



INFLUENCE OF SUSTAINABLE SUPPLIER COLLABORATION PRACTICES ON PERFORMANCE OF THE GOVERNMENT MINISTRIES IN KENYA

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Abstract: Organizations are under increasing pressure to avoid supplier problems and to attract and retain the high performers. Effective collaboration results into reduced inventory both to the material suppliers and customers, increased revenue, lower order management costs, higher gross margin, better forecast accuracy, better allocation of budgets, lower warehousing costs, lower material acquisition costs, fewer stock outs, lower freight costs, faster and more reliable delivery, lower capital costs, reduced depreciation and lower fixed costs. The objective of the study was to examine the influence of sustainable supplier collaboration practices on performance of the government ministries in Kenya. The study adopted descriptive survey design and a cross sectional study design. The unit of analysis for this study was 20 government ministries with a target population of 1372 staff working in the supply chain management department/units in the 20 government ministries in Kenya. Stratified random sampling was used to ensure representativeness of the sample. Both primary and secondary data were used. This study made use of semi-structured questionnaires to collect primary data. A pilot test was conducted to test the reliability and validity of the data collection instruments. Both qualitative and quantitative techniques were used to analyse the data. SPSS software program version 22 was used to facilitate data processing and analysis. Thematic content analysis was used to analyze qualitative data. Both descriptive and inferential statistics were used to analyze quantitative data. Analysis of variance, correlation analysis, chi-square and univariate regression analysis were used. The study found that sustainable supplier collaboration has a positive and significant influence on the performance of government ministries in Kenya. The study found government ministries in Kenya do not exchange information that help establish business planning and do not share proprietary information with suppliers. In addition, government ministers do not contact their suppliers frequently and have no compatible communication and information system with their supplier. Also, they do not help suppliers to improve their product quality and they do not solve procurement related problems jointly with suppliers. The study concludes organizational culture influences the association between the sustainable supplier collaboration and the performance of government ministries in Kenya. The study recommends that the government should come up with a policy requiring suppliers to have compatible information system with public institutions. In addition, the government of Kenya should come up with training programs to help suppliers improve the quality of their products and services.

Key words: Sustainable Supplier Collaboration, Performance, Organizational Culture

Introduction

The main dimensions of an effective supply chain include strategic collaboration with suppliers, customer relationship management and the level of information sharing among the supply chain partners. Barrat (2004) argues that the major goal of supply chain management is to enhance competitive performance by integrating the internal functions within a company and linking them closely with the external operations of suppliers, customers and other members of the supply chain network. Collaboration of supply chain enables the cooperating members in the supply chain to improve performance of the organization in terms of revenue improvement, cost reductions, operational flexibility and to cope with high demand uncertainties.

Abdallah & Alnamri (2015) asserts that SCM is about competing for value, collaborating with customers and suppliers to create a position of strength in the market place based on value derived from end consumer. The companies need to create strong collaboration that enable them to leverage their market orientations by responding to rapid changes in customers' value and competitor moves for them to acquire superior business performance. Collaborative approaches have been shown to deliver a wide range of benefits which enhance competitiveness and performance in terms of better cost management, improved delivery time, improved resource management, improved risk management and delivering incremental business value and innovation. Collaboration occurs when firms in the chain set common goals and work jointly to achieve the overall supply chain performance and value to the customer. Resources and information are exchanged between the chain partners. Caddy and Helou (2007), propose that supply chain collaboration is the construct of coordination, participation and joint problem solving between supply chain partners. Supply chain collaboration can help in the coordination in supply chain. Barrat and Green (2001) argues that supply chain coordination occurs when all the different stages of supply chain work toward the objective of maximizing total supply chain profitability rather than each stage devoting itself to its own profitability.

Studies conducted globally show different influences of supplier collaboration practices on organizational performance. In Jordan, Kumar and Rahman (2015) found that buyer-supplier relationship plays a major role in the supply chain. The supply chain and its processes reveal that a buyer-supplier relationship should be determined on the basis of the capability and capacity of the partner (supplier). In cases where the supplier firm lacks capability or capacity, the focal firm may decide to help or extend support. In Finland, Kahkonen et al. (2017) indicate that supplier collaboration practices in four specific areas (green and ethical supply management, early supplier involvement, systemic purchasing and inter-firm learning) lead to higher focal firm innovation performance, as they require the firm to adopt new business models, processes and product features. In a study on Supply chain collaboration and sustainability in Denmark, Blome, Paulraj and Schuetz (2014) found that an alignment between supply chain initiatives does pay off. Furthermore, the results show that the effects of alignment on performance measures are mediated by the firm's internal sustainable production. However, sustainable supply chain collaboration needs to be operated at an ideal profile in collaboration with advanced internal practices to generate improved performance. In the United Kingdom, Plane and Green (2012) indicate that in general clients are seeking more collaborative relationships and this may determine a more relational procurement process. Some organizations appear more practiced than others in defining the level of collaboration and business benefits sought. Results support the view that a relational procurement process provides greater clarity of service requirements and facilitates cultural alignment between the buyer and supplier. However, additional

time, effort, and cost are incurred, and concerns arise regarding the maturity of the supplier-market and the sincerity of client intentions to collaborate.

In Kenya, Barasa, Simiyu and Iravo (2014) established that supply chain collaboration practice statistically significantly predicted the performance of Steel Manufacturing Companies in Kenya. The study also found that supply chain collaboration involves supply chain integration, which in turn links an organization with its customers, suppliers and other channel members by integrating their relationships, activities functions, processes and locations. Integration involves the cooperation, collaboration, information sharing, trust, partnerships, shared technology and a fundamental shift away from managing individual functional processes to managing integrated chains of processes. In addition, Walumbe (2016) found that trust-based relationships with suppliers enabled the media firms to preserve good relations, share information with suppliers, and ensure that products are delivered to the company on time. Supplier collaboration was found to have seen the media firms and the suppliers hold regular business plan meetings, operational business reviews, encourage information sharing and transparency. The usage of supplier relationship management by the media firms has resulted in reduced cycle time while ensuring that it increases company competitive positioning, improves efficiency of production operations, reduce inventory, increase market share, reduce costs, retention of customers, customer loyalty and improved customer satisfaction.

Statement of the Problem

Governments are the largest consumers in an economy, on average the public sector spends 45% to 65% of their budgets and 13% to 17% of their GDP on procurement (IISD, 2007). Supply chain management in the Kenya government ministries, is characterized by increased costs, untimely service delivery, delay in procurement of goods, works and services. During the financial year 2014/2015, a number of Ministries, Department and Commissions had funds incurred expenditure totaling Ksh 14, 435, 690, 489 of which value for money could not be established which amounts to wastages. Much of the wastages occurred in the course of procurement (Auditor General Report, Financial Year 2014/2015). In addition, the government waste a lot of man hour and finances on disposal of obsolete and unserviceable stores that are associated with poor supply chain management practices, contributing to the increase in the recurrent expenditure which led to issuance of Treasury circular No. 20/2015 on austerity measures to cut down on expenditure.

According to Plane and Green (2012), effective collaboration results into reduced inventory both to the material suppliers and customers, increased revenue, lower order management costs, higher gross margin, better forecast accuracy, better allocation of budgets, lower warehousing costs, lower material acquisition costs, fewer stock outs, lower freight costs, faster and more reliable delivery, lower capital costs, reduced depreciation and lower fixed costs. In overall, effective collaboration leads to improved customer service and more efficient use of human resource. Even though the above benefits could be gained from an effective collaboration, that effective collaboration is quite elusive in the public sector in Kenya.

Studies conducted on sustainable supplier collaboration practices have been limited to the private sector. For instance, Barasa, Simiyu and Iravo (2014) conducted a study on the impact of supply chain collaboration practice on the performance of steel manufacturing companies in Kenya and Walumbe (2016) carried out a study on supplier relationship management and performance of media firms in Kenya. It is against this background that this study seeks to investigate the influence of sustainable supplier collaboration practices on performance of the government ministries in Kenya.

The following hypotheses were tested in the study:

H₀₁: Sustainable supplier collaboration practices do not have a significant influence on performance of the government ministries in Kenya.

H₀₂: Organizational culture do not significantly moderate the influence of sustainable supplier collaboration practices on performance of government ministries in Kenya

Theoretical framework

This study was anchored on the systems theory. General System Theory (GST) was originally founded by Hungarian biologist Ludwig von Bertalanffy in 1972 (Von Bertalanffy, 1972). From a biological perspective, the theory considers an organism as an integrated system of interdependent structures and functions. From a sociological perspective, system theory is the trans-disciplinary approach of an organization. A sociological system comprises of four things, namely; objects, attributes, internal relationships among objects and environment (Kast & Rosenzweig, 2011). According to Zenko et al. (2013), objects are considered to be parts, elements, or variables within the system. Attributes are the properties, characteristics of qualities of a system and its objects. Every system has internal relationships that exist among its objects. In addition, a system exists in an environment (Zenko et al., 2013). A system is a set of objects of things that influence one another within an environment and form a larger pattern that is different from any of the parts (Puche et al., 2016). A system can also be considered as a collection of entities that act together to perform a specific purpose. A system is separated from its environment by a boundary, which separates what is in the system and what is not. A system can either be open or closed.

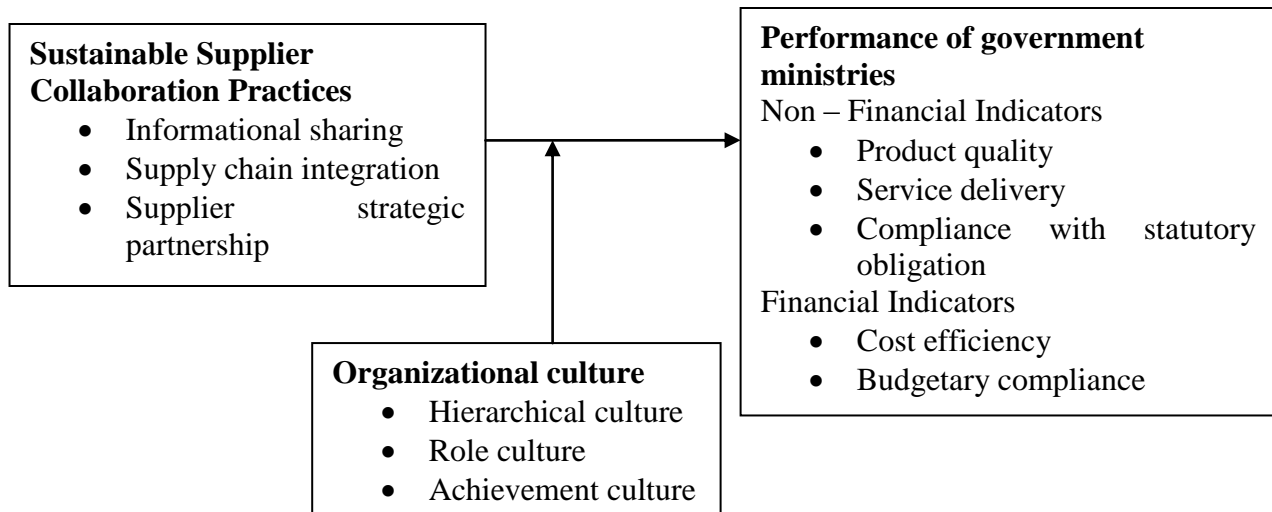
An open system can interact with its environment and it is characterized by exchanges of matter and information with the external environment. In other words, organizations like government ministries are open systems that interact regularly with external forces such as other government agencies, customers and suppliers. On the contrary, in a closed system there is no exchange of information and matter with the external environment (Hongwei, Huixin & Jian-bo, 2009). The open system theory focuses on the relationships between various departments and people in an organization as well as the relationship between the organization and its external environment. In applying the concept open system theory, Kast and Rosenzweig (2011) indicate that an organization is a system built by an energetic input-output, where the energy coming from the output reactivates the system. Another part of the open system concept focuses on the impact of changes within an organization. The changes in one part of the organization affect all other parts of the organization. The main function of an organization management is to act as a boundary-linking pin among the various subsystems within the organizational system (Kast & Rosenzweig, 2012).

Government ministries can be considered as systems that comprise of stakeholders like the general public (customers) and regulatory authorities. Each government ministry has various departments whose functions depend on each other (Caddy & Helou, 2007). Therefore, the performance of a government ministry does not depend on only one department but on the combine effort of all departments. For instance, the accounts department or the administrative department depends significantly on the supply chain department for material and equipment's. In addition, government ministries interact significantly with suppliers and hence the importance of sustainable supplier collaboration practices. However, the acquisition of materials or service through suppliers necessitate risk management, and performance monitoring which are guided by procurement policies like the

Public Procurement and Disposal Act, 2005 and Public Procurement and Asset Disposal Act, 2015 among others.

Conceptual framework

This study sought to investigate on the influence of sustainable supplier collaboration practices on performance of the government ministries in Kenya. The independent variables were sustainable supplier collaboration practices. The dependent variable was the performance of the government ministries in Kenya and the moderating variable was organizational culture.



Independent variables

Moderating variable

Dependent variable

Figure 1: Conceptual Framework

Sustainable supply chain collaboration Practices

Cohen and Roussel, (2004) defines Supply Chain collaboration as the means by which companies or business entities within the supply chain work together towards mutual objectives through sharing of ideas, information, knowledge, risks and rewards. The pressure from stakeholders on sustainability requirements has led many firms to collaborate with their suppliers and customers (Kassen & Vachon, 2003). Soosay *et al*, (2015) conducted a systematic review of the literature on supply chain collaboration published over a 10-year period from 2005 to 2014. It explores the nature and extent of research undertaken to identify key themes emerging in the field and gaps that need to be addressed. The authors reviewed a sample of 207 articles from 69 journals, after using an iterative cycle of defining appropriate search keywords, searching the literature and conducting the analysis. The Key themes in the findings include the meaning of collaboration; considerations for supply chain collaboration theory; emerging areas in collaboration for sustainability, technology-enabled supply chains and humanitarian supply chains; and the need for a more holistic approach, multi-tier perspectives and research into B2C collaborations. (Lehoux *et al.*, 2010; Deakins *et al.*, 2008; Sari, 2008) stated that, the widespread developments in supply chain technologies, tools and applications such as traceability systems, Quick Response, Efficient Consumer Response, Collaborative Planning,

Forecasting and Replenishment have assumed firms will engage in a collaborative approach to the implementation and use of technologies.

By taking this into consideration, Cao *et al.* (2010) derived a model for supply chain collaboration attributed to seven components (information sharing, goal congruence, decision synchronization, incentive alignment, resources sharing, collaborative communication and joint knowledge creation), which they term as mechanisms to reduce costs and risks. The study by Simatupang and Sridharan (2005) also proposes a model for the collaborative supply chain comprising five characteristics; collaborative performance system; information sharing; decision synchronization; incentive alignment; and integrated supply chain processes. Barratt, (2004) conducted a study on understanding the meaning of collaboration in supply chain. In the study, the author reviewed a number of literature on the elements of supply chain collaboration and their application and subsequent effect on business performance, some of the major elements supporting collaboration reviewed are; Collaborative culture where it was established that most of the corporate collaborative culture are not capable of supporting collaboration either externally or internally and according to Barratt and Geen (2001) functional thinking is rife and supported by organizational structures and performance measures that are aligned to functional activities rather than supply chain processes; Information sharing, in the study, it was established that information, particularly the transparency and quality of information flows, plays an important part in many accounts of supply chain developments. According to Mason-Jones and Towil (1997), information enrichment like immediate sharing of market place data throughout the chain is not merely desirable but obligatory.

Organizational Culture

Organizational culture is a system of shared assumptions, values, and beliefs, which governs how people behave in organizations. These shared values have a strong influence on the people in the organization and dictate how they dress, act, and perform their jobs. Deal and Kennedy (1982) reiterated that the effect of organizational culture and its potential impact on organizational success has contributed to the much attention it has received in the last two decades. (Schein, 1990) argues that, the idea of corporate culture serves to provide a basis for understanding the differences that may exist between successful companies operating in the same national culture. Firm culture is regarded quite widely as an important factor of firm performance. It is a concept that touches many internal parts of an organization just as it interfaces with the environment outside an organization.

Pakdil and Leonard, (2015) conducted a study on the effect of organizational culture on implementing and sustaining lean processes. The research findings established that lean processes in relation to organizational culture leads to propositions that identify the various cultural dimensions and their purported effect on lean implementation and sustainability. In the study, a model of interaction of those quadrants of competing values was developed including, group culture, development culture, hierarchical culture and rational culture. In the model, group culture often called clan culture is represented by high flexibility and an internal focus, including a focus on the employee (Cameron & Quinn, 1999). Shared values, participation, and collaboration were found in this culture, with teamwork, employee involvement, and corporate commitment to workers driving the firm. These researchers noted that rewards are based on team achievements, quality circles address process problems, and suggestion systems allow employees a voice – all aimed at improving company performance through empowerment. In these cultures, employees, suppliers, and customers are

considered partners with management to achieve organizational goals, which are defined by the internal needs of the firm and employees (Cameron & Quinn, 1999).

In the model, development culture, also called entrepreneurial culture is represented by high flexibility and an external focus. In this organizational culture, little is static or stable, because flexibility and creativity are the primary organizational goals used to cope with uncertainty and ambiguity (Cameron & Freeman, 1991; Cameron & Quinn, 1999). There is a high emphasis on individuals, risk, and preparing for the future. Hierarchical culture also called the market or results-oriented culture is characterized by low flexibility and internal focus. There is intense specialization and uniformity, resulting in little flexibility concerning rules, which allows outputs to be consistent (Cameron & Quinn, 1999). The dominant operational approach in this culture is efficiency, that is, effectiveness, timeliness, predictability, and elimination of waste and redundancy (Cameron & Quinn, 1999). It is a formal and structured workplace. Rational culture also termed market culture, is characterized by low flexibility and external focus. It has core values of competitiveness and productivity, focusing on the bottom line and profitability (Cameron & Quinn, 1999). To achieve this focus, they concentrate on their customers and on improving their competitive advantage. The external environment drives activities within the company toward winning, creating leaders centered primarily on achievement. Quality strategies in rational culture are improving productivity, measuring customer preferences, creating partnership, enhancing competitiveness, and involving customers and suppliers (Cameron & Quinn, 1999).

Performance of the Government Ministries

Abdallah and Alnamri (2015) conducted a study to investigate the use of financial and non-financial performance measurement practices, including the use of the balanced scorecard (BSC) and the impact of the cultural values on the use of performance measurement systems (PMSs), in multinational companies (MNCs) operating in the Middle East with a special attention to the Saudi Arabian subsidiaries. In their research methodology, the duo collected data using a survey mailed to 180 randomly selected Saudi manufacturing subsidiaries in different industrial cities to collect data on their PMSs including the use of the BSC. In the research findings, financial measures are more widely used by most of the companies included in the sample due to the fact they are common, well known, and the most familiar performance measures in the business practice and they are more standardized measures which can be easily understood, implemented, and quantified. Moreover, the use of the non-financial measures was at a very low rate compared with the use of financial measures. The reasons were the difficulty in finding objective measures of the effect of social actors and the avoidance of any disclosure of social problems that are existed in the society. In the research finding, the measures were classified in a descending order of the ones most widely used, as indicated by the highest mean, to the ones least widely used as indicated by the lowest mean among all measures. The financial and non-financial indicators employed in the study were, total sales, rate of achieved budget, unit product cost, rate of return on investment, number of customers' complaints, customer response time, rate of the growth sales, rate of defective output to total output, rate of market share, actual profit margin, measure of defective units, number of warranty claims, time for new product development, customer satisfaction, rate of new products launched, on-time delivery, number of new employee training/hours programs and employees' satisfaction.

Research Methodology

This study used a descriptive survey design and a cross sectional study design. A descriptive approach was used because it enables collection of accurate data and the provision of a clear picture of the phenomenon under study. In a cross-sectional study, data are collected on the whole study population at a single point in time to examine the relationship between the variables of interest. This study adopted a cross sectional study design because they generally use survey techniques to gather data, are relatively inexpensive and take up little time to conduct. The target population of this study was therefore 1372 staff working in the supply chain management department/units in the 20 government ministries in Kenya. The sample size was determined using Fisher *et al.* (2003) formula. This formula was used to obtain a representative sample of the target population. The target population is estimated at 1372 staff working in supply chain management departments in government ministries.

$$n = \frac{z^2 pq}{d^2}$$

Where,

- n = the desired sample size (if the target population is > 10,000).
- Z = is the standard normal deviate at the required confidence level.
- p = is the proportion in the target population estimated to have characteristics being studied. If unknown 50% should be used.
- q=1-p
- d = the level of statistical significance set = 0.05
- Z = Assuming 95% confidence interval Z = 1.96

$$n = \frac{1.96^2 0.5 * 0.5}{0.05^2}$$

$$n = 384 \text{ staff}$$

For a population that is less than 10000 an adjustment must be done using Cochran's correction formula (Cochran, 2011);

$$nf = n / 1 + (n/N)$$

Where;

nf=the final sample size, when population is less than 10,000

n=the sample for populations of 10,000 or more

N=the size of the total population from which the sample is drawn

$$nf = 384 / 1 + (384/1372)$$

$$= 300$$

$$nf = \frac{300 * 100}{1372}$$

$$nf = 20\%$$

According to Mugenda and Mugenda, (2003) a sample size of between 10% and 30% is good representation of the total population. The study used stratified random sampling to select 300 staff from the target population. Proportionate sampling was used to select the number of staff per category. Stratified random sampling is a probability sampling method that gives chances of selecting each unit within particular strata in a population. The strata in this study were sections of the supply chain management department. Stratified random sampling was used as it gives representative sample of the whole population. Proportionate sampling was used in allocating samples in each of the strata.

Table 1: Sample Size

Departments	Target Population	Sample Size
Records management	274	60
Stores	137	30
Procurement	960	210
Total	1372	300

This study used both primary and secondary data. Secondary data was collected through review of published literature such as journals articles, published theses, textbooks, annual reports of government ministries. This study used primary data, which was collected by use of semi-structured questionnaires. The questionnaires encompassed both closed ended or open ended questions so as to enable the A pilot test was conducted with 10% of the sample size. According to Hertzog (2008) 10% of the sample required for a full study should be used in a sample size. In this study, the researcher relied on experts in the field of project management like the supervisors to enhance face validity and construct validity. In addition, face validity and construct validity was enhanced by developing the research instruments as per the objectives of the study. Data reliability, which is a measure of internal consistency and average correlation, was measured using Cronbach's alpha coefficient which ranges between 0 and 1. A cronbach's alpha (α) of more than 0.7 was considered acceptable while a cronbach's alpha (α) of less than 0.7 is considered questionable.

The research instrument generated both qualitative and quantitative data. Thematic analysis was used to analyze qualitative data, that is, data collected from open ended questions. The results were then presented in form of a prose. In relation to quantitative data, nominal data from the socio-demographic information section was analyzed by use of percentages and frequencies. The arithmetic mean was as a measure of central tendency while the standard deviation was used as a measure of dispersion. For all quantitative data analysis, this study used Statistical Package for Social Sciences (SPSS version 22) as a tool. Inferential statistics included correlation analysis and univariate regression analysis. The regression analysis provided other test statistics like Student t-Tests, adjusted R^2 and F-test. The study applied a 95% confidence interval. A 95% confidence interval indicates a significance level of 0.05. This implies that for an independent variable to have a significant influence on the dependent variable, the p-value ought to be below the significance level (0.05).

Regression model was;

H₀₁: Sustainable supplier collaboration practices do not have a significant influence on performance of the government ministries in Kenya.

$$Y = \beta_0 + \beta_1 X_3 + \varepsilon$$

Whereby;

Y	= Performance of the government ministries in Kenya.
β_0	= Constant
β_1	= Coefficients of determination
X_3	= Sustainable supplier collaboration practices
ε	= Error term

The study used multiple regressions analysis (stepwise method) to establish the moderating effect of organizational culture (z) on relationship between independent variable and dependent variable.

Moderating effect regression model was;

$$Y = \beta_0 + \beta_1 X_3 + \beta_2 X_3 Z + \varepsilon$$

Where;

Y	is the dependent variable, Performance in the government ministries in Kenya.
β_0	is the constant
β_1	is the coefficient of X_1
X_3	= Sustainable supplier collaboration practices
Z	is the hypothesized moderator (organizational culture)
β_z	is the coefficient of $X_1 * Z$ the interaction term between organizational culture and each of the independent variables
ε	is the error term

Research Findings and Discussion

The sample size of this study was 300 staff working in the supply chain department that comprises of records management, stores and procurement. Out of the three hundred staff, 273 responses were obtained, which gives a response rate of 91%. According to Kothari (2004) a response rate of 50% or more is adequate for analysis.

Descriptive statistics results

A five point Likert scale was used to measure the indicators of different independent variables Where 1 was strongly disagree, 2 was disagree 3 was neither agree or disagree, 4 was agree and 5 was strongly Agree.

Sustainable Supplier Collaboration

The third objective of the study was to assess the influence of sustainable supplier collaboration practices on performance of the government ministries in Kenya. The indicators of sustainable supplier collaboration include information sharing, supply chain integration and supplier strategic partnership.

Information Sharing

The respondents were requested to indicate their level of agreement with various statements on information sharing. The results were as presented in table 2. From the findings, the respondents were neutral on the statement that they keep each other informed about the changes that may affect the other (M=3.172, SD=1.389). The respondents were also neutral on the statement that they provide full information to suppliers about issues that affect business (M=3.080, SD=1.460). The respondents were also neutral on the statements that they provide advance information of changing need to suppliers (M=3.047, SD=1.412) and share business knowledge of core business process (M=3.033, SD=1.362). In addition, the respondents were neutral on the statement that they exchange information that help establish business planning (M=2.992, SD=1.385) and sharing proprietary information with suppliers (M=2.956, SD=1.341).

Table 2: Information Sharing

	Mean	Std. Deviation
We share proprietary information with suppliers	2.956	1.341
We share business knowledge of core business process	3.033	1.362
We provide advance information of changing need to suppliers	3.047	1.412
We provide full information to suppliers about issues that affect business	3.080	1.460
We exchange information that help establish business planning	2.992	1.385
We keep each other informed about the changes that may affect the other	3.172	1.389

Supply chain integration

The respondents were asked to indicate their level of agreement with various statements on supply chain integration in relation to their ministries' supply chain departments. The results were as shown in table 3. According to the findings, the respondents were neutral on the statement that they frequently contact their suppliers (M=3.454, SD=1.133). The respondents were also neutral on the statement that they have a compatible communication and information system with their suppliers (M=3.267, SD=1.259). Further, the respondents were neutral on the statement that they participate in the marketing efforts of their suppliers (M=2.586, SD=1.350).

Table 3: Supply chain integration

	Mean	Std. Deviation
We frequently contact our suppliers	3.454	1.133
We have a compatible communication and information system with our suppliers	3.267	1.259

Supplier Strategic Partnership

The respondents were further requested to indicate their level of agreement with various statements on supplier strategic partnership. The results were as presented in table 4. According to the findings, the respondents agreed that they consider quality in supplier selection (M=3.978, SD=1.172). However, the respondents were neutral on the statements indicated that help suppliers to improve their product quality (M=3.256, SD=1.414) and also on solving procurement related problems jointly with suppliers (M=3.153, SD=1.244). The respondents were neutral with the statement that they include their

suppliers in continuous improvement programs (M=2.948, SD=1.451). The respondents were also neutral on the statements that they involve their suppliers in key development processes (M=2.674, SD=1.355) and they include their suppliers in planning and goal setting activities (M=2.461, SD=1.442).

Table 4: Supplier strategic partnership

	Mean	Std. Deviation
We solve our procurement related problems jointly with suppliers	3.153	1.244
We consider quality in supplier selection	3.978	1.172
We help suppliers to improve their product quality	3.256	1.414
We include our suppliers in continuous improvement programs	2.948	1.451
We include our suppliers in planning and goal setting activities	2.461	1.442
We involve our suppliers in key development processes	2.674	1.355

Organizational Culture

Organization culture was used as the moderating variable in this study and was measured in terms of hierarchical culture, role culture and achievement culture.

Hierarchical Culture

The respondents were asked to indicate their level of agreement with various statements on hierarchical culture in their ministries. The results were as presented in table 5. According to the findings, the respondents strongly agreed that their departments adhere to procurement regulation to guide the activities and processes (M=4.699, SD=0.662). They also strongly agreed that they adhere to laid down procurement approval systems and structure (M=4.626, SD=0.722), and controls in the procurement system (M=4.637, SD=0.672). The respondents agreed that they adhere to the laid down timeliness in the procurement legal framework (M=4.329, SD=0.891) and practice centralized procurement system (M=3.945, SD=1.153).

Table 5: Hierarchical Culture

	Mean	Std. Deviation
We adhere to procurement regulation to guide our activities and processes	4.699	.662
We practice centralized procurement system	3.945	1.153
We adhere to laid down procurement approval systems and structure	4.626	.722
We adhere to the controls in the procurement system	4.637	.672
We adhere to the laid down timeliness in the procurement legal framework	4.329	.891

Role culture

The respondents were asked to indicate their level of agreement with various statements on role culture. The results were as presented in table 6. According to the findings, the respondents indicated that they ensure documentation and information management (M=4.476, SD=0.809), adhere to contractual obligations (M=4.439, SD=0.793) and only do what they are authorized to do (M=4.326,

SD=0.911). The respondents also agreed that they exhibit loyalty towards systems in the ministry (M=4.201, SD=0.865).

Table 6: Role culture

	Mean	Std. Deviation
We adhere to contractual obligations	4.439	.793
We exhibit loyalty towards systems in the ministry	4.201	.865
We ensure documentation and information management	4.476	.809
We only do what we are authorized to do	4.326	.911

Achievement culture

The respondents were asked to indicate their level of agreement with various statements on achievement culture in their ministries. The results were as presented in table 7. According to the findings, the respondents agreed that they pursue goals and targets (M=4.128, SD=0.936) and encourage continuous achievement (M=4.073, SD=0.948). The respondents also agreed that they encourage employee participation (M=3.996, SD=0.979) and recognize employee's contributions and suggestions (M=3.919, SD=1.004).

Table 7: Achievement culture

	Mean	Std. Deviation
We recognize employee's contributions and suggestions	3.919	1.004
We pursue goals and targets	4.128	.936
We encourage employee participation	3.996	.979
We encourage continuous achievement	4.073	.948

Performance of Government Ministries

The performance of government ministries was measured in terms of non-financial indicators and financial indicators.

Non-financial indicators

Non-financial indicators are other measures used to assess the activities that an organization sees as important to the achievement of its strategic objectives. The non-financial indicators include product quality, compliance with statutory obligations and service delivery.

Product quality

The respondents were asked to rate product quality in their ministries. The results were as presented in table 8. According to the findings, the respondents indicated that the percentage of products that meet specifications was 60% to 80% (M=4.344, SD=0.973). In addition, they indicated that the percentage of defect free goods deliveries was 60% to 80% (M=3.549, SD=1.452). In addition, the percentage of product rejection on deliveries was between 20% and 40% (M=2.139, SD=1.360). Further, the percentage of product returns for repair during warranty period was between 20% and 40% (M=2.113, SD=1.360).

Table 8: Product quality

	between 0-20%	20% - 40%	40% - 60%	60% - 80%	80% - 100%	Mean	Std. Deviation
Indicate the percentage of defect free goods deliveries	17.9	5.9	12.5	30.8	33.0	3.549	1.452
Indicate the percentage of product rejection on deliveries	50.9	16.5	9.2	14.7	8.8	2.139	1.402
Indicate the percentage of products that meets specifications.	2.2	2.2	16.1	17.9	61.5	4.344	.973
Indicate the percentage of product returns for repair during warranty period	51.6	14.3	11.7	15.8	6.6	2.113	1.360

Compliance with statutory obligations

The respondents were also asked to rate compliance of their ministries with statutory obligations. The results were as shown in table 9. According to the findings, the respondents indicated that the percentage of statutory reports submitted on time was between 60% and 80% (M=4.128, SD=1.125). In addition, the percentage of audit queries on non-compliance was between 20% and 40% (M=2.117, SD=1.323). Also, the percentage of queries from procurement regulator on non-compliance was between 20% and 40% (M=2.029, SD=1.311).

Table 9: Compliance with statutory obligations

	Between 0-20%	20% - 40%	40% - 60%	60% - 80%	80% - 100%	Mean	Std. Deviation
Indicate the percentage of statutory reports submitted on time	7.0		15.8	27.8	49.5	4.128	1.125
Indicate the percentage of audit queries on non-compliance	46.5	23.1	10.3	12.5	7.7	2.117	1.323
Indicate the percentage of queries from procurement regulator on non-compliance	54.2	12.1	16.8	10.3	6.6	2.029	1.311

Service delivery

The respondents were asked to indicate their level of agreement with various statements on service delivery in their ministries. The results were as shown in table 10. According to the findings, the respondents agreed that they receive deliveries of goods from their suppliers on time (M=4.087, SD=0.752) and suppliers were readily available for consultation (M=3.908, SD=0.936). The respondents agreed that they receive prompt response to their queries from their supplier (M=3.758, SD=0.954). The respondents were neutral on whether they get after sales service from their suppliers (M=3.395, SD=1.110).

Table 10: Service delivery

	Mean	Std. Deviation
We receive deliveries of goods from our suppliers on time	4.087	.752
We get after sales service from our suppliers	3.395	1.110
We receive prompt response to our queries from our supplier	3.758	.954
Our suppliers are readily available for consultation	3.908	.936

Financial Indicators

Financial indicators are statistics extensively used to monitor the soundness, stability and performance of various institutions. The financial indicators used in this study include cost efficiency and budgetary compliance.

Cost efficiency

The respondents were asked to rate cost efficiency in their ministry in relation to supply chain. The results were as shown in table 11. According to the findings, the respondents indicated that the percentage of cost savings of procured goods/works/services on budgeted amount was 40% and 60% (M=3.044, SD=1.294). The respondents also indicated that the percentage of cost deviation of procured goods /works/services from market price was between 20% and 40% (M=2.091, SD=1.102). The respondents also indicated that the percentage of cost overrun of procured goods/works /services on budgeted amounts was between 20% and 40% (M=2.076, SD=1.045).

Table 11: Cost efficiency

	between 0-20%	20% - 40%	40% - 60%	60% - 80%	80% - 100%	Mean	Std. Deviation
Indicate the percentage of cost savings of procured goods/works/services on budgeted amount	14.7	20.9	26.4	21.6	16.5	3.044	1.294
Indicate the percentage of cost deviation of procured goods /works/services from market price	41.4	22.0	23.8	11.7	1.1	2.091	1.102
Indicate the percentage of cost overrun of procured goods/works /services on budgeted amounts	37.0	31.1	20.1	10.6	1.1	2.076	1.045

Budgetary compliance

The respondents were also requested to rate budgetary compliance in their ministries. The results were as presented in table 12. From the findings, the respondents indicated that the percentage of purchase orders pending due to budgetary constraints was between 20% and 40% (M=2.065, SD=1.210). The respondents also indicated that the percentage of goods/works/services procured above the budgetary allocation was between 20% and 40% (M=1.732, SD=1.002). The respondents further indicate that the percentage of audit queries on budgetary compliance was between 20% and 40% (M=1.721, SD=0.960). The respondents also indicated that the percentage of goods/works/services procured without budgetary allocation was between 20% and 40% (M=1.512, SD=0.962).

Table 12: Budgetary compliance

	between 0-20%	20% - 40%	40% - 60%	60% - 80%	80% – 100%	Mean	Std. Deviation
Indicate the percentage of goods/works/services procured without budgetary allocation	72.9	10.3	11.7	2.9	2.2	1.512	.962
Indicate the percentage of goods/works/services procured above the budgetary allocation	56.4	22.3	15.0	4.0	2.2	1.732	1.002
Indicate percentage of purchase orders pending due to budgetary constraints	47.3	17.2	21.6	9.5	4.4	2.065	1.210
Indicate the percentage of audit queries on budgetary compliance	57.1	20.1	16.1	6.6	0.0	1.721	.960

Inferential Statistics

Inferential statistics were used to assess the association between independent variables, moderating variable and the dependent variable. They included correlation analysis and univariate regression analysis.

Correlation Analysis

The correlation coefficient is a measure of linear association between two variables. Values of the correlation coefficient are always between -1 and +1. A correlation coefficient of +1 indicates that two variables are perfectly related in a positive linear sense, a correlation coefficient of -1 indicates that two variables are perfectly related in a negative linear sense, and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables. The findings show that a positive association exists between sustainable supplier collaboration and the performance of government ministries in Kenya ($r=0.417$, $p\text{-value}=0.000$). Also, the results show that there is a positive association between organizational culture and the performance of government ministries in Kenya ($r=0.196$, $p\text{-value}=0.001$).

Table 13: Correlation analysis

		Performance of government ministries	Sustainable supplier collaboration	Organizational culture
Performance of government ministries	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	273		
Sustainable supplier collaboration	Pearson Correlation	.417**	1	
	Sig. (2-tailed)	.000		
	N	273	273	
Organizational culture	Pearson Correlation	.196**	.62	1
	Sig. (2-tailed)	.001	.081	
	N	273	273	273

Univariate Regression Analysis

Univariate analysis was used to assess the relationship between sustainable supplier collaboration and performance of government ministries. The null hypothesis was;

H₀1: Sustainable supplier collaboration practices do not have a significant influence on performance of the government ministries in Kenya.

As indicated in table 14, the r-squared for the association between sustainable supplier collaboration practices and the performance of the government ministries in Kenya was 0.174. This implies that sustainable supplier collaboration practices can explain 17.4% of the performance of the government ministries in Kenya.

Table 14: Model Summary Sustainable Supplier Collaboration and Performance

R	R Square	Adjusted R Square	Std. Error of the Estimate
.417	.174	.171	.43531

According to the findings, the F-calculated (57.148) is greater than the F-critical (3.84) and the p-value (0.000) is less than the significance level (0.05). This shows that the univariate regression model is a good fit for the data and hence can be used in predicting the influence of the sustainable supplier collaboration practices on the performance of government ministries in Kenya.

Table 15: ANOVA for Sustainable Supplier Collaboration and Performance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	10.829	1	10.829	57.148	.000
Residual	51.353	271	.189		
Total	62.182	272			

The results show that holding sustainable supplier collaboration practices constant, the performance of government ministries in Kenya will be 2.168. In addition, the beta coefficient for the association between sustainable supplier collaboration practices and the performance of government ministries in Kenya is 0.208. This implies that a unit improvement in sustainable supplier collaboration practices would lead to 0.208 improvement in the performance of government ministries in Kenya. The p-value (0.000) was less than the significance level (0.05). Therefore, we can accept the alternative hypothesis that “sustainable supplier collaboration practices have a significant influence on performance of the government ministries in Kenya”.

Table 16: Coefficients for Sustainable Supplier Collaboration and Performance

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.168	.084		25.952	.000
Sustainable supplier collaboration	.208	.028	.417	7.560	.000

Moderating Effect Analysis

The moderating variable in this study was organizational culture. The study used multiple regressions analysis (stepwise method) to establish the moderating effect of organizational culture (z) on relationship between independent variable and dependent variable.

The statistical model used for analysis was as follows:

$$Y = \beta_1 X_1 + \beta_2 Z + \beta_z X_1 Z + \varepsilon$$

where:-

Y is the dependent variable, performance of government ministries in Kenya.

B₁- β₂ are the coefficient

X₁ = sustainable supplier collaboration

Z is the hypothesized moderator (organizational culture)

β_z is the coefficient of X_i *Z the interaction term between organizational culture and each of the dependent variables

ε is the error term

The model summary for the linear regression analysis between organizational culture, sustainable supplier collaboration and performance of government ministries indicated an R-squared of 0.208. This shows that both organizational culture and sustainable supplier collaboration can explain a variation of

20.8% of the dependent variable (performance of government ministries). The r-squared increased from 17.4% before the introduction of the moderating variable to 20.8% after the introduction of the moderating variable.

Table 17: Model Summary for OC, Sustainable Supplier Collaboration and Performance

R	R Square	Adjusted R Square	Std. Error of the Estimate
.456	.208	.200	.42778

The F-critical (3, 269) was 2.6802 while the F-calculated was 23.600. This shows that the F-calculated was greater than the F-critical and hence a linear significant relationship exists between organizational culture, sustainable supplier collaboration and performance of government ministries. In addition, the p-value was 0.000, which was less than the significance level (0.05). This confirms goodness of fit of the model in predicting the influence of organizational culture and sustainable supplier collaboration on performance of government ministries.

Table 18: ANOVA for OC Sustainable Supplier Collaboration and Performance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.956	3	4.319	23.600	.000 ^b
Residual	49.226	269	.183		
Total	62.182	272			

Using the unstandardized coefficients the following equation applies:

$$Y = 0.958X_1 + 0.503Z + 0.170X_1 * M$$

As shown in table 19, supplier collaboration has a significant influence on performance of government ministries as the beta coefficient (β_1) was 0.958 (p-value=0.000). In addition, organizational culture has a significant influence on performance of government ministries as shown by a beta coefficient (β_2) was 0.503 (p-value=0.000). Both organizational culture and sustainable supplier collaboration combined have a lower influence on performance of government ministries as shown by a beta coefficient (β_3) was 0.170 (p-value=0.000) as compared to sustainable supplier collaboration on its own.

Table 19: Regression Coefficients for OC, Sustainable Supplier Collaboration and Performance

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.009	.645		.014	.989
Sustainable supplier collaboration	.958	.228	1.921	4.194	.000
Organizational culture	.503	.149	.640	3.384	.001
Sustainable Supplier Collaboration * organizational culture	.170	.051	1.847	3.344	.001

Discussion of findings

The indicators of sustainable supplier collaboration include information sharing, supply chain integration and supplier strategic partnership. Information sharing is a key component in all types of supply chains. The study established that some government ministries provide full information to suppliers about issues that affect business, provide advance information of changing need to suppliers and share business knowledge of core business process, exchange information that help establish business planning and sharing proprietary information with suppliers. According to Cao et al. (2010), supply chain collaboration is attributed to seven components (information sharing, goal congruence, decision synchronization, incentive alignment, resources sharing, collaborative communication and joint knowledge creation). In addition, according to Mason- Jones and Towil (1997), information enrichment like immediate sharing of market place data throughout the chain is not merely desirable but obligatory. Online transactions in the integrated financial management information system (IFMIS) alongside other means of communication have made information sharing easy and convenient. However, any sharing of information must comply with the law relating to confidentiality, data protection, any human rights their need to establish legitimate purpose of sharing information.

In relation to supply chain integration, the study found that government ministries frequently contact their suppliers, have a compatible communication and information system with their suppliers and participate in the marketing efforts of their suppliers. These findings disagree with Vieira and Mergulhao, (2015) argument that in an effort to enhance supply chain integration public institutions normally contact their suppliers. Supply chain integration guarantees exchange of useful information for better service delivery gives clarity and avoids ambiguity. In addition, supplier registration and sensitization is a requirement by law hence should be undertaken.

In regard to supplier strategic partnership, the study found that government ministries consider quality in supplier selection. These findings concur with Weiland and Wallenburg (2012) findings that public institutions consider service quality during the selection process. However, some of the government ministries help suppliers to improve their product quality, solve procurement related problems jointly with suppliers, include their suppliers in continuous improvement programs, involve their suppliers in key development processes and they include their suppliers in planning and goal setting activities. These findings are in line with Lucas et al. (2007) argument that public institutions do not involve suppliers in key development processes as well as in planning and goal setting activities. When developing certain task the supplier partnership is mandatory for quality task or job. Suppliers' strategic partnership is key since parties are aware of the expectation and will work together to meet or achieve the set targets. Government ministries also organize training and sensitization of suppliers especially under youth women and persons with disability category.

From the correlation analysis, the study revealed that there is a positive association between sustainable supplier collaboration and the performance of government ministries in Kenya. The regression analysis results indicate that sustainable supplier collaboration has a positive and significant influence on the performance of government ministries in Kenya. These findings are in agreement with Soosay *et al.* (2015) found that supply chain collaboration had a significant influence on organizational performance.

From correlation analysis, the study found that organizational culture influences sustainable supplier collaboration as well as the performance of government ministries in Kenya. From the regression analysis, the study found that organizational culture influences the association between sustainable

supplier collaboration and the performance of government ministries in Kenya. These findings are in agreement with Hitt *et al.* (2016) carried out a study on organizational culture has a moderating effect on sustainable supply chain management practices and performance in Brazil.

Conclusion

The study concludes that sustainable supplier collaboration has a positive and significant influence on the performance of government ministries in Kenya. The study found government ministries in Kenya do not exchange information that help establish business planning and do not share proprietary information with suppliers. In addition, government ministers do not contact their suppliers frequently and have no compatible communication and information system with their supplier. Also, they do not help suppliers to improve their product quality and they do not solve procurement related problems jointly with suppliers. The study concludes organizational culture influences the association between the sustainable supplier collaboration and the performance of government ministries in Kenya.

Recommendations

The study found that government ministries in Kenya do not have a compatible communication and information system with their supplier. Information sharing and data exchange plays a major role in reducing lead time and reducing chances of stock out and improving on quality. The study therefore recommends that the government should come up with a policy requiring suppliers to have compatible information system with public institutions.

The study established that government ministries do not help suppliers to improve their product quality and do not include their suppliers in continuous improvement programs. Continuous improvement programs are key in ensuring improvements in service delivery. The study therefore recommends that the government of Kenya should come up with training programs to help suppliers improve the quality of their products and services.

Suggestions for Further studies

This research study was conducted in government ministries in Kenya and hence the findings cannot be generalized to other public institutions. This study therefore suggests further studies on the influence of sustainable supplier collaboration practices on performance of parastatals in Kenya. The study also found that sustainable supplier collaboration practices explain 17.4% of the performance of government ministries in Kenya. The study therefore suggests further studies on the other factors affecting the performance of government ministries in Kenya.

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