance
b. Predictors: (Constant), Green distribution
Source: Field Data, 2022

In table 4b, the ANOVA model showed a model fitness for the influence of green distribution on firm performance that was statistically significant (F=237.992, P<0.05). The calculated F=237.992, was greater than the critical F= 3.85 (1, 357), at $\alpha = 0.05$, and had p value of 0.000<0.05 which was fit to predict the relationship between green distribution and performance of private oil and gas marketing firms. Regression coefficients below determined a mean variation in organizational performance for individual unit variation in green distribution.

Table 4c: Coefficients[a] for Green Distribution

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.439	.112		12.866	.000
	Green distribution	.503	.033	.633	15.427	.000

a. Dependent Variable: Firm performance
Source: Field Data, 2022

Tables 4c, showed that β_0 =1.439, denoting that if all other factors were kept constant, performance of private oil and gas marketing firms would be 1.439. Next, the coefficient of green distribution was 0.503 meaning that a unit increase in green distribution keeping other factors constant at zero, would lead to 0.503 increase in performance of private oil and gas marketing firms in Kenya. Further, the outcome showed that green procurement exhibited a significant coefficient estimate centered on β_2=.633(p-value =.000<0.05). Thus, the study rejected the null hypothesis. This led to a conclusion that green distribution was having a

significant effect on the performance of private oil and gas marketing firms in Kenya. From the results in table 4c, a simple linear regression model below was formulated.

$Y=1.439 + .503X_2 + \varepsilon$

Government Regulation, Green Distribution on Firm Performance

This section utilized a simple linear regression to assess the effect of government regulation on the association between green distribution and firm performance. The outcome of the analysis is shown in tables 5a, 5b and 5c below.

Table 5a: Model Summary for Government Regulation, Green Distribution and 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	.633[a]	.401	.399	.51786	.401	237.992	1	356	.000
2	.766[b]	.586	.584	.43087	.186	159.266	1	355	.000

a. Predictors: (Constant), Green distribution

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

Source: Field Data, 2022

Results in table 5a, showed two different simple linear regression models generated (models 1 and 2). The most significant of the two models is the simple linear regression model 2 due to an interaction term introduced between green distribution and government regulation. The simple linear regression model 1, did not have an interaction term included. The simple linear regression model 2 indicated a moderate significant association among green distribution, government regulation and firm performance. This implied that green distribution and government regulation accounted for 58.6% (R^2=.586) of the variation in performance of private oil and gas marketing firms in Kenya. The results further indicated that green distribution exclusively accounted for 40.1% (R^2=.401) of the change in private oil and gas marketing firms' performance. When green distribution was combined with government regulation, they accounted for 58.6% (R^2=.586) of the change in firm performance of private oil and gas marketing firms in Kenya. The impact of the effect exerted by the moderating variable on firm performance was 18.5% (58.6%-40.1%).

Table 5b ANOVA[a] for Government Regulation, Green Distribution and Firm Performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	63.824	1	63.824	237.992	.000[b]
	Residual	95.472	356	.268		
	Total	159.296	357			
2	Regression	93.392	2	46.696	251.530	.000[c]
	Residual	65.905	355	.186		
	Total	159.296	357			

a. Dependent Variable: Firm performance

b. Predictors: (Constant), Green distribution

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

Source: Field Data, 2022

Result in table 5b, that is, the ANOVA model above, showed that green distribution and government regulation appeared statistically significant with (F=251.530, p-value<0.05).

Hence, this model was appropriate to forecast the moderation influence of government regulation on the association between green distribution and performance of private oil and gas marketing firms in Kenya. Since the calculated F =251.530, was greater than critical F = 3.00 (2, 357), at $\alpha = 0.05$, there was enough evidence that government regulation is a significant moderator on the association between green distribution and performance of private oil and gas marketing firms in Kenya. Consequently, H0(6a) was rejected. Below are the coefficients of the projected model purposed to solve the issues of objective (6_b) as shown in table 5c.

Table 5c: Coefficients[a] for Government Regulation, Green Distribution and Firm Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.439	.112		12.866	.000
	Green distribution	.503	.033	.633	15.427	.000
2	(Constant)	.624	.113		5.507	.000
	Green distribution	.330	.030	.415	10.847	.000
	Government regulation	.444	.035	.483	12.620	.000

a. Dependent Variable: Firm performance
Source: Field Data, 2022

The regression model output in table 4.30c showed that government regulation positively moderated the relationship between green distribution and firm performance. The outcome further indicated that a unit increase of green distribution moderated by government regulation led to an increase in private oil and gas marketing firms' performance by 0.483, $p<0.05$. Using the above outcome, the research formulated the model shown below.

$Y = 0.624 + 0.444X_2M + \varepsilon$

CONCLUSION AND RECOMMENDATIONS

With reference to green distribution, the research output confirmed that green distribution affected performance of private oil and gas marketing firms positively and significantly. This implied that increased green distribution practices including, green packaging materials, lighting production and storage facilities with renewable energy, use of ecofriendly modes of delivery and eco-labeling of products/materials, in the distribution and logistics supply chains, increase firm performance. The study, therefore, concluded that green distribution exhibited a positive effect on performance of private oil and gas marketing firms in Kenya.

This research found out that green distribution practices positively and significantly predicted performance of private oil and gas marketing firms. Consequently, the study recommends that management in private oil and gas marketing firms in Kenya should map out green distribution 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 marketing firms' performance. These green 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 distribution and performance of private oil and gas marketing firms. This implied that government regulation

could and is a mediating factor in the relationship between green distribution and firm performance. Therefore, the study concluded that government regulation was a moderating factor in the relationship between green distribution and performance of private oil and gas firms in Kenya.

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