INFLUENCE OF PROCUREMENT METHODS ON SUPPLY CHAIN PERFORMANCE IN DEVOLVED GOVERNMENTS IN KENYA: A CASE OF SELECTED COUNTY GOVERNMENTS

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ABSTRACT
This study sought to establish the influence of procurement methods on supply chain performance in devolved governments in Kenya. The study was guided by the following specific objectives: to assess the influence of open tendering on supply chain performance in devolved governments, to determine whether restricted tendering affects supply chain performance in devolved governments, to establish whether single sourcing influences supply chain performance in devolved governments and to explore whether request for quotations affect supply chain performance in devolved governments. Descriptive research design was used for the study. The target population for this study was supply chain personnel from the six counties. There are 90 employees working in supply chain department as they were arguably in a better position to answer the question in order to address the research problem. The respondents included supply chain managers, supply chain officers, procurement assistants and clerical officers in the department. Primary data was collected using questionnaires by use of the census survey technique. The quantitative data was entered into SPSS for analysis. Factor analysis was then applied to reduce the data which was finally used for analysis. Both quantitative and qualitative data analysis techniques were used. Quantitative data was analyzed using descriptive statistics while qualitative data was analyzed thematically. Descriptive statistics such as percentages, means and standard deviations were used to analyze the data while inferential statistics such as correlation and regression analysis were used to test on the relationship between the variables of the study where multiple regression model was used at 5% level of significance. Tables, graphs and charts were used to present the findings of the study. It is notable that there exist strong positive relationship between the independent variables and dependent variable as shown by R value (0.852). The coefficient of determination (R^2) is used to measure how far the regression model’s ability to explain the variation of the independent variables. The data showed that the high R square is 0.726. It shows that the independent variables in the study were able to explain 72.60% variation in the supply chain performance in devolved governments while the remaining 27.40% is explained by the variables or other aspects outside the model. The study recommends for open tendering in the devolved governments as it allows...
for fairness and transparency. Restricted tendering as a procurement method can limit the request for tenders to a selected number of service providers, suppliers or contractors. Single sourcing should be enhanced in the devolved governments especially when the tighter the coordination between procures in County Government and supplier required for Just in time (JIT) stock initiatives encourages the County to shift supply relations towards single sourcing. The county government can benefit from single sourcing in terms of reduced order lead times, quantity discounts from order consolidation and logistical cost reductions and this influences supply and processing of goods and services and achieve cost efficiency due to quantity discounts involved in this method. The findings have demonstrated role of procurement methods on the supply chain performance in devolved governments to include; open tendering, single sourcing, restricted tendering and request for quotations. The current study should therefore be expanded further in future in order to determine the effect of public procurement legal framework on supply chain management practices. Existing literature indicates that as a future avenue of research, there is need to undertake similar research in other devolved governments and national government in Kenya and other countries in order to establish whether the explored factors can be generalized to affect supply chain performance.

Introduction
The expansion of procurement has largely expanded post-implementation of county governments in Kenya. Chapter 11 (Cap 11) of the Kenya Constitution that was promulgated on august 27, 2010 paved way for the realization of the current devolved system of governance (Obanda, 2010). Juma (2010) noted that public procurement is a critical process in the economy owing to the fact that it controls a sizeable proportion (10%) of Kenya’s GDP. The Kenya constitution of 2010 devolved procurement powers such that at County levels, citizens are responsible for their own purchases (Constitution of Kenya, 2010). As such, each of the 47 counties has an established procurement function bestowed with the responsibility of purchasing goods and services for their departments. Nairobi County, though geographically small, harbours the largest number of people in Kenya due to its metropolitan position. Providing services founded on the dimensions of quality to large populations in the Nairobi County implies a huge budget of budget allocation and complex purchase and supply chain processes. Supply chain performance of such complex institution is founded on adoption of effective procurement methods. Performance of supply chain is based on the principles of efficiency and effectiveness (Fairgrieve&Lichère, 2011). Meeting the efficiency and effectiveness in procumbent systems has become a critical factor to consider among the procurement stakeholders. Lember, Kattel and Kalvet (2014) define efficiency as the ability to avoid wastage of resources in terms of materials, energy, money and time in the procurement process. Effectiveness, on the other hand, is defined as the capability of the procurement process to produce the desired result by meeting the commercial, regulatory and socio-economic goals of government in a manner that is appropriate to the government. According to Fairgrieve and Lichère (2011), a process that is deemed to be effective leads to achievement of the intended or expected outcome or produces a deep and vivid impression of devotion towards operational performance. The core concern of the stakeholders in the Nairobi County government constitutes adopting a procurement method that promises excellence in procumbent processes. Public Procurement Oversight Authority (2016) asserts that the Kenya’s Public Procurement System has undergone evolution across time from crude a system that featured no regulations to the current orderly and legally regulated procurement system. Originally, the procurement system of the Kenyan government was construed in the Supplies Manual of 1977 (Obanda, 2010). This was later supplemented by circulars issued from time to time by the treasury. During the same period, the responsibility of ensuring a proper observance of the provisions of the manual was bestowed upon the Director of Government Supply Services. Various tender boards were created by the manual; their primary role was to ensure proper adjudication of tenders and their awards with the efficiency of the whole process of supply chain.
The Supplies Manual of 1978 was reviewed in 1999 (Public Procurement Oversight Authority, 2016). Through this review, a myriad of weaknesses were identified. This included lack of uniform procurement systems for the public sector as a whole, lack of a penalties and sanctions against persons who breached the regulations, lack of coverage of public works, and weak dispute settlement mechanisms relating to the award procedures. Based on the aforementioned weaknesses, the necessity of enacting a law governing public sector’s procurement system could not be overlooked. The Public Procurement and Disposal Act (2005) was enacted, and it became operational on 1st January 2007 with the gazettlement of the Public Procurement and Disposal Regulations of 2006 (Public Procurement Oversight Authority, 2016). The Public Procurement and Disposal Act (2005) created the Public Procurement Oversight Authority (PPOA), the Public Procurement Advisory Board (PPAB) and the continuance of the Public Procurement Complaints, Review and Appeals Board as the Public Procurement Administrative Review Board (PPARB). The core responsibilities of the PPAB and PPARB include ensuring adherence to the procurement procedures established under the Public Procurement and Disposal Act (2005) (PPOA, 2016), monitoring the procurement system and reporting its overall performance, and ensuring compliance with the procurement procedures established under the Act.

Section 121 of the Public Finance Management Act (2012) provides that a County Government Entity shall procure goods and services and dispose of assets in accordance with Article 227 of the Constitution and the Public Procurement and Disposal Act (Fatuma&Wanyoike, 2015). Section 227 provides guidelines for various methods of procurement adopted by county governments in making their purchases. World Bank (2014) highlights various methods of procurement including direct procurement, restricted procurement, open tendering, public offer and single sourcing. Nairobi County applies different methods of procurement. The choice of method is based on the urgency of need, value of the product and constitutional requirements. Establishing the impact of each of the procurement method on Nairobi County’s performance of procurement process is imperative in informing the county about the most effective and efficiency method that can enable the county ensure value for money.

Kenyan Perspective of Supply Chain Performance in Devolved Governments
The Constitution of Kenya 2010 created County Government structure based on principles of democracy, revenue reliability, gender equity, accountability and citizen participation. Devolution is meant to enhance accountability by bringing politicians and resources closer to the people they are intended to serve. However, the implementation of devolution has not been easy as the County Government needed to engage in massive procurement in the establishment of County Governments. This has affected the performance levels of these County Government. Several studies have been done on impact of procurement and Disposal Act of 2005. Sound public procurement policies and practices are among the essential elements of good governance (KIPPRA, 2006; World Bank, 2012). An ideal procurement system should also focus on effectiveness, where procuring entities should meet the commercial, regulatory and socio-economic goals of government in a manner that is appropriate to the procurement requirement to enhance supply chain performance (Orioki, 2013).

In Kenya, the Public Procurement and Disposal Act, of 2005 was assented to on 26th October 2005 and was revised in 2009 to establish procedures for procurement and the disposal of unserviceable, obsolete or surplus stores and equipment by public entities (Mwangi, 2009). With the gazettment of the subsidiary legislation, the PPDR of 2006, the law became operational on 1st January, 2007 (Kirugu, 2010). The Act established three independent bodies; an oversight body, the PPOA, Public Procurement Oversight Advisory Board (PPOAB) and the Public Procurement Administrative Review Board (PPARB).
Statement of the Problem

The poor supply chain performance is a common problem in many county governments with an immeasurable cost spiraling to over USD10 million (Ksh. 85 billion) annually. Understanding these impacts is crucial in the adoption of efficient and effective procurement methods (Cullen, Bernon & Grost, 2010). Despite the extensive law provisions that guide the procedures of supply chain performance among counties in Kenya, there has been a myriad of issues arising based on the delayed payments, illegal outsourcing, and unethical procurement. The question that arises in this context constitutes whether the methods the county government adopt in their procurement processes has implications on the performance of supply chain processes. More than 50% of the corruption cases alleged in the county governments are related to procurement dealings of the county (Owalla, 2012). In Kenya, the central government and county government spends about Kshs. 234 billion per year on procurement. However, on annual bases, the county government losses close to Ksh. 71 billion about 17 per cent of the national budget due poor procurement methods used such as inflated procurement quotations (KISM 2014). According to Public Procurement Oversight Authority (PPOA 2014), most of the supply chain management in many county governments have a mark-up of 60 per cent on the market prices. The inefficiency and ineptness of overall implementation of procurement methods contributes to loss of over Ksh. 50 million annually (Tom 2014). According to Victor (2012), procurement expenditure could be minimized through proper implementation of proper procurement methods.

According to Kakwezi and Nyeko (2010), the ability to realize supply chain performance goals in county governments is influenced by internal force and external forces. Interactions between various elements, professionalism, staffing levels and budget resources, procurement organizational structure whether centralized or decentralized, procurement regulations, rules, and guidance, and internal control regulations, all need attention and influence the performance of the supply chain performance function. From the empirical standpoint, local studies have been done on the area of procurement performance have focused on the effect of procurement process in companies. Ngugi and Mugo (2007) analyzed the effect of procurement activities on the operation and effectiveness of public sectors in Kenya. Abdil (2012) examined procurement practices of public state corporations in Kenya Apiyo and Mburu (2014) identified that there has been limited research carried out with the aim of determining the actual reasons why the devolved units have not been able to achieve their streamlined supply chain objectives. Apiyo and Mburu (2014) addressed the general factors affecting the procurement planning in county governments; hence, they did not address the influence of procurement methods on procurement performance. Could open tendering, restricted tendering, single sourcing and request for quotations affecting procurement performance in devolved governments in Kenya? This study seeks to explore more.

Study Objectives

The study was guided by the following specific objectives:

i. To assess how open tendering influence supply chain performance in devolved governments in Kenya

ii. To find out how restricted tendering influence the supply chain performance in devolved governments in Kenya

iii. To establish how single sourcing influence supply chain performance in county governments in Kenya

iv. To identify how request for quotations influence supply chain performance of in county governments in Kenya.
Theoretical Review
Theoretical frameworks are explanations about a phenomenon. According to Abeywardena & Tham (2012) a theoretical framework provides the researcher with a lens to view the world. A theory is an accepted fact that attempts to provide a plausible or rational explanation of cause-and-effect (causal) relationship among a group of observed phenomenon (Adamov, 2012). Theoretical frameworks are explanations about a phenomenon and according to Marriam (2011) a theory is an accepted fact that attempt to provide a plausible or rational explanation of cause-and-effect (causal) relationship among a group of observed phenomenon (Kothari, 2009). Several theories and models have been put forward by scholars to explain the field of variables understudy. Theoretical review involves formulated theories and how they relate to concepts and variables of the study. Theories are vital in any research because they form grounds for explaining relationships between study variables (Connelly et al. 2011). The theory of supply chain performance informs on the dependent variable while the systems theory, reinforcement theory, just in time theory and theory of constraints inform on the independent variables.

Auction Theory
This theory will guide the study in investigating the relationship between open tendering and supply chain performance in devolved governments. According to Gunnar Alexandersso and Staffan Hultén (2006) open tendering when contracting out public services is similar to performing common value auctions with a sealed-bid procedure. However, the price of the bidders may not be the only factor (although often the most important) to take into account. The procuring public authority typically evaluates the competing bids regarding both price and quality once the bidding process has ended. He argues that, competitive tenders combine traits, advantages, disadvantages and risks, of both auctions and beauty contests. Hultkrantz and Nilsson (2011) claim that a pure auction is better than a beauty contest because it offers a more market-oriented, objective and transparent method for awarding licences. Their strongest argument in favour of open tendering is that firms in the auction process, by means of offering more and more money, reveal information about their estimation of the value of the good. Hultkrantz and Nilsson (2011) point out several disadvantages with beauty contests: the process is slow and cumbersome, in particular if the final decision is challenged in court, it is difficult to achieve transparency, and many criteria are not objective or difficult to quantify. They further suggest that, even when social concerns are important, an open tendering is a better alternative since it can also include minimum requirements and can allow both positive bids in attractive regions and negative bids in unattractive regions. This helps in supply chain performance because the best supplier or bidder depending on the criterion that will be will be selected.

Theory of constraints
This theory will guide the study in investigating the relationship between restricted tendering and supply chain performance in devolved governments. The theory of constraints views that organizations can be assessed and controlled by variations on three measures: inventory, operational expense and throughput (Barausse, Yunes & Chamberlain, 2016). Inventory is all the money that has been kept aside to buy goods or services that the system intends to use or sell. Operational expense is the capital spent to turn inventory into throughput. The rate at which the system generates capital by selling is called throughput. The main objective of most businesses is to make money, however, before this is achieved, necessary conditions such as legal obligations, quality and safety must be met. It is therefore vital for the business to understand how to make financial decisions based on inventory, operating expenses and throughput.
According to the theory of constraints, the rate of achieving a set goal is limited by at least one constraint. This is backed up by the argument that if there is nothing preventive a system from achieving higher throughput, then its throughput will be infinite, an impossible scenario in a real-life system (Puche et al., 2016). The overall throughput can only be increased by increasing flow through the system. Once the goal of a system has been identified, the organization should identify the constraint, decide how to exploit it and subordinate all other things while elevating the constraint. This will allow the organization to center its efforts on the identified constraint.

Constraints can be classified as either internal or external. Internal constraints show up when the market demands more than the organization can offer while external constraint occurs when a system delivers more than the market can bear (Rand, 2013). Constraints can present themselves in various ways such as lack of skilled people or the way equipment is used limits the ability to produce more salable goods or services. Additionally, a written policy may prevent a system from making more. This theory is therefore essential during procurement of goods in that organizations should source quality raw materials and services that will allow the system to meet the demands of the people. For example, the constraint may be the procurement method influencing the supply chain negatively and thus preventing the organization from getting more throughout. This theory can be applied to single sourcing so as to reduce the cost of operations or the expenses. This will be realized because the tendering processing cost will be reduced to zero. It will also help in ensuring the single sourced supplier has been developed by the buyer to ensure high quality supplies of either services or products that will lead to more throughput as opposed to having too many suppliers to pre-qualified and in need of development by the buyer.

Agency Theory
This theory will guide the study in investigating the relationship between single sourcing and supply chain performance in devolved governments. Agency theory attempts to describe the agency relationship, this is where the principal gives work to the agent who executes the work (Eisenhardt, 1989). There are challenges in such kind of relationship, this is due to the fact that principal and agent have differing objectives and this can result into conflict, in addition it is also difficult for the principal to know what the agent is doing. Principal–agent researchers cover the theory of the principal-agent relationship, as a theory that can be used to access different relationships such as employer-employee, buyer-supplier and other agency relationships.

Agency theory is most relevant in situations in which contracting problems are difficult. This ideally includes situations where there are substantial goal differences between principals and agents and uncertain outcomes that trigger the risk implications of the theory (Eisenhardt, 1989). Eisenhardt (1989) discusses the assumptions of the theory and raises the issue of principals learning about the agents when there is a long term relationship, when there may be less need for outcome-based contracts. This may be more the case with procurement in the private sector, where there are fewer regulations than in the public sector, and where tendering is not required. Private businesses are free to have long term relationships with software developers and consulting firms. Jones (1995) suggests that long term relationships with vendors may in the long run lead to higher effectiveness, due to the stability of the relationship being dependent on controlling goal conflicts. Sharma has extended the agency theory and focuses on the principal-professional relationship, where professionals can include consultants (Sharma, 2007). The agency theory is best used in restricted tendering where at times long term relationship is required between the buyer and the supplier so that they may be in a position to learn each other better and develop their relationship more. In areas that are highly sensitive like purchase of military equipment and printing of currency, Agency theory is important since the work or service involved requires long term relationship to produce effective results.
System theory
This theory will guide the study in investigating the relationship between request for quotations and supply chain performance in devolved governments. The system theory was initially applied in science and engineering before it was adopted for use in management in the late 1950s. The theory though not set based on management principles views an organization as a system with numerous interrelated sections (Connelly et al. 2011). These sections are influenced by either internal or external factors. Most organizations' systems are dependent on environmental factors for survival (open systems). Systems as per Birolini (2012) are groups of activities within an organization that work together to achieve the organizational goals. Rice (2013) further says that the flow of materials from all parts of the system must match the input requirements of the subsequent stage. Firms receive inputs from the outside world, process it into outputs then take it back to the world for use. Suppliers are needed by an organization to provide inputs such as labour, materials or information. The absence of suppliers means that the firm will not be able to carry out normal operation procedures and thus will be ineffective in its supply chain performance.
Systems theory is applicable in procurement as it explains the interrelationship between the firm and the surrounding (Ulrich and Probst, 2012). There will be a smooth conversion of inputs to outputs if this relationship is properly managed. Systems theory can be used by management to view its problem in a wider perspective. This theory is very crucial in decision making process by managers in that, the manager is able to understand that it is imperative for the organization to acquire inputs from suppliers, as a result, supply chain managers are better placed to see to it that selection of the supplier is done thoroughly (Rice, 2013). The effect will be a highly effective supply chain function that can meet the organizational goals.

Reinforcement Theory
The reinforcement theory argues that people’s behaviour is greatly determined by its consequences. People tend to repeat those actions that produce positive effects (Deng, Yang & Liu, 2014). As such, decision makers in a firm should strive to ensure that the effects of good performance are pleasant while those of poor performance are unpleasant. With regard to procurement methods, it should be made clear that meeting the selection criteria would result in winning the confidence of the one placing the bid (Spagnolo, 2012). This in turn results in the supplier benefiting by having the contracts awarded to them which as per the theory, can be referred to as the ‘pleasant consequence.’
Reinforcement theory involves four strategies namely positive reinforcement, negative reinforcement, extinction and punishment. Positive reinforcement entails assuring suppliers of long term business partnership as long as they continue meeting the client’s expectations. Moreover, they can be issued with recommendations letters due to their exemplary performance (D’agostino et al. 2011). Positive reinforcement may be applicable best in single sourcing procurement method. Negative reinforcement, on the other hand, involves using unpleasant consequences to prevent persons from behaving in an undesirable manner. Suppliers will change their ways to meet requirements of the organization when unpleasant effects are made contingent on poor performance (Deng, Yang & Liu, 2014). This is mostly applicable in tendering and RFP methods whereby effects of not meeting the criteria is made known in the tender or request for quotation documents so as to serve as a reminder of negative effects. Extinction is expressed in cases where the supplier deliberately fails to deliver the requested items on time in order to seek attention from the client (Spagnolo, 2012). The client should ignore such a client so as not to give them the attention that they are seeking and as such, they will not repeat the same in future. The strategy of punishment is employed when the unpleasant behavior needs to be eliminated. It is expressed in terms of deduction of invoice amount due to poor quality goods or rejection of the whole consignment. As a result, supply chain performance will be improved (Spagnolo, 2012). Procuring organizations should apply prudent supplier evaluation to promote good performance. The theory can be applied in request for quotations. This is because
during evaluation, the bidders who do not qualify will be notified through a regret letter indicating the reasons for failing. This helps the bidders to eliminate what made them fail and those who qualify are notified their strengths. The quotation evaluation criterion may either reinforce positively or negatively depending on the responses on the quotations.

Conceptual Framework
The conceptual framework, as per Mugenda & Mugenda (2012), refers to a conceptualization of the correlation between variables in the study and it is presented graphically or diagrammatically. A conceptual framework illustrates the researchers’ own position on the problem and it directs the study or visual depiction of the major variables of the study (Mugenda & Mugenda, 2008). According to Jabareen (2008) a conceptual framework is a network of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena. The concepts that constitute a conceptual framework support one another, articulate their respective phenomena, and establish a framework-specific philosophy. According to Orodho (2009) a conceptual framework describes the relationship between the research variables. Jabareen (2008) argues that a variable is a measurable characteristic that assumes different values among subjects. An independent variable is that variable which is presumed to affect or determine a dependent variable (Jabareen, 2008). According to Young (2009), conceptual framework is a diagrammatical representation that shows the relationship between dependent variable and independent variables. A dependent variable is a variable dependent on another variable like the independent variable. A dependent variable is the variable which is measured in the research study (Everitt, 2002). The dependent variable attempts to indicate the total influence arising from the effects of the independent variables. It therefore varies as a function of the independent variables (Mugenda & Mugenda, 2012). A dependent variable is a variable dependent on another variable like the independent variable. A dependent variable is the variable which is measured in the research study (Everett, 2002). Figure 2.1 shows the conceptual framework to be adopted by the study. In the conceptual framework, the independent variables are; open tendering, restricted tendering, single sourcing and request for quotations. The dependent variable is supply chain performance.
Figure 1: Conceptual Framework for the Study

- **Open Tendering**
  - Price
  - Fairness and transparency
  - Level Of Usage In Public Procurement

- **Restricted Tendering**
  - Competition
  - Cost Of Procurement
  - Reduction of risks

- **Single Sourcing**
  - Reliability
  - Relevance
  - Urgency

- **Request For Quotations**
  - Government Policy
  - Time & Resources Saving
  - Lead-time

- **Supply Chain Performance In County Governments**
  - Timely delivery of goods and services
  - Reduced Cost
  - Increased quality goods and services

Independent Variables

Dependent Variable
RESEARCH METHODOLOGY

Research design is the blueprint for the collection, measurement and analysis of data. It is a plan and structure of investment conceived so as to obtain answers to research questions (Coopers & Schindler, 2008). Lavkaras, (2008) describes a research design as a general plan or strategy for conducting a research study to examine specific testable research questions of interest. This study used descriptive research design. It involves gathering data that describe events and then organizes, tabulates, depicts, and describes the data. Descriptive studies portray the variables by answering who, what, and how questions (Bernard, 2011).

According to Orodo (2009), descriptive survey is a method of collecting data by interviewing or administering a questionnaire to a sample of individuals which can be used when collecting information about people’s attitudes, opinions, habits or any other social issues. Descriptive research is a description of the state of affairs as it exists (Orodo & Kombo, 2009). A descriptive study determines and reports the way things are (Brymann & Bell, 2011). The choice of descriptive study was based on the fact that the study was interested on the state of affairs already existing in the field and no variable will be manipulated. This study therefore could generalize the findings to a larger population.

Target Population

As Per Mugenda and Mugenda (2012), population is an entire group of individuals, events or objects having common observable characteristics that the researcher is interested in. This definition exhibits some similarity with Sekaran and Bougie (2011), who argue that the population is the entire group of people, events or things of interest that the researcher is interested in and wishes to investigate in the process of the study. The population and the area of study was drawn from 5 overall best performing ranked county governments in supply chain and 1 worst ranked overall performing county government according to the latest procurement performance ratings. The target population of this study was 90 procurement staff drawn from the six counties. The list of the staff members was obtained from the counties’ procurement departments’ offices. This is illustrated in Table 1.

Table 1: Target Population

<table>
<thead>
<tr>
<th>County</th>
<th>Population</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machakos</td>
<td>18</td>
<td>20.00%</td>
</tr>
<tr>
<td>Bungoma</td>
<td>14</td>
<td>15.55%</td>
</tr>
<tr>
<td>Vihiga</td>
<td>14</td>
<td>15.55%</td>
</tr>
<tr>
<td>Bomet</td>
<td>13</td>
<td>14.44%</td>
</tr>
<tr>
<td>Kwale</td>
<td>17</td>
<td>18.88%</td>
</tr>
<tr>
<td>Tan River</td>
<td>14</td>
<td>15.55%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: (CoG, 2015)
Sample size and Sampling Technique
A sample is a set of observations drawn from a population by a defined procedure (Creswell, 2013). The sample represents a subset of manageable size (Mugenda & Mugenda, 2012). Samples were collected and statistics were calculated from the samples so that the study could make inferences or extrapolations from the sample to the population. Due to the manageable study population, the study adopted a census survey for the 90 procurement staff as respondents for the study. According to Abbott and McKinney (2013) a census yields more reliable results than a sample, and whenever it is possible it should be undertaken. Since the day to day operations of supply chain management is carried out by the procurement staff in the counties, they are seen as most appropriate to give out the required information for the purpose of this study and therefore they were targeted as respondents for the study.

Data Collection Tools & Procedure
The study used questionnaires to collect primary data from respondents as research tools (Kothari, 2010). Young, (2009) points out that questioners are appropriate for studies since they collect information that is not directly observable as they inquire about feelings, motivations, attitudes, accomplishments as well as experiences of individuals. They further observed that questionnaires have the added advantage of being less costly and using less time as instruments of data collection. The questionnaire which is semi-structured was administered through drop and pick later method to the sampled population. For the main purpose of this study, the study collected primary data and compare it with the existing secondary data for the literature review. The research design was chosen because the study was not be confined within to the collection and description of the data but to determine the existence of certain relationships among the study variables. (Mugenda & Mugenda, 2012). In self-administered questionnaire, a respondent had the advantage of asking a question when it was not clear to them (Chandran, 2004). Self-administered questionnaires allow the participant to respond to the questions by themselves and at their own pace. They ease respondents’ burden by giving them the time to think through their responses (Monsen & Horn, 2008). The researcher obtained research permit from relevant authorities required for data collection. The study administered the questionnaires to the relevant respondents in an effort to achieve the necessary information. Research assistants were used to assist the researcher in dropping and collecting the questionnaires. The assistants were trained so that they could understand the study and their responsibilities in handling ethical research issues. The study maintained the register of the questionnaires which were given out and the once received after the responses.

Pilot Study
According to Bordens &Abbott (2008), pilot study is as a small-scale version of the study used to establish procedures, materials and parameters to be used in the full study. According to (Cooper and Schindler, 2010), pilot test is conducted to detect weaknesses in design and instrumentation and to provide proxy data for selection of a probability sample. Pilot study is an activity that assists the researcher in determining if there are flaws, limitations, or other weaknesses within the interview design and allows him or her to make the necessary revisions prior to the implementation of the study (Kvale, 2007).It is recommended that 10% of the population should constitute the pilot study
A pilot study was undertaken on 8 respondents for pilot testing.

Reliability of the research instrument

Reliability is the extents to which a research instrument yields findings that are consistent each time it is administered to same subjects (Mugenda & Mugenda, 2003). The measurement of reliability provides consistency in the measurement variables (Wanyoike, 2013). Internal consistency reliability is the most commonly used psychometric measure assessing survey instruments and scales (Zhang, 2000). Cronbach alpha is the basic formula for determining the reliability based on internal consistency (Kim & Cha, 2012). The standard minimum value of alpha of 0.7 is recommended Malhotra (2014). The theoretical and empirical literature, however, accepts a Cronbach’s alpha of 0.4 as minimum Zheka (2006), Beltratti (2015) & Abdulah (2004) in their study adopted the use of 0.4 as the minimum level for item loadings. This study adopted a reliability threshold of 0.7 as recommended by Tavakol & Dennick (2011).

The Kunder-Richardson (K-R) 20 formula is as below:

\[ KR_{20} = \frac{(K)(S^2 - \sum s^2)}{(S^2)(K-1)} \]

Where

- \( KR \) = Reliability coefficient of internal consistency
- K = Number of items used to measure the concept
- S^2 = Variance of all scores
- s^2 = Variance of individual items.

Validity of the research instruments

Validity is the degree to which the sample of the test item represent the content that is designed to measure, that is, the instrument measures the characteristics or trait that is intended to measure (Mugenda & Mugenda, 2012). Data need not only to be reliable but also true and accurate. If a measurement is valid, it is also reliable (Joppe, 2010). The research adopted a content validity which refers to the extent to which a measuring instrument provides adequate coverage of the topic under study. The content validity was achieved by subjecting the data collection instruments to an evaluation group of experts who provided their comments and relevance of each item of the instruments and indicate whether the item is relevant or not. The content validity formula by Amin (2005) was used. The formula is:

\[ CVI = \frac{\text{No. of judges declaring item valid}}{\text{Total no. of items}} \]

It is recommended that instruments used in research should have CVI of about 0.78 or higher and three or more experts could be considered evidence of good content validity (Amin, 2005). This study adopted a CVI of 0.78.

Data Analysis and Presentation

Burns and Grove (2013) define data analysis as a mechanism for reducing and organizing data to produce findings that require interpretation by the researcher. The data collected was quantitative.
and qualitative. Once the questionnaires were received they were coded and edited for completeness and consistency. To ensure easy analysis, the questionnaires were coded according to each variable of the study to ensure accuracy during analysis. Qualitative data was analyzed by use of content analysis. Quantitative data was analyzed by employing descriptive statistics and inferential analysis using statistical package for social science (SPSS) version 22 and excel. Descriptive statistics such as measures of central tendency and dispersion along with percentages were used to organize and summarize numerical data whose results were presented in tables, bar graphs for easy interpretation of the findings.

The study further adopted multiple regression model to test the variation of the dependent variable as explained by the variation in the independent variables by calculating the $R^2$ and adjusted $R^2$ statistics. Anova (F-test) at 5% level of significance was used to determine the goodness of the fit produced. Bivariate regression model was fitted to establish the strength and direction of the relationship between the independent variables (open tendering, restricted tendering, single sourcing and request for quotations) and the dependent variable (Supply chain performance in devolved governments). The Supply chain performance in devolved governments was regressed against four independent variables. A multiple regression model that was then fitted to determine the combined effect that the independent variables had on the dependent variable when acting jointly was expressed as follows:  

$$ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon, $$

Where: $Y =$ Supply chain performance in devolved governments;  
$\beta_0 =$ constant (coefficient of intercept);  
$X_1 =$ Open tendering;  
$X_2 =$ Restricted tendering;  
$X_3 =$ Single sourcing;  
$X_4 =$ Request for quotations;  
$\epsilon =$ Error term;  
$\beta_1...\beta_4 =$ Regression coefficient of four variables.

**RESULTS AND DISCUSSION**

A census of 90 was carried out using census survey design method. A total of 90 questionnaires were distributed to the supply chain staff. Out of the population covered, 55 were responsive representing a response rate of 61.11%. This was above the 50% which is considered adequate in descriptive statistics according to Mugenda & Mugenda (2012). Quantitative data obtained from the questionnaires were presented in tables, frequencies and percentages as shown hereafter.

| Table 2: Showing Response Rate of Respondents |
|-----------------|-----------------|-----------------|-----------------|
| Response        | Frequency       | Percentage      |                 |
| Actual Response | 55              | 61.11%          |                 |
| Non-Response    | 35              | 38.89%          |                 |
| Total           | 90              | 100%            |                 |

**Pilot Study**

The Cronbach alpha was computed in terms of the average inter-correlations among the items measuring the concepts. The rule of the thumb for Cronbach alpha is that the closer the alpha is to 1 the higher the reliability (Sekaran, 2008). A value of at least 0.7 is recommended. Cronbach’s alpha is the most commonly used coefficient of internal consistency and its computed as Reliability was
done by testing for both consistency and stability. Consistency indicated how well the items measuring the concepts hang together as a set. Cronbach’s alpha was used to measure reliability. This was done on the four objectives of the study. For validity tests factor analysis was used to reveal whether the dimensions were indeed tapped by the items in the measures. The Cronbach’s alpha results were ranging between 0.798 and 0.910 and therefore the construct was acceptable as shown by Table 3.

**Table 3: Reliability Results**

<table>
<thead>
<tr>
<th>Items</th>
<th>Alpha Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Open Tendering</td>
<td>.865</td>
</tr>
<tr>
<td>2. Restricted Tendering</td>
<td>.798</td>
</tr>
<tr>
<td>3. Single Sourcing</td>
<td>.880</td>
</tr>
<tr>
<td>4. Request for Quotations</td>
<td>.813</td>
</tr>
<tr>
<td>Overall Scale</td>
<td>.910</td>
</tr>
</tbody>
</table>

Table 3 shows the reliability results of the study. Cronbach's alpha values ranging from 0.798 to 0.910 indicate acceptable reliability of the measures. Discriminant validity was assessed to confirm that the measures are unique in nature. Discriminant validity gauges the extent to which measures of two different constructs are comparatively distinctive from each other, and that their correlation values are neither an absolute value of 0 nor 1. Discriminant validity assesses the degree to which a concept and its indicators differ from another concept and its indicators. It means that items from one scale should not load or converge too closely with items from a different scale and that different latent variables which correlate too highly may indeed be measuring the same construct rather than different constructs. A correlation analysis was run on all the dimensions of procurement methods on supply chain performance in devolved governments in Kenya. The results were presented in Table 4. According to the findings all the dimensions are not perfectly correlated as their correlation coefficients fall between 0 and 1.

**Table 4: Pearson Correlations**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Open Tendering</th>
<th>Restricted Tendering</th>
<th>Single Sourcing</th>
<th>Request for Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Tendering</td>
<td>1</td>
<td>.432**</td>
<td>.821**</td>
<td>.677**</td>
</tr>
<tr>
<td>Restricted Tendering</td>
<td>-</td>
<td>1</td>
<td>.773**</td>
<td>.354**</td>
</tr>
<tr>
<td>Single Sourcing</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.101**</td>
</tr>
<tr>
<td>Request for Quotations</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.05 level (2-tailed)**

**Multiple Regression Analysis Model**

The study adopted a multiple regression analysis so as to establish the relationship of independent
variables and dependent variables. The study applied SPSS version 22 to code, enter and compute the measurements of the multiple regression analysis. According to the model summary Table 5, R is the correlation coefficient which shows the relationship between the independent variables and dependent variable. It is notable that there exist strong positive relationship between the independent variables and dependent variable as shown by R value (0.852). The coefficient of determination ($R^2$) is used to measure how far the regression model’s ability to explain the variation of the independent variables. The coefficient of determination is between zero and one. The data showed that the high $R^2$ square is 0.726. It shows that the independent variables in the study were able to explain 72.60% variation in the supply chain performance in devolved governments while the remaining 27.40% is explained by the variables or other aspects outside the model. This implies that these variables are very significant and they therefore need to be considered in any effort to boost supply chain performance in devolved governments. The study therefore identifies variables as critical procurement methods of supply chain performance in the devolved governments in Kenya.

**Table 5: Model Summary**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.852</td>
<td>.726</td>
<td>.695</td>
<td>.010</td>
</tr>
</tbody>
</table>

**F-Test Results**

F-test is done to test the effect of independent variables on the dependent variable simultaneously. The F-statistic test basically shows whether all the independent variables included in the model jointly influence on the dependent variable. Based on the study results of the ANOVA Test or F-test in Table 6 obtained F-count (calculated) was 14.649 greater the F-critical (table) (12.756) with significance of 0.003. Since the significance level of 0.003< 0.05 we conclude that the set of independent variables affect the supply chain performance in devolved governments (Y-dependent variable) and this shows that the overall model was significant.

**Table 6: ANOVA**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>12.453</td>
<td>4</td>
<td>3.113</td>
<td>14.649</td>
<td>.003*</td>
</tr>
<tr>
<td>Residual</td>
<td>10.654</td>
<td>50</td>
<td>.2125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23.117</td>
<td>54</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NB: F-Critical Value = 12.756

The results of multiple regression analysis obtained regression coefficients t value and significance
level as indicated in Table 7. The study conducted a multiple regression analysis so as to determine the relationship between the dependent variable and independent variables. From the study findings on the regression equation established, taking all factors into account (independent variables) constant at zero supply chain performance will be 1.698. The data findings analyzed also shows that taking all other independent variables at zero, a unit increase in single sourcing will lead to a 0.654 increase in supply chain performance; a unit increase in open tendering will lead to a 0.635 increase in supply chain performance, a unit increase in restricted tendering will lead to 0.534 increase in supply chain performance and a unit increase in request of quotations will lead to 0.499 increase in supply chain performance. This infers that single sourcing contributed most to supply chain performance. Based at 5% level of significance, single sourcing had a .000 level of significance; open tendering show a .001 level of significance, restricted tendering show a .003 level of significance and request of quotation show a .004 level of significance hence the most significant factor was single sourcing.

Table 7: Coefficient Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>Std. Error</td>
<td>β</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>1.698</td>
<td>.223</td>
<td>7.615</td>
<td>.000</td>
</tr>
<tr>
<td>X₁_SS</td>
<td>.654</td>
<td>.096</td>
<td>.465</td>
<td>6.765</td>
</tr>
<tr>
<td>X₂_OP</td>
<td>.635</td>
<td>.110</td>
<td>.354</td>
<td>5.765</td>
</tr>
<tr>
<td>X₃_RT</td>
<td>.534</td>
<td>.105</td>
<td>.255</td>
<td>5.112</td>
</tr>
<tr>
<td>X₄_RoQ</td>
<td>.499</td>
<td>.118</td>
<td>.232</td>
<td>4.235</td>
</tr>
</tbody>
</table>

The general form of the equation was to predict supply chain performance from single sourcing, open tendering, restricted tendering and request for quotations is: \( Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon \). This indicates that supply chain performance= 1.698 + 0.654* Single Sourcing + 0.635* Open Tendering + 0.534* Restricted Tendering + 0.499* Request of Quotations + 0.223

T-Test Results

The t-value for open tendering (5.765 > 1.98) has a significance level of 0.001 thus the value is less than 0.05, thus research question one is concluded that the open tendering has significant positive impact on the supply chain performance in devolved governments in Kenya. The t-value for restricted tendering (5.112 > 1.98) has a significance level of 0.003 thus the value of less than 0.05. Thus research question two is concluded that restricted tendering has significant positive impact on the supply chain performance in devolved governments in Kenya. To determine the significance of the effect of independent variables (single sourcing, open tendering, restricted tendering and request for quotations).
of quotations) on the supply chain performance as the dependent variable is the t-test. The results of t-test on Table 4.10 were as follows: The t-value for single sourcing (6.765 > 1.98) has a significance level of 0.000 thus the value of less than 0.05. Thus research question three is concluded that the single sourcing has significant positive impact on the supply chain performance in devolved governments in Kenya. The t-value for request of quotations (4.235) has a significance level of 0.004 thus the value of less than 0.05. Thus research question four is concluded that the request of quotations has significant positive impact on the supply chain performance in devolved governments in Kenya.

Conclusions of the Study
Based on the study findings, the study concludes that supply chain performance in the devolved governments is affected by procurement methods used. The single sourcing followed by open tendering, restricted tendering and request for quotations are the major factors that mostly affect supply chain performance in devolved governments in Kenya.

The study concludes that single sourcing is the first important factor that affects supply chain performance in devolved governments. The regression coefficients of the study show that single sourcing has a significant influence of 0.654 on supply chain performance in devolved governments. This implies that increasing levels of single sourcing by a unit would affect the levels of supply chain performance in county governments by 0.654. This shows that single sourcing affect supply chain performance in devolved governments.

The open tendering is the second most important factor that affects supply chain performance in devolved governments. The regression coefficients of the study show that open tendering has a significant influence of 0.635 on supply chain performance in devolved governments. This implies that increasing levels of open tendering by a unit would affect the levels of supply chain performance in county governments by 0.635. This shows that open tendering affect supply chain performance in devolved governments.

Further, restricted tendering is the third important factor that affects supply chain performance in devolved governments. The regression coefficients of the study show that request for quotations has a significant influence of 0.534 on supply chain performance in devolved governments. This implies that increasing levels of restricted tendering by a unit would affect the levels of supply chain performance in county governments by 0.499. This shows that restricted tendering affect supply chain performance in devolved governments.

Finally, the study concludes that request for quotations is the fourth important factor that affects supply chain performance in devolved governments. The regression coefficients of the study show that request for quotations has a significant influence of 0.499 on supply chain performance in devolved governments. This implies that increasing levels of request for quotations by a unit would affect the levels of supply chain performance in county governments by 0.499. This shows that request for quotations affect supply chain performance in devolved governments.

Recommendations for the Study
The study recommends for open tendering in the devolved governments as it allows for fairness and transparency. Fairness is seen in terms of equal opportunities given to any organization to submit a tender. Transparency in the county governments ensures accountability and reduces fraud or theft of
county resources. Domestic and foreign investors can be attracted to open tenders in County
governments and this will lead to the creation of multinational trade thus enhancing the SCP by
enabling sourcing to be done globally.
Restricted tendering as a procurement method can limit the request for tenders to a selected number
of service providers, suppliers or contractors. Restricted tendering influences supply chain in the
devolved governments as can reduce the risks in the implementation of the contract. It can be a more
flexible approach to awarding contracts as it does not allow potential bidders to participate in the
technical specifications and scope of work.
Single sourcing should be enhanced in the devolved governments especially when the tighter the
coordination between buyers in the County Government and supplier required for Just in time (JIT)
stock initiatives encourages the County to shift supply relations towards single sourcing. The county
governments can benefit from single sourcing in terms of reduced order lead times, quantity
discounts from order consolidation and logistical cost reductions and this influences supply and
processing of goods and services and achieve cost efficiency due to quantity discounts involved in
this method.
Request for quotation need to be enhanced in the devolved governments since it influences the supply
chain in several ways. It reduces procurement lead-time and therefore the county has no need to
prepare solicitation documents or advertise requirements as in the case of open tendering. This in
turn reduces the time taken to acquire raw material, process them into finished products and sell
them. A period for submission of quotations is very short and this enables the devolved governments
to rapidly get the required items to complete projects and as a result enhances the performance of
supply chain performance.

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Gunnar in passenger railway services, Sweden