



**ROLE OF SUPPLIER SELECTION CRITERIA ON PROCUREMENT PERFORMANCE IN PUBLIC UNIVERSITIES IN KENYA; A CASE OF MACHAKOS UNIVERSITY**

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**Accepted: May 11, 2018**

**ABSTRACT**

*The purpose of this study was to ascertain the role of supplier selection criteria on procurement performance in public universities in Kenya. The study adopted a descriptive survey design to find out the role of supplier selection criteria and procurement performance in public universities in Kenya. The study targeted 1200 employees in Procurement department and other four departments like; Finance; Administration, Transport and ICT, that was divided into three sub population called strata which formed the target population, but only 120 employees were included in the sample population. Stratified and random sampling was used to select the sample size. The primary data was collected through the use of questionnaires. A five Point Likert scale that measured the level of agreement or disagreement with the role of selection criteria was adopted. The quantitative data was analyzed by employing descriptive statistics and inferential analysis using statistical package for social science (SPSS) version 22. The finding was presented in table of frequency distribution, pie charts and line graphs. The study revealed that majority of the respondents was in agreement with the supplier selection criteria adopted at Machakos University. The study also revealed that among the numerous criteria adopted, technology was the most important. Additionally, the findings also revealed that there was a significant relationship between supplier selection criteria and procurement performance as the independent variables: technology, supplier profile, quality assessment and price levels were statistically significant at the 95% confidence i.e.  $p\text{value} < 0.05$ . Based on the findings the study recommended that policy makers, need to pay closer attention to supplier profile of suppliers as a selection criterion which registered the lowest mean of 3.64 compared to other selection criteria.*

**Key Words:** Technology, Supplier Profile, Quality Assessment, Price Levels, Procurement Performance

## INTRODUCTION

Supplier selection is one of the classic areas in supply chain management. Supplier selection, a sub function of procurement, has become one of the elementary roles of procurement managers since it virtually affects competitiveness the Organizations. In fact, past reviews of literature in supplier selection indicate a strong diversity in the systemic approaches in supplier selection methodology as well as in supplier selection criteria (Ho et al. 2010). Traditionally, vendors are selected from among many suppliers on their ability to meet the quality requirements, delivery schedule, and the price offered. The main purchasing objective was to obtain the lowest possible price by creating strong competition between suppliers, and negotiating with them.

The Kenyan economy was and still is experiencing growth with the public and private sectors being engaged in numerous development projects amid expected socio-economic and governance impacts due to Vision 2030 which on its own, has enlisted over 120 flagship projects in order to put the country in a new socio-economic and political pedestal. However, it is vital to note that despite this growth, a huge chunk of Kenya's public sector which includes public universities are marred with spending staggering millions of tax payers' money on purchase of goods and services albeit having pitiable service delivery. Hence it suffices to say; procurement managers are expected to contract with suppliers who provide value for their money (Jordan, 2010)

According to KIPPRA (2006) sound public procurement policies and practices are among the essential elements of good governance and accountability. Otieno (2004) notes that irregular procurement activities like poor supplier selection

criteria and procedures in public institutions provide the biggest loophole through which public resources are misappropriated. Kipchilat (2006) quoting a Comesa report (2004) noted that procurement absorbs 60% of government expenditure. This therefore means that supplier selection process needs to be taken very seriously if at all stakeholders are to derive value for their money.

Public Procurement Reforms have occupied a centre stage in broad public sector reforms in Africa since the late 1990s (Ogot et al., 2009). The pressures to cut costs in public sector operations, the increased demand for accountability and transparency from the tax payers, the increased link between public procurement; trade and investment and the overall desire for efficiency among others combined to generate a renewed interest in the area of public procurement which inter twines with supplier selection. Hunja (2001) notes that in the previous years, many developing countries did not see public procurement as having a strategic importance in the management of public resources. It was largely treated as a process oriented 'back office' support function undertaken by non professional staff of the buying agency. However, this has been changing recently in the face of shrinking budgets, the need to fight corruption and the realization that significant savings can be gained by a well organized procurement system

Recently, researchers have called for more radical sustainable supplier selection criteria that focused around the three major pillars of price, quality and delivery (Igarashi, de Boer and Fet, 2013). Nydick and Hill (2003) then highlighted the importance of service attributes such as research and development support, personnel capabilities and facility capacity, to create four pillars which now included service. Despite emerging criteria such as technical ability, which is defined as quality and

reliability of the product, the adequacy of the manufacturing facilities, the financial strength of the firm and the managerial competence, these four criteria remained as the traditional attributes to use in the evaluation of suppliers (Raina, 2003).

Over time, the emphasis placed on each pillar shifted. According to a longitudinal study conducted by Wilson (2001), in the early 1970s, delivery was ranked the most important supplier selection attribute. The late 1970s and early 1980s saw an emphasis in quality, then there was a shift to focus on price and quality (Wilson, 2001). During the late 80s and early 90s firms then shifted away from price as a primary factor for choosing suppliers. Instead, companies ranked suppliers based on a widening array of criteria. However, these criteria were still highly quantified and were often focused on cutting costs or speeding up delivery. Firms realized that in order to reduce costs, an emphasis on quality and service could help them achieve this goal (Wilson, 2001). Therefore, firms emphasized customer service attributes and consistency ratings (Choi and Hartley, 2003), extensions of the traditional criteria (Lambert, Adams and Emmelhainz, 2005).

Nonetheless, the traditional criteria plus additional factors such as service and ability to be a collaborative partner held as the dominating guidelines used for the evaluation process (Hirakubo and Kublin, 2002) during the 1990s. In terms of the actual decision making process, Raina (2003) believed that each criteria should be weighted differently according to the level of importance and necessity to the buyer. This weighted ranking system is one trend that is seen throughout the overall analysis of all the supplier selection literature. Though the approaches vary and begin to grow more complex in the later literature, the idea of assigning each criterion a certain value still holds merit.

Though the emphasis in the early literature was on price, quality, delivery, and service, it slowly grew to include other facets of supplier's performance such as technological ability and lead time. As the evaluation processes started to branch out from the traditional criteria, Choi and Hartley (2003) believed that criteria should also include the analysis of customer service and relationship potential between the buyer and the seller, an important aspect for both the automobile and healthcare industry. They also extended this list to include past performance, technical capability and organizational profile as necessary areas of evaluation.

Supplier Selection basically involves scanning, analyzing, examining and filtering the basic background and bio data of suppliers within the market with the aim of choosing the best one that will propel the performance of the organization to a better direction (Stormy, 2005). The dynamic business environment owing to technological advancements and sophisticated market demands has forced procuring entities to earnestly source for new suppliers who will meet their business needs hence; the importance of supplier selection under the purchasing function cannot be stressed enough.

In Kenya, the organizational buyer has to identify the important vendor performance attributes he/she must have in order to qualify as a supplier. Much as the choice of a particular vendor over another is largely a function of numerous determinants as each and every organization has its own set of criterion they adhere to (Ogot et al., 2009), it cannot be denied that the procurement manager's key role is to choose a vendor who will ultimately enhance the organizations performance (Otieno, 2004). Garfamy (2005) indicates that the criterion for choosing suppliers is determined by such variables like: the buyers own characteristics, interpersonal attributes of other organizational

members, environmental factors like business constraints and price. Therefore, in order to keep the promises to stakeholders an effective supplier selection system becomes necessary beside the improved production methods and technology.

Public universities are universities that are predominantly funded by public means. In Kenya public universities were established through institutional acts of parliament under the university Act, 2012 which provide for the development of the university education, the established, accreditation and governance of universities. According to a 2004 report on reforming higher education in Kenya, the rapid expansion of universities education in the country was a spontaneous response to the increasing demand for higher education necessitated by the increasing flow of students from schools, Recent reports in the media show that effective and efficient governance has been a point of concern in public universities in Kenya. The demand for faster response and better service delivery to citizens has been at an all time high given the staggering millions of tax payers' money used in the purchase of goods, services and contract works within this public sector. According to Ethics and Anti-Corruption Commission (EACC), 2010, Kenya loses Kshs. 200 Billion annually, as a result of flaws in public procurement processes. Operationalization of the Public Procurement and Disposal Act, 2005 and its attendant regulations of 2006 in 2007 set a legal framework that enabled the finance minister to make and gazette the Public Procurement and Disposal.

Machakos University was founded in 1957 as a technical Rural Training school by the then colonial government. It was converted into Machakos technical and Trades school 1958, Machakos Technical School in 1967, and Machakos technical training institute in 1987.

The institution was upgraded to Machakos university college through legal notice No.130, on 16 September 2011. The journey towards achieving a full university status in earnest right at the inception. The university college has six degree programmes across its five initially constituted school – school of engineering, and technology, school of education, school of humanities and social sciences, school of hospitality and tourism management, and the school of business and economics. The university embarked on focused and sustained growth agenda involving of highly trained thematic leaders and expansion of infrastructure. This has seen the number of students grow from 2500 at inception to 9,000 currently.

### **Statement of the problem**

According to a 2004 report on reforming higher education in Kenya, the rapid expansion of universities education in the country was a spontaneous response to the increasing demand for higher education necessitated by the increasing flow of students from high schools. However, the growth in the education sector has not been accompanied by development of efficient systems to ensure that the sector plays its role in an efficient manner. There is clear evidence of prolonged inefficiency, financial mismanagement, waste and malpractices among these, lack of procurement ethics in many universities (Aseka, 2010).

Government demands high procurement performance, efficiency and reduced cost in respect of supply and service cost to be reduced and one of the ways is supplier selection and this explains why it is paramount for the universities to undertake vigorously supplier selection. According to Agaba and Shipman (2006), negative procurement practices are manifested in wrong computation of



costs by evaluation teams, shoddy commodities and services.

Beil and Ross (2009) argue that poor supplier selection criteria can cost the firm millions of loses due to recalls, warranty costs, and associated inventory adjustments, and have inflicted untold damage on their reputations and future sales potential. To avoid such dire consequences, it is paramount to have effective screening processes that help to identify top notch suppliers before awarding of contracts. Stormy (2005) argues that from the onset it is important to note that the background and traditions of the supplier are assessed and blend with the clients “three Ps” — personnel, policies and procedures — otherwise if the supplier firm and the client don’t walk and talk the same language, the relationship is destined for failure. A number of studies have been done in the area of procurement in Kenyan context. Mokori, Mairura and Ombui (2015) in a research on the „Effects of Procurement Practices on the Performance of Commercial State Owned Enterprises in Nairobi County“ established that the performance of procurement practices of State Owned Enterprises were significantly affected by relationships between the buyer and supplier, organizational capacity, management practices for the procurement processes and procedures for supplier selection. In modeling the factors affecting procurement performance at the Ministry of Energy, a study by Kiage (2013), established that procurement planning, resources allocation, staff competency and contract management are the key variables that influence procurement.

Ngugi and Mugo (2007) in their study on internal factors affecting procurement process of supplies in the public sector found that high amounts of discretion without adequate controls can create opportunities for corruption. Chimwani, Iravo and Tirimba (2014) studied the factors affecting

procurement performance at the State Law Office. They studied a number of variables namely record management systems, procurement procedures, and technology and staff qualifications and how they affect the performance of procurement.

These studies found that there is a linkage between supplier evaluation and procurement performance in public entities in Kenya. However, despite several studies that have been conducted on public entities, no study have been undertaken to establish the role of supplier selection criteria and procurement performance in Machakos University. In an effort to stop inefficiency, financial mismanagement and lack of procurement ethics Machakos University has put in place a vigorous supplier selection process and strategies to be pursued in order to achieve high procurement performance. ([www.mksu.ac.ke](http://www.mksu.ac.ke)) It is against this background that the study therefore sought to establish the role of supplier selection criteria and procurement performance in Machakos university.

### **Objectives of the study**

The general objective of this study was to establish the role of supplier selection criteria on procurement performance in public universities in Kenya. The specific objectives were:-

- To assess the effect of technology on procurement performance in public universities in Kenya.
- To establish the influence of supplier profile on procurement performance in public universities in Kenya.
- To examine the effect of quality assessment on procurement performance in public universities in Kenya.
- To assess the relationship between price levels and procurement performance in public universities in Kenya.

## LITERATURE REVIEW

### Theoretical Review

#### Technology Diffusion Theory

Technology Diffusion Theory is the common lens through which theorists study the adoption and development of new ideas. Diffusion is defined basically as the process by which an innovation is adopted and gains acceptance by individuals or members of a community. Rogers (1955) also came up with the perceived attributes theory that assumes that innovation bears the following characteristics: 1) Relative advantage: degree in which an advantage is perceived as better than the idea it supersedes. 2) Compatibility: degree that an innovation is seen to be consistent with existing values and norms. 3) Complexity: the degree in which an innovation is seen to be difficult or easy to understand and use. 4) Trial ability: is the degree in which an innovation may be experienced on a limited basis. 5) Observability: the degree to which the results of innovation are visible to others. The easier it is for individuals to see results of an innovation, the more likely they are to adopt it (Rogers, 1955). Although the process is not limited to these perceived attributes, the elements are helpful in formulating questions for potential adopters in better understanding what factors make adoption possible or desirable. This theory is relevant to the study because one element depends on another to be effective hence for effective procurement performance the organization needs to adopt competitive supplier selection criteria in a bid to enhance procurement performance in public universities in Kenya.

#### Supplier Performance Measurement Theory

Gordon, (2008), studied supplier performance measurement is a process, not an event. It requires

support from stakeholders besides procurement, as supplier performance impacts on firm's success. A SPM process should include key stakeholders who interact with suppliers as well as the suppliers themselves. A SPM program not only ensures that those benefits identified in the contracting stage are delivered, but that value delivery continues for the life of the contract. As companies increasingly focus on their core competencies and outsource a great percentage of work, their success becomes ever more dependent on the performance of strategic suppliers. Ultimately, the objective of SPM is to improve the performance of all parties involved in the contract and service level Agreement. Further based on the provisions provided in the new Act among others, PPOA conducted a study to determine the impact of the new constitution in public procurement in November, 2010 and developed a compendium of proposed amendment to the public procurement and disposal Act, 2005. The process of preparing a parliamentary bill is underway since the end of 2011. According to the fourth schedule of the new constitution, procurement of goods and services has to be looked into and steps taken to reform it, together with the PPD Act which has to be amended by an Act of parliament within four years after the enactment of the constitution, which means by the middle of 2014 ([www.ppa.co.ke](http://www.ppa.co.ke)). This theory is relevant to the study because all the key stakeholders who interact with suppliers as well the suppliers themselves are involved in adopting competitive supplier selection criteria in a bid to enhance procurement performance in public universities in Kenya.

#### Resource Based Theory

According to Grant (2001), strategy has been defined as "the match an organization makes between its internal resources and skills; the opportunities and risks created by external

environment". Most research into the strategic implication of the organization's internal environment and resources has been concerned with issues of strategy implementation and analysis of the organization processes through which strategy emerge. The theory proposes a framework for a resource-based approach to strategy formulation which integrates a number of the key themes. This is a five-stage procedure for strategy formulation, analyzing the organization's resource based; appraising the organization's capabilities; analyzing the profit earning potential of organization's resources and capabilities; selecting a strategy; and extending and upgrading the firm's pool of resources and capabilities. According to Wessman, (2003), obtaining resources for reform needed for technical assistance to help prepare business plan to describe and implement key objectives of the reform. There is a major concern on the level of professionalism on the government side in the conduct of procurement. There is a shortfall of professional capacity in many countries. This stems from a shortage of experienced procurement professional staff, inadequate training and low pay. It is clear that the development of procurement professionalism is of prime importance in the development of procurement system in the African region. The level of professionalism requirements for officials conducting and authorizing procurement functions is not taken seriously.

Quite a number of countries in Africa have no procurement qualifications as are requirement for employment. Instead they provide a minimum civil service qualification to serve as a procurement officer. Some countries show that familiarity and on the job training as the standard measure for one to carry out procurement function. Some argue that there is no need for degree requirement or study background in the field of purchasing or supply and materials management.

For other countries procurement functions were either conducted by professionals or in their absence procurement consultants such as Crown agents. In some situations the authorization of the award solely lies with the hands of political appointees rather than professional. In view of the above, a key element in the procurement reform process will have to be stressed in the initial stages and ongoing of public officials conducting public procurement activities. The need for training is further emphasized, as decentralization takes place there is a tendency untrained and inexperienced people into the procurement field.(Grant 2001). One of the requirements of the legal framework is to ensure that those charged with the responsibility with its implementation are provided with adequate administrative instructions. To improve performance, governments should strive towards creating a competent corps of procurement specialists with high ethical standards. Governments should delegate procurement to these procurement specialists. The competent procurement after training should be transferred to different positions to strengthen procurement performance. None of these will succeed without government support commitment and that of other stakeholders in the procurement process (Wessman, 2003).

### **Transaction cost theory**

Supplier selection is a rapidly evolving area of interest to academics and business management practitioners alike. Aspects of marketing, economics, logistics and organizational behavior are all important for developing insights into how and why different supply chain management arrangements emerge and for understanding the consequences of these arrangements for industry efficiency and competitiveness (Hobbs, 2003). This section discusses a theoretical framework for the study management which is drawn from the



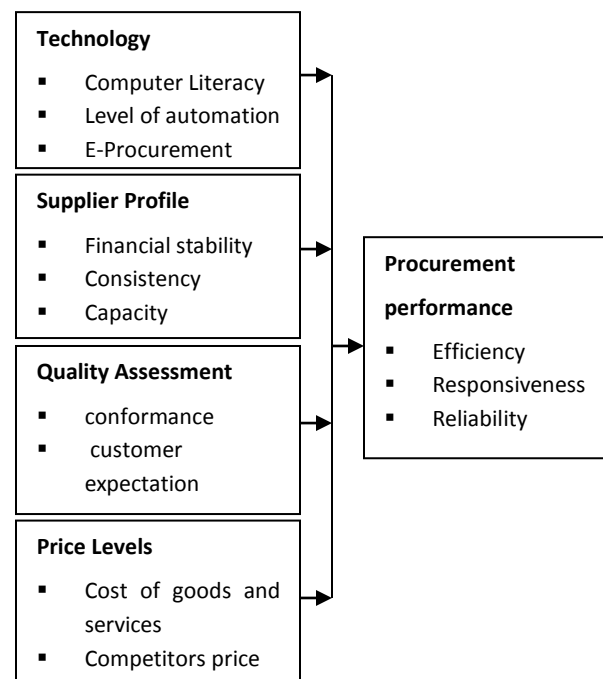
economics literature. The Transaction cost analysis (TCA) represents one possible approach to understanding and evaluating supply chain management and has the potential to be combined in an interdisciplinary setting with the insights provided by the marketing, logistics and organizational behavior literatures. of supply chain

Transaction costs are simply the costs of carrying out any exchange, whether between firms in a marketplace or a transfer of resources between stages in a vertically integrated firm, when the neoclassical assumption of perfect and costless information is relaxed. They arise wherever there is any form of economic organization, i.e. within a vertically integrated firm, in a market or in a command economy (in which market transactions are largely absent). It is useful to divide transaction costs into three main classifications: information costs, negotiation costs, and monitoring (or enforcement) costs. Firms and individuals face costs in the search for information about products, prices, inputs and buyers or sellers. Negotiation costs arise from the physical act of the transaction, such as negotiating and writing contracts (costs in terms of managerial expertise, the hiring of lawyers, etc.), or paying for the services of an intermediary to the transaction (such as an auctioneer or a broker). Monitoring or enforcement costs arise after an exchange has been negotiated. This may involve monitoring the quality of goods from a supplier or monitoring the behavior of a supplier or buyer to ensure that all the pre-agreed terms of the transaction are met. Also included are the costs of legally enforcing a broken contract, should the need arise (Hobbs, 2003).

Supply chains are a typical form of such intermediate arrangements, where some coordination occurs among the different companies. Hence, single transactions are neither completely one-off market based, nor do the single companies operate under the same organizational

roof, i.e. an integrated hierarchical company. The boundaries for this coordination are typically reached where non-specific commodities are sourced. In such cases, no specific inter-organizational relationship is required, and hence, neither is Supply chain management. On the other extreme, if very close coordination among different business processes is required, this might be performed in a hierarchical solution, i.e. within one company, thereby avoiding the risk of having to work with a supplier and/or customer (Grover & Malhotra, 2003).

### Conceptual Framework



**Independent Variables    Dependent Variable**

**Figure1: Conceptual Framework**

#### Technology

Technology involves use of computers, software and internet connections infrastructure for supporting information processing and communication functions (Crompton 2007). The use of information technology in public sector has not

been effectively implemented since most of the procurement functions are subjected to manual procedures that are slow, inaccurate and ineffective. This has negative impact on procurement procedures since the public sector organizations cannot effectively monitor and coordinate procurement procedures of all road construction projects because of lack of computerized procurement procedures and this subjects much of procurement functions to manual operations which are slow and ineffective. The use of computerized procurement systems demonstrates effective use of information technology. In cases where the organization subjects all its procurement functions to manual procedures, the benefits of information technology are not experienced and a high level of inefficiency is experienced during execution of procurement procedures.

Information technology enhances efficiency and effectiveness of the procurement process. An efficient procurement process in the public sector organizations will result in improved performance in public sector organizations (Dobler, 2002). At the public sector level, technology enhances infinite and non-restricted access to government information and increases market transparency and economic incorporation based on complementarities (Carayannis & Popescu, 2005). Procurement technologies grasp a virtual market, open to capable suppliers (and goods) according to not mainly restrictive selection criteria, in which public administrations can choose goods and services offered by several suppliers (Petrie, 2001).

The whole process is digital, using digital signature in order to guarantee transactions lawfully. Among the main advantages that a public administration can get through a system like this there are: costs and process cutting, possible broadening of suppliers base, easy access to preferred goods (pre-defined quality standards), information intelligibility

and ease of comparison among goods and purchases logging and ensuing expenditure monitoring. The road to executing successful ICT in developing countries public procurement management is paved with difficulties, such as resistance from the bureaucracies involved; lack of decision making from the top; lack of motivation; weak human capital; corruption and fraud; and, in the case of conflict-ridden countries, the instability and violence that damage any efficient long-term work (Dobler, 2002). Moreover, ICT systems are knotty, expensive, and difficult to manage and maintain.

Integration of supply chain activities and the technologies have become competitive necessities in most organizations. Accordingly, the trend toward greater use of supply chain technologies is on a clear path forward. With almost daily technology advancement globally in every facet of the business, organizations need to synchronize by adopting and implementing new electronic commerce and supply chain technology in order to protect market share, not to mention improve market penetration (Blecken & Hellings, 2008).

Better information exchange between supply chain partners, is the key advantage of an integrated supply chain provides more up-to-date information and allows for more accurate inventory responses to changes in demand and thus more appropriate inventory levels throughout the supply chain. However, the use of inadequate technology is a major challenge for public universities' supply chain management. Relatively high investment requirements of information technology are not generally justified by public universities' budgets. Public universities face challenges in implementation of information technology skills. Kassim and Hussin (2010) noted that the difficulties faced by suppliers are due to tedious procedures and lack of IT skills to perform e-procurement

transactions. Public universities' may outsource and use various modern technologies for cost savings and quality improvements in which the outsourcing vendor could achieve its return on investments and make sure that the system is performing effectively and efficiently.

### **Supplier profile**

When choosing a supplier it is paramount for the procuring firm to check the supplier's organization as this affects issues like risk and lead times. Issues like quality performance e.g. ISO 9000 accreditation, supplier innovation and technological levels need to be ascertained (Shahadat, 2003). Moreover, Petroni (2002) as many other scholars points out that the suppliers geographical location, capabilities and facilities need to be checked before their selection as this has great impact on whether or not they can deliver thus wade off unwarranted delays. Good suppliers should have: achievement of sales and marketing goals, high financial performance, achievement of current organizational goals and strategy for technology age.

The performance and past history of the suppliers help in taking decisions for its selection. Attention is paid to the suppliers: Financial Status (Awino, 2002); Response of Customers - Numbers don't lie - where customers are many the deals is good; and Performance History based on business references (Kibe, 2000).

Organizations have different policies and criteria that they put in place during suppliers selection. Policies are generally adopted by the Board or senior governance body within an organization whereas procedures or protocols would be developed and adopted by senior executive officers. Organization policies can assist in both subjective and objective decision making process. According to Matook et al. (2009) the operational success of

organizations policies will often depend on the development of a network of reliable and trustworthy suppliers and consequently, making the right supplier selection decisions are important.

According to Slack and Lewis (2002) if there is a gap of unsatisfactory performance it's assumed the relief organization will adapt their strategies thus dealing with operational decision areas in allocation of resources, level of cooperation and outsourcing in order to be strategic fit between the enablers and requirements of the beneficiaries'. Financial capabilities of the suppliers are crucial since it will indicate the procurement cost to be incurred by the organization.

The firm must therefore find a low-cost supply base where it can minimize its purchase price, import duties, documentation cost, transport cost, communication cost and cost of investigating the potential supplier's past performances and financial background. In this regard, financial stability of the supplier is a necessary requisite for long-term partnership programmes. Orders should be placed by the national governments depending on their allocated budgets for the product as well as on the epidemiological justifications of the country.

On the other end of the chain, competition is quite limited, with only a few manufacturers available. This is due to the strict regulations and high standards for manufacturers to enter the market (Milstien et al. 2005). These regulations are due to the nature of the product being a preventative means towards global health, and thus quality is a critical factor. In evaluating the market of supplies, the quality standards should be first checked. Thereafter, the availability of a purchasing and delivery infrastructure should also be evaluated to see whether sourcing is feasible from the region. Finally, suppliers meeting infrastructure and quality standards should be evaluated and selected according to previously set criteria of humanitarian

aid being of a unique nature implies different motives. Even though achieving lower price is still an important motive in order to make the products affordable for the buyer governments, availability and quality are also of critical importance.

Studies also show that buyers tend to choose their suppliers in a geographical proximity to one another due to various reasons such as raw materials, knowledge, transportation hubs, potential partners, etc. (Bozarth et al., 2007; Wu et al., 2006), which on the contrary makes them prone to the same risks. Thus, Deane et al. (2009) propose a model to capture these associated risks in order to mitigate them in sourcing supplies.

### **Quality Assessment**

The British Standards definition of quality is, the totality of features and characteristics of a product of a product or service that bear on its ability to satisfy given need" (CIPS, 2012). A buyer needs to assess and ensure that a supplier has robust systems and procedures in place for monitoring and managing its outputs. The systems for the detection and correction of defects are called quality control while those for prevention of defects are known as quality assurance and a buyer needs to check whether the supplier has these in place (Lysons et al., 2008).

According to Handfield et al. (2008) an important part of evaluation processes touches on a supplier's quality management systems and philosophy. According to Lysons et al., (2008) firms appraising quality of suppliers will find themselves looking at the following issues: procedures for inspection and testing of purchased materials, accreditation with national and international quality standards bodies such company standards, Association of Trade Standards, International standards organization (ISO) and British Standards Institution (BSI) (Lysons

2008). The success of the buying organization is highly dependent on how well the suppliers perform. It is also important that the supplier and the buyer have the same idea of what satisfactory quality is (Gallego, 2011).

Gupta (2004) point out the importance of quality by saying "quality is an important strategic dimension and a key competitive weapon that cannot be ignored by any corporation." Deming (1986) considered quality and process improvement activities as the catalyst necessary to start an economic chain reaction. Improving quality leads to decreased costs, fewer mistakes, fewer delays, and better use of resources, which in turn leads to improved productivity, which enables a firm to capture more of the market, which enables the firm to stay in business, which results in providing more jobs (Summers, 2006).

Assessing quality as one of the main factors for supplier selecting is so important. In order to assess the quality there are many factors and methods that can be used. There are a lot of literature has accumulated on the subject of vendor evaluation and selection models and in order to evaluate quality, most of these models have used rate of rejects (Qing and Xiao, 2007; Sanayei et al, 2008 and Kokangul and Susuz, 2009), while rate of rejects cannot present the quality appropriately. In a recent study, Lee (2009) used yield rate in order to evaluate the quality.

There are few studies about usage of loss functions in order to selecting the suppliers. In these studies scholars just have used the concepts of loss function in order to weigh the criteria. Pi and Low (2005) used Taguchi loss (1986) and assumed 3% defective products as the standard rate of rejects, the quality could be able to calculate with Taguchi loss function and this target value. In another study they (Pi and Low, 2006) continued their research

and proposed an AHP method in order to select the final supplier.

### **Price Levels**

The aim of this criterion is to identify vital element of price associated with purchase. The most common cost related with a product is purchase price, transportation cost and taxes (Stanley and Gregory, 2001). Operational costs are also being considered during the supplier selection and profits cannot be maximized without cost minimization. Mwikali et al (2012) quoting Beamon (1999) adds that Price and Distribution Cost should be taken into consideration when using this criterion to choose suppliers. Economic price theory asserts that in a free market economy the market price reflects interaction between supply and demand, the price is set so to equate the quantity being demanded. In turn these quantities are determined by the marginal utility of the asset to different buyers and to different sellers. In reality, the price may be distorted by other factors, such as tax and other government regulations. When a commodity is for sale at multiple locations, the law of one price is generally believed to hold. This essentially states that the cost difference between the locations cannot be greater than that representing shipping, taxes, other distribution costs and more. In the case of the majority of consumer goods and services, distribution cost are quite a high proportion of the overall price, so the law may not be useful. William (2010)

### **Procurement Performance**

According to Schiele (2007), procurement performance entails how well organizational procurement objectives have been attained. The extent to which procurement function is able to obtain best value for spent organizational money to purchase products and services is the best indicator

of procurement performance. This entails two major aspects; efficiency and effectiveness. Procurement efficiency is the association that exists between planned and actual required resources needed to realize formulated goals and objectives as well as their related activities. Effectiveness in procurement takes into consideration, various indicators for instance; delivery management, supplier quality, suppliers flexibility and profile, inventory incoming on-time, order cycle time, material quality defects and documentation. Procurement performance is largely seen as the most vital role of the procurement function since the organization's suppliers can affect the price, quality, delivery reliability and availability of its products (Li, 2008). Organizations feel that proper supplier selection would assist reduce product and material costs whilst ensuring a high degree of quality and after-sales services (Sonmez, 2006). The implication here is that an efficient appraisal should be in place for the successful procurement (Li, 2008). Cooperation between buyer and supplier is the starting point to establish a successful supply chain management and a necessary, but insufficient condition. The next level requires coordination and collaboration between buyer and suppliers. There are a number of benefits of supplier selection these include: ability to harness the strengths and skills of suppliers to the advantage of buyers (Dwyer, Schurr & Oh, 1987), improved quality and process performance and continuous cost reductions among others (Newman, 1988).

Procurement can be full of inefficiencies some due to poor policies and strategies at the suppliers, that results to hidden costs such as stock-outs, carrying costs of overstocking, incorrect payments of invoices, slow acknowledgement and reporting of shipment and lost sales which in turn affects productivity, quality issues, increased wasteful costs (extra inspections, additional freight fees, overtime, buffer stocks, obsolete inventory, multiple sourcing)



and slow movement of goods which can be improved by supplier evaluation and better communications between buyers and suppliers (Gordon, 2006).

Supplier selection to ensure compatibility between buyer and supplier in terms of shared business ethics, similar standards of excellence, commitment to continuous improvement are important in performance of suppliers (CIPS, 2012). Compatibility is of concern especially in adoption of procurement best practices such as lean enterprise or any high performance system that drives shorter delivery times, higher quality, and lower prices which could actually have an adverse effect on a supplier who is not aligned with these practices. According to Gordon (2006) a supplier who is unused to pursuing continuous improvement may be unable to keep up with its buyers' increasing requirements for better, cheaper, faster goods and services. Supplier appraisal is therefore important to ensure compatibility and reduce risk of failure of supplies (Handfield et al., 2008; Lysons et al., 2008). According to Vaidya Nathan and Deva raj (2008), effective performance measurement aids managers to make better procurement decisions needed to improve on performance and accountability. It enhances optimal allocation of resources more as well as evaluation of alternative approaches to procurement to allow for increased operational flexibilities. Shalle et al (2014) deduced that procurement performance can be assessed by focusing on delivery, flexibility, quality, cost and technology. Optimal performance attainment is dependent on how current suppliers' relationships are managed so as to ensure constant availability of needed quality supplies at the organization. This will ensure that sourced materials are indeed procured during the right time and at a reasonable cost. Procurement performance strives to enable improvements in the procurement process at the organization so as to improve on quality delivery of

firm products and services at least possible time and cost. Chimwani *et al.* (2014) quoting Smith and Conway (1993) observe that there are eight key success factors which influence procurement performance namely; a clear procurement strategy, effective management information and control systems, development of expertise, a role in corporate management, an entrepreneurial and proactive approach, coordination and focused efforts. An eighth is fundamental; communicate the key success factors to all levels of the organization and set out a procurement strategy to achieve continuous improvement in value for money. This should be based on total cost, quality, and enhancement of competitiveness of suppliers using best procurement practice. According to Basheka (2008) procurement performance is an outcome of the effectiveness and efficiency of policies and procedures adopted by the firm during supplier selection. Leenders and Fearon (2002) observe that decisions to buy instead of make so as to improve quality, lower inventories, integrate supplier and buyer systems, and create cooperative relations underline need for good supplier performance. Performance provides the foundation for an organization to gauge how well it is rolling towards its predetermined objectives, identifies areas of improvement and decides on potential initiatives with the goal of how to initiate performance improvements. Van Weele (2006) and Ogubala *et al.* (2014) concur that there is a link between procurement process, efficiency, effectiveness and performance. Procurement performance starts from purchasing efficiency and effectiveness in the procurement function in order to change from being reactive to being proactive to attain set performance levels in an entity, With that said Lardenoije, Van Raaij and Van Weele (2005) assert that basing on financial performance and neglecting non-financial performance cannot improve the procurement operations because only partial performance is considered. They continue to add

that procurement performance is an interaction between various elements; professionalism, staffing levels and budget resources. Organizations which do not have performance means in their processes, procedures and plans experience lower performance, higher customer dissatisfaction and employee turnover.

## **Empirical Review**

### **Technology**

Golder (2007), in his study on outsourcing recruitment to slash unnecessary costs asserts that organizations that fail to integrate procurement functions with information communication technology systems like electronic data interchange, employs manual procurement procedures that are inefficient and ineffective and leads this to wastage of procurement funds since the procurement processes are characterized by a low degree of transparency. Mwangi (2010), in his study on factors affecting the selection of optimal suppliers in Procurement Management asserts that purchasing departments have become larger and more complex, most organizations have adopted IT based systems that have created a platform for installation of automated procurement systems. These procurement systems provide efficient and extensive cost savings and other business benefits by automating many of the purchasing processes. According to Ken (2007), in his study of factors affecting procurement performance states that IT has reached almost every aspect of procurement and may enhance and deepen the effort of procurement reform. Specifically, information technology (IT) promotes economy and efficiency, significant savings of companies' funds by increasing competition, transparency by making available. Procurement information of all sorts such as bidding opportunities, bidding documents, notices etc,

Chang (2008) affirms that IT plays a great role towards supporting adoption of centralized procurement systems in public sector organizations. Centralized procurement system leads to a central procurement data base that creates a favorable environment for effective automation of procurement processes. Chopra (2008) affirms that there are two primary types of procurement systems: electronic procurement and standard procurement. Both types of systems are widely available and are often included in an enterprise resource planning (ERP) or accounting software product. Charles (2008) concurs that, as purchasing departments have become larger and more complex, most organizations have adopted IT based systems that have created a platform for installation of automated procurement systems. According to Baily (2007), organization with effective IT infrastructure can easily automate its procurement functions by implementing an Enterprise Resource Planning (ERP) system. ERP is a system that integrates all organizational functions into a single system in order to serve the needs of each different department within the enterprise. ERP is more of a methodology than a piece of software, although it does incorporate several software applications, brought together under a single, integrated interface. According to Lambert (2004), Handfield (2009) on Purchasing and supply chain management found out that integration of procurement functions with ICT has enabled many public training institutions to improve the level of effectiveness in the execution of procurement practices. A study by Sanjeeve (2009) on supplier evaluation and procurement performance found that implementation of ICT based procurement methods in many public institutions in Africa is hindered by lack of e-procurement methods, lack of automated procurement systems, lack of supportive ICT infrastructure and absence of ICT skills amongst procurement staff. A study by Tanzi (2009) found that in Canada, innovation in technology has played

a major role in enhancing many organizations to adopt effective procurement practice. George (2008) in his study found that in Kenya's many public institutions fail to succeed in embracing effective procurement practices due to lack of effective waste recycling technology and effective technology for utilizing renewable energy sources such as wind and solar energy.

### **Supplier Profile**

Scannell *et al.* (2012) investigated supply chain management efforts with first tier suppliers in automotive firms in the US. Using a survey questionnaire; they found that first tier supplier development is associated with innovation and cost measures, but not associated with flexibility and quality measures. They also found that the use of JIT purchasing by first-tier suppliers is strongly associated with their performance measures of flexibility, slightly associated with quality and cost, and not associated with innovation. They called for further research with larger sample in order to improve the generalizability of the results. Krause *et al.* (2007) found that commitment of the buying firm to long-term relationships with major suppliers, shared goals and values with suppliers, and the involvement in supplier development initiatives were positively associated with the buying firm competitive performance in US automotive and electronics industries. Shin, Collier & Wilson (2009) supply management orientation (SMO) on supplier's and buyer's performances in automotive firms in the US. They measured SMO in terms of long-term relationships with suppliers, supplier participation in new product development, limited number of suppliers, and selecting suppliers based on quality considerations. They found that SMO positively affected supplier's and buyer's performance in terms of quality and delivery. However, they found that SMO did not affect buyer's performance in terms of cost and flexibility.

Burton (2006) indicated that suppliers account for approximately 80% of lead-time problems. In lean production environment, JIT purchasing requires the supplier firms to deliver frequent supplies in small lots. This would require perfect synchronization between the supplier and the buyer, which can be achieved by integrating their production planning and control systems (De Toni & Nassimbeni, 2000). Heikkila (2012) pointed to reducing lead time as an essential approach to create responsive supply chain and avoid uncertainty. Hernandez (1993) pointed to the crucial role of reducing lead time on the ability of the supplier to become lean and responsive. He further indicated that supplier lead time reduction minimizes the potential problem of shifting inventories to the supplier firm and eliminates quality problems associated with holding buffer inventories. Lascelles and Dale (2011) indicated that buying firms should treat their suppliers as partners. Handfield and Bechtel (2002) argued that investments in supplier relationships will reduce risk; by involving in activities that is usually regarded in the area of the other firm. Vonderembse and Tracey (2003) indicated that supplier partnership enables both parties to improve decision making process, enhance knowledge sharing, advance communication, and improve the overall performance of both parties. MacDuffie and Helper (2007) argued that the buying firm will gain from efforts done to improve the supplier performance, as both will share the productivity benefits. Also, Technical assistance provided to suppliers enables them to deliver frequent and JIT supply of materials, improves quality, reliability, and delivery by suppliers (Langfield-Smith & Greenwood, 2005; Carr & Pearson, (2010). Furthermore, when the buying firm provides technical assistance to suppliers, the performance dimensions of the buying firm will improve in terms of cost, quality, productivity, and design (Lee & Ansari, 2008). Supplier development

Results of reduced costs, improved communication, risk sharing, and improved problem solving (Quayle, 2010).

### **Quality Assessment**

The study by Gordon, (2006) posts that supplier evaluation can: unearth the causes of performance difficulties; improve understanding of business operations; cultural factors and the leadership at the supplier which lead to follow-up activities, such as supplier training and development, and corrective actions that deal with supplier evaluation findings hence coming up with the best ways to obtain measurable and positive results which will at the end improve profitability and quality performance of buying firm.

In the study by Lysons et al., (2008) on a Purchasing and supplies chain Management asserts that firms appraising quality of suppliers will find themselves looking at the following issues: procedures for inspection and testing of purchased materials, accreditation with national and international quality standards bodies such company standards, Association of Trade Standards, International standards organization (ISO) and British Standards Institution (BSI)

### **Price levels**

In their study, Mwikali and Kavale (2012) seeking to identify the factors affecting supplier selection illustrated that; cost, technical capability, quality assessment, organizational profile, service levels, supplier profile and risk factors are the major factors affecting selection of suppliers. Their study concluded that a cost criterion is a key factor affecting supplier selection for it dictates among many elements, the profit margins.

In a study by (Handfield et al., 2008) in his study on purchasing and procurement performance asserts that a buyer should equally look at a supplier price and cost factors. Evaluating a supplier's cost structure needs a deep understanding of a supplier's total costs, including: direct labor costs, indirect labor costs, material costs, manufacturing costs and the general overhead costs. Understanding cost structure of the supplier will help a buyer determine how efficiently a supplier can produce an item and at the same time provide means for identification of areas of cost improvement.

### **Procurement performance**

Munyua (2012) while quoting Hand field et al (2009) also observes that procurement performance can be measured through price performance, cost effectiveness, revenue, responsiveness, technology or innovation, supplier performance, strategic performance, administration and efficiency. CIPS Australia (2005) presents the differences between efficiency and effectiveness. USAID (2013) report and Marr (2013) identify performance scorecards that assist in measuring procurement performance namely: timely delivery, quality, customer service, Procurement cycle time, payment processing time, transparent price information, overall equipment effectiveness and machine downtime level.

### **METHODOLOGY**

Research design is the blue print 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). This study adopted a descriptive research design. The target population was 1200 employees from the five departments which are; Procurement department, Finance department, Administration department, Transport department

and ICT department, that were divided into three sub populations called strata which formed the target population. The respondents included: Top management, middle level management, as well as support staff in these departments. Multiple Linear Regression Model was used in this study;

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

**Where:**

Y = Procurement performance Variables which are; Efficiency, reliability of Public Universities in Kenya.

$\beta_0$  = Constant term (intercept)

$\beta$  – Parameters to be estimated while  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\beta_4$  are the coefficient functions of the independent variables

X1= Technology.

X2 = Supplier Profile

X3= Quality Assessment.

X4= Price Levels

$\epsilon$  = Error term or Stochastic error

## FINDINGS

### Technology

The study sought to establish the contribution of technology on procurement performance of Universities in Kenya. The results were summarized on table 1.

**Table 1: Technology and procurement Performance**

Statement	SD=1	D=2	N=3	A=4	SA=5	Mean	SD
	%	%	%	%	%		
Integration of technology into business operation facilitates opportunities for the institution's faster process.	2.4	11.9	19.0	32.1	34.5	3.85	1.10
Our University uses information system to facilitate timely response to supplier needs.	2.4	11.9	25.0	26.2	34.5	3.79	1.12
The university pays attention to suppliers who have invested in IT.	3.6	11.9	27.4	28.6	28.6	3.67	1.12
Adoption of IT has facilitated information flow within the departments thereby improving Quality of information sharing.	4.8	11.9	21.4	31.0	31.0	3.71	1.17
The technology used leads to increase in the order size.	6.0	14.3	2.4	28.6	48.8	4.0	1.28
<b>Technology</b>						<b>3.80</b>	<b>0.57</b>

Results in table 1 indicated that 66.6 % (60) of the respondents strongly attested that the integration

of technology into business operation facilitates opportunities for the institution's faster process



with a mean of 3.85 and a standard deviation of 1.10. The study also revealed that 60.7% (55) of the respondents agreed that University uses information system to facilitate timely response to supplier needs with a mean of 3.79 and a standard deviation of 1.12. Similarly, 57.2% (51) of the respondents strongly agree that the university pays attention to suppliers who have invested in IT with a mean of 3.67 and a standard deviation of 1.12. The study also revealed that 62% (56) of the respondents agreed that adoption of IT has facilitated information flow within the departments thereby improving Quality of information sharing with a mean of 3.71 and a standard deviation of 1.17. Finally the study also revealed that 77.4% (70) of the respondents agreed that the technology used leads to increase in the order size with a mean 4.0 and a standard deviation of 1.28. The mean score of the responses was 3.80 which indicated that many respondents agreed that technology is key determinant of procurement performance in Machakos University. The results revealed that

**Table 2: Supplier Profile and Procurement Performance**

Statement	SD=1	D=2	N=3	A=4	SA=5	Mean	SD
	%	%	%	%	%		
The performance and litigation history on supplier's profile is a determinant factor in selection.	1.2	15.5	17.9	32.1	33.3	3.81	1.10
The University's selection criteria assists in streamlining procurement processes.	7.1	9.5	31.2	28.6	22.6	3.5	1.16
The University prefers supplier organizations with high quality performance accreditation	2.4	11.9	17.9	31.0	36.9	3.88	1.11
The University values supplier's with high financial performance	10.7	9.5	31.0	33.3	15.5	3.45	1.19
The University suppliers have shorter lead time.	6.0	15.5	29.8	25.0	23.8	3.53	1.12
<b>Supplier Profile</b>						<b>3.64</b>	<b>0.35</b>

computer literacy, level of automation and E-procurement influenced procurement performance of Universities in Kenya. The findings imply that there was constant technology in the Universities that has led to improved procurement performance. These findings are consistent with those of Kangongo & Gakure (2013) who concluded that technical compatibility and expertise of the implementation team are key determinants in the e-procurement implementation. On the other hand, the relationship between technological performance and risk factor as independent variables to procurement performance in Machakos University as the dependent variable is not significant.

### Supplier Profile

The study sought to establish whether supplier profile influences the procurement performance of Universities in Kenya. The results were shown in Table 2.

The study revealed that 65.4% (59) of the respondents agreed that the performance and litigation history on supplier's profile is a determinant factor in selection with a mean of 3.81 and a standard deviation of 1.11. The study also revealed that 51.2% (46) of the respondents agreed that The University's selection criteria assists in streamlining procurement processes with a mean of 3.50 and a standard deviation of 1.16. From the study, also 67.9% (61) of the respondents agreed that the University prefers supplier organizations with high quality performance accreditation with a mean of 3.88 and a standard deviation of 1.11.

The study also revealed that 48.8% (43) the respondents agreed that the University values supplier's with high financial performance with a mean of 3.45 and a standard deviation of 1.19. Further research shows that 48.8% (43) of the respondents agreed that the University suppliers have shorter lead time with a mean of 3.53 and a standard deviation of 1.20.

The mean score for the responses was 3.64 which indicate that many respondents agreed that supplier selection is a key determinant of procurement performance of Universities in Kenya.. The results revealed that Supplier selection influenced procurement performance of Universities in Kenya.

The findings agreed with that of Tanzi (2009) which states that application of poor procurement policies and lack of top management support hinders key impediments towards effective implementation of procurement practices in many government institutions in East Africa.

### Quality Assessment

The study sought to establish whether Quality assessment influences the procurement performance of Universities in Kenya. The results were as shown in Table 3.

**Table 3: Quality Assessment and Procurement Performance**

Statement	SD=1	D=2	N=3	A=4	SA=5	Mean	SD
	%	%	%	%	%		
Total value of purchased products have acceptable shelf life period.	3.6	13.1	23.8	25.0	34.5	3.58	1.14
The university suppliers offer better services levels (warranties, after sales service).	4.8	11.9	29.8	27.4	26.2	3.68	1.17
The procured products meet necessary quality assessment and register's low no. of product defects.	6.0	10.7	21.4	33.3	28.6	3.93	1.29
Supply base has demonstrated continuous improvement in defect rates.	8.1	17.5	24.2	29.6	20.2	3.7	1.18
The university prefers supplier organizations with high quality performance accreditation.	7.1	16.7	0	28.6	47.6	3.52	1.29
<b>Quality Assessment</b>						<b>3.65</b>	<b>0.46</b>
The results showed that 59.5% (54) of the respondents agreed with the opinion that the Total							
value of purchased products have acceptable shelf life period of Universities in Kenya with a mean of							

3.58 and a standard deviation of 1.14. The study revealed that 53.6% (48) of the respondents agreed that the university suppliers offer better services levels (warranties, after sales service) with a mean of 3.68 and a standard deviation of 1.17.

Further the study showed that 61.9% (56) of the respondents agreed that the procured products meet necessary quality assessment and register's low no. of product defects with a mean of 3.93 and a standard deviation of 1.29. The study revealed that 49.8% (45) of the respondents revealed that Supply base has demonstrated continuous improvement in defect rates with a mean of 3.7 and a standard deviation of 1.18. Finally the study revealed that 76.2% (69) of the respondents agreed that the university prefers supplier organizations with high quality performance accreditation with a mean of 3.52 and a standard deviation of 1.29. In general Quality Assessment had a mean of 3.65 and a standard deviation of 0.46.

The mean score for the responses was 3.65 which indicate that many respondents agreed that quality assessment is a key determinant of procurement performance of Universities in Kenya. The results revealed that Quality Assessment influenced procurement performance of Universities in Kenya. The findings imply that good Quality Assessment improved the Procurement performance. The findings corroborated with findings by Simpson and Power (2007) that low level of procurement regulations compliance in many public universities in developing nations hampers effective supplier selection criteria and implementation of institutional development projects.

### Price Levels

The study sought the effect of Price levels on procurement performance as it's indicated in table 3.

**Table 3: Price levels and Procurement Performance**

Statement	SD=1	D=2	N=3	A=4	SA=5	Mean	SD
	%	%	%	%	%		
Management often procures from supplies with quality goods and services but with a cheaper price.	4.8	20.2	21.4	34.5	19.0	3.42	1.54
The suppliers overall price (product and distribution cost) has an impact on selection sourcing.	3.6	2.4	2.4	52.4	19.0	4.21	0.89
The university compares the price with that of the competitor before buying.	7.1	17.9	20.2	20.2	34.5	3.57	1.32
The university buys in bulky so as to get quantity discount from suppliers.	4.8	11.9	29.8	27.4	26.2	3.58	1.14
<b>Price Levels</b>						<b>3.72</b>	<b>0.28</b>

The result showed that majority 53.5% (48) of the respondents agreed on the opinion that Management often procures from supplies with quality goods and services but with a cheaper price with a mean of 3.42 and a standard deviation of

1.54. The results also showed that 91.7% (83) of the respondents agreed that the suppliers overall price (product and distribution cost) has an impact on selection sourcing with a mean of 4.21 and a standard deviation of 0.89.

Further research showed that 54.7 % ( 49) of the respondents agreed that The university compares the price with that of the competitor before buying with mean of 3.57 and a standard deviation of 1.32. Finally the study revealed that 53.6 % ( 48) of the respondents agreed that the university buys in bulky so as to get quantity discount from suppliers with a mean of 3.58 and a standard deviation of 1.14.

The mean score for the responses was 3.72 which indicate that many respondents agreed that price levels is a key determinant of procurement performance of Universities in Kenya. The results revealed that price levels influenced procurement performance of Universities in Kenya. The finding implies that the university compares prices from

different suppliers before making a final decision of procurement.

These findings are in agreement with Christopher (2005) who observes that selection criteria can improve procurement performance by yielding benefits to organizations such as cost reduction; quality improvements and competitive advantage.

### Results of Correlation Analysis

#### Correlation Analysis - Technology and Procurement Performance

The study sought to establish the correlation test analysis between the dependent variable (procurement performance) and Technology. The results were presented in table 4.

**Table 4: Pearson Correlation - Technology and Procurement performance**

Variable		Technology	Performance
<b>Technology</b>	Pearson Correlation	1	.548**
	Sig. (2-tailed)		.000
	N	90	90
<b>Performance</b>	Pearson Correlation	0.548**	1
	Sig. (2-tailed)	.000	
	N	90	90

\*\* Correlation is significant at  $p < 0.01$

The results showed that procurement performance was positively correlated with Technology with a strong correlation coefficient of 0.548. This reveals that any positive change in technology led to improved procurement performance. Findings provided enough evidence to suggest that there was a linear relationship between technology and procurement performance.

#### Correlation Analysis – Supplier Profile and procurement Performance

Table 5 displays the results of correlation test analysis between the dependent variable (Procurement performance) and independent variable (Supplier Profile).

**Table 5: Pearson Correlation – Supplier profile and procurement performance**

Variable		SupplierProfile	Performance
<b>Supplier Profile</b>	Pearson	1	.580**
	Correlation		
	Sig. (2-tailed)		.000
	N	90	90
<b>Performance</b>	Pearson	.580**	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	90	90

\*\* Correlation is significant at  $p < 0.01$

The results show that the procurement performance was positively correlated with Supplier Profile with a high correlation coefficient of 0.580. This reveals that any positive change in making supplier profile led to improved procurement performance. Findings provided enough evidence to suggest that there was a linear relationship between supplier profile and procurement performance.

**Correlation Analysis – Quality Assessment and Procurement Performance**

Table 6 displays the results of correlation test analysis between the dependent variable (procurement performance) and independent variable (Quality Assessment).

**Table 6: Pearson Correlation – Quality Assessment and procurement performance**

Variable		Quality Assessment	Performance
<b>Quality Assessment</b>	Pearson	1	.563**
	Correlation		
	Sig. (2-tailed)		.000
	N	90	90
<b>Performance</b>	Pearson	.563**	1
	Correlation		
	Sig. (2-tailed)	.000	
	N	90	90

\*\* Correlation is significant at  $p < 0.01$

The results show that the procurement performance was positively correlated with quality assessment with a high correlation coefficient of 0.563. This reveals that any positive change in

management of Quality Assessment led to improved procurement performance. Findings provided enough evidence to suggest that there



was a linear relationship between quality assessment and procurement performance.

**Correlation Analysis – Price levels and Procurement Performance**

Table 7 displays the results of correlation test analysis between the dependent variable (Procurement performance) and independent variable (price levels).

**Table 7: Pearson Correlation – Price Levels and Procurement performance**

Variable		Price Levels	Performance
Price Levels	Pearson Correlation	1	.592**
	Sig. (2-tailed)		.000
	N	90	90
Performance	Pearson Correlation	.592**	1
	Sig. (2-tailed)	.000	
	N	90	90

\*\* Correlation is significant at p<0.01

The results show that the procurement performance was positively correlated with price levels, with a high correlation coefficient of 0.592 and the correlation is significant at the 0.05 significance level. This reveals that any positive change in price levels led to improved procurement performance. Findings provided enough evidence to suggest that there was a linear relationship between price levels and procurement performance.

**Results of Regression Analysis**

In this study, regression analysis was used to test the relationship between the dependent and

**Model Summary**

**Table 8: Regression Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.785 <sup>a</sup>	.645	.576	.18309

a. Predictors: (Constant), Technology, Supplier Profile, Quality Assessments and Price Levels

b. Dependent Variable: Procurement Performance

independent variables. The relationship between the variables was tested at the 5% level where the R-square (coefficient of determination) was used to show the percentage of the changes in procurement performance as explained by the independent variables. Through this method, the analysis assumed linearity between the dependent variable and the independent variables. Regression analysis was necessary to detect simple linear relationship and because it also acts as a building block for multiple regression models (Anglim, 2007).

Regression indicates the strength of the relationship between the independent variables (Technology, Supplier Profile, Quality Assessments and Price Levels) and the dependent variable (Procurement Performance). The R square value in this case is 0.645 which clearly suggests that there is a strong relationship between Technology, Supplier Profile, Quality Assessments, Price Levels and Procurement Performance. This indicates that Technology, Supplier Profile, Quality Assessment and Price Levels share a variation of 64.5% of procurement performance.

### ANOVA Model

An F statistic of 371.322 indicated that the combined model was significant. This was supported by a probability value of (0.000). The reported probability of (0.000) is less than the conventional probability of (0.05). Thus, the model was fit to predict procurement performance using technology, supplier profile, quality assessment and price levels. The results indicate that technology, supplier profile, quality assessment and price levels are influential in predicting the procurement performance in Machakos University.

**Table 9: ANOVA Table**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	48.079	4	12.020	371.322	.000 <sup>b</sup>
	Residual	9.226	85	.32		
	Total	57.305	89			

a. Dependent Variable: Procurement Performance

b. Predictors: (Constant), Technology, Supplier Profile, Quality Assessments and Price Levels.

### Overall Regression Analysis

A multiple regression model  $Y=B_0+ B_1X_1+ B_2X_2+ B_3X_3 + B_4X_4+\epsilon$  regression analysis was fitted to determine whether independent variable (Technology, Supplier Profile, Quality Assessments and Price Levels) predict dependent variable (Procurement Performance). The study revealed the amount of variation of dependent variable explained by independent variables. The result showed that R value of 0.785 and R<sup>2</sup> value of 0.645

which means that 64.5% of the correspondent variation in procurement performance can be explained or predicted by all the independent variables in this study. This means that the remaining 35.5% will be explained by other factors not included in this study. However F 371.322,  $p < 0.001$  in Table 10 showed the model of goodness of fit in explaining the variation. This validates the fact that the independent variables in this study influence procurement performance.

**Table 10: Overall Regression Analysis**

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
	(Constant)	1.734	.269		6.103
Technology	.297	.050	.190	5.80	.000

Supplier Profile	.239	.100	.182	2.29	.000
	.321	.0112	.127	3.05	.000
Quality Assessment	.173	.030	.245	4.67	.000
Price Levels					

a. Dependent Variable: Procurement Performance

b. Predictors: (Constant), Technology, Supplier Profile, Quality Assessments and Price Levels

F =371.322 P=0.000 Adjusted R-squared=0.576

The overall regression model was

The regression model is

$$Y = 1.734 + 0.297X_1 + 0.239X_2 + 0.321X_3 + 0.173X_4 + \epsilon$$

Standard Error 0.269 0.050 0.100 0.112 0.030

t-statistics 6.103 5.80 2.29 3.05 4.67

P- Value 0.000 0.000 0.013 0.000 0.000

Where Y = Procurement performance, X1 = Technology X2 = Supplier Profile, X3 = Quality Assessment, X4= Price Levels,  $\epsilon$  = Error Term

Bo= Constant term (intercept),  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\beta_4$  = Beta coefficients

From the regression model, the coefficient of Technology was found to be 0.297. This value shows that holding other variables in the model constant, an increase in Technology by one unit causes the Procurement to increase by 0.297 units. The value of the coefficient is also positive. The positive effect shows that there is a positive relationship between the technology in the Universities and the procurement performance.

The coefficient is not just positive but also statistically significant with a t-statistic value of 5.80. In statistics, a t-statistic of 2 and above is normally accepted to be significant in statistical inference. The standard error was found 0.050 and the p-value was found to be 0.000. This variable of supplier selection principles was also found to be the second most influential variable on the procurement performance in Machakos University.

The result thus shows that Technology as a principle in supplier selection criteria at Machakos University and in Public universities in Kenya influences the procurement performance. The implication is that the managers should make sure that enough resources are allocated in improving the University Technology since it has the impact in the procurement performance of the institution.

From the regression model, the coefficient of supplier profile was found to be 0.239. This value shows that holding other variables in the model constant, looking into supplier profile and capacity enhances the procurement performance to increase by 0.239 units. The value of the coefficient is also positive. The positive effect shows that there is a positive relationship between the supplier profile and procurement performance in public universities.

The coefficient is not just positive but also statistically significant with a t-statistic value of 2.29. In statistics, a t-statistic of 2 and above is normally accepted to be significant in statistical inference. The standard error was found 0.100 and the p-value was found to be 0.013. The variable was also found to be the third most influential variable on the procurement performance in Machakos University.

The result thus shows that supplier profile in Machakos University and in Public universities in Kenya influences the procurement performance. The implication is that the managers should make sure that enough resources are allocated in improving the University Technology since it has the impact in the procurement performance of the institution,

From the regression model above, the coefficient of quality assessment was found to be 0.321. This value shows that holding other variables in the model constant, an increase in quality assessment causes the procurement performance to increase by 0.321 units. The value of the coefficient is also positive. The positive effect shows that there is a positive relationship between quality assessment and procurement performance.

The coefficient is not just positive but also statistically significant with a t-statistic value of 3.05. In statistics, a t-statistic of 2 and above is normally accepted to be significant in statistical inference. The standard error was found 0.112 and the p-value was found to be 0.000. The variable was also found to be the most influential variable on the procurement performance. The result thus shows that Quality Assessment as a supplier selection criteria used in Machakos University and in Public universities in Kenya influences the procurement performance.

From the regression model above, the coefficient of price levels was found to be 0.173. This value shows that holding other variables in the model constant, an increase in price levels by one unit causes the procurement performance to increase by 0.1 units. The value of the coefficient is also positive. The positive effect shows that there is a positive relationship between price levels as a principle of supplier selection criteria in Machakos University and their procurement performance.

The coefficient is not just positive but also statistically significant with a t-statistic value of 4.67. In statistics, a t-statistic of 2 and above is normally accepted to be significant in statistical inference. The standard error was found 0.030 and the p-value was found to be 0.000. The variable was also found to be the least influential variable on the procurement performance of Machakos University.

The findings corroborated with findings by Simpson and Power (2007) that low level of procurement regulations compliance in many public universities in developing nations hampers effective supplier selection criteria and implementation of institutional development projects.

From the value of F-statistic is 371.322 and it is also statistically significant. The value of adjusted R-squared was found to be 0.645. This implied that the estimated model explains approximately 64.5% of the variation in the procurement performance in Machakos University, and that the remaining 35.5% is accounted for by other factors that were not included in the model. The future researchers are therefore urged to try and improve the model by including other relevant variables in the model.

## **CONCLUSION AND RECOMMENDATIONS**

The study sought to determine the effects of Technology on the procurement performance at

Machakos University. Various methods were used to arrive at the findings. These methods included descriptive statistics, correlation analysis and regression analysis.

The study found that Machakos University makes use of computers and internet to great extents. From the results, the university has adopted ICT in various phases of the procurement cycle including ICT in announcement of the notice – publication, contract administration, preparation of tender dossier and procurement planning to great extents and that the university adopted ICT in calculating the value and classification of the contract, opening and evaluation of tenders, determination of the procurement procedure and giving and signing of contract to moderate extents. Organizations need to consider another organizational factor that can potentially affect the adoption of an IT a firm's information sharing culture. According to Weele (2010) procurement via the Internet requires firms to share information with its business partners. Since procurement has evolved to facilitate streamlining and automating the entire procurement process as well as making order and requisition information available along the entire supply chain, information sharing between and within organizations is indispensable.

Further, the findings concur with Kearney (2004) that ICT in procurement significantly influence the success of a company and the priority of ICT is to provide support in the creation of process efficiency and cost / expenditure. The findings also concur with Javier et al., (2010) that the reengineering of procurement has been attempted through various information technologies; the real opportunity for achieving this reengineering goal may lie in the use of ICT. The ability to communicate electronically between supply chain members is rapidly becoming a requirement for entering into business alliance. Further, the objective of electronic business

strategy in procurement area is to provide purchasing managers with better control over their companies' purchasing habits and relationships.

The study sought to establish the effect supplier profile on procurement performance at Machakos University. In evaluating the market of supplies, the quality standards should be first checked. Thereafter, the availability of a purchasing and delivery infrastructure should also be evaluated to see whether sourcing is feasible from the region. Finally, suppliers meeting infrastructure and quality standards should be evaluated and selected according to previously set criteria of humanitarian aid being of a unique nature implies different motives. Even though achieving lower price is still an important motive in order to make the products affordable for the buyer. Deane et al. (2009)

Studies also show that buyers tend to choose their suppliers in a geographical proximity to one another due to various reasons such as raw materials, knowledge, transportation hubs, potential partners, etc. (Bozarth et al., 2007; Wu et al., 2006), which on the contrary makes them prone to the same risks. Thus, he proposes a model to capture these associated risks in order to mitigate them in sourcing supplies.

The study sought to establish the effect of Quality Assessment in procurement performance at Machakos University, the study established that buyer should focus on the supplier's commitment to innovation, responsibility, ethics, quality consciousness, and communication since this will be crucial indicators supplier's commitment to working in relationships. Evaluation of this will indicate whether there will be compatibility of the values, beliefs and attitudes to quality of those of buyer and supplier.

Since management runs the business and makes decisions that affect the competitiveness of the supplier, a buyer should look at the management competitiveness of the supplier taking into account of the following managerial issues: management practice on long- range planning, management's commitment to TQM, the turnover of managers, professional experience and educational backgrounds of the key managers, availability of vision about future direction among other things (Handfield et al., 2009).

The last objective was to establish if price levels as a principle of supplier selection criteria influences the procurement performance in Public Universities in Kenya. To meet this objective, descriptive statistics, regression analysis and ANOVA was conducted. Results indicated that the Machakos Universities have effective price levels in supplier selection criteria.

The study had hypothesized that price levels adopted influences the procurement performance of Machakos Universities. The results reveal that a price level is statistically significant in explaining procurement performance at public universities in Kenya. Investment in procurement functions should be focused to the high value areas such as supplier relationship management and strategic sourcing. By tracking the costs of the procurement function, any opportunity for reallocation of funds consumed in needless costs to the higher value activities such as strategic sourcing is facilitated.

The study sought to establish the procurement performance of Public Universities in Kenya. Descriptive statistics, regression analysis and ANOVA were conducted. Results indicated that there was increased Procurement performance of Public Universities across the years of study. Specifically, the results indicated that there was increased efficiency and responsiveness.

## **Conclusion**

Following the study findings it is possible to conclude that Machakos University uses a given set of procurement principles in its supplier selection process. This is true from the number of respondents who said the university uses a code of ethics. The study also concludes that cost is the most important criteria during supplier selection as it greatly impacts on the overall resource allocation given the fact that procurement uses a great margin of the university financial resources. It is also evident that the selection process is not a one man show but an all-inclusive which involves managers and support staff of all the relevant user departments.

This is because procurement is by extension the department that meets the needs of other users and thus it is advisable to incorporate the real 'buyers' during selection to clearly identify the need that has to be met. In addition, the element of ethics during supplier selection helps to cut down corruption costs and also enhance resource allocation as indicated by majority of respondents. Also, element of quality assessment as a selection criteria helps to improve procurement performance by registering low no. of product defects as indicated by majority of respondents.

## **Recommendations of the Study**

From the findings the researcher noted that technology is key in enhancing procurement performance in the university. Due to its usefulness the university therefore should adopt technology in all its transactions, this includes; calling for quotations, making orders, paying suppliers and even identifying the right supplier. This will make work easier and faster. By adopting technology the university should focus in retraining their staff so that they can be able to use technology in all the



procurement dealings hence procurement functions becomes easier. Every process involved in procurement should use technology for efficiency and effectiveness in procurement.

From the findings we can say that supplier profile helps to establish the existence of the suppliers business hence guard against 'brief case' companies which have been known to land procurement officers in trouble especially when the supplier fails to deliver. It also informs the University of the Risks involved for instance in case of suppliers with great geographical distances thus reduce transportation risks and improve lead times. The university therefore should strategies on how to look into different supplier profiles before they are given a contract, this will help the university to know their past dealings and whether they will be capable of meeting the requirements as per the university.

The study sought to examine the effect of quality assessment on procurement performance in Machakos University. The Management should consider quality assessment as the key component in procurement performance and take precaution measures on dealing with quality assessment, the study recommends total quality management to be used whenever the university wants to assess the quality requirements of certain supplier this is an international agreed method of quality assessment. The study recommends introduction of more strategies of assessing quality supplies so that the university is not exposed to the risk of poor quality supplies hence financial loss.

The study therefore, based on the findings and conclusions presented above makes recommendations that; the management and procurement departments in public universities in Kenya need to effectively evaluate the most effective selection criteria that would facilitate its procurement performance. Having effective supply

chain management will determine the ability of the procurement performance of the organization. There is need to ensure that competent personnel are in place to manage supply chain processes in the organizations. This would be facilitated through training of all the staffs in the supply chain on critical aspects of supply chain with major concern on supplier selection criteria.

The study also recommends that, universities should be guided by the constitution as well as the PPOA guidelines on supplier evaluation for these to ensure effectiveness and performance of the procurement systems. Funds should also be availed for the supply chain to effectively manage the procurement systems for improved performance in the procurement activities.

From the findings the study recommends that universities need to adopt various precautions while formulating the strategies for comparing price levels with different suppliers. This would lead to both quality and quantity supplies hence the university gets value for their money and ensure that the procurement performance is better.

From the finding the study recommends that universities should have a small department which looks into the prices that suppliers offer and the current market rate, also the relationship between price and quality being offered by the supplier. The university adopted various strategies of price level evaluation which includes; the management should compare the current market rate of the similar product in the market before making final decision, the price should not compromise the quality and the quantity of the supplies.

### **Suggested Areas for Further Research**

This study sought to establish the relationship that exists between supplier selection criteria and

procurement performance in Machakos University. The researcher suggests that a similar study be conducted in other Public universities in different regions for comparison of results. The study should also cover a larger scope as this study concentrated on only one particular University.

There is need for another research study to be conducted to seek and establish the challenges that

affects other public universities while adopting particular selection criteria in their procurement. This would help other public universities that seek to adopt such criteria to be aware of the challenges and the mitigation strategies they can adopt to ensure successful implementation of the particular selection criteria thus enhance their procurement performance.

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