

Moderating Effect of Collaborative Capability on the Relationship between Green Procurement and Performance of Manufacturing Firms in Kenya

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Abstract

Purpose: to establish moderating effect of collaborative capability on the relationship between green procurement and performance of manufacturing firms in Kenya. The theoretical background arose from the literature on competitive strategy, firm performance and green supply chain management.

Methodology/Material: The study adopted descriptive survey design using both qualitative and quantitative approaches. The study targeted 943 manufacturing firms in Kenya registered under the Kenya Association of Manufacturers as at the year 2017. A sample size of 330 firms was targeted and obtained by use of stratified random sampling. Primary data was collected using questionnaire that was addressed to firms operational and procurement managers. Descriptive statistics was used aided by Statistical Packages for Social Sciences version 21 to compute percentages of respondents' answers. Inferential statistics using multiple regression and correlation analysis was applied to assist examining relationship between the research variable.

Findings: The findings showed that green procurement had significant and positive effect on performance of manufacturing firms in Kenya. Further, collaborative capacity moderates the relationship green procurement and firm performance.

Conclusion/implication: As such, adoption of flexible green procurement practices through appropriate research will help the manufacturing firm to meet diverse yet drastic changing needs as well as address challenges arising from a dynamic global business environment. Therefore, it is utmost necessary for the firms to use inputs with relatively low environmental impacts.

Keywords: Collaborative Capability, Performance, Manufacturing, Green Procurement Practices

1. INTRODUCTION

The expanding global economy has brought prosperity but also environmental degradation (World bank, 2012), such as climate change, ozone layer depletion, loss of biodiversity, pollution, degradation and the depletion of air, water, minerals and land (United nations environment program, 2012; World bank, 2012). These issues have become important to firms because their stakeholders, such as regulatory authorities, customers, competitors, non-governmental organizations and employees, are increasingly demanding that firms address environmental and social sustainability in business operations (Carter & Easton, 2011). Green procurement has emerged one of the best innovative strategies to improved business competitiveness in a sustainable environment. On the other hand, many organizations worldwide are making an effort to purchase products and services which are less harmful to local and global environments (Nikbakhsh, 2009).

Firms wishing to minimize their environmental impacts might discover that their ability to do so is dependent on their ability to manage increasingly complex supplier relationships (Ahi & Searc 2013). Green procurement is an integration of environmental thinking into supply chain management, It is aimed at planning and controlling business processes from raw material suppliers and end-customer and links together partners in a supply chain which provides an excellent starting point for improving sustainability (Seuring, 2013). This research addresses the economic and environmental dimensions of sustainability, particularly in the context of green procurement. According to Brandenburg, Govindan, Sarkis & Seuring (2014), the focus of environmental management has shifted from firm level to supply chain level.

In a survey by McKinney (2014), 43 per cent of respondents said that their company seeks to align

sustainability with their overall business goals. Previous studies argue that properly designed environmental management in the supply chain can create competitive advantage and result in performance improvements (Pagell & Shevchenko, 2014). Following this stream of thought, the present study intends to examine the effects of green supply chain practices on the environmental performance of manufacturing firms in Kenya. Pollution prevention seeks to prevent waste and emissions at the source instead of at the end-of-the-pipe. Sustainable development, which goes beyond simply reducing environmental damage, encompasses economic and social concerns. Manufacturing firms just like other organizations throughout the world are increasingly becoming aware of the danger posed by environmental issues such as global warming, carbon emissions, toxic substance usage, and resource scarcity. It is this worrying realization that has made policy makers and activists advocate for going green, and many organizations including manufacturing firms throughout the world have responded to this by adopting green supply chain practices (Xie & Breen, 2012).

Both manufacturing and service organizations consider the impact production processes have on the environment and the economic viability of the firm as well as on the environmental performance. They link success of a manufacturing firm to supply chain and there are concerted efforts by businesses to adopt green procurement strategies. Customers and governmental entities have begun to demand that processes, products, However, green procurement practices are still less adopted by manufacturing firms in Kenya due to lack of knowledge and capability on implementing green procurement that enhance performance.

In addition, despite an increasing number of studies addressing the relationship between environmental sustainability and firm performance, findings from these studies have been inconsistent, giving practitioners no clear answers as to what actions would be beneficial to pursue (Golicic & Smith 2013). On the one hand, the implementation of green practices is anticipated to result in environmental performance improvements in a firm. However, there is a concern that such practices might not translate into improvements in financial performance, such as profitability or market share (Green et al. 2012b). Thus, the study aims to establish the influence of green supply chain practices on the performance of manufacturing firms in Kenya and whether the firm level of collaboration moderates the relationship between green practices and firms' performance.

Theoretical and Review Of Literature

This study was informed by natural resource based view theory. The resource-based view (RBV) was first developed by Wernerfelt (1984) who perceived a firm as a broader set of resources compared to the traditional view which accounts only for categories such as labor, capital and land. The extension of the RBV to the natural-resource-based view (NRBV) is widely used in explaining why firms adopt GSCM. The NRBV posits that strategy and competitive advantage can be created from capabilities facilitating environmentally sustainable economic activities (Hart 1995). Hart argues that for a resource to be valuable, rare, inimitable and non-substitutable, it must possess three characteristics: it must be causally ambiguous, socially complex and firm specific.

However, the potential importance of resources was understood much earlier. In the 1930s, economists, such as Edward Chamberlin and Joan Robinson highlighted firm heterogeneity (Fahy 2000). The idea was later developed by Edith Penrose (1959) who argued that the internal resources of a firm have a profound impact on the growth of the firm. A resource is -anything which could be thought of as a strength or weakness of a given firm. The resources a firm possesses can provide a source of competitive advantage (Barney 1991).

Although the requirement for firm-specificity has been challenged, the relational view posits that organizational capabilities can be developed beyond organizational boundaries by combining resources existing in different supply chain members (Dyer & Singh 1998). These resources are causally ambiguous and socially complex and thus difficult for competitors to imitate (Shi *et al.* 2012). The relational view has been combined with the NRBV (Vachon & Klassen 2008; Shi *et al.* 2012) to argue that environmental management in the supply chain can create competitive advantage. Environmental collaboration can lead to

the development of knowledge-sharing routines and the development of the capability to integrate external resources (Vachon & Klassen, 2008).

Thus, the theory is relevant to the study as NRBV theory is often used to explain more strategic motivations of GSCM adoption, such as why firms operating within the same context (market or industry) pursue different GSCM strategies despite experiencing similar institutional pressures (Testa & Iraldo 2010). According to the theory, environmental management in the supply chain can create competitive advantage to those practicing it. It highlights the whole concept of adopting this practice. Availability of the necessary infrastructure will make adoption of green practices easier hence the theory links to the independent variable of the study which is infrastructure.

Empirical Review (Hypothesis Development)

Green purchasing is a key strategy for enterprises to reduce waste and improve efficiency and enhance competitiveness. Green procurement is a set of supply-side practices utilized by an organization to effectively select suppliers based on their environmental competence, technical and eco-design capability, environmental performance, ability to develop environmentally friendly goods and ability to support focal company's environmental objectives (Olson, 2009). Green procurement means purchasing products and services that cause minimal adverse environmental impacts. It incorporates human health and environmental concerns into the search for high quality products and services at competitive prices.

Pembere (2016) conducted a study to determine the effect of green procurement practices on the supply chain performance of companies listed at the Nairobi securities exchange. The study adopted descriptive research design. The target population for the study was procurement managers of each listed company. The study used primary data. The findings of the study revealed that the adoption of green procurement practices improves the supply chain performance. However, the study focused on Green procurement activities which although have a strategic and important function that interfaces focal company and supplies, is only one part of the GSCM practices. The study was not supported by any theories and it had no moderating variable.

Another research by Kyalo (2015) sought to evaluate the influence of green supply chain management practices on operational performance of alcoholic beverage manufacturers in Kenya. The study used descriptive design. The research also conducted a census on the study population. The target population for the study included 41 registered alcoholic beverage manufacturers operating in Kenya. Results of the study showed that manufacturers utilize lean production, use biodegradable materials and total quality management in their operations. This study sought to evaluate the influence of GSCM practices on operational performance and not on financial performance.

Nasiche et al. (2014) conducted a case study on determinants of green procurement in public sector. The study evaluated factors that affect implementation of gp in public sector with a biased on Kenya pipeline company (KPC). The research discovered that internal capacities to implement green strategies and external motivators including demands from stakeholders and government legislation affected adoption of gp practices to a great extent. The issue of cost of implementation was not a major concern. The study showed that the institutional governance set up may be a success factor in going green. The major limitation is that the study only focused on one company; KPC. This makes the results inconclusive. The study lacked theories to support and show relationships among the variables. The study findings were limited to the descriptive case study and therefore, the findings cannot be generalized in the whole manufacturing firms because there are different manufacturing sectors which are unique from one another.

A research carried out by (McKinsey & Company, 2011) showed that 31-40% of the respondents indicated that the company executives rarely meet with the sales representatives to discuss supply chain tensions. The study also indicated that the sales and marketing department has difficulties collaborating with other functions such as manufacturing and planning. Supply chains constantly struggle with volatile demand.

because a rise in order volumes increases labor and distribution costs. Inaccurately forecasted sales can similarly lead to stock outs, loss of sales or increased inventories which are sold at a discount to move it off the shelf. A significant number of GSCM studies have investigated whether the implementation of environmental supply chain strategies leads to enhanced firm performance (Sarkis 2012).

However, the results of these studies were mostly mixed, ranging from little or no improvement (Zhu et al. 2005). To explain these contrasting results, several researchers have explored factors that influence this relationship (Lopez-Gamero et al. 2009; Sarkis et al. 2010; Zhu and Sarkis 2007). Following this stream of thought, the present study intends to examine another possible moderating effect—collaborative capability, which can be defined as a firm's ability to leverage other actors' resources and knowledge (Kotabe et al. 2003; Koufteros et al. 2007; Patnayakuni et al. 2006). Collaboration relationships have helped firms to reduce transaction costs and create a sustainable competitive position in highly uncertain business environments (Cao and Zhang 2011).

The review of existing literature pertinent to the current study has revealed conceptual, contextual as well as methodological gaps that the current study will attempt to address. Lack of studies on the relationship between green procurement practices and business economic performance presents a distinct knowledge gap. It means that we cannot clearly understand how green procurement impacts on the financial performance of manufacturing industries and which of the Green practices has greater impact. Green procurement research to date has concentrated almost exclusively on the developed world context. Moreover, the cultural and economic differences that exist between developed and developing economies suggest that perceptions and responses to green procurement practices may differ between these contexts. There are grounds for believing that the most catastrophic effects of green procurement failures (particularly on the environment and human life) have occurred in developing countries. For instance, the infiltration of counterfeit drugs into the pharmaceutical supply chain has been more prevalent and caused more severe effects in the developing world than in developed countries (Chika *et al.* 2011; Benjamin *et al.*, 2015). Thus, the study hypothesized that:

H₁ Collaborative capability does have a significant moderating effect on the relationship between green procurement practices and performance of manufacturing firms in Kenya

METHODOLOGY

This study used a positivism research philosophy. The study was based on theoretical foundations from which hypotheses derived, and quantitative methods were used for logic and evidence testing. This study adopted exploratory research design using both quantitative and qualitative approaches. The target population for this study was the entire population of 947 manufacturing firms which are registered members of Kenya association of manufacturers (KAM, 2017), of which about 80% are within Nairobi county. The study used Nachiamis & Nachamis (2012) formula to determine the sample size of 386. This represents 40% of the target population of 757 registered manufacturing companies in Kenya as per 2017 KAM Directory. The primary data collection instrument in this study was a questionnaire. The study collected collect primary data using structured questionnaires and capture information through a 5-point Likert scale type.

Variable Measurement, Reliability and Validity

Pilot tests were used to test the validity and reliability testing of the data collection instrument. In this study, reliability was measured using Cronbach alpha. Cronbach alpha is a test of internal consistency frequently used to calculate the correlation values among answers on an assessment tool (Sullivan, 2011). They argued that a value above 0.7 is generally accepted while a value of 0.6 is normally accepted for completely new instruments. To ensure criterion or face validity, the researcher critically examine each question against study objectives and how they would be answered by the operation managers and then make the necessary

adjustments. The study adopted confirmatory factor analysis to test for construct validity. The results of the reliability tests carried out in Table 4.1 show that green procurement ($\alpha = 0.764$), firm performance ($\alpha = 0.83$) and collaborative capability ($\alpha = 0.764$) had the lowest coefficient. Nunnally (1978) recommends Cronbach's alpha coefficient of 0.7 as the cut-off point for reliability, Davis (1964) suggests 0.5 as the minimum reliability coefficient. Factor analysis was carried out on firm performance. In general, the extraction method was principal component analysis and the rotation method was varimax with Kaiser Normalization and the findings were presented in Table 4.11. From the findings, all the items related to variables were significantly loaded on their respective factors thus all were retained for analysis. Furthermore, factor accounted for more than 50% of the total variation in each variable. Sampling adequacy was tested using the Kaiser- Meyer- Olkin (KMO) Measure of sampling adequacy. As evidenced in Table 1, KMO was greater than 0.5 (0.63), and Bartlett's Test was significant, p-value < 0.001.

Table 1 Variable Measurement, Reliability and Validity

n=224	Mean	Factor Loading	Cumulative %	KMO	Bartlett's Test of Sphericity
Firm performance (Cronbach's Alpha = 0.814)	1.71		57.45	0.63	2345.481*
FP1	1.24	0.66			
FP2	2.24	0.63			
FP3	1.40	0.87			
FP4	2.13	0.90			
FP5	1.41	0.66			
FP6	2.21	0.70			
FP7	1.17	0.92			
FP8	2.29	0.83			
FP9	1.24	0.77			
FP10	2.13	0.73			
Green procurement(Cronbach's Alpha = 0.764)	2.37		57.30	0.53	934.399*
GP1	2.12	0.56			
GP2	2.13	0.71			
GP3	2.50	0.57			
GP4	2.04	0.78			
GP5	2.79	0.86			
GP6	2.54	0.62			
GP7	2.32	0.83			
GP8	2.21	0.86			
GP9	2.64	0.54			
Collaborative capability(Cronbach's Alpha = 0.746)	2.45		64.73	0.66	684.624*
CC1	2.23	0.62			
CC2	2.07	0.73			
CC3	2.55	0.85			
CC4	2.52	0.90			
CC5	2.71	0.60			
CC6	2.71	0.90			
CC7	2.36	0.51			

**significant at the 0.01 level (2-tailed).

Analytic model

In line with the recommendations of Baron and Kenny (1986) and Hayes (2012), Hierarchical multiple regression analysis was used to test the moderating effect of collaborative capability on green supply chain

management and performance of manufacturing industry. This will provide evidence on whether to support or reject H_1 . The test for moderation in this study will involve analysing the interaction effect between green supply chain management and performance of manufacturing industry and reflecting upon the significance or insignificance of the resulting effect. The process will involve a number of steps and the resulting 'R square', 'F change' and 'p values' was reported and for moderation to exist, all effects must be significant. The first step will involve regressing the control variables against firm performance. The second step will involve regressing green supply chain management dimensions (green procurement, green manufacturing, green distribution and green disposal) against performance of manufacturing industry for direct effects. The third step will involve the introduction of the interaction term (collaborative capability) being regressed against the dependent variable (firm performance). Finally, the interaction term between the independent variable and moderator variable (was calculated by multiplying the two variables to yield a product term that represents the interaction effect. The above process of moderation testing is depicted and summarized using the moderation equation below. The paths giving rise to the moderation equation below are also statistically depicted by Figure 3.1

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 m + \beta_3 X_1 * m + \varepsilon$$

X_1 : Represents green procurement

Y : Represents the dependent variable (firm performance)

m : Represents the Moderator variable,

' ε_0 ': Represents the error terms

β_0 : Is a constant representing the Y intercept

' C_1, C_2, C_3 ' represents the effect of slope coefficients denoting the influence of the associated predictor variables over the dependent variable.

From the regression above, relationship management was said to have a significant moderating effect if the beta coefficient of the interacting term (β_3) is significant (has a p-value less than 0.05). T-test and f- statistic at 5% level of significance was used to examine significance of coefficients of variables in the model.

FINDINGS AND DISCUSSIONS

This section presents data analysis, presentation and interpretation of the findings. The section highlights the fundamental results of the examination based on which further investigations was attempted to test the hypotheses. in this study , 386 questionnaires set were distributed to respondents. However, 242 questionnaires were retrieved. Therefore, this makes the response rate of 62.7%, though; out of the 242 collected questionnaires only 224 were found to be useful for further analysis, because 18 questionnaires were excluded from the analysis due to missing data and outlier problems. This accounted for 70% valid response rate. According to Sekaran and Bougie (2010), response rate of 30% is acceptable for surveys. Hence forward, response rate of this study is adequate for further analysis.

Manufacturing Green Supply Chain Management characteristics

This section of the analysis focuses on manufacturing green supply chain management characteristics. The findings are as presented in table 4.4. Based on the findings in the table, 89.3% of the respondents confirmed that there is safe disposal of hazardous waste. In most of the cases, waste is disposed with the use of a garbage collector (76.3%). There is also recycling (17%) and the burning of waste (3.1%).

In addition, 92.9% of the management confirmed that the products do not contain banned or restricted substance. Further, 85.3% of the respondents stated that the firm has adopted green supply chain management practices while 14.7% of them were in disagreement. Besides, 85.7% of the respondents stipulated that the cost of production changed due to implementation of GSCM. However, 14.3% of them were of the opinion that there was no change in the cost of production once GSCM was implemented.

Regarding the years of adoption of green supply chain management practices, 19.2% of the respondents noted that their firm has adopted green supply chain management practices for up to a year, 45.9% for a period of 2 to 4 years, 28.6% for 5 to 7 years while 6.2% have adopted green supply chain management practices for a period ranging from 8 to 13 years. Finally, 91.1% of the respondents noted that there is budget allocation or green supply chain management. It is only 8.9% of them that denied there is budget allocation for GSCM.

Table 1 Manufacturing Green Supply Chain Management characteristics

		Frequency	Percent
safe disposal of hazardous waste	Yes	200	89.3
	No	24	10.7
	Total	224	100
Method used for Disposal	Burning	7	3.1
	Garbage collector	171	76.3
	Not applicable	8	3.6
	Recycling	38	17
	Total	224	100
Products Contain Banned or Restricted Substance	Yes	16	7.1
	No	208	92.9
	Total	224	100
Firm Adopted Green Supply Chain Management Practices	Yes	191	85.3
	No	33	14.7
	Total	224	100
cost of production changed due to implementation of GSCM	Total	224	100
	0	33	14.7
	1	10	4.5
	2	30	13.4
Years of adoption of green Supply Chain Management Practices	3	44	19.6
	4	29	12.9
	5	30	13.4
	over 5 years	53	48
	Total	224	100
	budget allocation for green supply chain management	Yes	204
No		20	8.9
Total		224	100

Univariate analysis

Firm performance realized a mean of 1.71, standard deviation of 0.21, skewness of -0.26 and a kurtosis of 0.22. The results suggest that not much change has been elicited in the performance of the manufacturing firms after the introduction of green supply chain management. green procurement summed up to a mean of 2.37, standard deviation of 0.31, skewness of 0.69 and kurtosis of 0.04. The implication is that the manufacturing firms in Kenya have made minimal efforts towards the adoption of green procurement. the

findings on collaborative capability summed up to a mean of 2.45, standard deviation of 0.33, skewness of 0.84 and kurtosis of -0.37. The findings indicate that the manufacturing firms have not fully optimized on the collaborative capability. Correlation analysis findings in the table, green procurement has a positive and significant relationship with firm performance ($r = 0.692$, $p\text{-value} = 0.000$) at 0.01 level of significance. collaborative capability did have a positive and significant relationship with firm performance ($r = 0.599$, $p\text{-value} = 0.000$).

Table 2 Correlation results

		FP	GP	CC
Firm performance (FP)	1.71	1		
Green procurement (GP)	2.37	.692**	1	
Collaborative capability (CC)	2.45	.599**	.604**	1

** Correlation is significant at the 0.01 level (2-tailed).

Multivariate Analysis (Testing For Moderation)

These hypothesis were tested using hierarchical regression. Prior to conducting hierarchical regression analyses, all study variables were standardized as z-scores to test for interaction terms (Aiken & West, 1991; Jose, 2008). Z-standardization of the variables allows easy interpretation of the interaction effects (Dawson, 2014). Model 1 represent the effect of independent variables on firm performance respectively. The hypotheses formulated are explained below.

H₁ Collaborative capability has significant effect on the relationship between green procurement and firm performance.

The moderation results show that Collaborative capability has a positive and significant moderating effect on the relationship between green procurement and firm performance ($R^2\Delta=0.04$; $\beta= 0.79$; $\rho<0.05$). The results show that there is a 4% increase in the variation of the firm performance by the addition of Collaborative capability on the relationship between green procurement and firm performance. The increase is significant ($\rho<0.05$) and positive ($\beta= 0.79$). The results suggest that Collaborative capability strengthens the relationship between green procurement and firm performance. The null hypothesis that Collaborative capability has no significant moderating effect on the relationship between green procurement and firm performance was thus rejected.

Table 2: Regression Coefficients of the Interaction of Collaborative Capability on Supply Chain Management and Firm performance

	Model 1 B(Se)	Model 2 B(Se)	Model 3 B(Se)
(Constant)	0.07(.04)	0.07(.04)	0.05(.03)
Zscore (GP)	0.42(.08)**	0.32(.06)**	(-0.07(.08)
Zscore(DsP)	0.26(.07)*8	0.11(.06)	0.13(.06)*
Zscore(CC)		0.46(.05)**	(-0.01(.09)
Zscore (GP_CC)			0.79(.11)**
Model Summary			
R	0.79	0.83	0.85
R Square	0.62	0.69	0.73
Adjusted R Square	0.61	0.68	0.72
Std. Error of the Estimate	0.81	0.73	0.69
Change Statistics			
R Square Change	0.61	0.08	0.04
F Change	156.18	94.96	52.16
df1	4.00	1.00	1.00

df2	394.00	393.00	392.00
Sig. F Change	0.00	0.00	0.00

a. Dependent variable: Firm performance

Legend: GP – Green procurement, CC – Collaborative capability – GP-CC Green procurement and Collaborative capability,

Conclusion and Recommendations

The results on collaborative capability indicated that there is limited focus on customer concerns on green products and lack of effective interdepartmental and interorganizational communication. Further, there is doubt if there is reliance on their partners engineering capacity for eco design. As well, it is undefined if there is cooperation with manufacturing department for green production and consumption. Moreover, there is limited cooperation with manufacturing for using less energy during production and transportation. Besides, there is not much emphasis on cooperation with distributors for green packaging. The firms should ensure that the materials purchased for manufacturing are of recyclable nature. Also, the firms need to make considerations on green specifications during inspection on delivery. Therefore, it is important for the firms to ensure that their products can be put to on alternative use after useful life. Specifically, all parts and components need to be recyclable and practices that involve processing of returned merchandise need to be in place. Further, there should be organizational policies on disposal methods. In connection with the findings, this study makes a number of possible implications on the influence of green supply chain practices on the performance of manufacturing firms in Kenya. First, it has highlighted the key role played by collaborative capability in moderating the relationship between green supply chain management and performance of manufacturing firms in Kenya. One direction of future research would be a replication study in other sectors not covered in the study. Furthermore, in terms of methodology, future scholars can conduct a longitudinal study as well as appreciate both the quantitative and qualitative aspects of research. Nonetheless, the thesis has contributed knowledge that is needed for this kind of research.

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