

**Factors affecting effective implementation of Procurement Practices in  
tertiary public training institutions in Kenya**

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**A thesis submitted in partial fulfillment for the degree of Doctor of  
Philosophy in Supply Chain Management in the Jomo Kenyatta  
University of Agriculture and Technology**

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## DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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## **DEDICATION**

To my family for their encouragement and continuous support throughout my progress to this magnitude of scholarship.

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## **ABBREVIATIONS& ACRONYMS**

<b>DEFRA</b>	Department For Environment Food and Rural Affairs
<b>EOQ</b>	Economic Order Quantity
<b>GDP</b>	Gross Domestic Product
<b>ICT</b>	Information Communication Technology
<b>JIT</b>	Just-in-time
<b>OECD</b>	Organization of Economic Cooperation Development
<b>PPDA</b>	Public Procurement and Disposal Act
<b>SP</b>	Sustainable Procurement
<b>TPS</b>	Toyota Production System
<b>UNEP</b>	United Nations Environment Programme
<b>WSSD</b>	World Summit on Sustainable Development
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>ROK</b>	Republic of Kenya
<b>PPDR</b>	Public Procurement and Disposal Regulations
<b>KISM</b>	Kenya Institute of Supplies Management

## DEFINITION OF TERMS

**Green Procurement or Environmental Procurement:** This is defined as taking into account environmental criteria for goods and services to be purchased in order to ensure that the related environmental impact is minimized (Sobczak 2008).

**Demand Management:** This ensures that resources required to fulfill the objectives of the strategic procurement plan are delivered to the organization efficiently, effectively and equitably without fruitless expenditure (Hawkins 2009).

**Disposal Management:** Refers to the decommissioning, clearance and removal of unserviceable, redundant and obsolete assets (Hawkins 2009).

**Supplier management:** This is a business process that allows a company to adequately select its vendors and negotiate the best prices for goods and services that it purchases. Senior managers also monitor the corporate supply chain to ensure that vendors familiarize themselves with the company's operating activities and manufacturing processes (Arthur 2009).

**Procurement:** The process in which public or private organizations buy supplies or services to fulfill various functions such as shelter, transport and need for infrastructures, among many others (Talluri 2008).

**Procurement policies:** These are rules and regulations for governing procurement procedures in an organization (Bartik 2009).

**Inventory management:** Is the application of data collection, demand and forecasting, lean and operational principles to manage the total amount of inventory within the supply chain at any point in time and manage inventory holding costs (Sharafali 2007).

**Training:** Is the process of identifying and developing the necessary knowledge and skills required for doing a job (Armstrong 2008).

**Information Communication Technology (ICT):** Is a technology that involves use of computers, software and internet connections infrastructure for supporting information processing and communication functions (Crompton 2007).

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## ABSTRACT

In Kenya, the inefficiency and ineptness of overall implementation of procurement practices in many tertiary public training institutions contributes to loss of over Ksh. 50 million annually. In addition, in over 50% of tertiary public training institutions, the quality and quantity of procured goods and services do not meet the raised specifications during tendering and the actual procurement expenditure is normally higher than the budgeted procurement funds. Procurement expenditure could be minimized through effective implementation of procurement practices. However, none of tertiary public training institution has successfully managed to effectively implement procurement practices and this has led to increased procurement expenditure and high institutions operational costs. The general objective of the study was to determine factors affecting effective implementation of procurement practices in tertiary public training institutions in Kenya. A descriptive correlational research design was adopted and the target population comprised 40 tertiary public training institutions in Kenya. Stratified random sampling technique was applied to select a sample size of 35 tertiary public training institutions. Questionnaires were used as the main data collection instruments and were pretested using a pilot study for validity and reliability. Descriptive and inferential statistics data analysis results revealed that the employed procurement policies, supplier management strategies, inventory management methods, professional training and use of ICT based systems hampered effective implementation of procurement practices in over 80% of tertiary public training institutions in Kenya. It was concluded that supplier management followed by training and then procurement policies are the major factors that mostly affect effective implementation of procurement practices tertiary public training institutions in Kenya. The study recommendations included; improvement on the level of compliance with procurement regulations, adoption of effective supplier management techniques, application of inventory management techniques based on economic order quantity, implementation of better supplier selection strategies and finally training of procurement staff and integration of procurement functions with ICT based systems.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background of the Study**

This section of the study introduces the following sub-sections in the following order, background to the study, statement of the problem, research objectives, research hypotheses, significance of the study, scope and limitations of the study. It is the part of the study that lays down the foundations of the research problem on factors affecting effective implementation of procurement practices in tertiary public training institutions in Kenya. Procurement is a crucial element in the working functions of any state. It refers to the purchasing of goods and services in the right quality, from the right source and the right price all to meet a specific need. Every government has the obligation to provide essential services to its citizens. In Kenya, procurement consumes 45% of the national budget, excluding local government procurement. The close relationship between procurement and development demonstrates that there is need for transparency and accountability in the manner in which procurement is conducted. (Masime 2009). This study aimed at determining factors affecting effective implementation of procurement practices in tertiary public training institutions in Kenya.

Procurement is the process in which public or private organizations buy supplies or services to fulfill various functions such as shelter, transport and need for infrastructures, among many others (Talluri 2008). According to (Chopra 2005),

procurement is the process of obtaining goods and services from the preparation and processing through to receipt and approval of the invoice for payment. Procurement commonly involves purchase planning, standards determination, specifications development, supplier research and selection, value analysis, financing, price negotiation, making the purchase, supply contract administration, inventory control and stores, and disposal and other related functions (Corsten 2009). Public procurement is concerned with how public sector organizations spend taxpayers' money on goods and services (Hall 2009). Public procurement is guided by principles of transparency, accountability, and achieving value for money for citizens and taxpayers. Globally, in many developed nations, public sector expenditure is substantial. Government organizations across the world tend to spend between 8 per cent and 25 per cent of GDP on goods and services (OECD 2006). In the UK, public procurement expenditure is approximately £150 billion (DEFRA 2007). Government is often the single biggest customer within a country, and governments can potentially use this purchasing power to influence the behavior of private sector organizations (Charles 2007). In particular, it has been noted that public procurement can be a lever to deliver broader government objectives, such as stimulating innovation in supply markets, using public money to support environmental or social objectives, and for supporting domestic markets (McCrudden 2008).

### **1.1.1 Effective Implementation of Procurement Practices**

Effective implementation of procurement practices is determined by the level of compliance with procurement regulations, minimization of procurement expenditure, transparency and accountability of procurement funds and quality of procured goods and services (Gadde 2007). Effective implementation of procurement practices entails implementation of strategies to be followed when making organization purchasing decisions. These include building supplier relationships, team-based approaches to procurement and proper use of technology or e-procurement (UNEP 2007). Effective implementation of procurement practices significantly improves the effectiveness of purchasing decisions (Sobczak 2008). One of the most important factor that promotes effective implementation of procurement practices is improving the relationship between the buyers and suppliers. Choosing a supplier based solely on pricings often viewed as short-sighted and may be ineffective. An alternative procurement practice is to use suppliers that offer reliable products at fair prices (Elliot 2007).

A key factor that affects effective implementation of procurement practices is to making an entire organization department responsible in some way for procurement (Simpson &Power 2007). Making procurement practices more of a team effort boosts employees' morale and improves strategic approaches to purchasing. Some practices include designating a representative from each department to sit on a procurement committee that consults regularly with the procurement department (McCrudden 2008). One of the most widely

discussed issue that promotes effective implementation of procurement practices is the use of e-procurement. E-procurement is an electronic method of purchasing supplies and services. Companies that purchase e-procurement software are able to receive products and service payments online. E-procurement is considered as an effective procurement practice because it can reduce overhead expenses by eliminating purchasing agent costs (WisegEEK 2013).

In Africa, many public sector organizations view effective implementation of procurement practices as an add-on or an approach that costs more. Truly, sustainable solutions can often cost less over the whole life of the purchase. Some key benefits include: value for money, protection and enhancement of the environment, more efficient use of resources, greater social inclusion, fair and ethical trade, support for innovation, better risk management, lower whole-life costs improved supplier relationships, a diverse and flexible supply chain and a competitive edge in your industry (Talluri 2008). Effective implementation of procurement practices procurement policies and practices are critical for good public financial management and effective budget implementation (Zuzana 2012). In many African countries, public procurement accounts for a substantial part of fiscal expenditures, making sound procurement methods central not only for sound public financial management but also for inclusive growth (Zuzana 2012).

### **1.1.2 Procurement Practices in Kenya**

In Kenya, public sector procurement can be broken down into two categories, namely; project specific procurement and general consumable procurement. In

project specific procurement, goods, works or services are sought for a particular initiative (e.g. a new road, a hospital, plant and equipment), whereas general consumable procurement relates to items that are required for a ministry or authority to perform its duties (e.g. fuel, stationery, vehicle parts, road maintenance, and security) (George 2008). According to the Kenya Gazette Supplement No. 92, (2006), there are five types of public procurements; open tenders, where prospective suppliers are invited to compete for a contract advertised in the press and the lowest tender in terms of price is generally accepted although the advertisers usually state that they are not bound to accept the lowest or any tender. Another type of tender is the restricted open tender where prospective suppliers are invited to compete for a contract, the advertising of which is restricted to appropriate local newspapers. Selective tenders are those where tenders are invited from suppliers from an approved list that have been previously vetted regarding their competence and financial standing. In a negotiated tender, a tender is negotiated with only one supplier such that competition is eliminated (Arthur 2009).

Procurement practices in Kenya public sector are regulated by three major acts, namely; (PPDA 2005, RoK 2005, PPDR 2006, GoK 2006) and the Supplies Practitioners Management Act, 2007 (GoK 2007). The PPDA, effective as of 1st January 2007, applies to all procurement of goods, works and services, as well as the disposal of assets by public entities. Public entities are those that procure goods, services or works utilizing public funds. As such, public entities include

the central and local governments, courts, commissions, state corporations, cooperatives, and educational institutions such as colleges, schools and universities (Duncan 2009).

This Act does not directly seek to regulate the private sector, though it does regulate its interaction with public entities. The PPDA was established in order to; maximize economy and efficiency, promote competition and ensure that competitors are treated fairly, promote the integrity and fairness of procurement procedures, increase transparency and accountability in those procedures, increase public confidence in those procedures, facilitate the promotion of local industry and economic development (Mathew 2009). To achieve these objectives, the Act establishes procurement and disposal procedures, and sets up the necessary structures to ensure that the procedures are followed and there is provision of oversight and compliance. The Act also establishes the Public Procurement Administrative Review Board, which handles complaints, reviews and appeals stemming from procurement practices. The Public Procurement and Disposal Regulations, 2006 (ROK) read together with the PPDA, outline the various processes and procedures to be followed when goods, services or works are procured. A threshold matrix is outlined, as are the duties and functions of the various participants. The Supplies Practitioners Management Act 2007 was assented to law on 22nd October 2007 and commenced on 30th October 2007. This Act regulates both public and private sector procurement practitioners and strives to professionalize procurement practice in Kenya (Andrew 2010).

### **1.1.3 Tertiary Public Training Institutions in Kenya**

Tertiary Public training institutions in Kenya comprises 40 technical training colleges (GoK 2012). For the past ten years, many tertiary public training institutions have continued to enroll more students as a result of spontaneous response to the increasing demand for higher education necessitated by the increasing flow of students from schools (Thomson 2007). The cost of running public training institutions has thus increased due to increase in facilities which has made students to pay higher fees to finance the institutions procurement expenditure. This has created unrests in many public training institutions and effective procurement measures are being demanded to help in cutting down the fees as an effort to make higher education affordable to many students (Benard 2008).

### **1.2 Statement of the Problem**

Tertiary public training institutions experience major challenges in the execution of procurement practices. In Kenya, the central government spends about Kshs. 234 billion per year on procurement. However on annual bases, the government losses close to Ksh. 121 billion about 17 per cent of the national budget due to inflated procurement quotations (KISM 2010). According to Public Procurement Oversight Authority (PPOA 2009), most of the tendered products/services in many tertiary public training institutions have a mark-up of 60 per cent on the market prices. In the year 2010, the Ministry of Education lost 4.2 billion Kenyan

shillings, in the year 2011, a total of Ksh. 33,061,925 is said to have been embezzled from “Kazi Kwa Vijana funds” (Daniel 2010).

The inefficiency and ineptness of overall implementation of procurement practices in many tertiary public training institutions contributes to loss of over Ksh.50 million annually (Tom 2009). According to Victor (2012), procurement expenditure could be minimized through proper implementation of procurement practices. A relatively well-developed body of research by Daniel (2010), Victor (2012) and Tom (2009) explored implementation of procurement practices in public sector organizations in general and left a major knowledge gap on effective implementation of procurement practices in tertiary public training institutions. It's hence against this background this study was undertaken to determine factors affecting effective implementation of procurement practices in tertiary public training institutions in Kenya.

### **1.3 Objectives of the Study**

The following were the objectives of the study;

#### **1.3.1 General Objective**

The general objective of the study was to determine factors affecting effective implementation of procurement practices in tertiary public training institutions in Kenya.

#### **1.3.2 Specific Objectives**

1. To determine the effect of procurement policies on effective implementation

- of procurement practices in tertiary public training institutions in Kenya.
2. To find out the effect of inventory management on effective implementation of procurement practices in tertiary public training institutions in Kenya.
  3. To establish the effect of supplier management on effective implementation of procurement practices in tertiary public training institutions in Kenya.
  4. To evaluate the effect of training on effective implementation of procurement practices in tertiary public training institutions in Kenya.
  5. To assess the effect of information communication technology on effective implementation of procurement practices in tertiary public training institutions in Kenya.

#### **1.4 Hypotheses**

1.  $H_{01}$ : There is no significant effect between procurement policies and effective implementation of procurement practices in tertiary public training institutions in Kenya.
2.  $H_{02}$ : There is no significant effect between inventory management and effective implementation of procurement practices in tertiary public training institutions in Kenya.
3.  $H_{03}$ : There is no significant effect between supplier management and effective implementation of procurement practices in tertiary public training institutions in Kenya.
4.  $H_{04}$ : There is no significant effect between training and effective implementation of procurement practices in tertiary public training institutions

in Kenya.

5. H<sub>05</sub>: There is no significant effect between information communication technology and effective implementation of procurement practices in tertiary public training institutions in Kenya.

### **1.5 Significance of the Study**

Effective implementation of procurement practices play a significant role towards enhancing sustainability of organizational operations with less negative impact to environmental issues (Paul. 2007). Organization that successfully manages to effectively implement procurement practices such as procurement of green energy like solar power and biogas fuel rarely experiences operational disruptions and this not only impacts positively on organization productivity but also helps in minimizing procurement expenditure and sustaining organization operations continuously (Ruben 2007). In Kenya, many tertiary public training institutions have not yet effectively embrace procurement practices because they have not put measures in place on how to manage factors affecting effective implementation of procurement practices in tertiary public training institutions.

This study provides a systematic and comprehensive insight into the state of procurement practices in tertiary public training institutions in Kenya. Given the paucity of previous research on public procurement and its scale and significance, it is important to shed greater light on how tertiary public training institutions expenditure can be minimized through effective implementation of procurement practices in accordance with the public procurement legal framework. This

therefore called for a more comprehensive study to determine factors affecting effective implementation of procurement practices in tertiary public training institutions in Kenya. The study is of great significant to stake holders and board members in all tertiary public training institutions in Kenya since the study findings will assist in formulation and implementation of guidelines and framework for supporting effective implementation of procurement practices.

The study is of great significance to all other public training institutions in Kenya since study recommendations will assist institutions management to overcome the major challenges that hinder effective implementation of procurement practices in training institutions. The study could be of importance to procurement professionals in various industrial sectors since it would add a body of knowledge to theory and practice of effective implementation of procurement practices. The study is of great importance to the government since the obtained findings will provide guidelines on how public organizations can effectively implement procurement practices hence leading to proper utilization of government financial resources. The findings of this study are expected to be of significance to various scholars, students and researchers who might be involved in procurement research activities since the documented report would provide ready reference material that could equip the learners with more knowledge and skills on issues relating to factors affecting effective implementation of procurement practices in public training institutions in Kenya.

### **1.6 Scope of the Study**

The study was undertaken at tertiary public training institutions in Kenya. The study involved all the procurement staff in tertiary public training institutions. The study specifically gathered data on the effect of procurement policies, inventory management, supplier management, training and information communication technology on effective implementation of procurement practices in tertiary public training institutions in Kenya. The study was undertaken within a duration of six months.

### **1.7 Limitations of the Study**

The challenges experienced included some of the respondents not filling or completing the questions or some issues being misunderstood, inadequate responses to questionnaires and unexpected occurrences like people going on leave before completing the questionnaire. This was mitigated through constant reminder to the respondents during the period the questionnaires were administered to them. The organizational confidential policy restricted most of the respondents from answering some of the questionnaires. This was considered to be against the organization confidentiality policy to expose the organization confidential matters. The introduction letter obtained from the university to the organizations management helped to avoid suspicion and enabled the institutions to disclose much of the information sought by the study.

## **CHAPTER TWO**

### **REVIEW**

#### **2.1 Introduction**

This chapter explores the existing literature on factors affecting effective implementation of procurement practices in tertiary public training institutions. The chapter covers conceptual framework, theoretical framework, empirical literature, critical review and research gaps.

#### **2.2 Theoretical Framework**

There are many models that exist to analyze the creation and application of procurement policies. Most of these models are mostly used in the creation of public policies. These models are used to identify important aspects of policy, as well as explain and predict policy and its consequences.

##### **2.2.1 Agency Theory**

Agency theory is concerned with agency relationships. The two parties have an agency relationship when they cooperate and engage in an association wherein one party (the principal) delegates decisions and/or work to another (an agent) to act on its behalf (Eisenhardt 2009; Rungtusanatham et al., 2007). The important assumptions underlying agency theory is that; potential goal conflicts exist between principals and agents; each party acts in its own self-interest; information asymmetry frequently exists between principals and agents; agents are more risk averse than the principal; and efficiency is the effectiveness criterion. Two

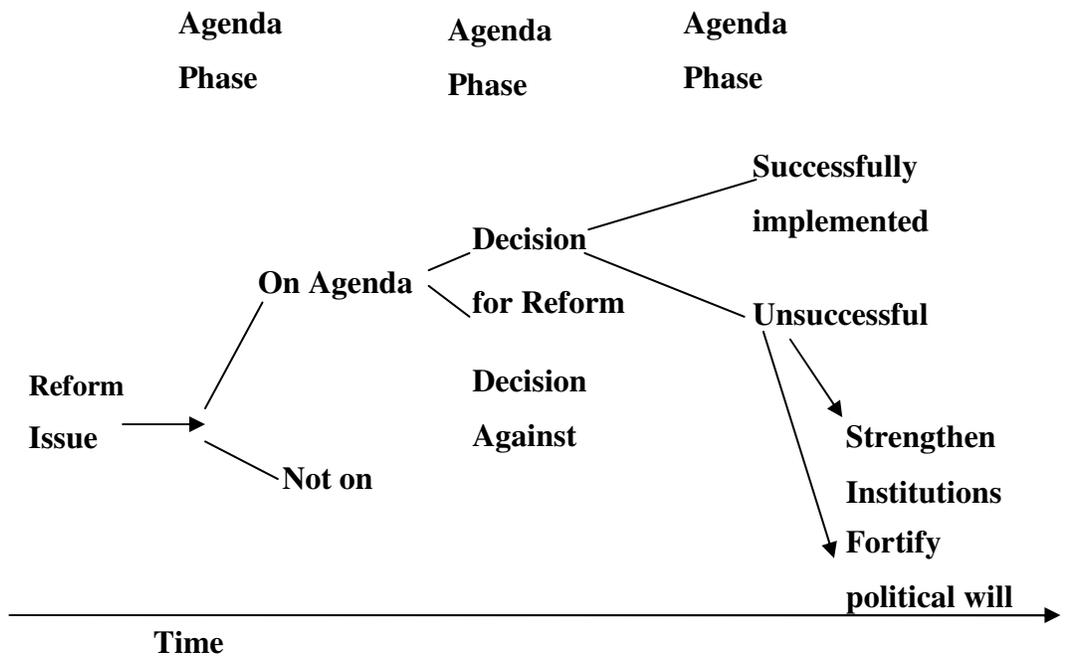
potential problems stemming from these assumptions may arise in agency relationships: an agency problem and a risk-sharing problem (Xingxing 2012). An agency problem appears when agents' goals differ from the principals' and it is difficult or expensive to verify whether agents have appropriately performed the delegated work (i.e. moral hazard). This problem also arises when it is difficult or expensive to verify that agents have the expertise to perform the delegated work (i.e. adverse selection) that they claim to have. A risk-sharing problem arises when principals and agents have different attitudes towards risk that cause disagreements about actions to be taken (Xingxing 2012).

The assumptions and prescriptions of agency theory fit naturally with the issues inherent in supply chain quality management. In the process of managing supplier quality, buyers in agency relations are faced with potential problems. By their nature, buyers expect suppliers to provide good quality and to improve the quality of supplied products and/or services, but suppliers may be reluctant to invest substantially in quality, especially if they perceive that buyers are reaping all the benefits. The difference between buyers and suppliers will result in the two parties concerning themselves only with their self-interests (Xingxing 2012). Agency theory determines how procurement managers execute procurement practices on behalf of tertiary public training institutions. Existence of poor principle agent relationship leads to low level of top management commitment and this also affects the relationship between institutions and the suppliers. Existence of conflict of interest amongst the agents leads to execution of

procurement practices against the procurement the procurement policies and this leads to increased procurement budget and loss of procurement funds. The study thus used this model to determine the effect of procurement policies for effective implementation of procurement practices in tertiary public training institutions in Kenya.

### **2.2.2 Linear Policy Model**

This model was developed by Grindle & Thomas (2000) also known as rational model and is the most widely-held view of the way in which policy is made. It outlines policy-making as a problem solving process which is rational, balanced, objective and analytical. In the model, decisions are made in a series of sequential phases, starting with the identification of a problem or issue, and ending with a set of activities to solve or deal with it. The policy model phases include; recognizing and defining the nature of the issue to be dealt with; identifying possible courses of action to deal with the issue; weighing the advantages and disadvantages of each of these alternatives; choosing the option which offers the best solution; implementing the policy and possibly evaluating the outcome (Grindle & Thomas, 2000). Figure 2.1 explains the agenda phases.



**Fig 2.1: Linear Policy Model, adapted from Grindle and Thomas (2000)**

This model assumes that policymakers approach the issues rationally, going through each logical stage of the process, and carefully considering all relevant information. If policies do not achieve what they are intended to achieve, blame is often not laid on the policy itself, but rather on political or managerial failure in implementing it (Juma & Clarke, 2005). Failure can be blamed on a lack of political will, poor management or shortage of resources that eventually hinders formulation and effective implementation of procurement practices (Juma & Clarke, 2005). Linear Policy Model determines the process under which policies are made and implemented in an organization. The model assumes that failure in policy implementation can be blamed to poor management and shortage of resources and this implies that management support and budgetary allocation

plays a key role in supporting policy implementation. Implementation of procurement policies is greatly determined by procurement planning, management support, budgetary allocation, and preparation of procurement progress reports, procurement records management and the employed procurement methods. The study thus used this model to determine the effect of procurement policies on effective implementation of procurement practices in tertiary public training institutions in Kenya.

### **2.2.3 Economic Order Quantity (EOQ) Model**

The EOQ model is the method that provides the company with an order quantity. This order quantity figure is where the record holding costs and ordering costs are minimized. By using this model, the companies can minimize the costs associated with the ordering and inventory holding. In 1913, Ford W. Harris developed this formula whereas R. H. Wilson is given credit for the application and in-depth analysis on this model (Edward, 2010). The EOQ is a model that is used to calculate the optimal quantity that can be purchased or produced to minimize the cost of both the carrying inventory and the processing of purchase orders or production setups (Edward, 2010). Following is the formula for the order quantity model:

$$Q^* = \sqrt{\frac{2DS}{H}}$$

Where Q is optimal order quantity; D is units of annual demand; S is cost incurred to place a single order or setup and H is carrying cost per unit. This formula is

derived from the following cost function: Total cost = purchase cost + ordering cost + holding cost.

The economic order-quantity model considers the tradeoff between ordering cost and storage cost in choosing the quantity to use in replenishing item inventories. A larger order-quantity reduces ordering frequency, and, hence ordering cost/month, but requires holding a larger average inventory, which increases storage (holding) cost/month. On the other hand, a smaller order-quantity reduces average inventory but requires more frequent ordering and higher ordering cost/month (Edward, 2010). The EOQ model helps organizations to reduce inventory management costs by reducing the cost of ordering and holding stock. The study thus used this theory to find out the effect of inventory management on effective implementation of procurement practices in tertiary public training institutions in Kenya.

#### **2.2.4 Just in Time Model**

The JIT is a philosophy of manufacturing based on planned elimination of all waste and on continuous improvement of productivity (Mehra & Inman 2007). It also has been described as an approach with the objective of producing the right part in the right place at the right time. Waste results from any activity that adds cost without adding value, such as the unnecessary moving of materials, the accumulation of excess inventory, or the use of faulty production methods that create products requiring subsequent rework. JIT also known as lean

production or stockless production) should improve profits and return on investment by reducing inventory levels, reducing variability, improving product quality, reducing production and delivery lead times, and reducing other costs (such as those associated with machine setup and equipment breakdown). In a JIT system, underutilized (excess) capacity is used instead of buffer inventories to hedge against problems that may arise (Patricia, Dale & Michael 2012). The basic elements of JIT were developed by Toyota in the 1950s, and became known as the Toyota Production System (TPS). JIT was well-established in many Japanese factories by the early 1970s. JIT began to be adopted in U.S.A in the 1980's (General Electric was an early adopter), and the JIT/lean concepts are now widely accepted and used (Patricia, Dale & Michael 2012).

Daugherty & Spencer (2005) proposed that JIT “is adaptable to any productive system, a transportation system, an administrative system, or a manufacturing system”. To illustrate their views, they developed a functional model comprising three components which they assert are needed to support the goal of elimination of waste through a process of continual improvement (Wantuck 2009). The three components are: respect of the people within the system; the execution system; the planning process prerequisites for continuous improvements to the system. The first component, respect for the people within the system, appears to be critical to the success of a JIT programme. The second component of the functional model is the execution system. The execution system is proposed to consist of two elements: the Kanban method of pull-through production and the

inventory buffers. The supermarket buffer is a transitional buffer between the fabrication areas and the assembly areas. The purpose of the buffer is to provide the inventory necessary to maintain operations as improvements are made in the production process to reduce the inventory levels (Mehra & Inman 2007).

The third component of the functional model is the planning process prerequisites to continuous improvement. There are six elements identified within this component. The common characteristic justifying their inclusion into the component is the opportunity the elements provide for continuous improvements to occur to the overall system. Total quality management is a prerequisite to successful JIT because of the potential for disruption in the production process of components that are outside of specifications. The existence of any quality defect is the antithesis of the JIT goal of the elimination of all waste in the system through continuous improvements. Again, with lower levels of inventory, high quality levels are required in order to keep the system operating (Sharafali 2007).

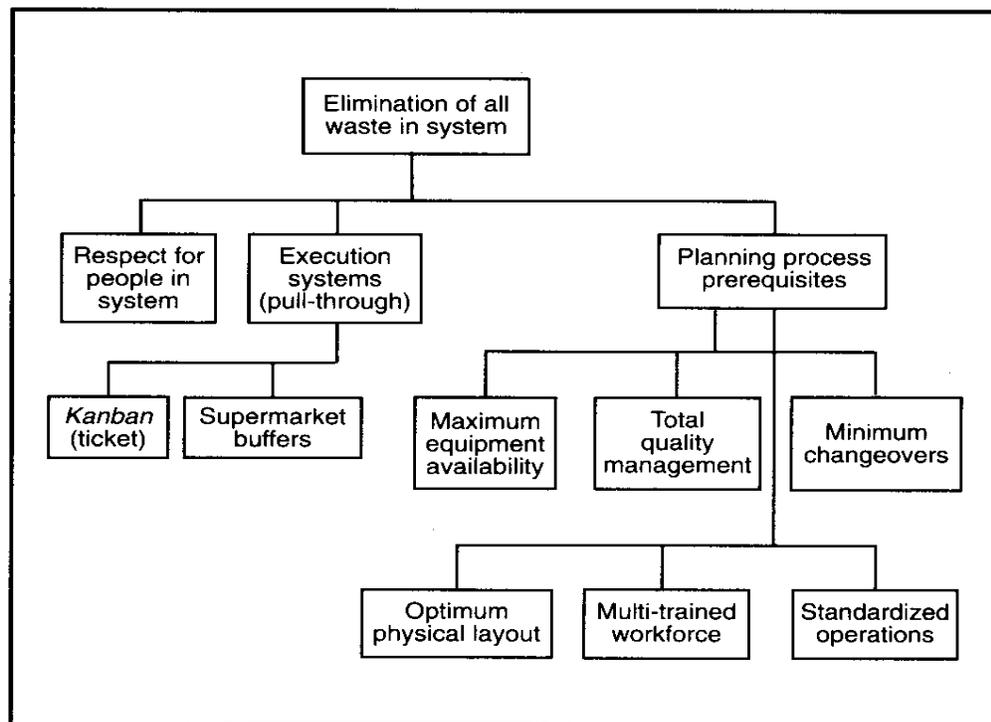
Minimum changeover is also a prerequisite because the changeover determines the lot size given a capacity. Lotless productions, or zero inventories, are synonymous and often used to describe a JIT programme. To reduce lot sizes, reductions in changeover times are required. The optimum layout element is a prerequisite to successful JIT programmes because of the potential for disruption in the system caused by misplaced components. A second requirement for optimum layouts is elimination of waste made possible through redesign of the

process layout. A third requirement is increased flexibility of the workforce through a U-shaped layout (Wantuck 2009).

The need for a well-trained and flexible workforce has been documented in the previously cited literature. A well-trained workforce reduces the potential for waste resulting from human errors and lack of equipment knowledge. A cross-trained workforce permits flexibility in work assignments. Absences of workers can be covered by reassigning cross-trained workers. Standardized operations are necessary to improve employee flexibility and to eliminate the potential for errors due to the lack of training or equipment knowledge. Break-in times can be significantly reduced or eliminated. Additionally, the time required to repair equipment is reduced (Sharafali 2007). The model is intended to illustrate the interaction necessary to link the human side of the organization, the planning side and the actual execution of the system's functions. That interaction of the three components is directed at completely eliminating all waste from the system. All three components must be balanced; fairly equal commitment or proportioning is needed if a JIT implementation is to be successful. Success can be gauged by monitoring tangible indicators of progress such as inventory reductions, quality enhancements and productivity improvements (Patricia, Dale & Michael 2012).

Just in Time Model helps organizations to reduce inventory management costs since goods are delivered in time of use and thus storage costs are minimized. Just in Time model also helps reduction of lead time and encourages effective

execution of store management practices. In tertiary public training institutions, the use of JIT can have a significant effect on execution inventory management practices. The study thus used this theory to find out the effect of inventory management on effective implementation of procurement practices in tertiary public training institutions in Kenya.

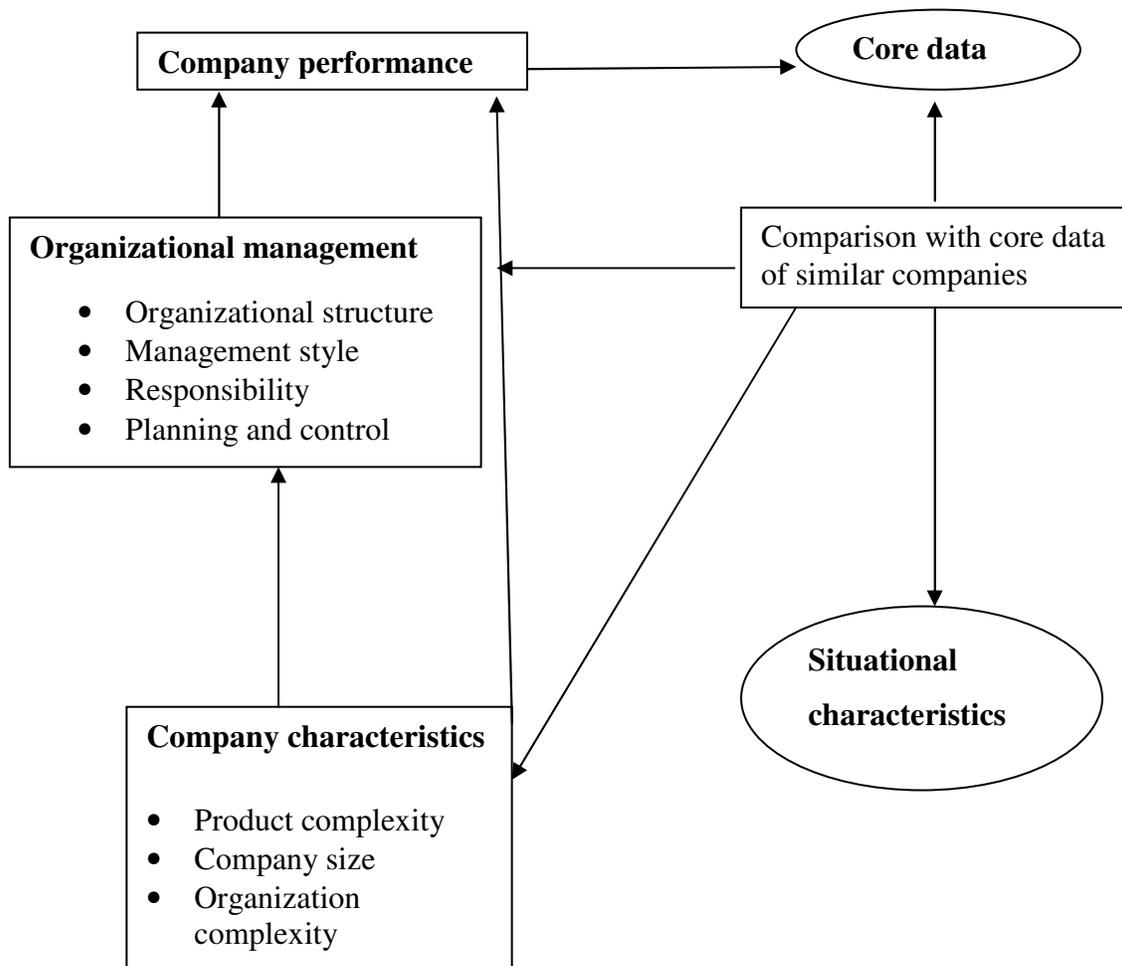


**Fig 2.2: Just in Time Model, adapted from Patricia, Dale & Michael, (2012)**

### 2.2.5 The Benchmarking Model

According to Praxion Research group limited (2010), benchmarking is an approach that is used for best practices. These practices include among others strategies, policies, operations, processes, products and organizational structures.

Have et al (2009) describe benchmarking as a systematic comparison of organizational processes and performance in order to create new standards and/or improve processes. The four basic types of benchmarking are: Internal- within the organization e.g. between business units, competitive- benchmarking operations and performance with direct competitors, functional- benchmarking similar processes within the broader range of the industry, and generic- comparing operations between unrelated industries. Benchmarking involves various steps; determining the scope, choosing the benchmark partners, determining measures, units, indicators and data collection methods, collecting data, analyzing the discrepancies, presenting the analysis and discussing implications in terms of new goals, making an action plan and/or procedures, and monitoring progress in ongoing benchmark. The benchmarking process involves various parameters as depicted below (Berenschot 2009).



**Figure. 2.2: Benchmarking model, adapted from Berenschot (2009).**

Benchmarking is not easy, according to Berenschot (2009), if it is carried out by semi committed managers, without the user of predetermined measures and without proper tools for analysis and presentation, it ends up in dismay, a futile exercise often betrayed as industrial tourism, comparing apples and pears. Berenschot further comments that if well-executed, benchmarking can trigger the need for improvement, highlighting new opportunities and solutions to problems. This model, therefore, underscores the need to have highly competent managers who are committed to the process.

Benchmarking model guides organizations on how to use best practices that helps to effectively implement supplier management practices. Through benchmarking with other organizations, tertiary public training institutions can be able to employ better supplier appraisal strategies, supplier selection strategies, supplier selection process, supplier performance strategies, supplier relationship management strategies, payment methods and able to acquire after sale services from suppliers. These also may have a significant effect towards strengthening supplier management practices in the organization hence leading to creation of favorable environment for effective implementation of procurement practices. The study thus used the benchmarking model to establish the effect of supplier management on effective implementation of procurement practices in tertiary public training institutions in Kenya.

#### **2.2.6 Transaction Cost Economics Theory and Resource Based View**

In transaction cost economics (TCE), the focus of the firm is to minimize the sum of transaction costs and production costs (Williamson 1979). Transaction costs affect the firms' decisions on how they organize their activities, whether to move towards vertical integration (hierarchy) or to prefer market exchange. Thus, According to TCE, the decision of whether to collaborate or not should be based on the efficiency of governance. Transaction cost economics theory identifies and explains the conditions suitable for a firm to manage an economic exchange internally, and the conditions under which it should manage an economic exchange externally (Williamson 2005). Heide and John (1990) argue that

transaction cost analysis is useful in studies of relationships, because it provides insights into the circumstances that cause the development of a closer relationship between the buyers and suppliers. Heide and John (1990) base their theoretical argument on Williamson's (1979) studies stating that the establishment of a closer relationship corresponds to a shift away from market-based exchange toward bilateral governance.

RBV and TCE are important to the study of supplier management, as superior performance achieved in supply chain activities relative to competitors, would explain how these activities can be supported by suppliers and how supplier selection/evaluation/development can contribute to the supply chain core competences (Dey 2010). Applying TCE underlies the aspects of efficiency and cost focus. Especially, it defines the boundaries of a firm. RBV refers to the firm's internal value creation through its resources and capabilities. Value can be created from supplier relationship management through learning mechanisms, routines and experience. RBV applies the aspects of external and internal social relations, power distribution and the level of dependency on external counterparts. It aims at the optimization of the continuity of the business and the autonomy of a firm. As a summary, it can be said that these theories support the purpose of supplier management, diffusion of supplier information between business units, minimization of transaction costs, value creation through internal capabilities and resources, and reducing the risks of supply dependence and availability (Ellram 2008). In this study TCE was used to establish the effect of supplier management

on effective implementation of procurement practices in tertiary public training institutions in Kenya.

### **2.2.7 Kirkpatrick Model**

Donald Kirkpatrick has developed a very popular evaluation model that has been used since the late 1950s by the training community. The focus is on measuring four kinds of outcomes that should result from a highly effective training programme (Kirkpatrick 1994). Kirkpatrick's model includes four levels or steps of outcome evaluation: Level 1 Evaluation is called Reaction level; Level 2 Evaluation is called Learning level; Level 3 Evaluation is called Behavior level and finally Level 4 Evaluation is called Results level.

Level 1 Reaction level, the goal is to measure participants' reactions to the training programme. One should measure their reactions immediately after the program. Level one evaluation should not just include reactions toward the overall programme; it should also include measurement of participants' reactions or attitudes toward specific components of the programme, such as the instructor, the topics, the presentation style, the schedule, audiovisuals, etc. Furthermore, each of these components can be further broken down into sub-components for evaluation (e.g., you can ask participants to evaluate specific characteristics of the instructor, the presentation, etc.). In short, level one evaluation is far more than just the measurement of overall customer satisfaction (Richard 2007).

In level 2 Learning level, the goal is to determine what the training programme participants learned during the training event. Because the training instructor should have specific learning objective, one hopes to find clear learning outcomes. Learning outcomes can include changes in knowledge. The evaluation should focus on measuring what was covered in the training event (i.e., the learning objectives) (Richard 2007). Level two evaluations should be done immediately after the training event to determine if participants gained the knowledge, skills, or attitudes. A couple of issues here are (a) how shall one measure knowledge, skills, attitudes, and (b) what research design should be use to demonstrate improvement in level two outcomes? (Richard 2007).

In Level 3 Behaviour, the goal is to find out if training programme participants change their on-the-job-behaviour (OJB) as a result of their having attended and participated in the training programme. If the behaviour change does not occur, you also want to find out why the change did not occur. The level three question is, did the training have a positive effect on job performance? Level three evaluation specifically involves measuring the transfer of knowledge, skills, and attitudes from the training context to the workplace (Richard 2007). Level 4 Results is where the goal is to find out if the training programme led to final results, especially business results that contribute to the “bottom line” (i.e., business profits). Level four outcomes are not limited return on training investment (ROI). Level four outcomes can include other major results that contribute to the wel functioning of an organization. Level four includes any

outcome that most people would agree is “good for the business.” Level four outcomes are either changes in financial outcomes (such as positive ROI or increased profits) or changes in variables that should have a relatively direct effect on financial outcomes at some point in the future (Richard 2007). Kirkpartick Model helps in determining the organization training needs and establishing how employees should be trained in order to fill the organization skills gaps. The model is important in assessing training need, determining how staff should be qualified, finding out the impact of the offered training and equipping the employees with additional skills. The study used this model to evaluate the effect of training on effective implementation of procurement practices in tertiary public training institutions in Kenya.

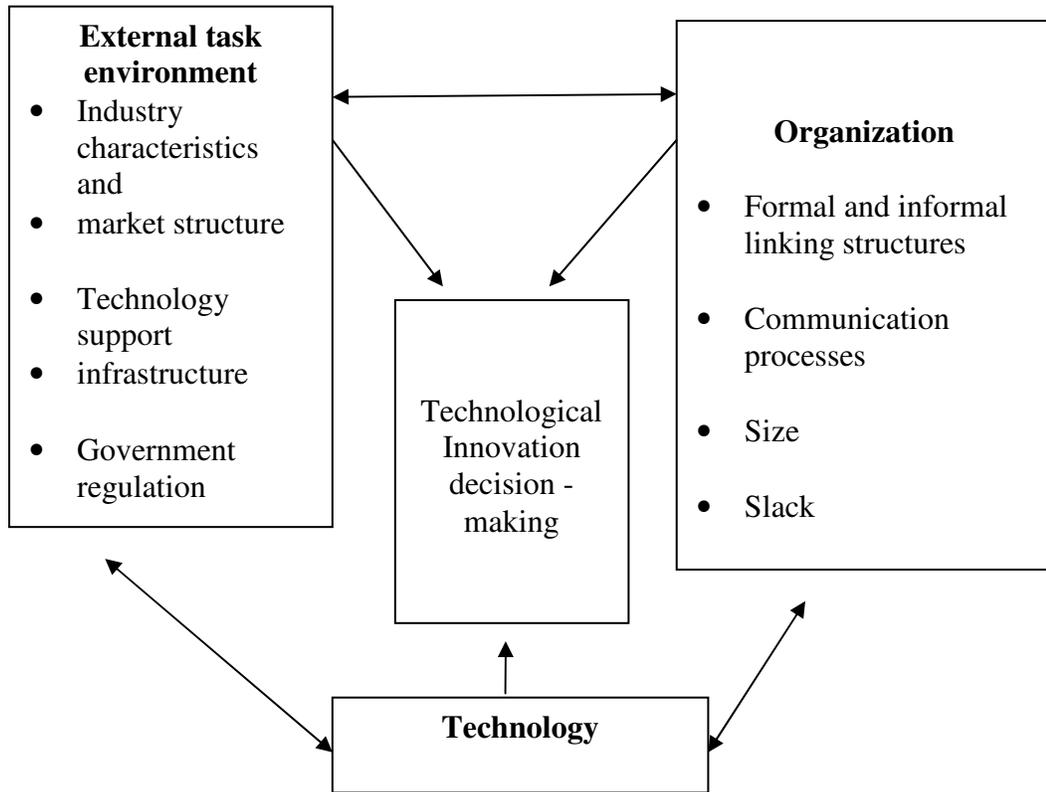
### **2.2.8 The Knowledge-Based Theory**

The knowledge-based theory of the firm considers knowledge as the most strategically significant resource of the firm. Its proponents argue that because knowledge-based resources are usually difficult to imitate and socially complex, heterogeneous knowledge bases and capabilities among firms are the major determinants of sustained competitive advantage and superior corporate performance (Grant 2007). This knowledge is embedded and carried through multiple entities including organizational culture and identity, policies, routines, documents, systems, and employees (Zander 2007). The knowledge-based theory determines the nature organization human resources capabilities which are mostly influenced by the nature of training given to the employees. Existence of

professional trained staff in procurement field and availability of many staff with high education level plays an important role in strengthening the organization capabilities in terms of trained manpower. The study thus used this theory to establish how an organization trains employees in order to equip them with knowledge that helps them to support effective implementation of procurement practices.

### **2.2.9 Technology, Organization, and Environment Model (TOE)**

The TOE framework was developed in 1990 by Tornatzky and Fleischer. It identifies three aspects of an entrepreneurial context that influences the process by which it adopts and implements a technological innovation: technological context, organizational context, and environmental context. Technological context describes both the internal and external technologies relevant to the firm. This includes current practices and equipment internal to the firm, as well as the set of available technologies external to the firm. Organizational context refers to descriptive measures about the organization such as scope, size, and managerial structure. Environmental context is the arena in which a firm conducts its business, its industry, competitors, and dealings with the government (Tiago & Maria 2010).



**Figure 2.4: Technology, organization, and environment model, adapted from Tiago & Maria (2010).**

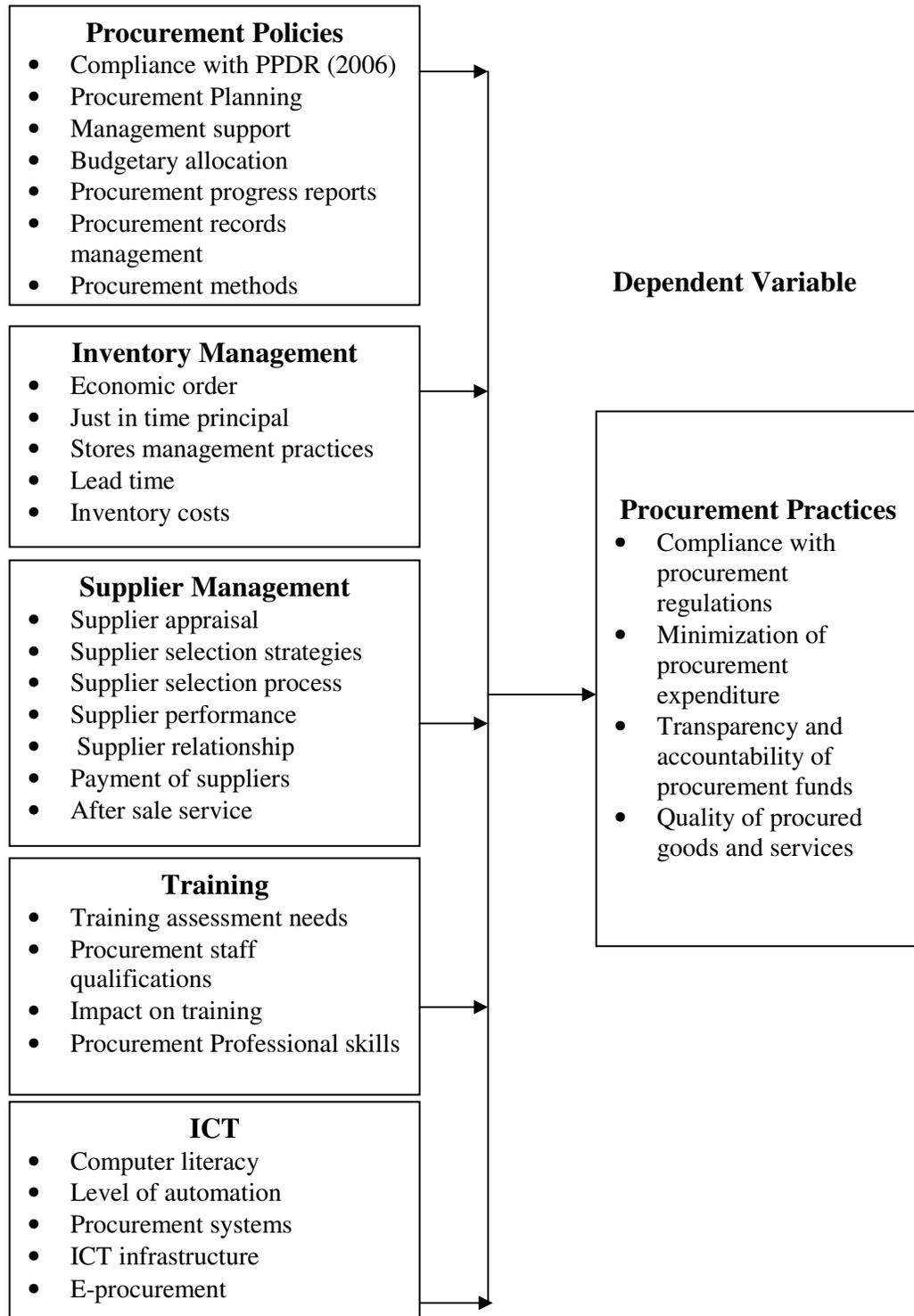
The TOE framework as originally presented, and later adapted in IT adoption studies, provides a useful analytical framework that can be used for studying the adoption and assimilation of different types of IT innovation. The TOE framework has a solid theoretical basis, consistent empirical support and the potential of application to IS innovation domains, though specific factors identified within the three contexts may vary across different studies (Tiago and Maria 2010). The use of ICT based procurement systems in tertiary public training institutions is influenced by technological innovation: technological context, organizational context and environmental context. All these contexts

determines the level of Computer literacy in the institutions, level of automation, type of procurement systems to be used in the institutions, nature of the ICT infrastructure and how e-procurement is employed in the institution. The study thus used this theory to assess the effect of information communication technology on effective implementation of procurement practices in tertiary public training institutions in Kenya.

### **2.3 Conceptual Framework**

A conceptual framework is a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation (Biklen 2003). In conducting the study, a conceptual framework was developed to show the relationship between the independent variables and dependent variable. In this study, the dependent variable is effective procurement practices and the independent variables are; procurement policies, supplier management, inventory management and sourcing strategies. The constructs and relationships between research variables are illustrated in the following figure 2.8.

## Independent Variables



**Figure 2.5: Conceptual Framework**

### **2.3.1 Procurement Policies**

Procurement policies are rules and regulations for governing procurement procedures in an organization. A properly designed and implemented procurement policy plays a pivotal role in providing a guiding framework for the implementation of effective procurement practices (Bartik 2009). The employed procurement policies in government training institutions do not provide a framework for supporting implementation of effective procurement practices.

### **2.3.2 Inventory Management**

Inventory management is the application of data collection, demand and forecasting, lean and operational principles to manage the total amount of inventory within the supply chain at any point in time and manage inventory holding costs (Sharafali 2007). The scope of inventory management concerns the fine lines between replenishment lead time, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods, and demand forecasting. Balancing these competing requirements leads to optimal inventory levels, which is an on-going process as the business needs shift and react to the wider environment (Riggs & Sharon 2008). Application of effective inventory management methods such as economic order quantity and just in time greatly supports implementation of effective procurement practices.

### **2.3.3 Supplier Management**

Supplier management is a business process that allows a company to adequately select its vendors and negotiate the best prices for goods and services that it purchases. Senior managers also monitor the corporate supply chain to ensure that vendors familiarize themselves with the company's operating activities and manufacturing processes (Arthur 2009).

### **2.3.4 Training**

Training is the process of identifying and developing the necessary knowledge and skills required for doing a job. Training is learning provided in order to improve performance on the present job (Armstrong 2008). Lack of training on application of sustainable procurement strategies hinders implementation of effective procurement practices in many government training institutions.

### **2.3.5 Technology**

Information Technology (IT) is a technology that 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 infective. 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.

## **2.4 Empirical Review**

This section reviews the existing empirical studies on factors affecting effective implementation of procurement practices. The chapter covers relations studies on; effect of procurement policies on effective implementation of procurement practices; effect of inventory management on effective implementation of procurement practices; effect of supplier management affects effective implementation of procurement practices; effect of training on effective implementation of procurement practices and effect of information communication technology on effective implementation of procurement practices.

### **2.4.1 Procurement Policies**

A procurement policy is simply the rules and regulations that are set in place to govern the process of acquiring goods and services needed by an organization to function efficiently (Findlay 2009). The exact process will seek to minimize expenses associated with the purchase of those goods and services by using such strategies as volume purchasing; the establishment of a set roster of vendors, and establishing reorder protocols that help to keep inventories low without

jeopardizing the function of the operation. Both small and large companies as well as non-profit organizations routinely make use of some sort of procurement policy (Bartik 2009). There is no correct way to establish a procurement policy, factors such as the size of the business, the availability of vendors to supply necessary goods and services, and the cash flow and credit of the company will often influence the purchasing procurement approach. (Golder 2007). The size of the company is likely to make a difference in the formation of procurement policy, in that a small company may not be able to command the volume purchase discounts that a large corporation can manage with relative ease (Gadde 2007).

Procurement policy benefits the organization by keeping costs in line and clearly defining how purchases will be made (Hall 2009). As the needs of the entity change, there is a good chance that the procurement policy will be adjusted to meet those new circumstances. This is necessary to make sure the policy continues to function in the best interests of the company or non-profit organization and keep the acquisition process simple and orderly (Günther 2007). According to PPOA (2007), the public procurement system in Kenya has been undergoing consistent reforms with the global trend since mid-1990s, most notably within the periods covering 1997-2001 and 2005. Previous to these reforms, the legal framework governing public procurement was very amorphous, providing a conducive environment for the perpetration of various malpractices in public procurement including the endemic corruption that characterized the system. George (2010) contends that the level of compliance with procurement

regulations greatly influences the efficiency of the procurement procedures in public sector organizations

According to Patrick (2009), with the official launch of Public Procurement Reforms, the country set on the reform road in the area of public procurement by; putting in place a unified legal and regulatory framework to guide the reforms. This was realized through the gazettelement of the Exchequer and Audit Act Public Procurement, Regulations (2001), which harmonized all the Treasury circulars and manuals governing procurement in the public sector. Putting in place an institution to oversee development and implementation of the public procurement policy in Kenya and improve transparency. This was realized through the creation of the Public Procurement Directorate (PPD) to oversee the public procurement process in Kenya and the Public Procurement Complaints, Review and Appeals Board (PPCRAB) to handle tendering disputes Act (PPOA 2007).

According to Johnson (2010), the landmark in the reforms was in 2005 when the Public Procurement and Disposal Act (2005) was enacted by Parliament. The Act established an oversight body, the Public Procurement Oversight Authority (PPOA), Public Procurement Oversight Advisory Board and the Public Procurement Administrative Review Board. It amended all other laws relating to procurement in public entities ensuring that all of it is done under the umbrella of the Act thus widening the scope of application of the law and providing a proper basis for enforcement. With the gazettelement of the subsidiary legislation entitled

Public Procurement and Disposal Regulations 2006, the law became operational on 1st January, 2007 (PPOA 2007). According to Andrew (2008), the Public Procurement and Disposal Act, 2005 became operational on 1st January, 2007 with the gazettelement of the Public Procurement and Disposal Regulations, 2006. This called for all public entities to strictly execute procurement functions according the Act. However, despite all these regulatory machines, the public sector procurement process is not in tandem with these legislations. According to the study by Price Water House Coopers PWHC (2009), over 50% of public enterprises in Kenya do not comply with procurement regulations and this has created corruption loopholes and other malpractices on procurement processes. According to PPOA (2009), the current public procurement framework in Kenya has recently been strengthened in a number of respects: With the enactment of the PPDA and Regulations, Kenya today has in place a sound and comprehensive legal framework for public procurement with a clear hierarchical distinction. The PPDA clearly establishes the procurement methods to be applied, advertising rules and time limits, the content of tender documents and technical specifications, tender evaluation and award criteria, procedures for submission, receipt and opening of tenders, and the complaints system structure and sequence. The PPDA and Regulations cover goods, works and services for all procurement using national funds. Both documents are published and widely distributed within government. The legal framework is complemented with a series of Standard Tender Documents (STDs) covering procurement of goods, works and services,

and the responsibility for updating the STDs is clearly assigned to the PPOA (PPOA 2009).

Christianne (2008) found that the procurement policies employed by many public training institutions in UK determine the level of effectiveness in execution of the procurement practices. The study also notes that the level of procurement regulations compliance, level of top management support and the employed procurement procedures determine the nature of the employed procurement policies in many training institutions. Jackson (2007) noted that over 70% of public and private companies in Britain and Germany have embraced effective procurement policies while in China only less than 30% of organizations have managed to successfully implement effective procurement policies. Talluri (2008) found that many government organizations in United India and Malaysia lack effective procurement policies for supporting implementation of sustainable procurement policies. A study by George (2008) notes that in Africa many government corporations lack effective procurement policies and this influences implementation of ineffective procurement practices. Further, findings by Simpson & Power (2007) revealed that low level of procurement regulations compliance in many public training institutions in developing nations hampers effective execution of procurement functions and this impedes implementation of institutional development projects. Tanzi (2009) notes that application of poor procurement policies and lack of top management support does not promote effective implementation of procurement practice in many government

institutions in East Africa. Arthur (2009) notes that many procurement managers in Kenyan state corporations lack competitive knowledge and skills on how to formulate and embrace effective procurement policies in many public institutions in Kenya. A study by Jerald (2010) notes that procurement reforms in Kenya have led to enactment of Public Procurement and Disposal Act 2005, the Public Procurement and Disposal Regulations 2006 and The Secondary Schools and Colleges Procurement Manual (2007). The manual provides procurement guidelines on KESSP related expenditure. The manuals make reference to other Ministry of Education publications that set out in a more comprehensive manner the processes to be observed in the procurement of particular items such as instructional materials and school infrastructure. The study reveals that only less than 20% of public colleges undertake their procurement practices in tandem with the Secondary Schools and Colleges Procurement Manual guidelines. Onyinkwa's (2013) study on factors influencing compliance of procurement regulations in public secondary schools in Nyamache sub-county found that ethics, awareness and training influence the compliances of procurement regulations in public secondary schools. The study recommends that it is important to offer ethics education to school tendering committee members in order to ensure they serve in ultimate objectivity, accountability, and non-discrimination.

Ombuki, Arasa, Ngugi, and Muhwezi, (2014) conducted a study on determinants of procurement regulatory compliance by Kenya's public universities. The study findings indicate that political factors influence most the regulatory compliance in

the public university procurement in Kenya. The most influential politician was the member of the women representative whose influence accounted for 95.5%. The study recommended that politicians should be well-educated on the need to comply with the government's procurement rules and regulations. A study by Muli (2009) reveals that the public procurement reforms in Kenya have culminated in promulgation of the Public Procurement and Disposal Act 2005 and the Public Procurement and Disposal Regulations 2006 that provide a legal framework for regulating public procurement, with oversight functions carried out by the Public Procurement Oversight Authority (PPOA). The study further notes that many public training institutions procurement practices do not fully comply with the procurement regulations and this leads to misappropriation of institutional funds.

#### **2.4.2 Inventory Management**

Inventory management is the process of efficiently overseeing the constant flow of units into and out of an existing inventory (Elliot 2007). This process usually involves controlling the transfer of units in order to prevent the inventory from becoming too high, or dwindling to levels that could put the operation of the company into jeopardy. Competent inventory management also seeks to control the costs associated with the inventory, both from the perspective of the total value of the goods included and the tax burden generated by the cumulative value of the inventory (Barcodesinc 2012).

Balancing the various tasks of inventory management means paying attention to three key aspects of any inventory (Benton 2007). The first aspect has to do with time. In terms of materials acquired for inclusion in the total inventory, this means understanding how long it takes for a supplier to process an order and execute a delivery. Inventory management also demands that a solid understanding of how long it will take for those materials to transfer out of the inventory be established. Knowing these two important lead times makes it possible to understand when to place an order and how many units must be ordered to keep production running smoothly (Barcodesinc 2012). Calculating what is known as buffer stock is also key to effective inventory management. Essentially, buffer stock is additional units above and beyond the minimum number required to maintain production levels. For example, the manager may determine that it would be a good idea to keep one or two extra units of a given machine part on hand, just in case an emergency situation arises or one of the units proves to be defective once installed. Creating this cushion or buffer helps to minimize the chance for production to be interrupted due to a lack of essential parts in the operation supply inventory (Margetta 2008).

Inventory management is not limited to documenting the delivery of raw materials and the movement of those materials into operational process. The movement of those materials as they go through the various stages of operation is also important. Typically known as a goods or work in progress inventory, tracking materials as they are used to create finished goods also helps to identify

the need to adjust ordering amounts before the raw materials inventory gets dangerously low or is inflated to an unfavorable level (Murphy 2007).

Finally, inventory management has to do with keeping accurate records of finished goods that are ready for shipment. This means posting the production of newly completed goods to the inventory totals as well as subtracting the most recent shipments of finished goods to buyers (Cooper 2008). When the company has a return policy in place, there is usually a sub-category contained in the finished goods inventory to account for any returned goods that are reclassified as refurbished or second grade quality. Maintaining figures on the finished goods inventory makes it possible to quickly convey information to sales personnel as to what is available and ready for shipment at any given time (Cooper 2008). In addition to maintaining control of the volume and movement of various inventories, inventory management also makes it possible to prepare accurate records that are used for accessing any taxes due on each inventory type. Without precise data regarding unit volumes within each phase of the overall operation, the company cannot accurately calculate the tax amounts. This could lead to underpaying the due taxes and possibly incurring stiff penalties in the event of an independent audit (Barcodesinc 2012).

Right inventory management approach for any purchased item must not only address the cash tied up in physical inventory but also the costs of planning, storing, and handling such an item. In fact, within the same firm, the “right”

inventory management approach for a particular purchased item may not be the “right” inventory management approach for another purchased item. Moreover, across firms, the “right” inventory management approach for a particular purchased item in one firm may not be the “right” inventory management approach for the same purchased item in another firm (Margetta 2008).

Generally speaking, there are four basic approaches to managing inbound inventory of raw materials, components, sub-systems, or retail inventory (henceforth referred to simply as purchased items). These four inventory management strategies can be differentiated by disentangling the question of who owns the purchased items from the question of where these items are physically held (Handfield 2009). The inventory speculation approach is, by far, the most frequently encountered inventory management approach in practice. With this approach, a firm would purchase items and physically hold such items within its storage facilities before demand or usage requirements for these items are known with certainty (Ramasesh 2007). This choice comes with many benefits, not the least of which is the ability to respond quickly to demand or usage needs and the ability to protect itself against fluctuations in prices. In addition, with this approach, a firm can also avail itself of volume discounts and reduced inbound transportation costs from bulk buying.

However, the inventory speculation approach is not without its cost disadvantages. Besides the opportunity cost and financial burden of having cash

tied up in physical inventory, there is also the incurrence of high inventory holding costs, given the need for storage, material handling and tracking, and given the threat and expense of inventory obsolescence, particularly when operating in highly volatile competitive environments (Ramasesh 2007).

In contrast to inventory speculation, a firm, operating under an inventory postponement approach, would deliberately delay the purchase and the physical possession of inventory items until demand or usage requirements are known with certainty (Richardson, 2007). By doing so, a firm can minimize the risk of inventory obsolescence, reduce the opportunity cost of having capital tied up in such items, and avoid incurring inventory storage and tracking expenses since these items are physically located with the supplier. However, such an approach has its drawbacks. There is, foremost, the risk of lost sales because the firm may not be able to respond timely in a manner to have these items readily available within its own storage facilities. Furthermore, transportation and materials handling costs from having to purchase in smaller batch sizes would likely result as would the risk of price increases (Cooper 2008). A firm operating under an inventory consignment approach would physically hold purchased items in inventory but, in this arrangement, ownership of these items would reside with its supplier (Cooper 2008). Only after the items have been either used in production or have been sold to customers would the firm then make payments to the appropriate suppliers. By following this approach, the firm would benefit from having relatively immediate access to items to meet demand or usage needs

without investing financial capital or risking obsolescence expense. Unfortunately, in addition to the expense of storing, handling and tracking these purchased items, a firm could also be subject to price fluctuations, with the price of the items on hand increasing between the time when they were physically received and when they were put to use or sold (Richardson 2007).

In contrast to inventory consignment, a firm operating under a reverse inventory consignment approach, rare as it may be, would pay for and own but would not take physical possession of inventory of purchased items. Rather, the items would reside physically within the supplier's network of storage facilities (Richardson 2007). At the firm's request, such items would be transferred either into the firm's production facilities or directly to the firm's customer. The benefits of an inventory consignment approach mirror the drawbacks of a reverse inventory consignment approach, and vice versa. With reverse inventory consignment, not only is the risk of future price increases mitigated but the storage and storage-related costs also become trivialized. Rather, the disadvantages with this approach are the opportunity cost of capital tied up in physical inventory and the risk and expense of inventory obsolescence (Elliot 2007).

Materials requirements planning (MRP) systems manage inventory in supply chains with the help of time-phased inventory levels (Cooper 2008). An MRP system consists of a set of logically related procedures, decision rules, and records designed to translate a master production schedule into time-phased net

requirements and the planned coverage of such requirements for each stock point. MRP systems begin with a master production schedule that provides the timing and quantities of production of all end-products. With the help of the bill of materials, a series of gross requirements by time period is generated for components. Then, the existing inventory levels are allocated against the gross requirements to produce a time series of net requirements. Next, the net requirements are translated to planned receipts. Finally, these planned receipts are backed off over the lead time, resulting in planned order releases. These planned order releases are translated into gross requirements for the next lower component level in the bill of materials. For the next level, the gross requirements are used to derive stepwise planned order releases, and so on (Cooper 2008). MRP systems seek to overcome the weaknesses of traditional decision systems in a manufacturing environment. MRP systems make use of the dependent nature of demands for components; they take into account the time varying nature of the requirements and they co-ordinate stock points that deal with the same operation. With the explosion of planned orders, MRP systems make the gross requirements known for the upstream stock points, but not the information which lead to these dates and quantities. Furthermore, in a stochastic environment MRP is too rigid, resulting in nervousness of plans and rapidly decreasing performance as soon as the environment becomes uncertain (Margetta 2008).

Distribution requirements planning (DRP) systems are twins of MRP systems. DRP is simply the application of the MRP principles and techniques to the

management of inventories in distribution. In DRP systems for each downstream stock point, a master schedule with its gross requirements is developed. Through allocation of existing inventory levels, net requirements for the stock point are obtained. These net requirements are translated to planned receipts and planned orders respectively. The planned orders are translated to gross requirements for the next upstream inventory points. DRP is a very natural extension of MRP that addresses the drawbacks of using independent control of the same product at different locations (Benton 2007). Bansal (2009) revealed that over 50% of American companies that have not effectively embraced effective procurement practices employ poor inventory management practices. Sobczak (2008) notes that many Japanese firms that employ just in time inventory management technique have succeeded in embracing effective procurement practices. Another study by Chang (2007) noted that many organizations in Africa lack effective inventory management practices and this greatly influences application of effective procurement practices.

Hunja (2010) notes that inventory management problems that affects implementation of effective procurement practices in many public institutions in Canada include; lack of application of economic order quantity principle, application of poor stores management practices, long lead time and higher inventory costs. Elliot (2007) found that many government training institutions in India employed ineffective inventory management practices as a result of lack of

application of economic order quantity principle, application of poor stores management practices, long lead time and higher inventory costs. Shalle, Guyo, and Amuhaya (2014) conducted a study on role of inventory optimization on e-procurement performance in State Parastatals in Kenya. The findings of the study emphasize that continuous inventory replenishment policy takes a regular order. The time of a replenishment decision is called an order point and the arrival of an order is regeneration point.

### **2.4.3 Supplier Management**

Lee (2002) affirms that SRM is a discipline of working collaboratively with those suppliers that are vital to the success of your organization to maximize the potential value of that relationship. SRM is about developing two-way, mutually beneficial relationships with your most strategic supply partners that deliver greater levels of innovation and competitive advantage than could be achieved by operating independently. Peters (2004) argues that SRM managers should be responsible for managing no more than three supplier relationships, in order to devote sufficient time to each. Staff involved in SRM activities will have a good combination of commercial, technical and interpersonal skills. Commercial acumen, market knowledge, analytical abilities and project management expertise are important. But “softer” skills around communication, listening, influencing and managing change are critical to developing strong and trusting working relations. SRM managers understand their suppliers’ business and strategic goals and are able to see issues from the supplier’s point of view, while balancing this

with their own organizational requirements and priorities. Browne (2004) contends that supplier relationship management is a comprehensive approach to managing an enterprise's interactions with the organizations that supply the goods and services it uses. The goal of supplier relationship management (SRM) is to streamline and make more effective the processes between an enterprise and its suppliers just as customer relationship management (CRM) is intended to streamline and make more effective the processes between an enterprise and its customers. Cooper (2005) concurs that SRM includes both business practices and software and is part of the information flow component of supply chain management (SCM). SRM practices create a common frame of reference to enable effective communication between an enterprise and suppliers who may use quite different business practices and terminology. As a result, SRM increases the efficiency of processes associated with acquiring goods and services, managing inventory, and processing materials. According to Ansari (2009), the use of SRM software can lead to lower production costs and a higher quality, but lower priced end product.

Supplier involvement in product development allows firm to make better use of their suppliers capabilities and technology to deliver competitive products. Coordinating operational activities through joint planning also results to inventory reduction, smoothing production, improve product quality, and lead time reduction. The firm's integration is an effective strategy in enhancing suppliers commitment throughout product lifecycle and is an effective strategy in reducing

supply uncertainty (Handfield 2001). According to Lysons (2008), customer relationship management (CRM) is a widely-implemented strategy for managing a company's interactions with customers, clients and sales prospects. It involves using technology to organize, automate, and synchronize business processes principally sales activities, but also those for marketing, customer service, and technical support. The overall goals are to find, attract, and win new clients, nurture and retain those the company already has, entice former clients back into the fold, and reduce the costs of marketing and client service. Customer relationship management describes a company-wide business strategy including customer-interface departments as well as other departments. Measuring and valuing customer relationships is critical to implementing this strategy.

Supplier management is a business process that allows a company to adequately select its vendors and negotiate the best prices for goods and services that it purchases. Senior managers also monitor the corporate supply chain to ensure that vendors familiarize themselves with the company's operating activities and manufacturing processes (Arthur 2009). A study by Findlay (2009) notes that many public training institutions in USA encountered supplier management challenges that hampered implementation of effective procurement practices. The key notable challenges encountered by many institutions included; supplier appraisal methods, supplier selection strategies and supplier rating methods. Gadde's (2007) study revealed that many public training institutions in India employed poor supplier appraisal methods and this hindered implementation of

effective procurement practices. A study by Mulwa (2009) revealed that the use of poor supplier appraisal methods and application of ineffective supplier selection process discourages implementation of effective procurement practices in many public training institutions in Kenya. Oyugi (2010) notes that many public training institutions lack effective supplier relationship management strategies and do not collaborate with suppliers and this impacts negatively towards implementation of cost-effective procurement practices. The study, therefore, deduced that the key notable factors influencing supplier management to affect implementation of effective procurement practices in tertiary public training institutions include; poor supplier appraisal techniques, poor supplier selection strategies, poor supplier selection process, lack of effective supplier performance rating method, lack of supplier relationship management, lack of supplier development and lack of supplier collaboration.

Supplier management studies have been largely dominated by mathematical models which try to rate and rank suppliers based on a number of pre-defined factors such as cost, quality, service, and delivery (De Boer 2001). However, in an era of new trends in products and services outsourcing, there is an increasing need to employ theories from other relevant disciplines such as economics, strategy, and organizational behaviour to supply management and supplier selection/evaluation/development research (McIvor 2009).

#### **2.4.4 Training**

Compton (2007) suggests that effective execution of organization procurement procedures greatly depends on the level of employees' training since lack of professional trained staff on procurement functions limits the ability of the organizations to embrace procurement best practices through benchmarking. Charles (2007) contends that lack of professional training is a key impediment to maintenance of high level of professionalism in the execution of procurement procedures in many public sector organizations. According to Andrew (2008), new training ideas are developed because trends are towards making training more practical, realistic and pertaining to employees' jobs. Training must give employees broader knowledge to enable them to effectively use new technology and integrate it into the workplace. Lower costs, better quality, faster return on investment, increased productivity and long-term growth are all achieved once employees adapt to changes and are trained accordingly. In the past, training was very classroom/instructor-oriented, this has recently proved ineffective compared to modern developments. More recent trends show training going beyond "job specific" to "continuous learning", in which the focus is on other areas of expertise within the company. In continuous learning, employees are encouraged to learn and understand the jobs and skills needed of those around them and more often perform them on a regular basis. Semi-autonomous work teams are most conducive in the continuous learning environment because each employee trains others in their group. This way, employees know one another's jobs and can

perform them in case of an employee absence. Employees begin to realize that learning and continuous training is as big as job itself (Christianne 2008). Training one another, or “train the trainer”, is another important aspect of continuous learning. It allows employees to develop new applications and techniques and share them with their peers or supervisors. (Christianne 2008). Smith (2009) contends that lack of professional training on procurement functions and lack of continuous training on implementation of best procurement practices hinders the procurement staff in public sector organizations to effectively execute procurement procedures. Hall (2009) argue that the efficiency and the effectiveness of procurement procedures is hindered by absence of effective continuous employees training programmes that help in equipping the employees with competitive procurement management skills.

Armstrong (2008) affirms that continuous employees training contributes towards improvement of the level of their competency in the execution of respective job task functions. David (2007) argues that competency is a standardized requirement for an individual to properly perform a specific job. It encompasses a combination of knowledge, skills and behaviour used to improve performance. More generally, competency is the state or quality of being adequately or well-qualified, having the ability to perform a specific role.

Ebrahim (2010) contends that from management viewpoint, training is associated with higher organizational productivity, it can improve the adaptability and

flexibility of their employees and their responsiveness to innovation, it can be regarded as a means of engaging the commitment of employees to the organization and training programmes specific to the organization are of paramount importance not least because they bind the employee and cannot be used by rival organizations. A study by Emmanuel (2007) showed that in Africa, training of procurement personnel could greatly support effective implementation of procurement practices in many public training institutions. A study by Simpson and Power (2007) found that in many African government institutions, many procurement managers are not trained on implementation of effective procurement practices and this contributes to wastage of procurement funds. A study by Arthur (2009) notes that many procurement managers in tertiary training institutions in Kenya lack competitive knowledge and skills on how to effectively embrace effective procurement practices and this hampers minimization of procurement expenditure. A study by Handfield (2009) notes that in UK, many public training institutions have succeeded in embracing effective procurement practices as a result of continuous training of procurement staff and employment of professionally trained procurement staff. Findlay (2009) notes that in South Africa, many public training institutions have not managed to embrace effective procurement practices as a result of low level of staff competency, use of poor training methods, lack of qualified procurement staff with technical knowledge and skills on the requirements of effective procurement practices. A study by Cristianne (2008) reveals that lack of professionally trained procurement staff

and employment of unqualified and incompetent staff discourages implementation of effective procurement practices in many public institutions in developing nations.

#### **2.4.5 Information Communication Technology**

According to Bell (2007), information technology is a general term that describes any technology that helps to produce, manipulate, communicate or disseminate information. ICT merges computing with high-speed communication links carrying data, sound and videodisc can also be defined as an automatic acquisition, Storage, manipulation, movement, control, display, switching interchange, transmission or reception of data or information. The two important major components of ICT are computers and telecommunications. A computer is a programmable, multiple machine that accepts data, raw facts and figures and processes or manipulates these into information that is easily understandable which enhances speed processing of information leading to increased organization productivity (Compton 2007). Golder (2007) 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. According to Ken (2007), 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 public funds by increasing competition, transparency by making procurement information of all sorts such as bidding opportunities, bidding documents, notices, texts of applicable rules readily available and in diminishing the opportunities for discretion (and hence corruption), and public confidence in the integrity of government. 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 favourable 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. These procurement systems provide efficient and extensive cost savings and other business benefits by automating many of the purchasing processes.

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), Electronic Data Interchange (EDI) is a communication technology used to facilitate effective execution of procurement functions by most organizations. Michael (2010), explains that Electronic Data Interchange refers to computer-to-computer exchange of business documents in a standard format. Chopra (2004) affirms that EDI describes both the capability and practice of communicating information between two organizations electronically instead of traditional form of mail, courier, and fax.

The benefits of EDI are; quick access to information, better customer service, reduced paperwork, increased productivity, improved tracing and expediting, cost efficiency, competitive advantage and improved billing. Through the use of EDI, supply chain partners can overcome the distortions and exaggeration in supply and demand information by improving technologies to facilitate real time sharing of actual demand and supply information (Linda 2003).

Handfield (2009) study 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) 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 practices. Sobczak (2008) found that in Japan and China, the use of renewable energy such as solar and wind energy has made it possible for many firms to embrace effective procurement practices. A study by George (2008) 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. A 2005 survey of 25 EU member states was conducted in which government purchasing agencies were assessed to determine the effectiveness of their green purchasing programme (Brulhart 2009). The study evaluated 1,099 tender documents and surveyed 865 purchasers and found that while 67% identified themselves as green purchasers, only 37% had green purchasing programme in place (Brulhart 2009). This conclusion was based on a scan of the actual tender documents. In many cases, there were either no green specifications at all or else grey practices were in place in which attempts for green specifications were found, but would not lead to a greener product, as in environmental aspects are considered. The tendency for organizations to under-perform their expectations is one to watch going forward as increasingly organizations will be called to account for their impacts on society and environment. Such underperformance will be spotted through evaluation and monitoring programme, a later stage of sustainable purchasing practice (Tanzi

2009). Murray, (2009) found out that in Canada, the Canadian federal government procurement policies emphasize similar economically oriented aspects of purchasing as those found in Europe including mandates concerning promotion of competition and value for money. However, in addition to these, Canadian public procurement policies include foci on non-discrimination and ensuring procurement opportunities from Aboriginal businesses. The Canadian federal government founded the Office of Greening Government Operations (OGGO) in 2005, which developed its Policy on Green Procurement in 2006. Through this policy, all government bodies are required to formulate green procurement targets and all personnel responsible for procurement need to be trained in green procurement. The OGGO provides purchasers with a decision-making toolkit and a checklist on their web site to encourage them to consider sustainability (Bovaird 2007).

In Kenya, the concept of effective procurement has only attracted attention in private sector organizations while in public sector no measures have been made to promote implementation of effective procurement practices (Patrick 2008). A study by Matunga, Nyanamba and Okibo (2013) on the effect of e-procurement on efficiency of procurement in public hospitals established that Kisii Level 5 hospital uses e-tendering, e-quotations and e-sourcing as the main e-procurement applications and that the greatest challenges faced when using e-market provider were inadequate funding, organization's inability to handle change management and lack of training of employees on how to use the system. The study concluded

that public hospitals have adopted some of the e-procurement applications regardless of the challenges that accompany the adoption. Charles (2008) found out that over 46% of firms in Canada had succeeded in implementing effective procurement practices through application of strategic sourcing strategies such as global sourcing, multiple sourcing and supplier development. However, another study by Michael (2009) notes that in South Africa, many organizations employ single sourcing strategies and lack effective sourcing strategies for supporting effective implementation of sustainable procurement practices. Moses (2009) noted that application of poor sourcing strategies is a key impediment to implementation of effective procurement practices in many government institutions in Kenya. A study by Oyugi (2010) notes that lack of e-procurement methods, lack of automated procurement systems, lack of supportive ICT infrastructure and absence of ICT skills amongst procurement staff greatly affect the implementation of effective procurement practices in tertiary public training institutions in Kenya.

#### **2.4.6 Effective Procurement Practices**

Effective public procurement systems are systems that are defined as offering a high level of transparency, accountability and value for money in the application of a procurement budget. They are critical to poverty reduction and AID effectiveness. Hence, all parties in the development process must have a vested interest in promoting this critical pillar of good governance: and to do so, in the context of an open macro economic framework that promotes open competition,

the free functioning of markets and the allocation of resources based on comparative advantages (Cox 2007). A study by Wanyama (2010) revealed that many public training institutions lose huge amounts of funds annually as result of implementation of ineffective procurement practices which are not in tandem with the public and disposal regulations. Mugo (2011) notes that low level of compliance with procurement regulations, lack of transparency and accountability of procurement funds lowers the level of effectiveness in procurement practices in public training institutions. Mugo (2011) established that the major factors that determine the extent to which effective procurement practices are employed in tertiary public training institutions in Kenya include; the level of compliance with procurement regulations, minimization of procurement expenditure, transparency and accountability of procurement funds and quality of procured goods and services. Velnampy (2010) conducted a study on evaluation of factors influencing effective procurement management system of public sector organizations. The study found that low level of compliance with procurement regulations and lack of high degree of transparency and accountability hinder execution of effective procurement practices. Muindi's (2014) study on factors influencing public procurement under free primary education programme in Kenya with reference to Machakos County revealed that staff training technology, supplier management relations and the organizational structure affect implementation of effective procurement practices in many public schools. A study by Wanjiru (2014) on the effects of records management on the efficiency of procurement function in an

organization revealed that poor record management practices affect procurement efficiency in organizations to a great extent. The study recommends that the firms adequate controls should be put in place by introduction of electronic data management software for managing records in liaison with these both internal and external stakeholders should be connected to the electronic data software for transparency and efficiency.

A study by Kinyanjui (2013) reveals that although there is a scanty application of the procurement tools studied, that is: six sigma, continuous improvement, just in time procurement, and lean management, there was a positive correlation between the level of application and efficiency levels of procurement. Therefore, these tools play a significant role in enhancing efficiency in procurement. The study therefore recommends that the university should relook into the tools that contribute to the procurement objectives of the organization and design a structured procedure of implementing to the full so as to harness the full benefits of these tools. A study by Ngugi and Mugo (2010) on internal factors affecting procurement process of supplies in government ministries in Kenya revealed that accountability, ICT adoption and ethics affected procurement process of healthcare supplies in the public sector to a great extent. The study recommends that adequate controls should be put in place reducing opportunities for corruption.

## **2.5 Critique of the Existing Literature Related to Research Study**

The theoretical and the empirical literature demonstrate that, the existing literature on implementation of effective procurement practices is not extensive in Africa and in Kenya in particular. Most studies on implementation of effective Public Procurement practices are common in many developed countries such as Europe, America and Canada. This is explained by studies by Bovaird (2007), Ryall (2001), Murray (2009) and Stonebraker (2007).

### **2.5.1 Procurement Policies**

A study by George (2008) notes that in Africa, many government corporations lack effective procurement policies and this greatly hinders effective implementation of sustainable procurement practices. However, the study failed to suggest how organizations should design and implement effective procurement policies for supporting implementation of sustainable procurement practices. In Kenya, there is lack of a specific study that highlights how government training institutions should improve on procurement policies in order to create a guiding framework for implementing effective procurement practices. The public procurement and disposal act (2005) has also failed to offer guidelines on how government training institutions should embrace efficient procurement policies.

### **2.5.2 Inventory Management**

According to Sobczak (2008), many Japanese firms that employ just in time inventory management technique have succeeded in embracing sustainable procurement practices. However, the study failed to explain how just in time and

other inventory management techniques affect implementation of efficient procurement practices in government training institutions and give recommendations on the best inventory management techniques for supporting implementation of sustainable procurement practices.

### **2.5.3 Supplier Management**

Charles (2008) found that over 46% of firms in Canada had succeeded in implementing effective procurement practices through application of strategic sourcing strategies such as global sourcing, multiple sourcing and supplier development. However, Charles (2008) failed to explain how each of the sourcing strategies can support implementation of effective procurement practices in government training institutions. This indicates that, there lacks a specific study that clearly recommends the best sourcing strategies for supporting implementation of effective procurement practices.

### **2.5.4 Training**

A study by Emmanuel (2007) shows that in Africa, training on application of best procurement practices could greatly support implementation of effective procurement practices in many public and private organizations on the implementation of effective procurement practices in public training institutions. However, Emmanuel (2007) failed to highlight the key procurement best practices that support implementation of effective procurement practices. According to Simpson and Power (2007), many African government institutional procurement

managers are not trained on implementation of effective procurement practices since most African training institutions have not embraced effective procurement practices in public procurement training curriculum. The study, however, failed to give recommendations on how African institutions should incorporate effective procurement practices in public procurement training organizations. This clearly demonstrates that training on implementation of effective procurement practices remains a major critical issue affecting implementation of effective procurement practices.

#### **2.5.5 ICT**

A study by Tanzi (2009) found that in Canada, innovation in technology has played a major role in enhancing many organizations to adopt sustainable procurement practices. Tanzi (2009) study did not clearly elaborate how organizations should innovate technology to succeed in implementing efficient procurement. A study by George (2008) found that in Kenya 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. However, George (2008) failed to explain the type of technology that should be embraced by government training institutions in order to effectively implement effective procurement practices. According to Patrick (2008) in Kenya, the concept of effective procurement has only attracted attention in private sector organizations while in public sector, no measures have been made to promote implementation

of effective procurement practices. However, Patrick did not offer any practical explanation of measures to be employed to support implementation of effective procurement practices in public sector organizations. On the other hand, Edward (2009) notes that over 50% of public sector organizations could realize increased level of performance if effective procurement measures were put in place. Moreover, Edward still failed to support his argument by explaining how public sector organizations should adopt effective procurement practices to promote realization of increased organizational performance. The empirical review shows that the awareness and implementation of SPP is still comparatively low in most developing countries and no measures have been made to promote implementation of efficient procurement practices in Kenya government training organizations. Recognizing the important role that effective procurement can play in promoting realization of increased organizational performance, this study addressed the major critical issues as an effort to promote implementation of effective procurement practices in government training institutions in Kenya.

## **2.6 Research Gaps**

Despite the importance of public sector procurement, the number of studies that have investigated the role of public authorities in effective supply is still small. Studies by Thomson and Jackson (2007), DEFRA (2006) and Brulhart (2009) draw much emphasis on effective procurement in developed nations but fail to address the factors affecting adoption of effective procurement practices in developing nations. Studies by Patrick (2008) and Edward (2009) attempted to

explain the status of effective procurement practices in Kenya but do not offer practical solution on how government training institutions should embrace effective procurement practices. A study by Talluri (2008) found that many government organizations in United India and Malaysia lack effective procurement policies for supporting effective implementation of procurement practices . A study by Sobczak (2008) notes that many Japanese firms that employ just in time inventory management technique have succeeded in embracing efficient procurement practices. A study by Moses (2009) found that application of poor sourcing strategies is a key impediment to implementation of effective procurement practices in many government institutions in Kenya. A study by Simpson and Power (2007) found that in many African government institutions, many procurement managers are not trained on implementation of effective procurement practices since most African training institutions have not embraced effective procurement practices in public procurement training institutions.

These studies have not specifically addressed the key effective procurement practices implementation challenges hence developing a major knowledge gap on factors influencing implementation of effective procurement practices in public training institutions in Kenya. This study aims to fill the missing gaps by determining the major factors influencing the implementation of effective procurement practices in public training institutions in Kenya and offering recommendations on implementation of effective procurement practices in government training institutions.

## **2.7 Summary**

This chapter discussed the existing literature on factors affecting effective implementation of procurement practices in tertiary public training institutions. The chapter explained the conceptual framework, theoretical framework, empirical literature, critical review and research gaps. The next chapter covers the methodology adopted to undertake the study.

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1 Introduction

This chapter discusses the methodological approach for the study and it comprises the research design, target population sampling design, research instruments, data collection procedure and data analysis methods. Research philosophy is the development of the research background, research knowledge and its nature (Saunders & Thornhill 2007). Research philosophy is also defined as a research paradigm. According to Cohen Manion and Morrison (2000), research paradigm can be defined as the broad framework, which comprises perception, beliefs and understanding of several theories and practices that are used to conduct a research. It can also be characterized as a precise procedure, which involves various steps through which a researcher creates a relationship between the research objectives and questions.

According to the definition given by Gliner and Morgan (2000) paradigm is a way of thinking about and conducting a research. It is not strictly a methodology, but more of a philosophy that guides how the research is to be conducted (p.17)". Research paradigm and philosophy comprises various factors such as individual's mental model, his way of seeing thing, different perceptions, variety of beliefs towards reality, etc. This concept influences the beliefs and value of the

researchers, so that he can provide valid arguments and terminology to give reliable results.

The study applied a positivism research philosophy. This paradigm was applied since it is directly associated with the idea of objectivism. In this type of philosophical approach, researchers give their viewpoint to evaluate social world with the help of objectivity in place of subjectivity (Cooper & Schindler 2006). According to this philosophy, researchers are interested to collect general information and data from a large social sample instead of focusing details of research. According to this approach, researcher's own beliefs have no value to influence the research study. The positivism philosophical approach is mainly related with the observations and experiments to collect numeric data (Saunders 2007). Positivisms claim there is a single, objective reality that can be observed and measured without bias using standardized instruments. In the positivist paradigm, the researcher sees himself or herself as a neutral recorder. Different researchers using the same instruments should reach the same conclusions. Positivists evaluate the success of their research in part by measuring how closely the findings of different researchers match (Cohen & Manion, 2007). According to Kasi (2009) positivism paradigms seek to develop standardized instruments that precisely tap a single reality. Positivism seek to imitate the sciences that have developed quantitative ways of measuring physical, biological, or chemical phenomena in replicable ways. In addition, positivists judge research in terms of its validity, that is, the extent to which their research tools actually do measure the

underlying concept that they are supposed to measure. Positivists aim to work out theories that apply to people or societies broadly. Positivism helps to test hypothesis and examines the relationship between two or more variables (Sekaran & Bougie 2010).

### **3.2 Research Design**

According to Green and Tull (2009), a research design is the specification of methods and procedures for acquiring the information needed. It is the over-all operational pattern or framework of the project that stipulates what information is to be collected from which source by what procedures. Research design is important as it prepares proper framework within which the research work/activity will be actually carried out. The study applied descriptive correlational research design. The descriptive design was used since the study gathered quantitative and qualitative data that described the nature and characteristics of factors influencing the implementation of effective procurement practices in tertiary public training institutions in Kenya. According to Sekeran (2003), descriptive research design is a type of design used to obtain information concerning the current status of the phenomena to describe "what exists" with respect to variables or conditions in a situation. Kothari (2003) describes descriptive research as including surveys and fact-finding enquiries adding that the major purpose of descriptive research is description of the state of affairs as it exists. Correlation research design was used to determine the extent to which two variables are related. This design uses a statistic known as correlation coefficient

to measure the strength and direction of the linear relationship between the involved variables. The two study designs facilitated towards gathering of reliable data describing the true characteristics of factors affecting the implementation of effective procurement practices in tertiary public training institutions in Kenya.

### **3.3 Population**

Population is the entire set of units for which the study data are to be used to make inferences (Kothari 2003). Target population defines those units for which the findings of the study are meant to be generalized from (Dempsey 2003). The target population comprised a total of 40 tertiary public training institutions in Kenya. According to Inspectorate of State Corporations of Kenya (2012), tertiary public training institutions in Kenya comprise 40 technical training colleges.

The targeted respondents comprised procurement staff from each of the tertiary public training institutions. The study population thus comprise all the 40 tertiary public training institutions in Kenya. The procurement staff were targeted since they are the ones involved in the execution of key procurement management decisions and hence have technical knowledge and skills on factors affecting the implementation of effective procurement practices in tertiary public training institutions in Kenya. Tertiary public training institutions were of interest to the study since they play a major role in country's human resource development and hence spend huge amounts of funds in procurement functions. Most of tertiary public training institutions face operational challenges as result of absence of

effective procurement practices. Many public training institutions could effectively minimize procurement expenditure through implementation of effective procurement practices and this will result to reduction of operational costs, reduction of fees hence making education affordable to many students.

### **3.4 Sample and Sampling Technique**

The study adopted a census technique with respect to the unit of analysis which is the tertiary institutions in Kenya. This therefore ruled out application of specific sampling design and sampling technique. The researcher decided to use a census since the population of 40 was small and the study aimed to reach all the procurement managers in all tertiary public training institutions. Population Census is unique in that it provides the possibility of examining small and special population groups, and acquiring information on small geographic units. The census approach is justified since according to Orodho (2009), data gathered using census contributes towards gathering of unbiased data representing all individuals' opinions in the study population on a study problem. The census approach is also justified since according to Field (2006) results obtained from a census are likely to be more representative accurate and reliable than results obtained from a population sample and thus census assists in generalization of research findings. Census provides a true measure of the population since there is no sampling error and more detailed information about the study problem within the population is likely to be gathered (Sekaran & Bougie 2010).

The population was stratified in groups depending on the kind of courses offered.

The three strata adopted were;

Technical colleges: colleges that offer technical courses

Teachers colleges: Teachers training colleges

Other Colleges: Colleges that offer other courses like medical, Mass communication

### **3.5 Data Collection Procedure**

The study collected both primary and secondary data. According to Morris (2001), data collection procedure is the process of gathering pieces of information that are necessary for research process. Primary data present the actual information that was obtained for the purpose of the research study. Data collection instrument is a device used to collect data in an objective and a systematic manner for the purpose of the research. Data collection instruments can be questionnaires, interviews, schedules and available records. Questionnaires are a paper and a pencil data collection instruments filled in by respondents for the purpose of the research study (Morris 2001). The main data collection instruments used to collect data included questionnaires containing open-ended and closed-ended questions with the quantitative section of the instrument utilizing an ordinal scale format. The ordinal format was selected because according to Kiess and Bloomquist (2009), this format yields equal-interval data, a fact that allows for the use of more powerful statistical tools to test research variables. Questionnaires are preferred because according to Dempsey (2003)

they are effective data collection instruments that allow respondents to give much of their opinions pertaining to the researched problem. According to Kothari (2003), the information obtained from questionnaires is free from bias and researchers influence and thus accurate and valid data were gathered. Interview schedules were also used to compliment questionnaires data. The questions addressed by the questionnaires and interview guide sought factors affecting the implementation of effective procurement practices in tertiary public training institutions in Kenya. Primary data were gathered through the use of questioning method in form of a semi structured questionnaire (open and closed-ended questions). The questionnaires were self-administered to a total of 160 respondents and later picked for analysis. Secondary data was collected through the review of both empirical and theoretical literature sourced from books, journals and internet on effective procurement practices.

### **3.6 Pilot Study**

Pilot study was conducted to test the reliability and validity of the questionnaire. This was undertaken to test the reliability and validity of data collection instruments (Sekeran 2003). According to Dempsey (2003) pilot study is the process of conducting preliminary test of data collection instruments in order to eliminate data collection problems that may led to low data validity and reliability. Pilot study was thus conducted to help in identification of errors in data collection instruments and make necessary adjustment in order to ensure valid and reliable data was collected.

### **3.6.1 Validity**

Validity refers to the extent to which an instrument measures what is supposed to measure. Data need not only to be reliable but also true and accurate. If a measurement is valid, it is also reliable (Joppe 2000). The content of validity of the data collection instrument was determined through discussing the research instrument with the research experts in the university. The valuable comments, corrections, suggestions given by the research experts assisted in the validation of the instrument. The research experts and the procurement department staff were expected to tick the items in the questionnaires if they help to determine the factors influencing the implementation of sustainable procurement practices in public sector organizations in Kenya or not. The content of the responses given by the respondents were checked against the study objectives. Evidence of content relevance, representativeness and relevance to the research variables indicates that the research instruments are valid (Joppe 2000).

### **3.6.2 Reliability**

Reliability refers to the consistence, stability, or dependability of the data. Whenever an investigator measures a variable, he or she wants to be sure that the measurement provides dependable and consistent results (Cooper & Schindler 2003). A reliable measurement is one that if repeated a second time gives the same results as it did the first time. If the results are different, then the measurement is unreliable (Mugenda & Mugenda 2008). To measure the reliability of the data collection instruments, an internal consistency technique

using Cronbach's alpha was applied (Mugenda 2008). Cronbach's alpha is a coefficient of reliability that gives an unbiased estimate of data generalizability (Zinbarg 2005). An alpha coefficient of 0.75 or higher indicated that the gathered data are reliable as they have a relatively high internal consistency and can be generalized to reflect opinions of all respondents in the target population (Zinbarg 2005). All the study variables were found to have a cronbanch alpha coefficient greater than 0.8 and thus they were all retained for further analysis.

### **3.7 Data Analysis and Presentation**

The use of closed-end and open-end questionnaires contributed towards gathering of both quantitative and qualitative data. Descriptive statistics method was applied to analyze quantitative data where data were scored by calculating the percentages, mean' STD deviation and Variance. This was done using Statistical Package for Social Sciences (SPSS) computer software. SPSS was considered appropriate since it allows the researcher to follow clear set of quantitative data analysis procedures that leads to increased data validity and reliability and demonstrates the relationship between the research variables. SPSS also assisted in producing frequency tables for descriptive analysis. Inferential statistics were applied through correlation analysis and the use of multiple regression analysis. The correlation analysis was used to establish with statistical significance, the nature of the existing relationship between the dependent variable and the independent variables. The regression analysis was used to determine with

statistical significance, the influence or effect that the independent variables had in the dependent variable. The multiple regression model was of the form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$$

Where;

$\beta_0$  = Constant

Y= Effective implementation of procurement practices

$X_1$ = Procurement policies

$X_2$ = Inventory management

$X_3$ = Supplier management

$X_4$ = Training

$X_5$ = Information Communication Technology

$\beta_i$  = Coefficients of regression for the independent variables  $X_i$  (for  $i = 1,2,3,4,5$ )

e. = error term

The regression analysis tested the variation of the dependent variable explained by the variation in the independent variables by calculation of the R2 and adjusted R2 statistics. ANOVA for regression was also used to determine the goodness of fit of the produced. Bivariate regression models were first fitted to determine the influence that each of the independent variables had on the dependent variable. A

multiple regression model was then fitted to determine the combined effect that the independent variables had on the dependent variable when acting jointly.

Qualitative data drawn from open-ended question were in the questionnaire and interview guide was analyzed through summarising the set of observations drawn from the respondents in frequency tables. Common set of observation was assigned numerical value and entered into the SPSS computer system. The analyzed findings were presented in form of frequency tables, pie charts and bar charts.

### **3.8 Operationalization / Measurement of Variables**

To operationalize the research variables, the study first determined the indicators/parameters of each independent variable and then employed ordinal/Likert scale to measure the independent variables. Based on theories and models in the literature review, the scale comprised an ordinal scale of 1-5 (1= not at all, 2 = small extent, 3 = moderate extent, 4 = large extent, 5 = very large extent). The study operationalized the research variables as follows:

**Table 3.1: Operationalisation of the research variables**

Variable	Indicator	Measure	Scale	Instrument
Procurement Policies	Compliance with PPDR (2006) Procurement Planning Management support Budgetary allocation Procurement progress reports Procurement records management Procurement methods	Likert/ Ordinal	5 Point Likert Scale	Questionnaire Interview Guide
Inventory Management	Economic order Just in time principal Stores management practices Lead time Inventory costs	Likert/ Ordinal	5 Point Likert Scale	Questionnaire Interview Guide
Supplier Management	Supplier appraisal Supplier selection strategies Supplier selection process Supplier performance Supplier relationship Payment of suppliers After sale service	Likert/ Ordinal	5 Point Likert Scale	Questionnaire Interview Guide
Training	Training assessment needs Procurement staff qualifications Impact on training Procurement Professional skills	Likert/ Ordinal	5 Point Likert Scale	Questionnaire Interview Guide
ICT	Computer literacy Level of automation Procurement systems ICT infrastructure E-procurement	Likert/ Ordinal	5 Point Likert Scale	Questionnaire Interview Guide
Effective Implementation of Procurement Practices	Compliance with procurement regulations Minimization of procurement expenditure Transparency and accountability of procurement funds Quality of procured goods and services	Likert/ Ordinal	5 Point Likert Scale	Questionnaire Interview Guide

## CHAPTER FOUR

### DATA ANALYSIS, DISCUSSION AND FINDINGS

#### 4.1 Introduction

The study employed different statistical techniques aided by SPSS to determine factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya. This chapter describes the analysis of data followed by a discussion of the research findings. The findings relate to the research questions that guided the study. The chapter begins with the analysis of the response rate and then explains factor analysis and reliability techniques adopted by the study. Factor analysis was adopted in order to reduce the number of indicators or factors under each research variable and retain the indicators capable of explaining the factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya. Reliability analysis was carried out using Cronbach alpha which is a coefficient of reliability that gives an unbiased estimate of data generalizability.

#### 4.2 Response Rate

The study population consisted of 40 institutions. Questionnaires were self-administered to procurement staff in 40 public tertiary training institutions in Kenya. Out of the 40 institutions the questionnaires were filled and returned by 35 public tertiary training institutions the individual respondents translating to a response rate of 87.5%. The high response rate of 87.5% facilitated gathering

sufficient data that could be generalized to determine factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya. This was in line with Orodho (2009) that a response rate above 50% contributes towards gathering of sufficient data that could be generalized to represent the opinions of respondents about the study problem in the target population. These response rate is presented on table 4.1 below.

**Table 4.1 Individual Response Rate**

	<b>Sampled</b>	<b>Responded</b>	<b>Response Rate</b>
Technical Colleges	16	14	87.5%
Teachers colleges	7	7	100.0%
Other Colleges	17	15	88.2%
Total	40	35	87.5%

**4.3 Reliability and validity tests**

The study adopted factor analysis in order to reduce the number of indicators or factors under each research variable and retain the indicators capable of explaining the factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya. The retained factors had factor loading values of above 0.7 and were used for further analysis. Hair, Tathan, Anderson and Black (1998) recommend use of factors with factor loadings of above 0.4. Stevens (1992) suggests using a cut-off of factors with factor loading above 0.4, irrespective of sample size, for interpretative purposes. This also supports suggestion by Tabachnick and Fidell (2007) using more stringent cut-offs going from 0.32 (poor), 0.45 (fair), 0.55 (good), 0.63 (very good) or 0.71 (excellent).

To measure the reliability of the gathered data Cronbach's alpha was applied. Cronbach's alpha is a coefficient of reliability that gives an unbiased estimate of data generalizability (Zinbarg 2005). An alpha coefficient of 0.80 or higher indicates that the gathered data are reliable and are relatively high internal consistency and can be generalized to reflect opinions of all respondents in the target population (Zinbarg 2005).

#### **4.3.1 Procurement Policies**

Table 4.2 shows that the Cronbach's alpha result of procurement policy factors was 0.830 and the factor loadings results were above 0.7. This implies that all the factors were retained for further analysis. According to Tathan, Anderson and Black (1998) factors with factor loadings of above 0.7 are excellent and should be retained for further data analysis. The Cronbach alpha above 0.80 corroborated with Zinbarg (2005) that an alpha coefficient of 0.80 or higher indicates that the gathered data are reliable as it has a relatively high internal consistency and can be generalized to reflect opinions of all respondents in the target population about the study problem. The study hence deduced that all the procurement policy factors to be reliable in determining factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya. All the procurement policy factors notably, procurement procedures, type of procurement policies, management support, organization resources, level of procurement regulations compliance, relationship between management and stakeholders and policy-making process were later used for further analysis.

**Table 4. 2 Procurement Policies Reliability and Factor Analysis Results**

<b>Indicators</b>	<b>Factors loadings</b>	<b>Cronbach's Alpha</b>
What is the organizations level of compliance with Public Procurement and Disposal Regulations (2006)	0.801	0.83
What is the level of accuracy in the procurement records used.	0.758	
What is the level of accuracy and reliability of Procurement records kept	0.756	
How often does the firm prepare or implement procurement plans	0.709	
How often does the firms employees prepare or receive expected management support	0.767	
How often does the firm adhere to the Budgetary allocation	0.753	
How often does the firm adhere to the Procurement progress reports	0.714	

#### **4.3.2 Inventory Management**

As can be observed in table 4.3, the variable inventory management had a Cronbach's alpha value of 0.848 and factor loadings values above 0.7. The study, therefore, retained all the inventory management factors. According to Tathan, Anderson and Black (1998) factors with factor loadings of above 0.7 are excellent and should be retained for further data analysis. The Cronbach alpha above 0.80 corroborated with Zinbarg (2005) that an alpha coefficient of 0.80 or higher indicates that the gathered data are reliable as it has a relatively high internal

consistency and can be generalized to reflect opinions of all respondents in the target population about the study problem. The study therefore, drew conclusions that stores management practices, lead time, inventory costs, economic order quantity principle and just in time are reliable factors that help in determining factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya.

**Table 4. 3 Inventory Management Reliability and Factor Analysis Results**

<b>Indicators</b>	<b>Factors loadings</b>	<b>Cronbach's Alpha</b>
How often does management use economic order quantity on purchases	0.811	0.848
How often do purchase inventory meeting the just in time principal	0.807	
What is your organizations level of compliance on stores management practice.	0.793	
What is the firms level of reduction in inventory costs	0.743	

#### **4.3.3 Supplier Management**

Table 4.4 presents that supplier management had a Cronbach alpha value of 0.835. This concurs with Zinbarg (2005) that an alpha coefficient of 0.80 and above indicates that the gathered data are reliable and can be generalized to reflect opinions of all respondents in the target population about the study problem. All the indicators had factor loadings above 0.7. This, therefore, ruled out elimination of any supplier management factor, none of the factors had a factor loading of less than 0.7. Tathan, Anderson and Black (1998) factors with factor loadings of

above 0.7 are excellent and should be retained for further data analysis. The study, therefore, retained all the seven factors and hence supplier selection strategies, supplier performance, supplier appraisal, supplier selection process, supplier development, supplier relationship management and supplier collaboration were considered as the most reliable factors for determining the factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya.

**Table 4. 4 Supplier Management Reliability and Factor Analysis Results**

<b>Indicators</b>	<b>Factors loadings</b>	<b>Cronbach's Alpha</b>
How often do you appraise the suppliers you use.	0.806	0.835
How often are suppliers paid in time?	0.747	
How often do you get after sale service from your suppliers.	0.732	
What percentage of your suppliers are ISO certified	0.711	
What percentage of your suppliers offer credit facilities.	0.701	
How often annually are delivered goods rejected due to non-conformity to specifications	0.875	
How often annually do your suppliers fail to honour the orders issued	0.796	

#### **4.3.4 Training**

As indicated in table 4.5, training had a Cronbach's alpha value of 0.831 and factor loadings above 0.7 for all the indicators. The study, therefore, retained all

the four factors in accordance to (Tabachnick & Fidell 2007) who recommend that using factor loading of 0.7 and above is excellent in determining the factors to be retained. The factor loadings of 0.7 and above are a clear indication that the factors belong to the variable training. Zinbarg (2005) argues that Cronbach alpha value of 0.80 or higher indicates that the gathered data are reliable and can be generalized to reflect opinions of all respondents in the target population about the study problem. The study, therefore, retained all the four training factors notably staff competency, training methods, employee qualifications and sustainable procurement skills as the most reliable factors for determining how training affects the effective implementation of procurement practices in tertiary public training institutions in Kenya.

**Table 4. 5 Training Reliability and Factor Analysis Results**

<b>Indicators</b>	<b>Factors loadings</b>	<b>Cronbach's Alpha</b>
How many times are your procurement staff taken for refresher courses annually.	0.86	0.825
Percentage of employees with a first degree.	0.808	
Percentage quality of procurement records produced.	0.796	
What percentage of procurement employees have professional skills in procurement	0.72	

#### **4.3.5 Information Communication Technology**

As can be observed in table 4.6, all the five ICT factors scored Cronbach's alpha value of 0.831 and factor loadings of between 0.871 and 0.735. The study, therefore, retained all the five indicators since according to Stevens (1992), factor

loading of 0.70 and above should be used as the minimum criterion in determining the variables to be eliminated. The Cronbach's alpha value remained as 0.831 since all the ICT factors were retained and used for further analysis. The Cronbach alpha above 0.80 corroborated with Zinbarg (2005) that an alpha coefficient of 0.80 or higher indicates that the gathered data are reliable as it has a relatively high internal consistency and can be generalized to reflect opinions of all respondents in the target population about the study problem. The study hence considered retention of the indicators of ICT infrastructure, level of automation, procurement systems-procurement and ICT skills as the most suitable factors for determining how ICT affects the effective implementation of procurement practices in tertiary public training institutions in Kenya.

**Table 4. 6 ICT Factor Analysis and Reliability Results**

<b>Indicators</b>	<b>Factors loadings</b>	<b>Cronbach's Alpha</b>
What percentage of employees in the firm are computer literacy	0.871	0.831
What is the firms level of of Automation	0.852	
What is the level of procurement systems usage	0.834	
What is the level of ICT infrastructure	0.83	
What is the firms level of embracement of E-procurement	0.735	

#### **4.3.6 Effective implementation of procurement practices**

Table 4.7 indicates that the variable effective implementation of procurement practices had a Cronbach's alpha value of 0.831 and factor loadings values of

above 0.7 for all the indicators. Zinbarg (2005) states that an alpha coefficient of 0.80 or higher indicates that the gathered data are reliable as they have a relatively high internal consistency and can be generalized to reflect opinions of all respondents in the target population about the study problem. The study was also in accordance to Tabachnick and Fidell (2007) who recommend that using factor loading of 0.7 and above is excellent in determining the factors to be retained. The study hence deduced that transparency and accountability of procurement funds, minimization of procurement expenditure, compliance with procurement regulations and quality of procured goods and services as the most reliable factors in determining factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya.

**Table 4. 7 Effective Implementation of Procurement Practices Reliability and Factor Analysis Results**

<b>Indicators</b>	<b>Factors loadings</b>	<b>Cronbach's Alpha</b>
Transparency and accountability of procurement funds	0.849	0.895
What is the organizations level of compliance a) Compliance with procurement regulations	0.844	
What is the level of Minimization of procurement expenditure	0.769	
What is the level of Transparency and accountability of procurement funds	0.794	
What is the level of Quality of procured goods and services offered	0.754	

#### **4.3.7 Multicollinearity.**

Further to the reliability tests a multicollinearity test was done at the pilot stage to ensure that the accepted independent variables did not exhibit collinearity amongst themselves. A situation in which there is a high degree of association between independent variables is said to be a problem of multi-collinearity which results into large standard errors of the coefficients associated with the affected variables. According to Mugenda and Mugenda (2012), multi-collinearity can occur in multiple regression models in which some of the independent variables are significantly correlated among themselves.

In a regression model that best fits the data, independent variables correlate highly with dependent variables but correlate, at most, minimally with each other. This problem was solved by ensuring that there was a large enough sample as multi-collinearity is not known to exist in large samples. Multi-collinearity can also be solved by deleting one of the highly correlated variables and re-computing the regression equation. From table 4.8, the tolerances are all above 0.2. If a variable has collinearity tolerance below 0.2, it implies that 80% of its variance is shared with some other independent variables. The variance inflation factors (VIFs) are also all below 5. The VIF is generally the inverse of the tolerance. Multicollinearity is associated with VIF above 5 and tolerance below 0.2. The accepted variables were therefore determined not to exhibit multicollinearity. Since the accepted variables did not exhibit multi collinearity, they were fit to be used for analysis.

**Table 4. 8 Collinearity Statistics**

<b>Variable</b>	<b>Tolerance</b>	<b>VIF</b>
Procurement Policies	0.56135	1.78143
Inventory Management	0.81974	1.2199
Supplier Management	0.80075	1.24882
Training	0.54033	1.85073
Information Communication Technology	0.64928	1.54017

#### **4.4 Descriptive Statistics**

Descriptive statistics are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data (Tronchim 2006). The study used descriptive statistics to present the frequency and the percentages of the gathered data on factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya.

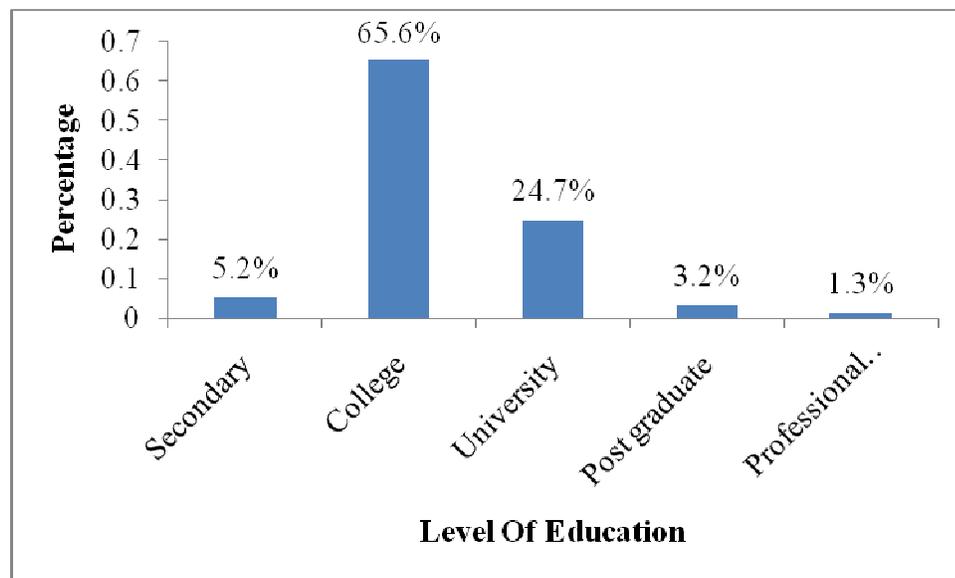
##### **4.4.1 Background Information**

This section presents personal information of the respondents who participated in the research study.

##### **4.4.2 Education Level of the Respondents**

It was important to establish the education level held by the study respondents in order to ascertain if they were equipped with relevant knowledge and skills on

procurement management functions. As presented in table figure 4.1, majority (65.6%) had college education level, 24.7% had university education level, 3.2% had post graduate education level, 5.2% had secondary education level and 1.3% had professional qualifications. These findings implied that most of the respondents were qualified to understand the nature of the study problem. This concurs with Joppe (2000) that during research process, respondents with technical knowledge on the study problem assist in gathering reliable and accurate data on the problem under investigation. This demonstrated that most of the organization employees were qualified professionals with technical knowledge and skills on the study problem and thus provided the study with reliable information on factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya.



**Figure 4. 1 Education Level of the Respondents**

#### 4.4.3 Working Experience of the Respondents

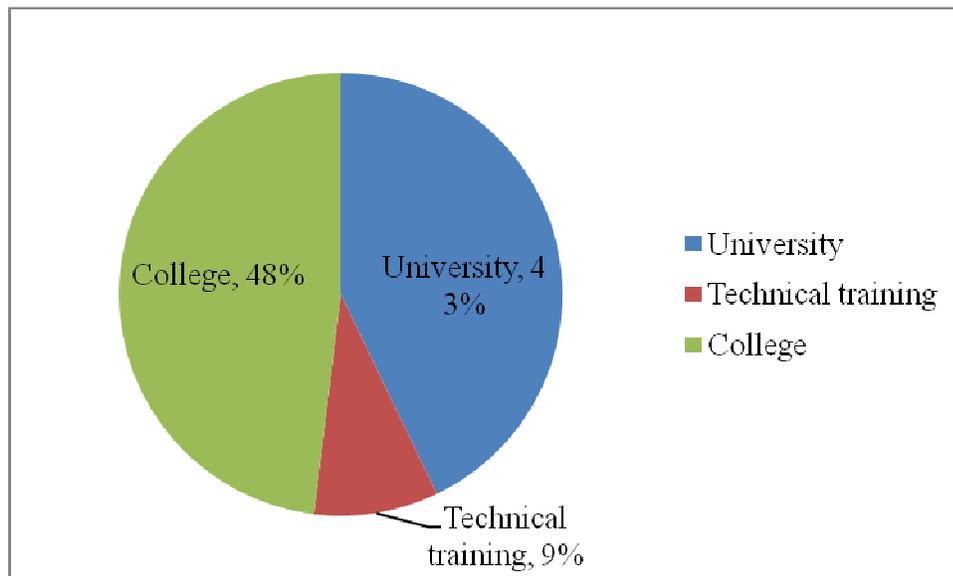
The study determined the working experience held by the respondents in order to ascertain the extent to which their responses could be relied upon to make conclusions on the study problem using their working experience. From the findings in table 4.9, (48.7%) indicated to have a working experience of 6-10 years, 20.1% had a working experience of less than 5 years, 16.2 % had a working experience of 11-15 years and 14.9% had a working experience of 16 years and above. These findings were in line with Braxton (2008) that respondents with a high working experience assist in providing reliable data on the study problem since they have technical experience on the problem being investigated by the study. This indicates that 50% of the respondents had worked in the tertiary training institutions for a long time and thus understood technical issues on factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya.

**Table 4. 9 Working experience of the respondents**

<b>Working Experience</b>	<b>Frequency</b>	<b>Percent</b>
Less than 5 years	31	20.1
6 - 10 years	75	48.7
11 - 15 years	25	16.2
16 years and above	23	14.9
<b>Total</b>	<b>154</b>	<b>100.0</b>

#### 4.4.4 Institution Category

The study further found that it was important to identify the institution category in order to establish the nature and characteristics of procurement challenges experienced by different categories of the institutions. From the findings in figure 4.2, majority (48.1%) of the respondents were from colleges, 42.9 were from technical training institutions and 9.1% were from universities.

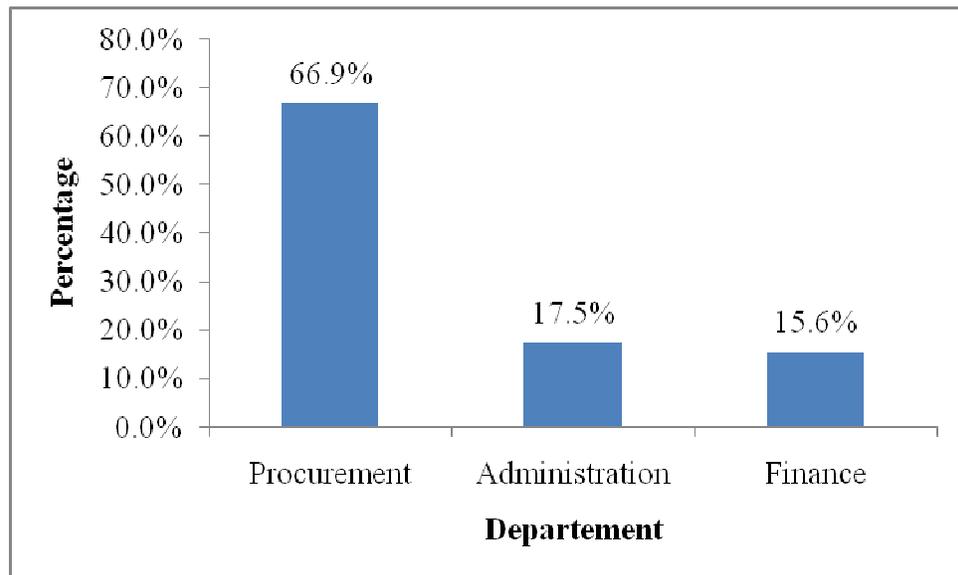


**Table 4. 10: Institutions Category**

#### 4.4.5 Respondents from Respective Departments

The study further sought to establish the respondents departments in order to determine if the respondents were from the key institutions departments concerned with the execution of procurement management functions. As presented in figure 4.3, majority (66.9%) of the respondents were from procurement department, 17.5% were from administration department and 15.6% were from finance department. This demonstrated that all the respondents were

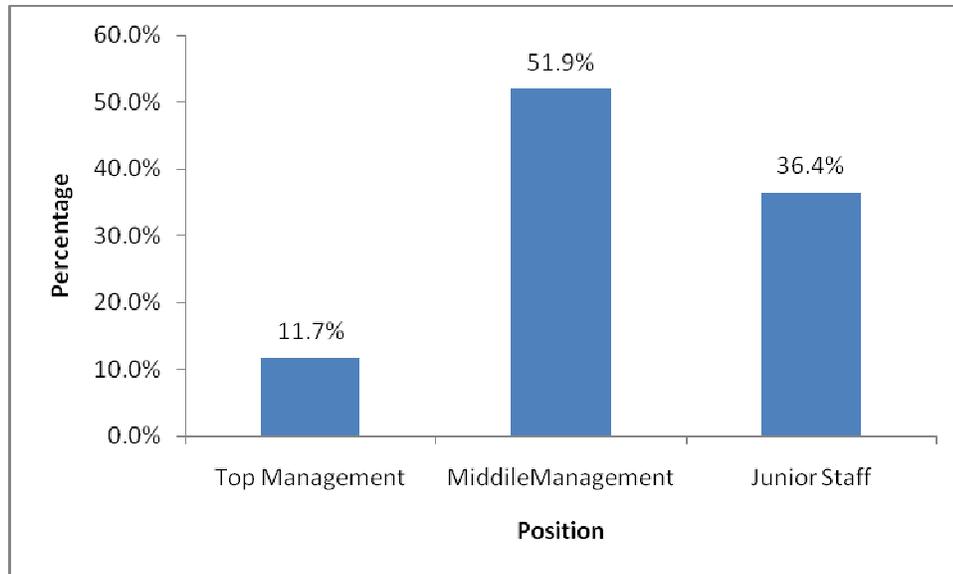
directly involved in the execution of procurement functions and this helped in gathering reliable data on factors affecting the effective implementation of procurement practices in tertiary public training institutions in Kenya.



**Figure 4. 2: Respondents' Respective Departments**

#### **4.4.6 Respondents' Position in the Institution**

The study further found that it was important to establish the management position held by the respondents in order to determine the extent to which respondents were involved in the execution of procurement functions in the institution. From the findings presented in figure 4.4, majority (51.9%) of the respondents were middle level procurement staff, 36.4% junior procurement staff and 11.7% were top management procurement staff.



**Figure 4. 3 Respondents Position in the Institution**

#### **4.4.7 Procurement Policies**

Procurement policies are rules and regulations for governing procurement procedures in an organization. A properly designed and implemented procurement policy plays a pivotal role in providing a guiding framework for the effective implementation of procurement practices (Bartik 2009). Respondents were asked various questions that are indicators of compliance and implementation of procurement policies. The data collected being ordinal categorical, was presented in frequency tables with the median being used as the appropriate measure of central tendency. Table 4.10 presents the findings.

The respondents were asked what is the organizations level of compliance with Public Procurement and Disposal Regulations (2006), 0% of the respondents had 0-20% level of compliance, 0%, had 20-30% level of compliance, 14%, had 30-40% level of compliance, 29%, had 40-50% level of compliance, 57% , had over

50% level of compliance. The modal class is of the respondents who had over 50% level of compliance to the regulation. The median was also found to be 5 which implies that on average the organizations had over 50% level of compliance with Public Procurement and Disposal Regulations (2006).

The study also inquired the level of accuracy in the procurement records used. 0% of the respondents had 0-20% level of accuracy, 6%, had 20-30% level of accuracy, 14%, had 30-40% level of accuracy, 34%, had 40-50% level of accuracy, 46% , had over 50% level of accuracy. The modal class is of the respondents who over 50% level of accuracy. The median was found to be 4 which implies that on average the firms had 40-50% level of accuracy in the procurement records used. When the respondents were asked what the level of accuracy and reliability of Procurement records kept was, 0% of the respondents had 0-20% level of reliability, 3%, had 20-30% level of reliability, 14%, had 30-40% level of reliability, 43%, had 40-50% level of reliability, 40% , had over 50% level of reliability The modal class is of the respondents who had 40-50% level of reliability. The median was found to be 4 which implies that on average the respondents who had 40-50% level of accuracy and reliability of Procurement records kept.

The next indicator inquired from the respondents how often the firm prepares or implement procurement plan annually, 0% of the respondents said they never, 3%, had 1-2 times, 6%, had 3-4 times, 37%, had 5-6 times, 54%, said they prepare

these reports over 6 times annually. The modal class is of the respondents who prepare the plans for implementation over 6 times annually. The median was found to be 5 which implies that on average the institutions have procurement plans prepared over 6 times annually.

When the asked how the firms employees prepare or receive expected management support, 3% of the respondents said they never, 3%, said they receive 1 to 2 times annually, 9%, receive expected support 3-4 times , 34%, 5 to 6 times, 51%, receive support over 6 times annually. The modal class is of the respondents who prepare or receive expected management support over 6 times annually. The median was found to be 5 which implies that on average the firms employees always receive expected management support over 6 times annually.

When asked how often the firm fail to adhere to the Budgetary allocation, 0% of the respondents said over 6 times annually , 3%, 5-6 times , 26%, 4 to 3 times , 37%, 1 to 2 times and 31% of the institutions never fail to adhere to budgetary allocation. The modal class is of the respondents who said the firm fails to adhere to budgetary allocations 1 to 2 times annually. The median was found to be 4 which implies that on average the firms fail to adhere to budgetary allocations 1 to 2 times annually.

The last indicator under the variable procurement policies inquired how often does the firm fail to prepare the procurement progress reports as required, 0% of the respondents had over 6 times failure, 3%, 5 to 6 times failure to prepare, 14%,

3 to 4 times, 26%, 1 to 2 times, 49% , of the firms never fail to prepare progress reports as required. The modal class is of the respondents whose firms never fail to prepare the required procurement progress reports. The median was found to be 5 which implies that on average the firms never fail to prepare the procurement progress reports as required.

**Table 4. 11 Procurement Policies**

	<b>0- 20%</b>	<b>20- 30%</b>	<b>30- 40%</b>	<b>40- 50%</b>	<b>over 50%</b>	<b>Median</b>
What is the organizations level of compliance with Public Procurement and Disposal Regulations (2006)	0% (0)	0% (0)	14.3% (5)	28.6% (10)	57.1% (20)	5
What is the level of accuracy in the procurement records used.	0% (0)	6% (2)	14.3% (5)	34.3% (12)	45.7% (16)	4
What is the level of accuracy and reliability of Procurement records kept	0% (0)	2.9% (1)	14.3% (5)	42.9% (15)	40% (14)	4

	<b>Never</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>Over 6 times</b>	<b>Median</b>
How often does the firm prepare or implement procurement plans annually.	0% (0)	2.9% (1)	5.7% (2)	37.1% (13)	54.3% (19)	5
How often does the firms employees prepare or receive expected management support annually.	2.9% (1)	2.9% (1)	8.6% (3)	34.3% (12)	51.4% (18)	5

	<b>Over 6 times</b>	<b>5-6</b>	<b>3-4</b>	<b>1-2</b>	<b>Never</b>	<b>Median</b>
How often does the firm fail to adhere to the Budgetary allocation annually	0% (0)	2.9% (1)	25.7% (9)	37.1% (13)	31.4% (11)	4
How often does the firm fail to prepare the procurement progress reports as required annually	0% (0)	2.9% (1)	14.3% (5)	25.7% (9)	48.6% (17)	5

These findings demonstrated that all the procurement policy factors affected effective implementation of procurement practices in tertiary public training institutions in Kenya to a large extent. The findings corroborated with findings by Simpson and Power (2007) that low level of procurement regulations compliance in many public training institutions in developing nations hampers effective execution of procurement functions and implementation of institutional development projects. Tanzi (2009) notes 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. Arthur (2009) notes that many procurement managers in Kenyan state corporations lack competitive knowledge and skills on how to formulate and embrace effective procurement policies in many public institutions in Kenya. The study, therefore, deduced that the key procurement policy factors that affect effective implementation of procurement practices in tertiary public training institutions in Kenya includes; level of procurement regulations compliance, type of procurement policies, management support, procurement procedures, relationship between management, organizational resources and policy-making process.

#### **4.4.8 Inventory Management**

Inventory management is the application of data collection, demand and forecasting, lean and operational principles to manage the total amount of inventory within the supply chain at any point in time and manage inventory

holding costs (Sharafali 2007). The scope of inventory management concerns the fine lines between replenishment lead time, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods, and demand forecasting. Balancing these competing requirements leads to optimal inventory levels, which is an on-going process as the business needs shift and react to the wider environment (Riggs & Sharon, 2008). The data was collected from the different indicators of the variable inventory management which was ordinal categorical. The data was therefore presented in frequency tables with the median being used as the appropriate measure of central tendency. Table 4.11 presents the findings.

Under inventory management, the first question was to find out how often the management fail to use economic order quantity on purchases, 49% of the respondents said they fail to do so over 6 times annually, 23%, 5 to 6 times, 26%, 3 to 4 times, 0%, 1 to 2 times and 3% said they never fail to use the economic order quantity when making purchases. The modal class is of the respondents who said management fail to use economic order quantity on purchases even over 6 times annually. The median was found to be 1 which implies that on average the management in the institutions fail to use economic order quantity on purchases even over 6 times annually.

The researcher also required to know how often the institutions' inventory purchase fail to meet the just in time principal, 9% of the respondents said their purchases fail to meet the just in time principal even over 6 times annually, 11%, up to 5 to 6 times annually, 6%, 3 to 4 times, 40%, up to 1 to 3 times, 31% , never have purchases that fail to meet the just in time principal. The modal class is of the respondents whose inventory purchases fail meet the just in time principal up to 1 to 2 times annually. The median was found to be 4 which implies that on average the institutions have inventory purchases that fail to meet the just in time principal up to 1 to 2 times annually. When asked the firms level of compliance on stores management practice, 11% of the respondents had 0-20%, 29%, had 21-40% , 17% of the respondents had 41-60%, 20% of them had 61-80% and 23% , had over 80% level of compliance. The modal class is of the respondents who had over 80% level of compliance. The median was found to be 4 which implies that on average the respondents had 60 to 80% level of compliance with stores management practices.

The last indicator under inventory management required the institutions to state their levels of minimisation of inventory costs, 3% of the respondents had 0-20%, 11%, had 21-40% , 14% of the respondents had 41-60%, 34% of them had 61-80% and 37% , had over 80% level of compliance. The modal class is of the respondents who had over 80% level of minimisation of costs. The median was found to be 5 which implies that on average the respondents had over 80% level of minimisation of inventory costs.

**Table 4. 12 Inventory Cost**

	<b>Over 6 times</b>	<b>5-6 times</b>	<b>3-4 times</b>	<b>1-2 times</b>	<b>Never</b>	<b>Median</b>
How often does management fail to use economic order quantity on purchases	48.6% (17)	22.9% (8)	25.7% (9)	0% (0)	2.9% (1)	5
How often do inventory purchase fail to meet the just in time principal	8.6% (3)	11.4% (4)	5.7% (2)	40% (14)	31.4% (11)	4

	<b>0- 20%</b>	<b>21- 40%</b>	<b>41- 60%</b>	<b>61- 80%</b>	<b>Over 80%</b>	<b>Median</b>
What is your organizations level of compliance on stores management practice.	11.4% (4)	28.6% (10)	17.1% (6)	20% (7)	22.9% (8)	4
What is the firms level of reduction in inventory costs	2.9% (1)	11.4% (4)	14.3% (5)	34.3% (12)	37.1% (13)	5

**4.4.9 Supplier Management**

Supplier management is a business process that allows a company to adequately select its vendors and negotiate the best prices for goods and services that it purchases. Senior managers also monitor the corporate supply chain to ensure that vendors familiarize themselves with the company's operating activities and

manufacturing processes(Arthur 2009).On the extent to which supplier management affected the effective implementation of procurement practices in tertiary public training institutions in Kenya, respondents were asked to indicate the extent to which supplier management factors hindered effective implementation of procurement practices in the institutions. The data was collected from the different indicators of the variable Supplier management which was ordinal categorical. The data was therefore presented in frequency tables with the median being used as the appropriate measure of central tendency. Table 4.12 presents the findings.

For the variable supplier management, the first indicator inquired from the respondents how often they appraise the suppliers they use annually, 43% of the respondents Never appraise their suppliers, 31%, appraise them once a year, 20%, appraise suppliers up to twice a year , 3%, appraise their suppliers up to 3 times annually and 3%of the institutions appraise their suppliers over 3 times annually. The modal class is of the respondents who never appraise suppliers. The median was found to be 1 which implies that on average the institutions never appraise the suppliers they use.

The respondents also answered to the question how often they pay suppliers in time annually, 3% of the respondents never pay the suppliers in time, 9%, make timely payments once a year , 14%, make timely payments up to 2 times a year, 23%, up to 3 times a year, 51% make timely payments over 3 times annually. The

modal class is of the respondents who make timely payments to suppliers over 3 times annually. The median was found to be 5 which implies that on average the institutions pay their suppliers in time over 3 times annually.

The next indicator under supplier management required the respondents to state how often their institutions get after sale service from their suppliers annually, 3% of the respondents never get after sales service from suppliers, 6%, get after sales service once a year, 11%, twice a year , 14%, 3 times and 66% get after sales service over three times annually. The modal class is of the respondents whose institutions get after sales service over three times annually. The median was found to be 5 which implies that on average the respondents whose institutions get after sales service over three times annually.

The respondents were then asked the percentage of their suppliers that are ISO certified, 3% of the respondents had 0-20%, 6%, had 21-40% , 6% of the respondents had 41-60%, 34% of them had 61-80% and 51% , had over 80% of ISO certified suppliers. The modal class is of the respondents who had over 80% of ISO certified suppliers. The median was found to be 5 which implies that on average the institutions had over 80 percent of ISO certified suppliers.

The respondents were also to state the percentage of their suppliers that offer credit facilities, 3% of the respondents had 0-20%, 6%, had 21-40% , 23% of the respondents had 41-60%, 29% of them had 61-80% and 43% , had over 80% of

ISO certified suppliers. The modal class is of the respondents who had over 80% of suppliers offering credit facilities. The median was found to be 5 which implies that on average the institutions had over 80 percent suppliers that offer credit facilities.

Lastly for this indicator the firms were asked how often annually their suppliers fail to honour the orders issued, 3% of the respondents had over 6 times of rejections, 11%, had 5 to 6 times annually, 25% of the respondents had 3 to 4 times, 29% of them had 1 to 2 times and 31%, never have rejections. The modal class is of the respondents who never have rejections of compliance. The median was found to be 5 which imply that on average the respondents never have goods rejected due to non-conformity to specifications.

**Table 4. 13 Supplier Management**

	<b>Never</b>	<b>Once</b>	<b>Twice</b>	<b>Thrice</b>	<b>Over 3 times</b>	<b>Median</b>
How often do you appraise the suppliers you use annually.	42.9% (15)	31.4% (11)	20% (7)	2.9% (1)	2.9% (1)	5
How often are suppliers paid in time annually	2.9% (1)	8.6% (3)	14.3% (5)	22.9% (8)	51.4% (18)	4
How often do you get after sale service from your suppliers annually.	2.9% (1)	5.7% (2)	11.4% (4)	14.3% (5)	65.7% (23)	4
	<b>0-</b>	<b>21-</b>	<b>41-</b>	<b>61-</b>	<b>Over</b>	<b>Median</b>

	<b>20%</b>	<b>40%</b>	<b>60%</b>	<b>80%</b>	<b>80%</b>	
What percentage of your suppliers are ISO certified	2.9% (1)	5.7% (2)	5.7% (2)	34.3% (12)	51.4% (18)	5
What percentage of your suppliers offer credit facilities.	2.9% (1)	5.7% (2)	22.9% (8)	28.6% (10)	42.9% (15)	5

	<b>Over 6 times</b>	<b>5-6</b>	<b>3-4</b>	<b>1-2</b>	<b>Never</b>	<b>Median</b>
How often annually are delivered goods rejected due to non-conformity to specifications	2.9% (1)	2.9% (1)	22.9% (8)	28.6% (10)	37.1% (13)	4
How often annually do your suppliers fail to honour the orders issued	2.9% (1)	11.4% (4)	25.7% (9)	28.6% (10)	31.4% (11)	5

#### **4.5 Training**

Training is the process of identifying and developing the necessary knowledge and skills required for doing a job. Training is learning provided in order to improve performance on the present job (Armstrong 2008). On the extent to which training affected the effective implementation of procurement practices in tertiary public training institutions in Kenya, respondents were asked to indicate the extent to which training factors hindered effective implementation of

procurement practices in the institution. The findings for are presented in the table 4.13. The data was collected from the different indicators of the variable inventory management which was ordinal categorical. The data was therefore presented in frequency tables with the median being used as the appropriate measure of central tendency.

On the first indicator, respondents were asked how many times the institution have their procurement staff taken for refresher courses annually, 0% of the institutions never takes procurement staff for refresher courses. Implies all institutions have them taken at least once a year. 3%, had 1 to 2 times annually, 65% of the respondents had 3 to 4 times, 11% of them had 5 to 6 times and 11%, had over 6 times of rejections. The modal class is of the respondents who had take their staff for refresher courses 3 to 4 times. The median was found to be 3 which implies that on average the respondents take their procurement staff for refresher courses at least 3 to 4 times annually.

The second indicator under training inquired from the respondents the percentage of procurement staff who had not achieved at least an undergraduate degree, 46% of the respondents had no employee in this category, 3% had 1-20% in this category, 14%, 21 to 40 in this category, 11%, 41 to 60 in this category, 3%, had over 60% in this category. The modal class is of the respondents who had 0% of employees in the category of those had not achieved a first degree. The median was found to be 1 which implies that on average the institutions have 0% of employees who haven't achieved an undergraduate degree. This further implies

that on average all institutions employ procurement staff with at least a first degree.

The third indicator looked at the quality of reports that are produced, The respondents were to state the level of quality of the procurement reports produced. 0% of the respondents had 0-20%, 3% had 21-40% , 3% of the respondents had 41-60%, 9% of them had 61-80% and 65% , had over 80% score in the quality of the procurement reports produced. The modal class is of the respondents who had over 80% score in the quality of the procurement reports produced. The median was found to be 5 which implies that on average the institutions had over 80 score in the quality of the procurement reports produced.

The second indicator inquired the percentage of procurement employees that have professional skills in procurement, 0% of the respondents had 0-20% , 3% had 20-30% , 11% had 30-40% , 37% had 40-50% and 46% had over 50% of employees with professional skills in procurement. The modal class is of the respondents who had over 50% employees. The median was found to be 5 which implies that on average the respondents had over 50% of procurement employees with professional skills in procurement.

**Table 4. 14 Training**

	<b>Never</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>Over 6</b>	<b>Median</b>
How many times are your procurement staff taken for refresher courses annually.	0% (0)	2.9% (1)	65.7% (23)	11.4% (4)	2.9% (1)	5
	<b>0%</b>	<b>10%</b>	<b>20%</b>	<b>40%</b>	<b>Over 60%</b>	<b>Median</b>
Percentage of employees with a first degree.	45.7% (16)	2.9% (1)	14.3% (5)	11.4% (4)	2.9% (1)	4
Percentage quality of procurement records produced.	0% (0)	2.9% (1)	2.9% (1)	25.7% (9)	65.7% (23)	4
What percentage of procurement employees have professional skills in procurement	0% (0)	2.9% (1)	11.4% (4)	37.1% (13)	45.7% (16)	5

**4.5.1 Information Communication Technology**

Information Communication Technology (IT) is a technology that 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 infective. This has negative impact on procurement

procedures since the public sector organizations cannot effectively monitor and coordinate procurement procedures of all road construction projects, there is 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 efficient use of information technology but 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. On the extent to which ICT affected the effective implementation of procurement practices in tertiary public training institutions in Kenya, respondents were asked to indicate the extent to which ICT factors hindered effective implementation of procurement practices in the institutions.

The findings for are presented in the table 4.14. The data was collected from the different indicators of the variable ICT which was ordinal categorical. The data was therefore presented in frequency tables with the median being used as the appropriate measure of central tendency.

Information Communication technology had the first indicator that required the institutions to state the percentage of employees in the firm who are computer literacy , 54% of the respondents had 0-20% , 3% had 20-30% , 14% had 30-40% had 9%, 40-50% and 6% had over 50% The modal class is of the respondents who

had between 0 to 20% literacy. The median was found to be 1 which implies that on average the respondents 0 to 20% of employees in the firm that are computer literacy.

When the respondents were asked in the second question what the firms level of Automation was, 3% of the respondents had 0-20%, 3% had 20-30%, 6% had 30-40%, 37% had 40-50% and 49% had over 50%. The modal class is of the respondents who had over 50% automation. The median was found to be 5 which implies that on average the firms have over 50% level of Automation.

The next indicator asked the respondents what the level of procurement systems usage was in the institution, 0% of the respondents had 0-20%, 3% had 20-30% , 6% had 30-40% , 37% had 40-50%, 46% had over 50%. The modal class is of the respondents who had over 50% level of procurement usage. The median was found to be 5 which implies that on average the firms had over 50% level of procurement systems usage.

When the respondents were asked what the level of ICT infrastructure was, 3% of the respondents had 0-20%, 3% had 20-30% , 9% had 30-40% , 31% had 40-50%, 51% had over 50% ” The modal class is of the respondents who had over 50% level. The median was found to be 5 which implies that on average the firms had over 50% level of ICT infrastructure.

The last indicator for the variable ICT inquired what the firms level of embracement of E-procurement was. 0% of the respondents 0-20%, 3% had 20-30% , 3% had 30-40% , 31% had 40-50% and 60% had over 50% ” The modal class is of the respondents who had over 50%. The median was found to be 5 which implies that on average the firms have over 50% level of embracement of E-procurement.

**Table 4. 15 ICT**

	<b>0%</b>	<b>10%</b>	<b>20%</b>	<b>40%</b>	<b>Over 60%</b>	<b>Median</b>
What percentage of employees in the firm are computer literacy	54.3% (19)	2.9% (1)	14.3% (5)	8.6% (3)	5.7% (2)	5
What is the firms level of Automation	2.9% (1)	2.9% (1)	5.7% (2)	37.1% (13)	48.6% (17)	4
What is the level of procurement systems usage	0% (0)	2.9% (1)	5.7% (2)	37.1% (13)	45.7% (16)	4
What is the level of ICT infrastructure	2.9% (1)	2.9% (1)	8.6% (3)	31.4% (11)	51.4% (18)	5
What is the firms level of embracement of E-procurement	0% (0)	2.9% (1)	2.9% (1)	31.4% (11)	60% (21)	5

#### **4.5.2 Effective implementation of procurement practices**

On the extent to which effective implementation of procurement practices were employed in tertiary public training institutions in Kenya, respondents were asked to indicate the extent to which effective implementation of procurement practices

factors determined the effectiveness of procurement practices in the institution. The data was collected from the different indicators of the variable Effective implementation of procurement practices which was ordinal categorical. The data was therefore presented in frequency tables with the median being used as the appropriate measure of central tendency. The results were presented in table 4.15.

The first indicator for the dependent variable required to know what the organizations level of Compliance with procurement regulations was, 0% of the respondents had 0-20% , 3% had 20-30% , 11% had 30-40% , 17% had 40-50%, 69% had had over 50% The modal class is of the respondents who had over 50% compliance. The median was found to be 5 which implies that on average the organizations level of Compliance with procurement regulations is over 50%.

The next indicator required the respondents to state the level of Minimization of procurement expenditure in the institution, 3% of the respondents had 0-20% , 3% had 20-30% , 14% had 30-40% , 26% had 40-50%, 49% had over 50% The modal class is of the respondents who had over 50%. The median was found to be 5 which implies that on average firms levels of Minimization of procurement expenditure was by over 50%.

When the respondents were asked what the level of Transparency and accountability of procurement funds was, 0% of the respondents 0-20% , 3% had 20-30% , 3% had 30-40% , 34% had 40-50%, 60% had over 50% ” The modal class is of the respondents who had over 50% transparency. The median was

found to be 5 which implies that on average the level of Transparency and accountability of procurement funds in organisations is over 50%.

Finally the respondents were asked what the level of Quality of procured goods and services offered was, 0% of the respondents 0-20%, 3% had 20-30%, 20% had 30-40%, 43% had 40-50%, 34% had over 50% The modal class is of the respondents who had between 40-50% quality level. The median was found to be 4 which implies that on average the level of Quality of procured goods and services offered is between 40-50%.

**Table 4. 16 Effective implementation of procurement practices**

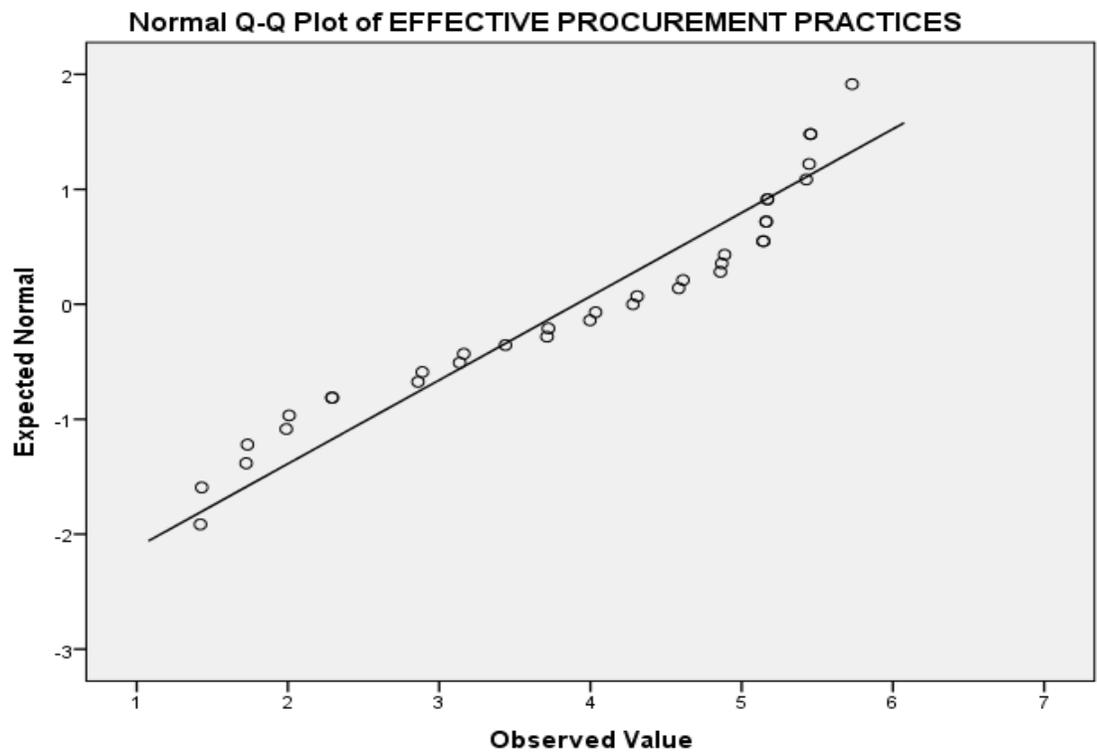
	<b>0%</b>	<b>10%</b>	<b>20%</b>	<b>40%</b>	<b>Over 60%</b>	<b>Median</b>
What is the organizations level of compliance a) Compliance with procurement regulations	0% (0)	2.9% (1)	11.4% (4)	17.1% (6)	68.6% (24)	5
What is the level of Minimization of procurement expenditure	2.9% (1)	2.9% (1)	14.3% (5)	25.7% (9)	48.6% (17)	4
What is the level of Transparency and accountability of procurement funds	0% (0)	2.9% (1)	2.9% (1)	34.3% (12)	60% (21)	4
What is the level of Quality of procured goods and services offered	0% (0)	2.9% (1)	20% (7)	42.9% (15)	34.3% (12)	5

#### 4.6 Normality Test

For one to fit a linear model to some given data, the dependent variable (Effective implementation of procurement practices) has to be normally distributed (Ghasemi & Zahedias 2012).

#### Q-Q Plot

For data to be normally distributed, the observed values should be spread along the straight diagonal line shown in figure 4.5. Since most of the observed values are spread very close to the straight line, there is high likelihood that the data are normally distributed. This finding is confirmed by the Q-Q plot test below.



**Figure 4. 4 Normal Q-Q Plot of effective implementation of procurement practices**

### **Kolmogorov-Smirnov test**

The Kolmogorov-Smirnov test is a non-parametric test that can be used to test the underlying distribution of a given random variable. This was used to test whether the dependent variable followed a normal distribution.

From table 4.16 the Shapiro-Wilk statistic 0.902 has a p-value of 0.004 which is less than 0.05. with 95% confidence, the study concluded that the dependent variable Effective Procurement Policies followed a normal distributed. Fitting a linear model to the data was thus justified.

**Table 4. 17 Normality Test**

	<b>Kolmogorov-Smirnov<sup>a</sup></b>			<b>Shapiro-Wilk</b>		
	<b>Statistic</b>	<b>Df</b>	<b>Sig.</b>	<b>Statistic</b>	<b>df</b>	<b>Sig.</b>
Effective implementation of procurement practices	0.156	35	0.03	0.902	35	0.004

### **4.6.1 Regression Analysis**

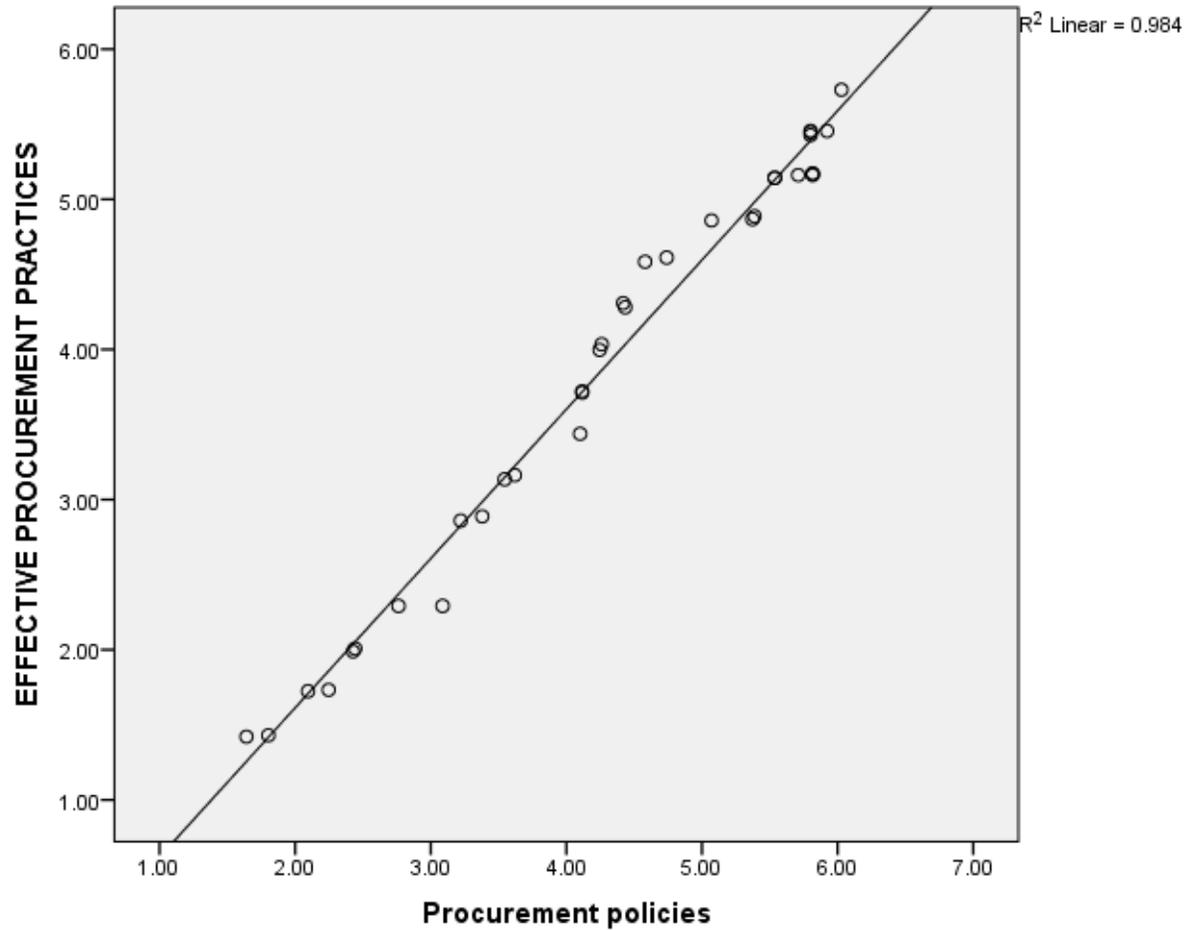
The study further carried out regression analysis to establish the statistical significance relationship between the independent variables notably, procurement policies, inventory management, supplier management, training and ICT on the dependent variable which was effective implementation of procurement practices. According to Green and Salkind (2003), regression analysis is a statistics process of estimating the relationship between variables. Regression analysis helps in generating equation that describes the statistics relationship between one or more

predictor variables and the response variable. The regression analysis results were presented using a scatter plot diagrams, regression model summary tables, Analysis Of Variance (ANOVA) table and beta coefficients tables. The ordinal categorical data collected for each variable was scored to produce total scores for each variable that was then used for regression analysis.

#### **4.6.2 Regression Analysis on Procurement Policies Vs Effective**

##### **Procurement Practices**

Regression analysis was conducted to determine the significance relationship of procurement policies against effective implementation of procurement practices. Figure 4.11 illustrates scatter plot diagram of regression analysis results of significance of procurement policies versus effective implementation of procurement practices. The figure presents that all the plots appear in the first quadrante and the line of best of fit indicates an estimate line that is increasingly positively upwards. This implies that there is a positive linear relationship between procurement policies and effective implementation of procurement practices .



**Figure 4. 5 Regression Model on Procurement Policies Vs Effective implementation of procurement practices**

Table 4.18 presents the regression model on procurement policies versus effective implementation of procurement practices . As presented in the table, the coefficient of determination R square is 0.984 and R is 0.992. The coefficient of determination R square indicates that 98.4% of the variation on the implementation of effective practices is explained by the variation in procurement policies. The R square is high implies a good model fit. The Adjusted R square is

0.989 which is more than the R square. This implies that there is still possibility of improving the model fit by adding another factor influencing the dependent variable to the model. An additional independent variable would increase the R Square to the value of the adjusted R square.

The table also presents the results of Analysis of Variance (ANOVA) on procurement policies versus effective implementation of procurement practices. The ANOVA results for regression coefficients indicate that the significance of the F is 0.00 which is less than 0.05 hence implying that the predictor coefficient is at least not equal to zero. This also implies a good fit for the model.

The study further determined the beta coefficients of procurement policies versus effective implementation of procurement practices . Table 4.18 also presents that the coefficient of procurement policies is 0.994. The t statics is for this coefficient is 45.41 with a p-value of 0.000 which is less than 0.05. This p value confirms the significance of the coefficient of procurement policies at 95% confidence. We can thus conclude that procurement policies significantly influences effective implementation of procurement practices and thus has a significant positive relationship with effective implementation of procurement practices .

**Table 4. 18 Regression Model Procurement Policies**

**Model Summary, Procurement Policies**

<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
.992 <sup>a</sup>	0.98425	0.98977	0.17498

**ANOVA**

	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Regression	63.1413	1	63.1413	2062.21	.000 <sup>b</sup>
Residual	1.0104	33	0.03062		
Total	64.1517	34			

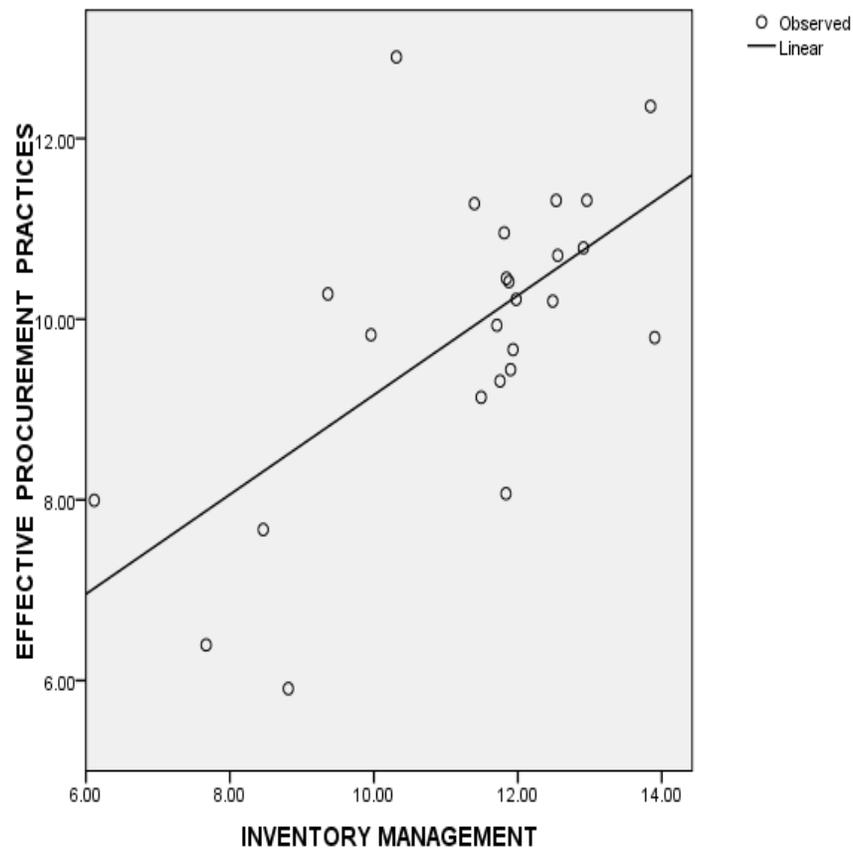
**Coefficients**

	<b>B</b>	<b>Std. Error</b>	<b>t</b>	<b>Sig.</b>
(Constant)	-0.3745	0.09879	-3.7914	0.00061
Procurement policies	0.9942	0.02189	45.4115	2.5E-31

**4.6.3 Regression Analysis on Inventory Management Vs Effective implementation of procurement practices**

The study conducted regression analysis to determine the significance relationship of inventory management versus effective implementation of procurement

practices. Figure 4.10 thus presents a scatter plot diagram of regression analysis results of significance of inventory management versus effective implementation of procurement practices. Figure 4.12 presents that all the plots are in the first quadrante and the line of best of fit indicates an estimate line that is increasingly positively upwards. This demonstrates that there is a positive linear relationship between inventory management and effective implementation of procurement practices .



**Figure 4. 6 Regression Model on Inventory Management Vs Effective implementation of procurement practices**

Table 4.19 presents the regression model on inventory management versus effective implementation of procurement practices . As presented in the table, the coefficient of determination R square is 0.002 and R is 0.044. The coefficient of determination R square indicates that 0.2% of the variation on the implementation of effective practices is explained by the variation in inventory management. The R square is low implying that the model was not well fitted with this independent variable. Other factors could be influencing implementation of effective procurement other than inventory management.

The table also presents the results of Analysis of Variance (ANOVA) on inventory management versus effective implementation of procurement practices. The ANOVA results for regression coefficients indicate that the significance of the F is 0.803 which is greater than 0.05 hence implying that the predictor coefficient is at least equal to zero. This does not imply a good fit for the model since it shows that inventory management has no significant influence on effective implementation of procurement practices.

The study further determined the beta coefficients of inventory management versus effective implementation of procurement practices. Table 4.19 also presents that the coefficient of procurement policies is 0.053. The t statics is for this coefficient is 0.21 with a p-value of 0.030 which is less than 0.05. This p value confirms the significance of the coefficient of procurement policies at 95% confidence. We can thus conclude that inventory management significantly

influences effective implementation of procurement practices and thus has a significant relationship with effective implementation of procurement practices.

**Table 4. 19 Regression, Inventory Management**

**Regression Model Summary, Inventory Management.**

<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
.044a	0.002	-0.028	1.39293

**ANOVA, Inventory Management.**

	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Regression	0.123	1	0.123	0.064	.803b
Residual	64.028	33	1.94		
Total	64.152	34			

**Coefficients inventory management.**

	<b>B</b>	<b>Std. Error</b>	<b>t</b>	<b>Sig.</b>
(Constant)	3.672	0.957	3.836	0.001
Inventory Management	0.472	0.21	2.252	0.030

#### 4.6.4 Regression Analysis on Supplier Management Vs Effective implementation of procurement practices

The study further carried out regression analysis to establish the significance of the relationship between supplier management and effective implementation of procurement practices. As presented in the scatter diagram in Figure 4.11, all the plots are in the first quadrante and the line of best of fit indicates an estimate line that is increasingly positively upwards. This therefore demonstrates that there is a positive linear relationship between supplier management and effective implementation of procurement practices.

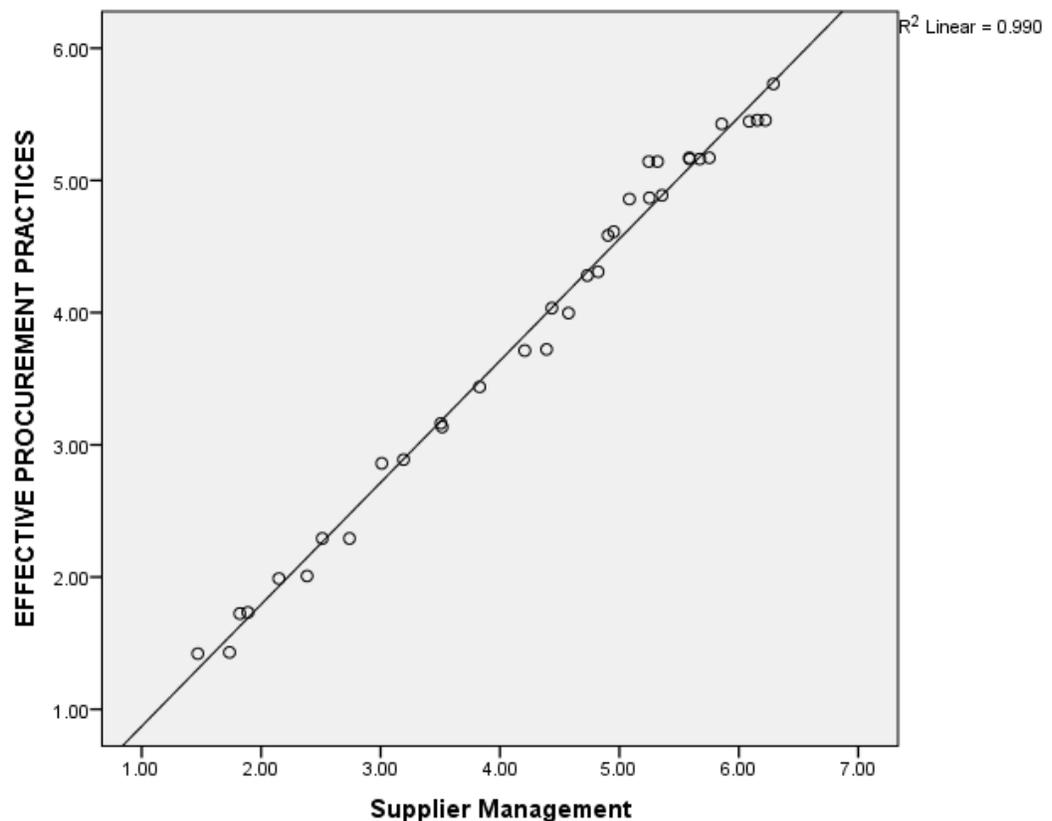


Figure 4. 7 Regression Model on Supplier Management Vs Effective

## **Procurement Practices.**

Table 4.20 presents the regression model on supplier management versus effective implementation of procurement practices. As presented in the table, the coefficient of determination R square is 0.9893 and R is 0.995. The coefficient of determination R square indicates that 98.93% of the variation on the implementation of effective practices is explained by the variation in supplier management. The R square is high implies a good model fit. The Adjusted R square is 0.9895 which is higher than the R square. This implies that there is still possibility of improving the model fit by adding another factor influencing the dependent variable to the model. An additional independent variable would increase the R Square to the value of the adjusted R square.

The table also presents the results of Analysis of Variance (ANOVA) on supplier management versus effective implementation of procurement practices. The ANOVA results for regression coefficients indicate that the significance of the F is 0.00 which is less than 0.05 hence implying that the predictor coefficient is at least not equal to zero. This also implies a good fit for the model.

Further analysis was carried out to determine the beta coefficients of supplier management versus effective implementation of procurement practices . Table 4.20 also presents that the coefficient of procurement policies is 0.9215. The t statics is for this coefficient is 56.68 with a p-value of 0.000 which is less than

0.05. This p value confirms the significance of the coefficient of supplier management at 95% confidence. We can thus conclude that supplier management significantly influences effective implementation of procurement practices and thus has a significant positive relationship with effective implementation of procurement practice.

**Table 4. 20 Regressionsupplier management**

**Model Summary, supplier management**

<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
.995 <sup>a</sup>	0.98983	0.98952	0.14059

**ANOVA, supplier management**

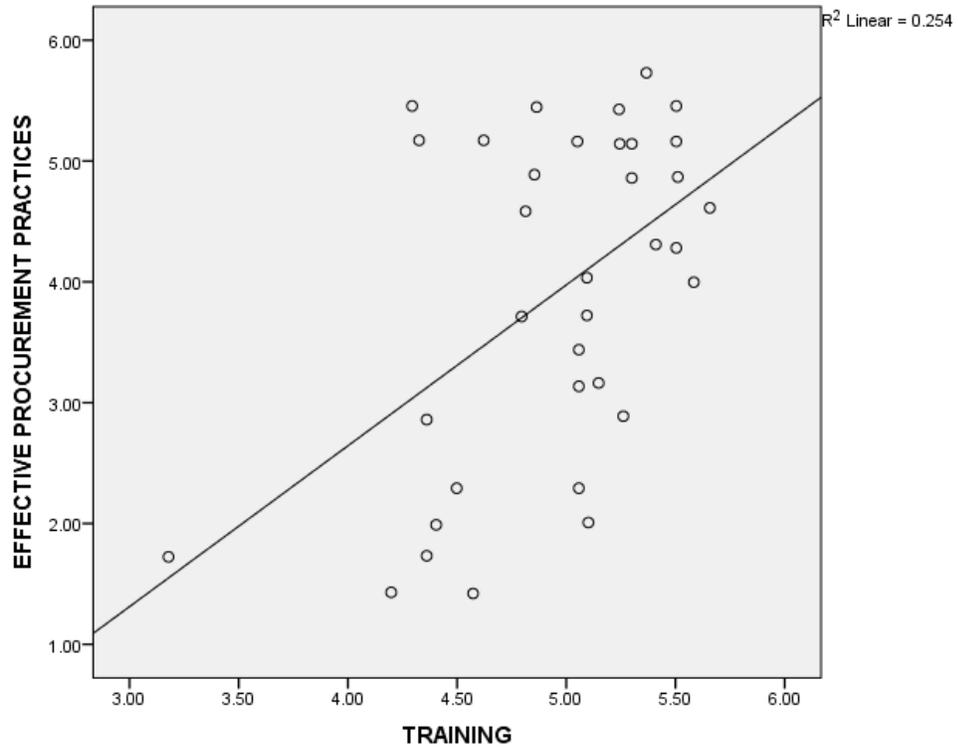
	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Regression	63.4995	1	63.4995	3212.67	.000 <sup>b</sup>
Residual	0.65225	33	0.01977		
Total	64.1517	34			

**Coefficients, supplier management.**

	<b>B</b>	<b>Std. Error</b>	<b>t</b>	<b>Sig.</b>
(Constant)	-0.0496	0.07372	-0.6729	0.50568
Supplier Management	0.9215	0.01626	56.6805	1.8E-34

**4.6.5 Regression Analysis on Training Vs Effective implementation of procurement practices**

The study further carried out regression analysis to establish the significance of the relationship between training and effective implementation of procurement practices. As presented in the scatter diagram in Figure 4.12, all the plots are in the first quadrate and the line of best of fit indicates an estimate line that is increasingly positively upwards. This, therefore, demonstrates that there is a positive linear relationship between training and effective implementation of procurement practices.



**Figure 4. 8 Regression Model on Training Vs Effective implementation of procurement practices**

As presented in the table 4.21, the coefficient of determination R square is 0.25449 and R is 0.504. The coefficient of determination R square indicates that 22.4% of the variation on the implementation of effective practices is explained by the variation in training. The R square is not very high which implies that the model does not have a good fit. This can be corrected by adding more factors into the model. The Adjusted R square is 0.231 which is higher than the R square. This implies that there is still possibility of improving the model fit by adding another factor influencing the dependent variable to the model. An additional independent variable would increase the R Square to the value of the adjusted R square.

The table also presents the results of Analysis of Variance (ANOVA) on training versus effective implementation of procurement practices. The ANOVA results for regression coefficients indicate that the significance of the F is 0.002 which is less than 0.05 hence implying that the predictor coefficient is at least not equal to zero. This also implies a good fit for the model.

Further, analysis was carried out to determine the beta coefficients of training versus effective implementation of procurement practices. Table 4.21 also presents that the coefficient of procurement policies is 0.1.33117. The t statics is for this coefficient is 3.356 with a p-value of 0.002 which is less than 0.05. This p value confirms the significance of the coefficient of training at 95% confidence. We can thus conclude that training significantly influences effective implementation of procurement practices and thus has a significant positive relationship with effective implementation of procurement practices.

**Table 4. 21 Regression Model, Training**

**Model Summary, Training.**

<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
.504 <sup>a</sup>	0.22449	0.2319	1.20385

#### ANOVA, Training.

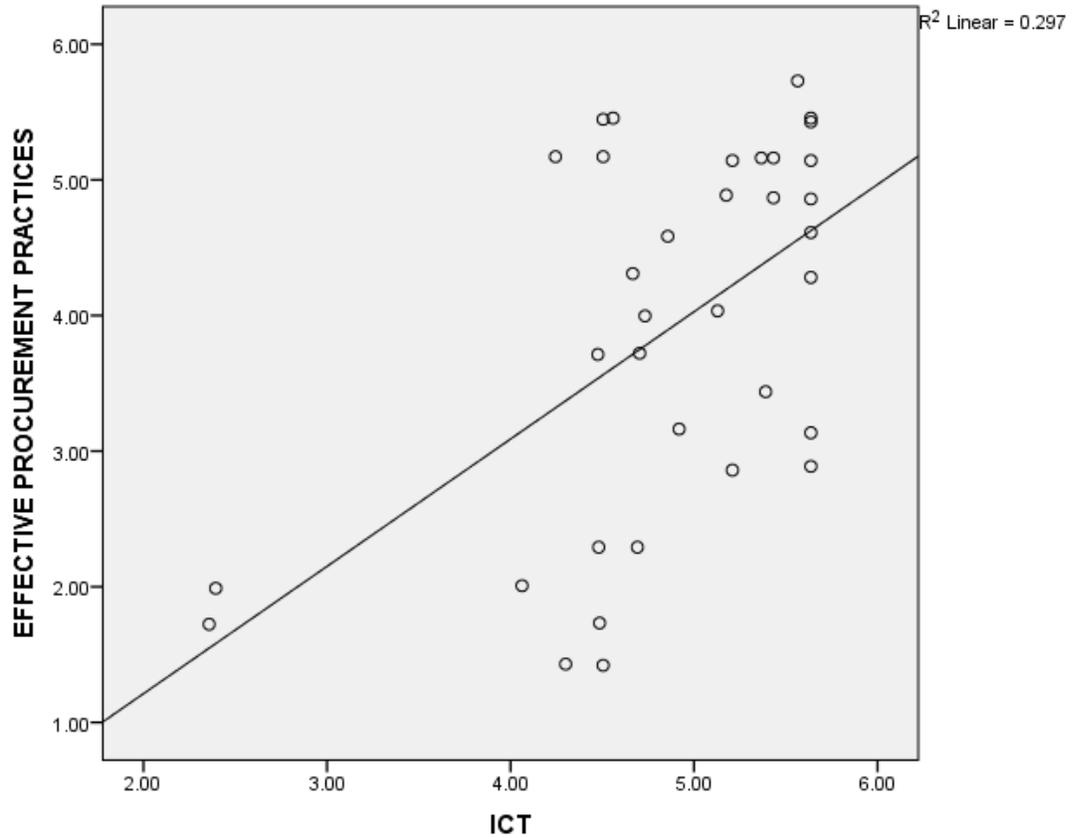
	Sum of Squares	Df	Mean Square	F	Sig.
Regression	16.326	1	16.326	11.265	.002 <sup>b</sup>
Residual	47.8257	33	1.44926		
Total	64.1517	34			

#### Coefficients, Training.

	B	Std. Error	t	Sig.
(Constant)	-2.6811	1.97306	-1.3589	0.1834
Training	1.33117	0.39661	3.35634	0.002

#### 4.6.6 Regression Analysis on ICT Vs Effective implementation of procurement practices

Regression analysis was further carried out to establish the significance of the relationship between ICT and effective implementation of procurement practices. The results were presented in a scatter plot diagram Figure 4.13 where it can be observed that all the plots in the diagram are in the first quadrante and the line of best of fit indicates an estimate line that is increasingly positively upwards. This demonstrates that there is a positive linear relationship between ICT and effective implementation of procurement practices .



**Figure 4. 9 Regression Model on ICT Vs Effective implementation of procurement practices**

Further, regression model on ICT versus effective implementation of procurement practices was presented in table 4.22. As presented in the table, the coefficient of determination R square is 0.266 and R is 0.545. The coefficient of determination R square indicates that 26.76% of the variation on the implementation of effective practices is explained by the variation in ICT. The R square low which implies that the model does not have a good fit. This can be corrected by adding more variables to the model. The Adjusted R square is 0.0.275 which is more than the R

square. This implies that there is still possibility of improving the model fit by adding another factor influencing the dependent variable to the model. An additional independent variable would increase the R Square to the value of the adjusted R square. The study further used Analysis of Variance (ANOVA) in order to test the significance of ICT on effective implementation of procurement practices . The ANOVA results for regression in table 4.22 indicate that the significance of the F is 0.001 which is less than 0.05 hence implying that the predictor coefficient is at least not equal to zero. This also implies a good fit for the model.

Further analysis was carried out to determine the beta coefficients of ICT versus effective implementation of procurement practices . Table 4.22 also presents that the coefficient of procurement policies is 0.09385. The t statics is for this coefficient is 3.731 with a p-value of 0.0007 which is less than 0.05. This p value confirms the significance of the coefficient of ICT at 95% confidence. We can thus conclude that ICT significantly influences effective implementation of procurement practices and thus has a significant positive relationship with effective implementation of procurement practices.

**Table 4. 22 Regression Model, ICT****Model Summary, ICT**

<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
.545 <sup>a</sup>	0.26678	0.27547	1.16921

**ANOVA, ICT**

	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Regression	19.0388	1	19.0388	13.9268	.001 <sup>b</sup>
Residual	45.1129	33	1.36706		
Total	64.1517	34			

**Coefficients, ICT**

	<b>B</b>	<b>Std. Error</b>	<b>t</b>	<b>Sig.</b>
(Constant)	-0.6649	1.24062	-0.5359	0.59562
ICT	0.93855	0.2515	3.73187	0.00072

**4.7. Combined Effect Model**

A multiple regression model was fitted to determine whether independent variables notably,  $X_1$ = Procurement policies,  $X_2$ =Inventory management,  $X_3$ = Supplier management,  $X_4$ = Training and  $X_5$ = Information Communication Technology simultaneously affected the dependent variable  $Y$ = effective

implementation of procurement practices. As a result, this subsection examines whether the multiple regression equation can be used to explain the nature of the relationship that exists between the independent variables and the dependent variable. The multiple regression model was of the form:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + e$$

Where;

$\beta_0$  = Constant

Y= Effective implementation of procurement practices

$X_1$ = Procurement policies

$X_2$ =Inventory management

$X_3$ = Supplier management

$X_4$ = Training

$X_5$ = Information Communication Technology

$\beta_i$  = Coefficients of regression for the independent variables  $X_i$  (for  $i = 1,2,3,4,5$ )

e. = error term

As can be observed in table 4.23, the regression model of effective implementation of procurement practices coefficient of determination R Square was 0.993 and R was 0.996. The coefficient of determination R Square indicated that 99.3 % of the variation on effective implementation of procurement practices can be explained by the set of independent variables, namely;  $X_1$ = Procurement policies,  $X_2$ =Inventory management,  $X_3$ = Supplier management,  $X_4$ = Training and  $X_5$ = Information Communication Technology. The remaining 0.7% of variation in

effective implementation of procurement practices can be explained by other variables not included in this model. This shows that the model has a good fit since the value is above 80%. This concurs with Graham (2002) that R-squared is always between 0 and 100%: 0% indicates that the model explains none of the variability of the response data around its mean and 100% indicates that the model explains the variability of the response data around its mean. In general, the higher the R-squared, the better the model fits the data. The adjusted R square is slightly lower than the R square which implies that the regression model may be over fitted by including too many independent variables. Dropping one independent variable will reduce the R square to the value of the adjusted R-square.

The study further used Analysis of Variance (ANOVA) in order to test the significance of the overall regression model. Green and Salkind (2003) posit that Analysis of Variance helps in determining the significance of relationship between the research variables. The results of Analysis of Variance (ANOVA) for regression coefficients in table 4.23 reveals that the significance of the F statistics is 0.00 which is less than 0.05 and the value of F (551.555) being significant at 0.00 confidence level. The value of F is large enough to conclude that the set coefficients of the of independent variables are not jointly equal to zero . This implies that at least one of the independent variables have an effect on the dependent variable.

Table 4.23 presents the beta coefficients of all independent variables versus effective implementation of procurement practices . As can be observed from Table 4.23, procurement polices (X1) had a coefficient of 0.373 which is greater than zero. The t statics is 3.709 which has a p-value of 0.003 which is less than 0.05 implies that the coefficient of  $X_1$  is significant at 0.05 level of significance. This shows that procurement policies has a significant positive influence on effective implementation of procurement practices.

The coefficient of inventory management (X2) was 0.049 which was greater than zero. The t statistic of this coefficient is 2.444 with a p value of 0.02 which is greater than 0.05. This implies that the coefficient 0.049 is significant. Since the coefficient of  $X_2$  is significant, it shows that inventory management has a significant effect on implementation of procurement practices.

Table 4.23 also shows that supplier management ( $X_3$ ) had a coefficient of 0.5707 which is greater than zero. The t statics is 5..531 which has a p-value of 0.000 which is less than 0.05 implies that the coefficient of  $X_3$  is significant at 0.05 level of significance. This shows that supplier management has a significant positive influence on effective implementation of procurement practices. Table 4.23 further shows that training (X4) had a coefficient of 0.378 with a t static of 3.14 which has a p-value of 0.002 which is less than 0.05. This implies that the coefficient of  $X_4$  is significant at 0.05 level of significance. This shows that

training has a significant positive influence on effective implementation of procurement practices .

Finally, table 4.23 demonstrates that ICT (X5) had a coefficient of 0.10069 which is greater than zero. The t statistic of this coefficient is 0.2.268 with a p value of 0.03 which is greater than 0.05. This implies that the coefficient 0.10069 is significant. Since the coefficient of X<sub>2</sub> is significant, it shows that ICT has a significant effect on implementation of procurement practices.

The constant term is -0.4255. The constant term is the value of the dependent variable when all the independent variables are equal to zero. The constant term has a p value of 0.092 which is greater than 0.05. This implies that the constant term is insignificant. The multiple regression for effective implementation of procurement practices is thus an equation through the origin. If all the independent variables take on the values of zero, there would be zero effective implementation of procurement practices.

**Table 4. 23 Multiple regression**

**Model Summary, Multiple regression**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.996 <sup>a</sup>	0.993	0.991793	0.124438

### ANOVA, Multiple Regressions

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	63.702651	5	12.7405	822.778	.000 <sup>b</sup>
Residual	0.4490584	29	0.01548		
Total	64.151709	34			

### Coefficients of Overall Regression Model

	B Coefficients	Std. Error	t	Sig.
(Constant)	-0.4255	0.24433	-1.7414	0.09221
Supplier Management	0.57074	0.10666	5.35103	0.00000
Training	0.37788	0.11082	3.40981	0.00193
Procurement policies	0.37263	0.11422	3.26251	0.00283
ICT	0.10069	0.0444	2.26778	0.03002
Inventory Management	0.04879	0.01996	2.4444	0.01926

### 4.8 Optimal Model

Since the constant term found not to be significant in the model, another model was fitted. The optimal model fitted passes through the origin including all the variables which were retained.

Table 4.24 shows the model of effective implementation of procurement practices with the coefficient of determination  $R^2 = 1$  and  $R = 0.999$ . The coefficient of

determination indicates that 99.9 % of the variation on effective implementation of procurement practices can be explained by the optimal model. This shows that the model has a good fit since the value is above 75%. The adjusted R square is also equal to the R square. The adjusted R-square being equal to the R square implies a perfect fit. Adding another independent variable to the model will not improve the goodness of fit of the model as it optimally explains the variation in the dependent variable. Table 4.24 summary ANOVA and F statistic which reveals the value of F (1.184) is significant at 0.05 confidence level. The value of F is large enough to conclude that the set coefficients of the of independent variables are not jointly equal to zero . This implies that at least one of the independent variables have an effect on the dependent variable.

Table 4.24 evaluates and interprets the coefficients of regression (beta). In estimating the contribution of each independent variable in the study, it was established that the independent variables notably; supplier management, training, procurement policies, ICT and inventory management significantly affect effective implementation of procurement practices at significance level of 0.05. This is because the p values of the t statistics of their coefficients are all less than 0.05.

**Table 4. 24: Optimal Regression Model****Summary, Optimal Regression Model**

R	R Square <sup>b</sup>	Adjusted R Square	Std. Error of the Estimate
1.000 <sup>a</sup>	0.999	0.999	0.12552

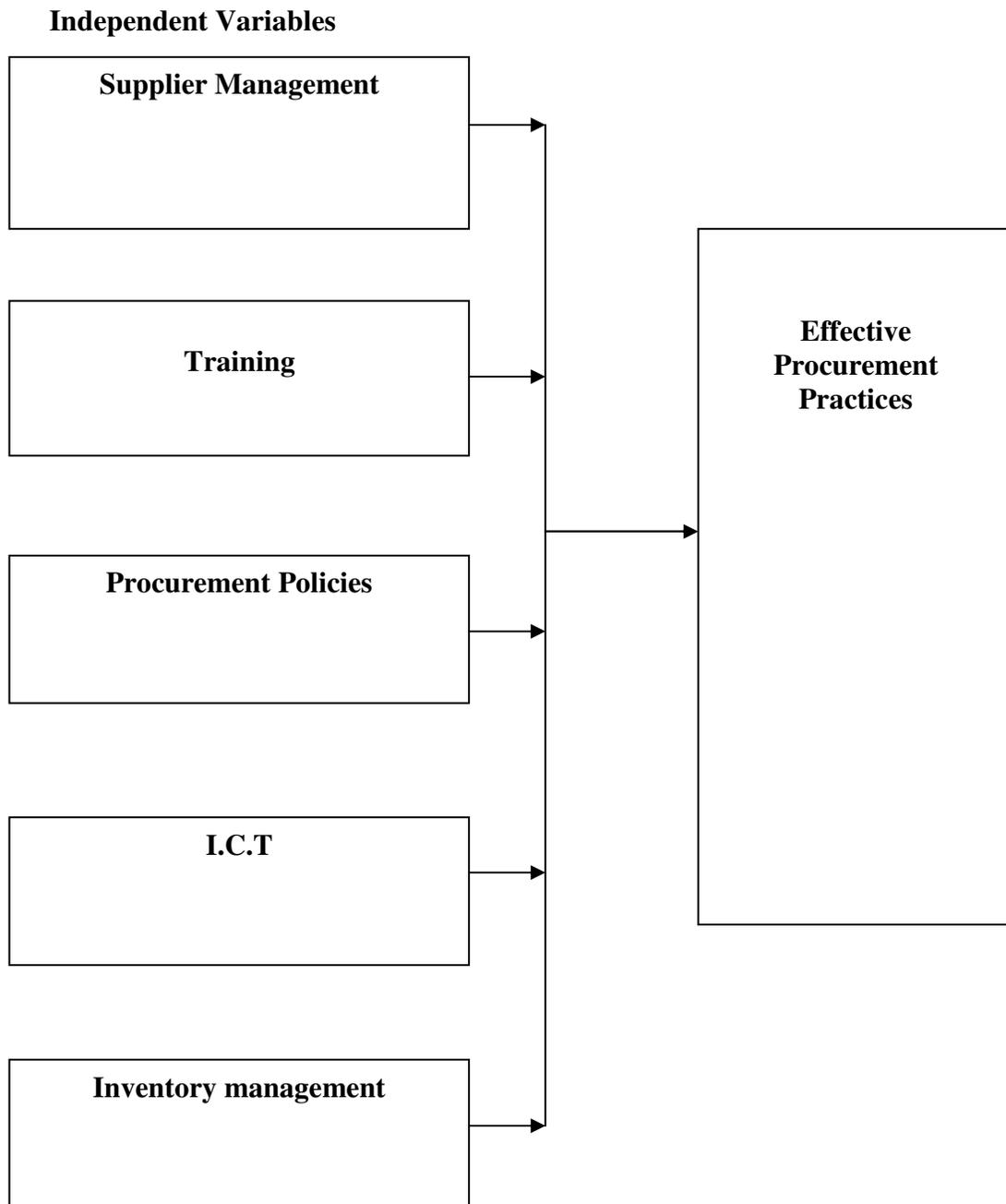
**ANOVA, Optimal Regression Model**

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	597.59	3	199.197	12642.9	.000 <sup>c</sup>
Residual	0.50418	32	0.01576		
Total	598.094 <sup>d</sup>	35			

**Coefficients, Optimal Regression Model**

	Coefficients	Std. Error	t	Sig.
Supplier Management	0.62998	0.09554	6.5936	0.000000
Training	0.35517	0.10786	3.29275	0.002484
Procurement policies	0.31738	0.10262	3.09261	0.00409
ICT	0.12004	0.04442	2.70236	0.01079
Inventory Management	0.04622	0.01933	2.39136	0.022644

The resulting Optimal regression equation was;  $Y = 0.630X_3 + 0.355X_1 + 0.317X_4 + 0.120X_5 + 0.04622X_2 + e$ .



**Figure 4. 10 Revised Conceptual Framework model**

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter discusses the summary of the key findings along the study objectives and the corresponding hypothesis. It then draws conclusions based on these findings and discussions are put forth for the recommendations of the study based on both policy and practice. Finally, the chapter presents the study limitations and recommendations for further areas of research.

#### **5.2 Summary of Major Findings**

The general objective of the study was to determine factors affecting effective implementation of procurement practices in tertiary public training institutions in Kenya. The study specifically determined the effect of procurement policies; inventory management; supplier management, training and information communication technology on effective implementation of procurement practices in tertiary public training institutions in Kenya. The reviewed literature showed that effective implementation of procurement practices plays an important role in minimization of overall institution procurement expenditure and facilitates delivery of quality goods and services. Further, it was revealed that the type of the employed procurement policies, inventory management methods, supplier management strategies, level of procurement staff training and level of ICT application significantly affected effective implementation of procurement

practices. The major findings summarized from the five specific objectives are as follows:

### **5.2.1 Procurement Policies and Effective Implementation of Procurement Practices**

The study sought to determine the effect of procurement policies on effective implementation of procurement practices in tertiary public training institutions in Kenya. The study found out that procurement policies have a significant strong positive correlation with implementation of effective procurement practices of 0.992. The optimal model of the study showed that procurement policies have a significant influence of 0.317 on effective implementation of procurement practices. Increasing levels of procurement policies by a unit would increase the levels of effective implementation of procurement practices by 0.317. The study further revealed procurement policies factors such as level of compliance with Public Procurement and Disposal Regulations (2006), procurement planning, management support, budgetary allocation, and preparation of procurement progress reports, procurement records management methods and type of the employed procurement methods to a large extent affected effective implementation of procurement practices in tertiary public training institutions.

### **5.2.2 Inventory Management and Effective Implementation of Procurement Practices**

The study aimed to find out the effect of inventory management on effective

implementation of procurement practices in tertiary public training institutions in Kenya. According to the findings, inventory management did not have any significant correlation with implementation of effective procurement practices. This implies that inventory management has no relationship with implementation of effective procurement practices. Further analysis also showed that inventory management has no significant influence on effective implementation of procurement practices in public institutions in Kenya. Increasing levels of inventory management in public tertiary learning institutions in Kenya would have no significance effect on effective implementation of procurement practices public tertiary learning institutions in Kenya.

### **5.2.3 Supplier Management and Effective Implementation of Procurement Practices**

The study sought to investigate how supplier management affects effective implementation of procurement practices in tertiary public training institutions in Kenya. The study findings revealed that supplier management has a significant strong positive correlation with implementation of effective procurement policies of 0.995. The strong correlation implies that there is a positive relationship between supplier management and implementation of effective procurement policies. The optimal model of the study shows that supplier management has a significant influence of 0.62998 on effective implementation of procurement practices. Increasing levels of supplier management by a unit would increase the levels of effective implementation of procurement practices by 0.62998. This

shows that supplier management has a positive influence on effective implementation of procurement practices.

#### **5.2.4 Training and Effective Implementation of Procurement Practices**

The study evaluated the effect of training on effective implementation of procurement practices in tertiary public training institutions in Kenya. According to the study findings training has a significant positive correlation with effective implementation of effective procurement policies of 0.504. The correlation implies that there is a positive relationship between training and effective implementation of procurement practices. The optimal model of the study shows that training has a significant influence of 0.35517 on the effective implementation of procurement practices. Increasing levels of training by a unit would increase the levels of effective implementation of procurement practices by 0.35517. This shows that also training has a positive influence on effective implementation of procurement practices.

#### **5.2.5 Information Communication Technology and Effective Implementation of Procurement Practices**

The study further assessed how information communication technology affects effective implementation of procurement practices in tertiary public training institutions in Kenya. The study findings showed that ICT factors notably; computer literacy level amongst the employees in the institutions, level of automation, use procurement systems, ICT infrastructure and level of embracement of E-procurement systems to a large extent affected effective

implementation of procurement practices in tertiary public training institutions. Regression model on ICT versus effective implementation of procurement practices gave a coefficient of determination R square as 0.288 and R as 0.537 at 0.05 significance level. The coefficient of determination thus indicated that 53.7% of the variation on effective implementation of procurement practices is influenced by ICT. This indicates that there exists a strong positive relationship between ICT and effective implementation of procurement practices.

#### **5.2.6 Effective Implementation of Procurement Practices**

The overall regression model of effective implementation of procurement practices had a coefficient of determination R Square was 0.993 and R was 0.996 at 0.05 a significant level. The coefficient of determination indicated that 96.6 % of the variation on implementation of effective procurement practices can be explained by the set of independent variables, namely; procurement policies, inventory management, supplier management, training and information communication technology. Finally, in estimating the contribution of each independent variable in the study, it was established that the independent variables notably; procurement policies, supplier management and training significantly affect implementation of effective procurement practices at significance level of 0.05. This is since the p values of their coefficients were all less than 0.05.

### **5.3 Conclusions**

Based on the study findings, the study concludes that effective implementation of procurement practices in tertiary public training institutions is affected by supplier management followed by training and then procurement policies are the major factors that mostly affect effective implementation of procurement practices tertiary public training institutions in Kenya.

The study concludes that supplier management is the first important factor that affects effective implementation of procurement practices in tertiary public training institutions. The optimal model of the study shows that supplier management has a significant influence of 0.62998 on effective implementation of procurement practices. This implies that increasing levels of supplier management by a unit would increase the levels of effective implementation of procurement practices by 0.62998. This shows that supplier management has a positive influence on effective implementation of procurement practices. Supplier management factors such as rate of appraising suppliers, supplier selection strategies, supplier performance management and supplier performance evaluation methods, supplier relationship management, payment of suppliers and after sale service from suppliers affects effective implementation of procurement practices tertiary public training institutions.

Training is the second important factors that affect effective implementation of procurement practices in tertiary public training institutions. The optimal model

of the study shows that increasing levels of training by a unit would increase the levels of effective implementation of procurement practices by 0.35517. According to the study findings, training factors such as training assessment needs, procurement staff qualifications, impact on the applied training and the percentage of procurement employees with professional skills in procurement to a large extent affected effective implementation of procurement practices in tertiary public training institutions.

Finally the study concludes that procurement policies is the third important factor that affect effective implementation of procurement practices in tertiary public training institutions. The optimal model of the study shows that procurement policies have a significant influence of 0.317 on effective implementation of procurement practices. Increasing levels of procurement policies by a unit would increase the levels of effective implementation of procurement practices by 0.317. Procurement policies factors such as level of compliance with Public Procurement and Disposal Regulations (2006), procurement planning, management support, budgetary allocation, and preparation of procurement progress reports, procurement records management methods and type of the employed procurement methods to a large extent affects effective implementation of procurement practices in tertiary public training institutions.

#### **5.4 Recommendations**

To ensure that procurement policies supports effective implementation of procurement practices in many tertiary public training institutions in Kenya, the management of tertiary public training institutions should improve on the level of compliance with procurement regulations compliance, design and apply better poor procurement policies, support and encourage other staff to execute procurement functions in accordance with the procurement regulations and procurement policies, use effective procurement procedures, improve on relationship between management and stakeholders and employ better methods of managing organization resources.

Effective implementation of procurement practices in many tertiary public training institutions in Kenya is hindered by the employed inventory management methods. The management of tertiary public training institutions should thus apply the principle of economic order quantity in inventory management practices, use effective stores management practices, avoid procurement methods that lead to long lead time and embrace inventory management strategies that help in minimization of inventory costs.

The management of tertiary public training institutions should embrace effective supplier management strategies in order to support implementation of effective procurement practices in many tertiary public training institutions in Kenya. Effective supplier appraisal techniques should be adopted, better supplier

selection strategies should be used, effective supplier selection process should be employed, better supplier performance methods should be applied, effective supplier relationship management techniques should be adopted and supplier development and supplier collaboration should be employed.

The management of tertiary public training institutions to invest extensively in employees training by emphasizing and promoting the culture of learning organizations that is different from the current trends where many institutions use seminars and workshops as the only method of training. The management of tertiary public training institutions should also employ professional trained procurement staff and continuously train the staff on emerging issues on public procurement practices.

Tertiary public training institutions should effectively integrate procurement functions with ICT based systems through application of e-procurement methods, use of automated procurement systems; implementation of supportive ICT infrastructure for encouraging adoption of ICT based procurement systems and training of procurement staff on ICT skills.

#### **5.4.1 Knowledge gained for policy and practice**

The study contributes the body of knowledge by determining that effective implementation of procurement practices in tertiary public training institutions in Kenya is greatly affected by procurement policies, inventory management and training. The study contributes to the existing literature in the field of

procurement by elaborating exiting theories, models and empirical studies on factors affecting effective implementation of procurement practices in tertiary public training institutions in Kenya. The study thus contributes to the existing knowledge in procurement by reviewing theories and models that can be applied to improve procurement practices in organizations.

#### **5.4.2 Areas for further research**

The study is a milestone for further research in the field of procurement practices in Africa and particularly in Kenya. The findings demonstrated the important factors to effective implementation of procurement practices in tertiary public training institutions to include; procurement policies, supplier management, inventory management, training and ICT. The current study should therefore be expanded further in future in order to determine the effect of public procurement legal framework on effective implementation of procurement practices. Existing literature indicates that as a future avenue of research, there is need to undertake similar research in other training institutions and public sector organizations in Kenya and other countries in order to establish whether the explored factors can be generalized to affect effective implementation of procurement practices.

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## APPENDICES

### Appendix 1: Introduction Letter

To Whom It May Concern

Dear Sir/Madam,

**RE: COLLECTION OF DATA**

I am a Doctor of Philosophy (Ph.D) student in the Department of Business Entrepreneurship and Procurement, Jomo Kenyatta University of Agriculture and Technology (CBD Campus) Nairobi. As part of the requirement for the award of the degree, I am expected to undertake a research study on **FACTORS AFFECTING EFFECTIVE IMPLEMENTATION PROCUREMENT PRACTICES IN TERTIARY PUBLIC TRAINING INSTITUTIONS IN KENYA**. I'm therefore, seeking your assistance to fill the questionnaires attached. The attached questionnaire will take about twenty minutes to complete. Kindly answer all the questions. The research results will be used for academic purposes only and will be treated with utmost confidentiality. Only summary results will be made public. No one, except the institution will have access to these records.

Should you require the summary, kindly indicate so at the end of the questionnaire. A self-addressed envelope is provided for your reply. Your co-operation will be appreciated.

Yours sincerely,

Silas E. Njeru

## Appendix II: Questionnaire

### SECTION 1: GENERAL INFORMATION

(Instruction -Tick where appropriate)

1. Highest Education Level

- Secondary level
- College level
- University level
- Post graduate
- Professional Qualification

(Specify.....)

2. Working Experience

- Less than 5 years
- 6-10 Years
- 11-15years
- 16 years and above

3. Institution Category

- College
- University
- Technical Training

4. Department

- Procurement
- Administration
- Finance
- Other.....

5. Position

- Top management procurement staff

- Middle level procurement staff
- Junior procurement staff
- Other.....

**Section 2: Procurement Policies**

Please tick what the category applicable to your institutions way of operations with respect to procurement policies

	<b>0- 20%</b>	<b>20- 30%</b>	<b>30- 40%</b>	<b>40- 50%</b>	<b>over 50%</b>
What is the organizations level of compliance with Public Procurement and Disposal Regulations (2006)					
What is the level of accuracy in the procurement records used.					
What is the level of accuracy and reliability of Procurement records kept					

	<b>Never</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>Over 6 times</b>
How often does the firm prepare or implement procurement plans annually.					
How often does the firms employees prepare or receive expected management support annually.					

	<b>Over 6 times</b>	<b>5-6</b>	<b>3-4</b>	<b>1-2</b>	<b>Never</b>
How often does the firm fail to adhere to the Budgetary allocation annually					
How often does the firm fail to prepare the procurement progress reports as required annually					

3. In your own opinion, how could the management of tertiary public training institutions improve on procurement policies?.

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.....  
.....

**Section 3: Inventory Management**

1. Please tick what the category applicable to your institutions way of operations with respect to Inventory Management.

	<b>Over 6 times</b>	<b>5-6</b>	<b>3-4</b>	<b>1-2</b>	<b>Never</b>
How often does management fail to use economic order quantity on purchases					
How often do inventory purchase fail to meet the just in time principal					

	<b>0-</b>	<b>21</b>	<b>41-</b>	<b>61</b>	<b>Over</b>
	<b>20%</b>	<b>40%</b>	<b>60%</b>	<b>80%</b>	<b>80%</b>
What is your organizations level of compliance on stores management practice.					
What is the firms level of reduction in inventory costs					

2. In your own opinion, how could the institution management improve on inventory management methods?.

.....

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.....

#### Section 4: Supplier Management

1. Please tick what the category applicable to your institutions way of operations with respect to Inventory Management.

	<b>Never</b>	<b>Once</b>	<b>Twice</b>	<b>Thrice</b>	<b>Over 3 times</b>
How often do you appraise the suppliers you use annually.					
How often are suppliers paid in time annually					
How often do you get after sale service from your suppliers annually.					

	<b>0- 20%</b>	<b>21- 40%</b>	<b>41- 60%</b>	<b>61- 80%</b>	<b>Over 80%</b>
What percentage of your suppliers are ISO certified					
What percentage of your suppliers offer credit facilities.					

	<b>Over 6 times</b>	<b>5-6</b>	<b>3-4</b>	<b>1-2</b>	<b>Never</b>
How often annually are delivered goods rejected due to non-conformity to specifications					
How often annually do your suppliers fail to honour the orders issued					

2. In your own opinion, state how could the institution management improve on supplier management?.

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**Section 5: Training**

1. How often are the employees trained on procurement practices?

- Very often
- Often
- Rarely
- Never

2. Please tick what the category applicable to your institutions way of operations with respect to training.

	<b>Never</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>Over 6 times</b>
How many times are your procurement staff taken for refresher courses annually.					
	<b>0%</b>	<b>10%</b>	<b>20%</b>	<b>40%</b>	<b>Over 60%</b>

Percentage of employees with a first degree.					
Percentage quality of procurement records produced.					
What percentage of procurement employees have professional skills in procurement					

3. In your own opinion, how could the management train the procurement staff in the institution?.

.....

.....

.....

**Section 6: Information Communication Technology**

1. Please tick what the category applicable to your institutions way of operations with respect to ICT.

	<b>0%</b>	<b>10%</b>	<b>20%</b>	<b>40%</b>	<b>Over 60%</b>
What percentage of employees in the firm are computer literacy					
What is the firms level of Automation					
What is the level of procurement systems usage					
What is the level of ICT infrastructure					
What is the firms level of embracement of E-procurement					

4. In your own opinion, could you explain how the application of ICT should be embraced by the management in the institution?.

.....

.....

**Section 7: Effective Procurement Practice.**

3. Using a scale of (1= not at all, 2 = small extent, 3 = moderate extent, 4 = large extent, 5 = very large extent), indicate the extent to which the following factors determine the effectiveness of procurement practices in the institution?

	<b>0%</b>	<b>10%</b>	<b>20%</b>	<b>40%</b>	<b>Over 60%</b>
What is the organizations level of compliance a) Compliance with procurement regulations					
What is the level of Minimization of procurement expenditure					
What is the level of Transparency and accountability of procurement funds					
What is the level of Quality of procured goods and services offered					

### **Appendix III: Sampling Frame**

These are also called colleges, vocational schools or post secondary institutions. They offer diplomas or certificate courses that last anywhere from a few months to 4 years. Typical courses offered are Accounting (including CPA), nursing, IT, Culinary studies, tourism, metal work, teacher training etc.

1. Bandari College
2. Government Training Institute (GTI) Mombasa
3. Kenya School of Government
4. Eldoret Polytechnic
5. Kenya Institute of Administration (KIA)
6. Kenya Institute of Biomedical Sciences and Technology
7. Kenya Institute of Management (KIM)
8. Kenya Institute of Mass Communication – South C
9. Kenya Utalii College
10. Kenya Forestry Studies, Londiani
11. Kenya Medical Training Centre (KMTC)
12. Kenya School of Monetary Studies Ruaraka
13. Kenya College of Science and Technology
14. Baraton Teachers College, Nandi Central Kapsabet
15. Gussi Institute of Technology
16. Kaibio Yechanical Training Institute

17. Kagumo Teachers College
18. Kabete Technical Training Institute
19. Kenya Science Teacher College University of Nairobi
20. Kenya Technical Teachers College
21. Kenya Water Institute – South C
22. Kenya Wildlife Service Training Institute , Naivasha
23. Kericho Teachers College
24. Kiambu Institute of Science and Technology
25. Kigari Teachers College, Embu
26. Kitale Technical Institute, Kitale
27. Machakos Institute of Technology
28. Kilimambogo Teachers College
29. Technical Training Institute (MTTI Mombasa)
30. Kisumu Polytechnic
31. Ramogi Institute of Advance Technology
32. Valley Institute of Science and Technology
33. Rift Valley Technical Training Institute Eldoret
34. Railway Training Institute- South B
35. Sirisia Youth Polytechnic Labour College, Kisumu
36. Mboya Labour College Kisumu
37. Technical Training Institute – Thika
38. Technical Training Institute – Nairobi

39. Nakuru Counseling & Training Institute, Nakuru
40. Sacred Training Institute, Bungoma and Nairobi Campuses