

# Factors Affecting Inventory Management Efficiency in Kenya Seed Company, Kitale Branch, Kenya

<sup>1</sup>Okwaro, Fredrick, <sup>2</sup>Iravo, Mike, <sup>3</sup>Berut, Zipporah

<sup>1</sup>Jomo Kenyatta University of Agriculture & Technology (Msc. Procurement & Logistics)

<sup>2</sup>Jomo Kenyatta University of Agriculture & Technology (Ph.D)

<sup>3</sup>Jomo Kenyatta University of Agriculture & Technology (Ph.D Student)

---

**Abstract:** Most of parastatal in Kenya face problems of efficiency in their inventory management systems. Despite this fact, limited scientific research has been undertaken to examine the factors that influence inventory management efficiency in Kenya Seeds Company. The main objective of the study was to assess factors affecting the effectiveness of inventory management practices in Kenya Seed Company. The study adopted a case study research design to produce detailed description in order to evaluate the phenomena. The target population was 110 management staff working at the Company's procurement departments from which a sample size of 87 respondents was drawn. Questionnaires were used to collect data and descriptive statistics data analysis method applied to analyze data using Statistical Package for Social Sciences version 20. Data analysis involved inferential statistics where regression analysis was used to establish the association between study variables at 95% confidence level, p-value  $\pm$  0.05. Staff training, level of technology, stock evaluation and procurement policies had a positive and significant association on the efficiency of inventory management at Kenya Seed Company. The results showed that most of the staff do not have necessary competency to run the procurement function, there is poor stock audit practices, outdated procurement systems and long bureaucratic procedures. The research finding is helpful to academicians, procurement officers and the Kenya seed company as a whole on the determinants of procurement performance.

**Keywords:** Inventory management efficiency, level of technology, procurement policies, Staff training, and stock evaluation.

---

## I. INTRODUCTION

Inventory management efficiency is a critical management issue for most public sectors. Logistics is all about managing inventory, whether the inventory is moving or staying, whether it is in a raw state, in manufacturing, or finished goods (Goldsby and Martichenko, 2005). Logistics and inventory management efficiency are embedded in each other and tied up closely. The "Bill of 'Rights' that logistics professionals often repeat is to deliver the right product to the right place, at the right time, in the right quantity and condition, and at the right cost (Goldsby and Martichenko, 2005). Inventory management efficiency also becomes a fundamental part of supply chain management (SCM) now. A lot of research in SCM over the last two decades can be characterized as so called "multi-echelon inventory theory" (Quayle, 2013). SCM has in recent years become an important way to enhance the public sector competitive strength and therefore an important issue for most public sectors. According to Lam and Postle, (2006) SCM involves all the activities involved in delivering a product from raw material through to the customer including sourcing raw inventory and parts, manufacturing and

assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, delivery to the customer and the information systems necessary to monitor all of these activities. The goal of inventory management efficiency is to ensure that seed inventory is available at their point of use when needed. Inventory management efficiency is the system for planning and controlling all of the efforts necessary to ensure that the correct quality and quantity of inventory are properly specified in a timely manner, obtained at a reasonable cost and most importantly, available at the point of use when required. Poor inventory management can result in increased costs during construction. Efficient management of inventory can result in substantial savings in project costs. If inventory are purchased too early, capital may be held up and interest charges incurred for the excess inventory of inventory. Inventory may deteriorate during storage or get stolen unless special care is taken. Delays and extra expenses may be incurred if inventory required for particular activities are unavailable.

According to Coyle, Bardi, and Langley (2003), effective inventory flow management in supply chains is one of the key factors for success. The challenge in managing inventory is to balance the supply of inventory with demand. A company would ideally want to have enough inventories to satisfy the demands of its customers- no lost sales due to inventory stock-outs. On the other hand, the company does not want to have too much inventory staying on hand because of the cost of carrying inventory. Enough but not too much is the ultimate objective. Inventory management efficiency is ever the means of conducting public sector around the world and it facilitate continued flow of production (Quayle, 2013). Globalization of institutions requires efficient Supply Chain Management. The science of supply chain further connects with management to efficiently deliver the goods in a regular base. Many management functions are being hypothesize and eventually use as the bases for the institution operations. Today, institutions are integrating their supply chain formulation with the help of the internet infrastructure. Certainly, inventory management efficiency considers some important elements that public sector must consider. There have been numerous attempts to explain inventory management efficiency of institution in the fields of strategic management, accounting, finance, marketing and management science. In the US, Narasimhan (2000) studied the effect of excess inventory on long term stock price performance.

The problem of inventory has continued to receive much attention in most businesses. Inventory levels of raw materials, semi-finished and finished goods need to be effectively managed to control the cost of inventory (Kotler, 2002). It is common to find the balance sheet of an average company having inventory running to 60% of its current assets as capital tied down (Pandey, 2005). It is for this reason that the management of Kenya Seed Company in Kitale, Kenya through its warehouse manual (2010) have instituted procedures and techniques for the purpose of proper inventory management. Although inventory management efficiency is not highly pronounced in the Kenya government, ministries, public sector and producing public sector, the use on inventory management efficiency can be felt through reduced costs, maintaining production, continuous supply and reduced loss. If you walk into their inventory, chances are that the managed institution has a clean, well-organized building while the struggling institution operates out of a messy, disorganized space. This is because the effect of inventory systems can be felt throughout an institution, (Goldsby and Martichenko, 2005). Inventory management efficiency is no easy task, and yet once your institution has employed best practices, maintenance is far simpler in an organized space than a cramped, messy one. If one can't find inventory put away in their warehouse they can't sell it. Paying for inventory that was simply sit unused in the warehouse was a waste of resources. The ERP software is designed to include inventory systems, but it's up to the sector to put them to good use. One can take advantage of the planning modules to organize the store in an efficient manner; putting inventory away properly and in the right place reduces the risk of damage and loss, (Toomey, 2010). The same logic needs to be applied to outgoing shipments. It is one thing to misplace stock at own facility, and quite another to send the wrong order to your customers. Outgoing shipments should be correct, as the cost of a replacement order is significant. There are also other constraints in areas of inventory management efficiency, information management, and aspects which include high inventory related cost, overstock, under stock, poor documentation, uncertainty of customer demands, Long supplier Leads times, long bureaucratic procurement procedure, and inaccurate procurement needs estimation. Therefore, the mere fact that ineffective inventory management efficiency affects virtually the organizational objectives necessitates this type of research work.

**Statement of the Problem:**

Over many decades public sector have been facing challenges in inventory management efficiency (Oke and Gopalakrishnan, 2009). Lack of use inventory control planning has led to delayed stock taking and poor stock control methods. This study explained the importance of using inventory control planning in inventory management efficiency. In public sector there is lack of keeping inventory track on what is ordered, what is received and their originality leading to prolonged delay, unmanaged quality receipts, increased damages, increased handling cost and long operation cycles (Melville, Kraemer, and Gurbaxani, 2014). Also lack of keeping inventory track has led to employee's resistance to change in adoption of new approaches to handle supplier appropriately, and respond to market demands (Beer, 2003). Lyson, (2006) in their study stated that inventory control planning in inventory management efficiency led to accuracy and reliability and effective management of inventory operation in public sector.

Invariably, the Kenya Seed Company must neither keep excess inventories to avoid an unnecessary tying down of funds as well as loss in fund due to pilferage, spoilage and obsolescence nor maintain too low inventories so as to meet users demand as at when needed. Therefore, the mere fact that ineffective inventory management efficiency affects virtually the public sector objectives necessitates this type of research work (Dobler and Burt 2010). Efficient inventory management efficiency process in the public sector would enhance minimized ordering costs (Silver, Pyke, and Peterson, 2008). However, from the evaluation of other research previously done, no study was found covering factors affecting inventory management efficiency in the Kenya Seed Company inventory. This study therefore was intended to fill in this research gap. Therefore the purpose of this study was to investigate the factors affecting inventory management efficiency in public institutions in Kenya with specific focus to Kenya Seed Company, Kitale

**Objectives of the Study:****General objectives:**

The main objective of the study was to investigate the factors affecting inventory management efficiency in Kenya parastatal organizations using Kenya Seed Company as a case study.

**Specific objectives of the study:**

1. To assess the level of training of staff with respect to materials management
2. To examine the level of technology adopted to ensure inventory management efficiency
3. To determine effect of Stock Audit Practice on Inventory Management efficiency
4. To determine the effect of procurement policies on procurement management efficiency

**Research Questions:**

1. Does the education level of stores staff determine efficiency over inventory management?
2. Is the system adopted adequate for proper control of stock?
3. How is the inventory priced to ensure efficiency?
4. What are effects of procurement policies on effective implementation of procurement efficiency?

**Justification of the study:**

Inventories represent more than 50% of total investment cost of an organization. It was also a potential source of waste that needs to be reviewed regularly and closely reviewed e.g. through perpetual stock taking, periodic reviews also as well as internal and external auditing. Thus efficient inventory management was paramount to ensuring that money is utilized appropriately. The study assisted the management in ensuring effective inventory management efficiency at all times as it was aid those entrusted with decision making to formulate strategies of combating the persistent problem of inventory management efficiency in the organization. The research findings would hopefully add to the body of knowledge in the area of inventory management efficiency for common user items which would help researchers and scholars and be a basis for reference. Lastly for the Researcher, the study not only fulfills the partial requirement for the award of the

Degree of Master of Science in Procurement and Logistics but also serve as a basis for further research in the field of inventory management and stores control.

## 2. LITERATURE REVIEW

### Theoretical Framework:

There research established the following theories relevant to the study: Theory of Inventory and Production, Stock Diffusion Theory and Application Control Theory.

### Theory of Inventory and Production:

The theory of inventory and production is described as specialty in operations research and is commonly referred to as the mathematical theory of inventory and production (Hillier & Lieberman, 2001). The theory is concerned with the development and adoption of inventory and production systems that are effective and that will result in the minimization of institutional cost. In this connection, the theory studies the following organizational functions: supply chain, warehousing, manufacturing and production, spare part allocation, and logistics.

According to Hillier and Lieberman (2001), institutions should follow the following steps in order to have an effective inventory management system: develop a mathematical model which describes the behavior of inventory; design and adopt an optimal inventory policy with respect to the firm's mathematical model; develop a computerized information processing system that will provide information on the current inventory levels; use the current inventory levels information to apply the optimal inventory policy to replenish existing inventory levels. In addition, the theory of inventory and production considers and uses the following measures: ordering costs, shortage costs, holding costs, salvage costs, discount rates, and revenues.

### Stock Diffusion Theory:

A stock diffusion theory was pioneered by Braglia, Gabbrielli and Zammori (2013: 3018) with an intention to derive the probability distribution of the stock consumption and that of the reorder time. These authors further explained that the importance of stock diffusion theory is to assess and evaluate the required inventory levels in theory and practice. There are three considerations of the stock diffusion theory: storage space required; how quickly inventory is sold or used; and how to avoid inventory from becoming outdated before it is used. These considerations can prevent shortages and wasteful spending. In addition, the stock diffusion theory has been confirmed to lower inventory level and has a direct impact on cost savings emanating from storage costs including stock insurance premiums (Unegbu and Mohammed, 2011).

### Application Control Theory:

A theory called the application control theory was pioneered by Ortega and Lin in 2004 to reduce inventory variation, reduce demand amplification and optimize ordering rules (Sourirajan, Ramachandran and An., 2008). In a flexible demand environment, other organizations have doubts on inventory control, but Bijulal, Venkateswaran and Hemachandra (2011) point out that application control theory plays a vast role to deal with uncertainties of demand. For example, to answer the question when and how much to reorder in the situation of uncertainty demand, the theory can suggest guidelines on reordering processes. It is clear that uncertainty of demand is subjected into intervals and can result in great effort placed upon procurement because there is no specific lead time in between of the demand and the extent to reorder. Satisfying customers in this situation may also require strong management support and advanced procurement strategies that derive theory into practice (Minner and Transchel, 2010).

### Conceptual Framework:

Various issues contribute to proper functioning of inventory management objective in any organization, some of these variables on which inventory management depends includes, proper demand forecasting, assured lead time, proper record keeping of stock, proper inventory system, qualified personnel and proper inventory pricing technique.

The variables under this study of inventory management are related by the study in the following manner as illustrated here in Figure 1.

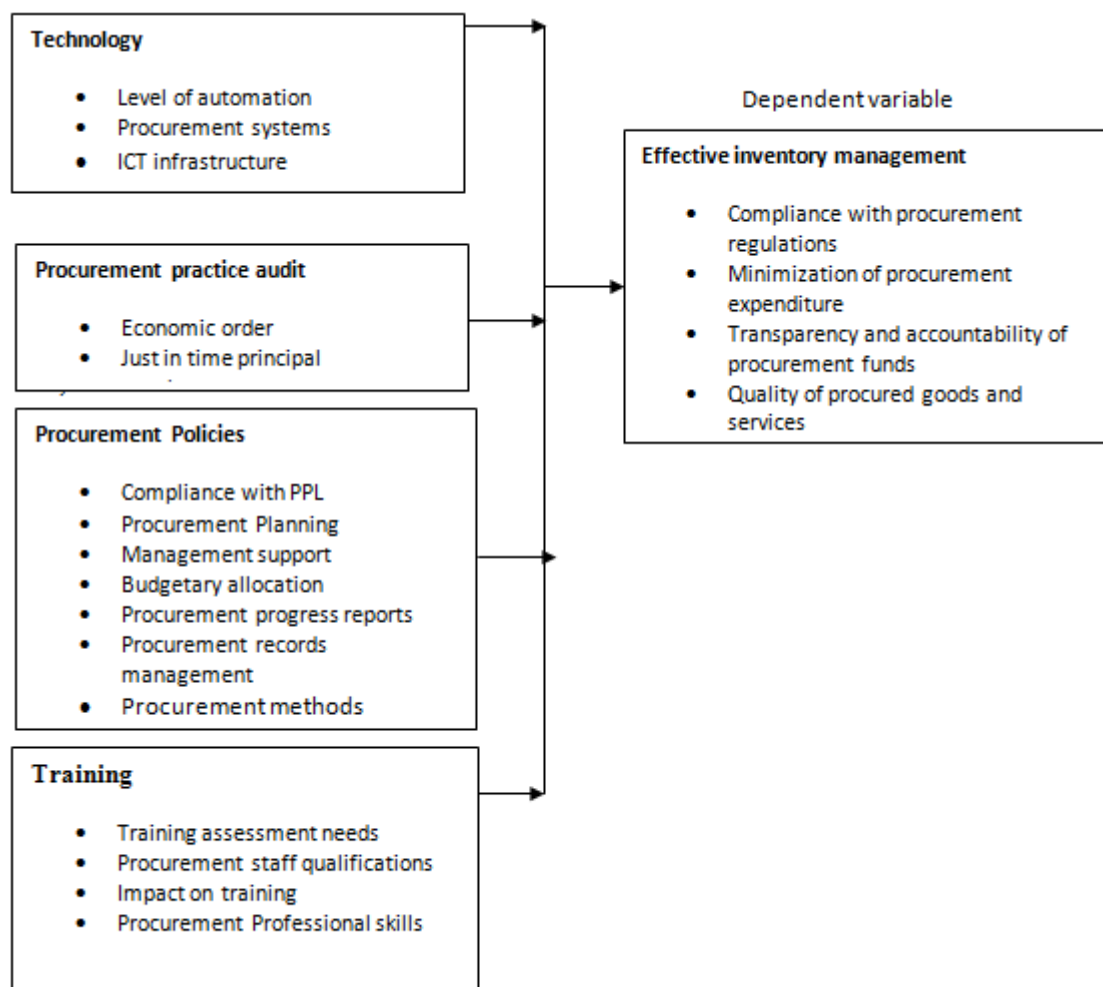


Figure 1: Conceptual Framework

**Empirical review:**

Morgan (2009) conducted a research study in United States of America on inventory management performance to Alien Technology Corporation. That was involved with pharmaceutical products where by other companies wins to supply pharmaceutical product to the government of United States of America because of its good customer services well organized and planned. The findings revealed that Alien Technology Corporation is almost 95% efficiency on inventory management practices where by the corporation manufactures products very high volume and at a low cost. The company provides a family of Radio Frequency Identification product for a variety applications including supply chain management, logistics to improve inventory management and reduce operating costs.

In United Kingdom, (Weber and Rick, 2008) revealed that organization's goal and satisfaction are achievable within the given time limitations, however control of inventory system which typically represents 45% to 90% of all expenses for an organization, is needed to ensure that it has the right goods on hand to avoid stock outs also to prevent shrinkage and run certain accounting, many organizations have fair enough of their limited resources, capital tied up in their major assets and inventory. Worth than that, they may have their capital tied up in the wrong kind of inventory. Inventory may be old, worn out, shop worn, obsolete, or the wrong size, or colors, or there may be an imbalance among different product lines that reduces the customer appeal and concerns of the total operation. (Stevenson, 2006) revealed that inventory management is a key operations management activity, effective inventory management is critical to the smooth operation of most businesses and their supply chains. Good inventory management has an impact on operations, marketing and finance departments. Poor inventory management hinders operations, reduces customer satisfaction and raises operating costs.

In Zimbabwe, (Lisa et al., 2003) on their study revealed that inventory management, storage and distribution of goods to users is efficiently done for example to hospitals drugs are distributed in an efficient manner because qualified people are employed with right qualifications and experience in materials related functions and the entire system of inventory management is computerized to ensure good performance. In South Africa, (Musara, 2012) conducted a study and revealed that the majority of organizations are not applying Just In Time (JIT) inventory management principles, he added that there are challenges impeding the implementation of Just In Time (JIT) principles in the organizations, these challenges include, lack of reliable supplier networks, lack of capital and lack of knowledge of immediate financial gain among others, further more statistically significant positive correlations between the application of JIT inventory management principles and cost efficiency, quality and flexibility were found. It is therefore deduced that organizations can benefit significantly in terms of improved quality of products, increased operational, costs cuts and increased flexibility by applying the JIT inventory management principle.

In Uganda, (Namagembe, 2010) her study revealed that a significant positive relationship between information sharing and inventory management means that if chain partners implement information technologies and collaborate among each other, then inventory management could improve, also in her study revealed that a significant positive relationship between inventory management and customer satisfaction means that in order to obtain high levels of customer satisfaction there is need for better inventory management. She further showed that significant positive relationship between information sharing and customer satisfaction which implies that increased levels of information sharing among chains partners lead to improved levels in customer satisfaction.

The assessment of inventory management effectiveness can also be evaluated from the assessment of the effectiveness of inventory management and control process as one aspect that contribute to or enhance inventory management practices. Gerald and Odhiambo (2012) revealed that 23% of the organizations were found to recognize materials management as they had in charge reporting directly to the Chief Executive Officer. However generally Kenyan organizations are not practicing professionalism in materials management and owing to the huge amount of resources they are committing on materials related activities, a lot of emphasis need to be directed towards materials management and it should be recognized as a top management function. Also revealed that Kenyan organizations spend an average of 56% of their annual sales turnover on materials and materials related costs while the majority of the organizations had not given due recognition to materials function. 64% of the organizations were found to be applying materials management concept, though most were doing so unknowingly, majority of the organizations have material functions performed by general managers and production managers. Most Kenyans have not yet recognized professionalism in materials management as most sensitive positions like purchasing and supplies are undertaken by non-professionals. This is a great undoing in this globally competitive market and recommended that much emphasis and attention should be given to materials management to enable organizations achieve the best optimal cost structures as such need to create departments dealing with materials function to enable easy control and monitoring costs.

#### **Critique of Existing Literature Relevant to the Study:**

More than a decade now, there has been uproar over the rise and fall of the inventory management in public sector (Silver, 2011). Further, the this author argues that inventory control planning, keeping inventory track, procurement and inventory management strategy are important keys in inventory management but studies in this area are inadequate. Further, they elude that significant change in the inventory control planning strategies in inventory management, is rapidly changing yet the sector is not upgrading to comply with the changes to strategically be ready to be able to integrate with the suppliers and other sector. Further, existing literature faces enormous issues, omitted variable bias, and had difficulties accurately.

The study found out that the role of inventory management is maintaining production, cost control, reduced loss, and continuous supply. However the study failed to explain how inventory management strategy affects organization performance and hence further studies are required to explore the influence of inventory management on organization performance. However, the study drew much emphasis on the impact of inventory management on performance of Kenya Seed Company in Kitale, Kenya but failed to explore the key factors that influence realization of increased efficiency in public sector.

Silver, (2001), conducted a study on the relationship between information technology and staff training in inventory management. The study found out that there is no doubt that many institutions have embraced inventory management as



way to increase efficiency and reduce cost. The study narrowed its research undertakings on reduced loss and hence failed to establish how technology adaption influences realization of increased efficiency in public sector (Subramani, 2004).

#### **Research Gaps:**

Various studies are reviewed previously have not adequately indicated extensively the role played by inventory management in public sector in Kenya. Most of these previous studies are limited to small and medium enterprises in Kenya. These previous studies have not indicated the importance of inventory control planning, keeping inventory track, procurement and inventory management strategy in public sector in Kenya. Further, Toomey, (2010) conducted a survey on procurement in SMEs broadly but did not extensively discuss its effects on public sector institutions. Inventory management has adversely affected the public sector in Kenya and contributed to poor operations performance as indicated by (Waters, 2013). There is therefore great need to investigate further to get a solution.

One might expect the seemingly infinite inventory theories related research to be a key resource for managers seeking to gain a competitive advantage through stores control. However, some have suggested that managers who turn to inventory theory research may find it to be of little significance (Krautter, 2009) or that it has little to offer in terms of enhancing stores practices (Wagner, 2002). This has led to continued existence of a gap between inventory theory and practice (Lenard and Roy, 2005). While the varied solutions offered to bridge this gap represent valuable research, input from practitioners is noticeably absent (Patton and Steele, 2000). Therefore, an empirically derived agenda founded on practitioner-identified issues, is needed (Vigoroso, 2005). There is no study that have been comprehensively been done on factors affecting inventory management in the public sector, in particular Seed industry and Kitale region and hence this study intend to fill these gaps.

### **3. RESEARCH METHODOLOGY**

#### **Research Design:**

This study employed a descriptive case study design to investigate the factors affecting inventory management efficiency at Kenya Seed Company, which is a government managed organization falling under public sector in Kenya. The study adopted a descriptive case study design (Yin, 2004) as it was allowed for in-depth contextual analysis.

#### **Target Population:**

The target population of this study was 110 employees of Kenya Seed Company in Kitale. The respondents were drawn from all the departments within the company since the inventory management efficiency was an issue that affects the entire organization.

#### **Sample Size and Sampling Procedure:**

While deciding sample size, the researcher determined the desired precision as also an acceptable confidence level of the estimate (Kothari, 2004). According to Kothari, (2004), the sample size should be optimum in order to fulfil the requirements of Technical, representation, reliability and flexibility. Mugenda and Mugenda, (2004) recommends 10% of accessible population are adequate. At least 10% sample of the population is considered a generally acceptable method of selecting samples in such a study (Stanley & Gregory, 2001). Kerlinger (2009) states that a 10% sample allows for reliable data analysis and provides desired levels of accuracy for testing significance of differences between estimates. Empirical study by Roscoe (1975), suggests that sample size should be larger than 30 and less than 500. A total of 87 respondents were involved in the study. This sample is 79% of the entire population and is representative as it is drawn from all the departments. In order to select appropriate sample size the study employed probability sampling technique and in particular stratified sampling.

Using confidence level of 95%; level off error of 5% and the target population of 110, the simple random calculator generated a population of 87. This was confirmed by the calculation of the formula given below that generated 87 and some decimal numbers that was rounded up to whole number generating 87. The participants were asked to voluntarily participate in the study by answering a questionnaire and the interview questions. This sample size produced adequate data for analysis and in making conclusive generation. Simple random sampling method was used to select respondents from various strata. Gay (2002) identifies random sampling as the best form of sampling as it allows all members of population to have an equal and unbiased chance of appearing in the sample.

A sampling frame according to Cooper and Schindler is a list of elements from which the sample is actually drawn and is closely related to the population. Since the population of interest to the researcher is too large and the time for the study will not be enough to reach out to entire population, the researcher selected a sample and used it as a true representation of the entire population. The sampling frame for this study was a list of all the employees working in the public sector seven departments namely, administration, finance, human resource, ICT, internal audit, procurement and operating staffs.

The list containing the names of the employees formed the basis of sampling frame and it was obtained from public sector human resource department. A sample size was determined based on these registrants. A formula propounded by Cochran (1963) was used to determine the size as follows;

Where;  $n$  – is the sample size

$N$  – is the population size

$e$  – is the level of precision (95%;  $e = 0.05$ )

Given that  $N=110$  (see Table 3.1);  $e=0.052$  Therefore  $n = 110 \div (1 + (110 \times 0.052)) = 86.27$  approximately 87, hence from the above a sample of 87 respondents that was selected for the study. The Institute of Economic Affairs (2009) defines a sample size as a function of logistics and homogeneity or heterogeneity of the population.

**Table 1: Target population and sample size:**

Category of Population	Target population	Determination	Sample Size
1. Top Level Managers	10	$(10/300) \times 172$	06
2. Middle Level	40	$(94/300) \times 172$	30
3. Operational Level	60	$(196/300) \times 172$	51
Total	110		87

#### **Data Collection Procedure:**

Data was collected through an administration of questionnaire distributed to the sample group of 87 participants and to an extend interview was applied where there was need for further clarification. The respondents were asked to answer questions without regard to gender, age, or qualifications. The questionnaire was preferred due to its ability to collect data from a large group within a short time. Questionnaires were mainly administered to the respondent to complete the questions themselves, the questioners were hand-delivered to them. Secondary data was collected through reviews of both empirical and theoretical data from books, journals, magazine and the internet.

#### **Data Collection Instruments:**

Data was collected using structured questionnaires and interview schedules. Likert type of scale was used which are often used in matrix questions and compose of 1-5 categories. The questions covered areas of objectives of the project and the conceptual framework. Both primary and secondary data were used to obtain information for the success of this research. Primary data was obtained through self- administration of questionnaires and observations. These two methods were identified because of their advantages and ability to compliment the other.

The respondents were required to fill the designed questionnaire so as to assist the researcher with the data that were needed in the study. The questionnaire was the main tool used in the research. The questionnaire consisted of questions and statements. Secondary data was obtained from research journals and the company reports and documents.

#### **Data Analysis and Presentation:**

The questionnaires were checked for completeness and consistency of information at the end of every field data collection day and before storage. This study used both qualitative and quantitative analysis in order to achieve the objectives of the study. A descriptive method was employed. The data was organized in tabular form and represented in frequency distribution tables and percentage distribution of the respondents. Quantitative techniques (frequency tables and charts) were used for the presentation of quantifiable data that was presented textually using descriptive and inferential statistics.

The questionnaires were collected and counted to ensure that all respondents had answered and completed the questions. The returned questionnaires were coded and captured on the computer. De Vos, et al. (2007) describes data analyses as the process of bringing order, structure and meaning to the mass of collected data. Questionnaires received from



respondents, content analysis and interview schedules were checked for completeness with repeat calls being made for incomplete questionnaires to maintain the number of respondents. Categorization and coding were then done and data entered into SPSS for windows version 20 for analysis. Data capturing was done using SPSS computer aided software. The data from the questionnaire recorded and entered into the computer using stratified packages for social science (SPSS) version 20 for analysis. Data were presented in the form of frequency graphs and pie charts that facilitate in the description and explanation of the findings. Finally inferential statistics using correlation analysis was carried out to establish the relationship between the research variables.

Both descriptive and inferential tests were used in the analysis. Data were described or summarized using descriptive statistics such as mean and frequencies, which helped in meaningfully describing the distribution of responses.

#### 4. RESEARCH FINDINGS AND DISCUSSIONS

##### Findings of Demographic Characteristics of Respondents:

The findings of demographic characteristics of the sample include: gender, age, position, level of education, and year of service. This aspect of the analysis deals with the personal data on the respondents of the questionnaire given to them.

Table 4.1 below shows the details of background information of the respondents in tabular form.

**Gender of Respondents**

Gender	Frequency	%
Male	48	55.18
Female	39	44.82
<b>Total</b>	<b>87</b>	<b>100</b>

As noted in table 4.1 above, the majority of the respondents (55.18%) were male and the remaining 44.82 % were female. This shows that many males participated in the study because in most cases they dominate the handling of inventory in the organization. They have got their own inefficiencies that lead to negative contribution towards inventory control of a given organization.

##### Educational Background:

**Table 4.2**

Education level	Frequency	%
Certificate	23	26.44
Diploma	29	33.33
Degree	4	4.60
None	31	35.63
<b>Total</b>	<b>87</b>	<b>100</b>

As indicated in table 4.2 above, the majority of the respondents had no formal education accounting about 35.63% of the staff followed by 33.33% with diploma education level. Only 4.60% of the workforce in the procurement department was graduates.

##### Number of years in service:

**Table 4.3**

Experience	Frequency	%
Less than one year	10	11.49
2 to 5 years	30	34.48
6 to 10 years	27	31.03
11 to 15 years	17	19.54
Above 15 years	13	14.94
<b>Total</b>	<b>87</b>	<b>100</b>

As depicted in table 4.3 above, it shows that 34.48% of the respondent had the experience of 2-5 years of service in the area of inventory control section, 31.03% respondent had the experience in the age bracket of 6 to 10 years of inventory section, 19.54 % of the respondent had between 11 to 15 years the experience in the area of inventory control section for and 14.94 % had served in the area of inventory control section for more than 15 years. The research also revealed that 11.49 % of the respondent had experienced in inventory control section for less than a year.

#### Service year in the area of inventory control:

As it can be noted from figure 4.4 below, 34.48% of the respondents had been performing inventory control function for the periods of between 2 to 5 years and 31.03 % had been performing inventory control functions of periods of between 6 to 10 years. On the other hand 19.54% and 14.94% of respondents indicated that they have worked in inventory control functions for periods of between 11 to 15 years and above 15 years respectively. However, 11.49% of respondents reported having worked in inventory control functions for less than 1 year.

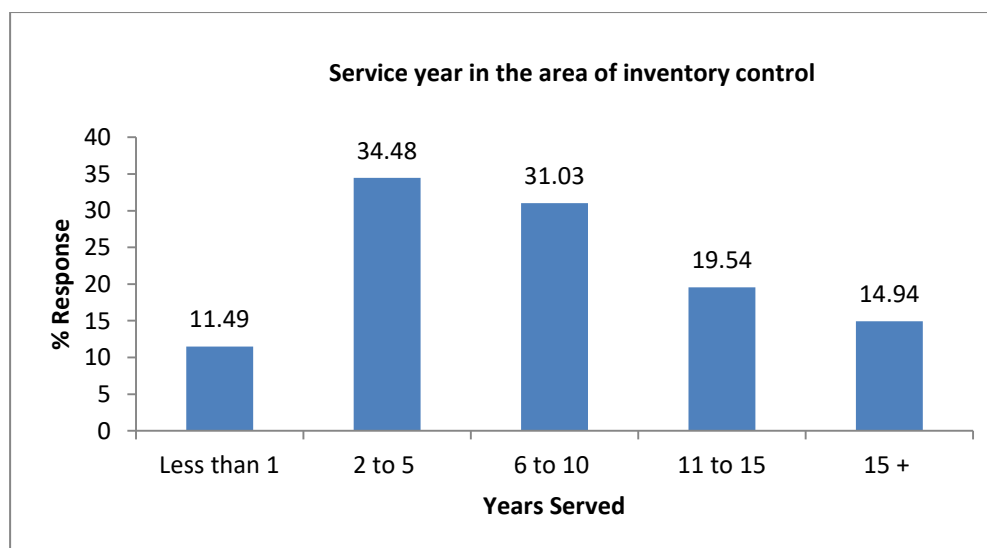


Figure 4.4: Result summary of service year in inventory control

#### Result summary of the level of training in inventory control:

As indicated in figure 4.5 below, 26.43% respondents were taken pre/post inventory control training and received certificate.

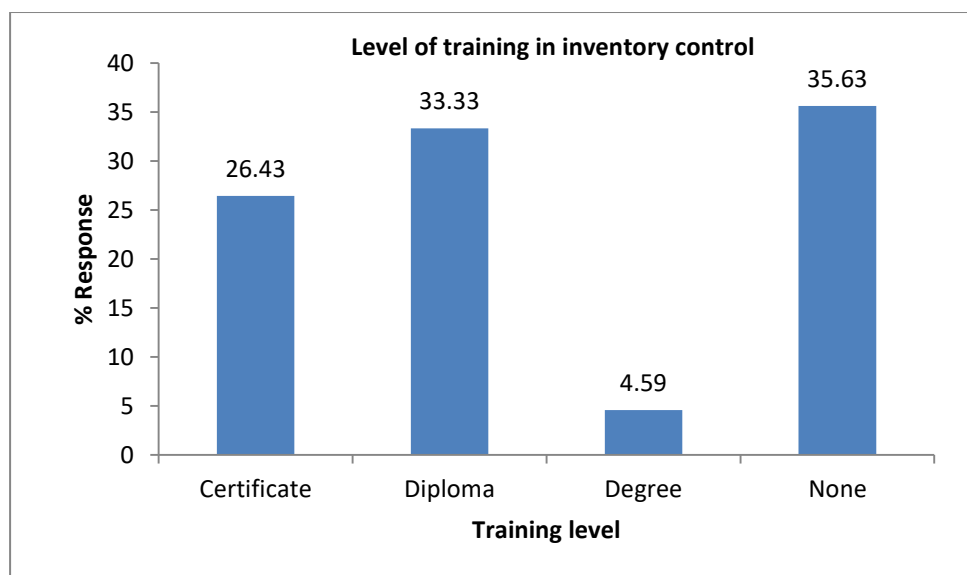
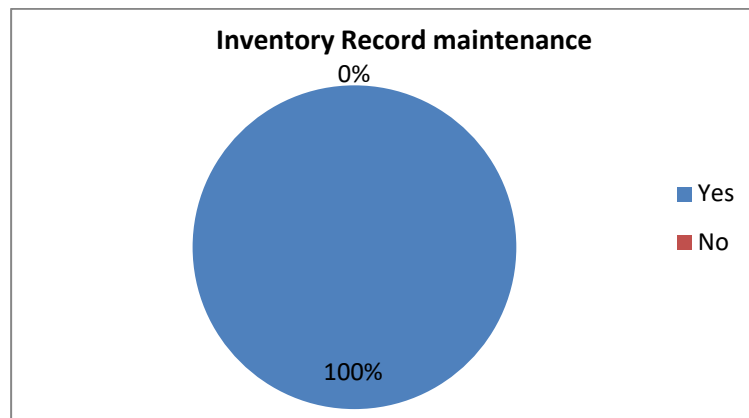


Figure 4.5 Inventory Control Training

**Findings on the Level of Technology:**

4.5 Result summary of whether there was inventory record maintenance in the organization As it can be noted from figure 4.5.1 below, all respondents indicated that there was maintenance of inventory record in their respective categories.

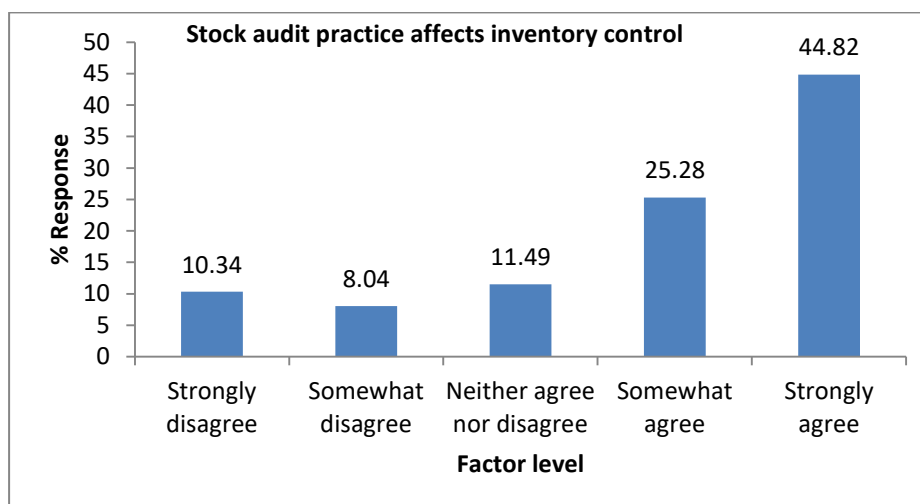


**Figure 4.5.1: Result summary of maintaining inventory record**

The result of the finding implies that the organization had a system of maintaining inventory record in all the five categories. The Kenya seed company implemented Carter and Price (2010) recommendations who stated that all organizations need a complete information system to manage inventory. An Inventory manager needs information technology in order to succeed in his work. They added that computers can assist in stock control in calculating the optimum amount of stock to hold and dispatch in order to satisfy the user requirements. The computer can do this by comparing inventory variables.

**Respondents view on whether stock audit practice affects inventory control of the organization:**

As indicated from the figure 4.5.2 below, 44.82% of the respondents strongly agreed with the statement and the other 24.2% of respondents somewhat agreed.



**Figure 4.5.2: Stock audit practice effects on inventory control**

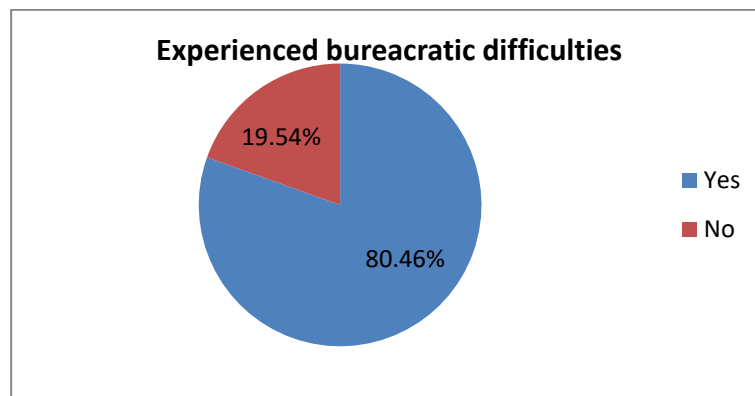
On the other hand 10.34% and 8.04% of respondents indicated they strongly disagree and somewhat disagree with the statement respectively. However, 11.49% were neither agreed nor disagreed. Since majority of the respondents (70.10%) agreed with the statement, it implies that stock audit practice affects inventory control of the organization and the organization has to ensure strong stock audit procedure. The above findings concur with the findings of Ahmad et al. (2015) that adoption of inventory audit practices enhances procurement efficiency thereby ensuring competitive advantage of the organization. The findings of Ngunyi (2014) revealed that if effective procurement audit is employed effectively then is expected to improve accuracy in inventory records and enhance inventory control

**Findings on Procurement policies on procurement management efficiency:**

The findings of Procurement policies procedure of the sample include: experience on long bureaucratic purchase difficulties, frequency of stock out and respondents view on whether long bureaucratic procurement procedure affects inventory control. This aspect of the analysis deals with the review of respondents on the questionnaire about bureaucratic procurement procedure in the organization. Respondents were required to tick according to how they felt about the issues of bureaucratic procurement procedure in the organization.

**Whether there were experienced long bureaucratic purchase difficulties:**

It was only 17 respondents out of 87 (19.54%) of respondent who were not experienced long bureaucratic purchase difficulties. On the other hand 80.46 % of the respondents experienced long bureaucratic procurement procedure related purchase difficulties that made the purchase of goods difficult.

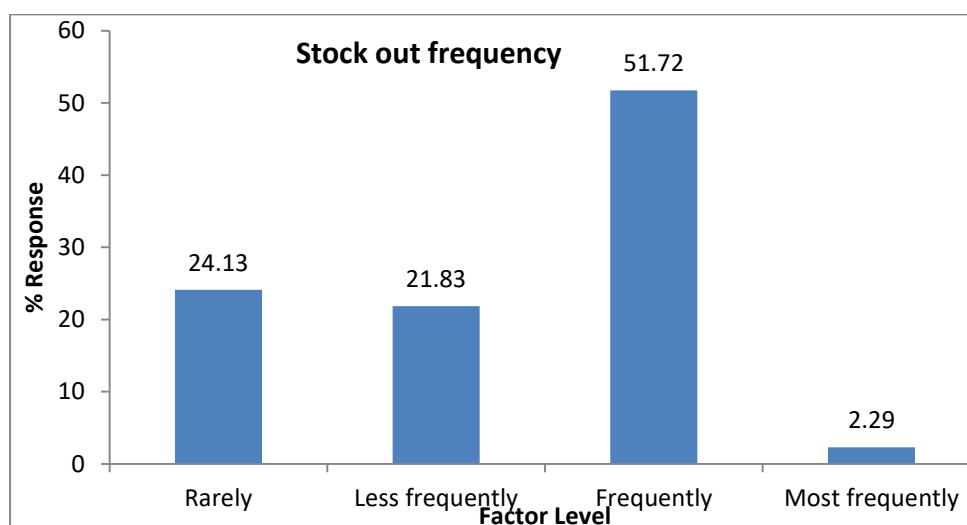


**Figure 4.5.3 Experienced bureaucratic procurement difficulties**

Kenneth & Kenneth (2005) stated that as organizations become large and more complex, the authoritarian- paternalistic pattern gave way to increased functional specialization with many layers of middle and lower management for coordinating organization effort. Since employees are treated impersonally and they are expected to rely on rules and policies, they are unwilling to experience individual judgment and avoid risks (Osborne et al., 1997). In practice Kenneth & Kenneth (2005) concluded that bureaucracy expects conformity in behaviour rather than performance.

**Stock out frequency due to bureaucratic procedure purchase difficulties:**

As depicted in Figure 4.5.4 below, 51.72 % of respondents indicated that stock out in the organization due to long bureaucratic procedure purchase difficulties was frequent while 21.87% respondents indicated that stock out was less frequent in the organization. However, 24.13% of respondent indicated that stock out in the organization is rare.



**Figure 4.5.4: Stock out frequency due to bureaucratic purchase difficulties**

The finding implies the long bureaucratic procurement procedure negatively influences stock out frequency. The results of the finding are similar with that of Burton (2006) the long procedures in procurement have made the purchase of goods and services difficult, as all of them have to follow step by step making the process cumbersome and discouraging, resulting into a lot of inefficiencies and irregularities.

#### Respondents view on whether long bureaucratic procurement practice affects inventory control:

As it can be noted from figure 4.5.5 below, 65.51% of the respondents strongly agreed with the statement, 21.87% somewhat agreed, 5.74% were neither agreed nor disagreed and 4.59% of respondents indicated somewhat disagreed. Finally 2.29% respondents indicated strongly disagreed. Since majority of the respondents (78.8%) agreed with the statement, it implies that long bureaucratic procurement practice affects inventory control the organization and therefore the organization should ensure to avoid long bureaucratic procurement procedure to improve inventory control.

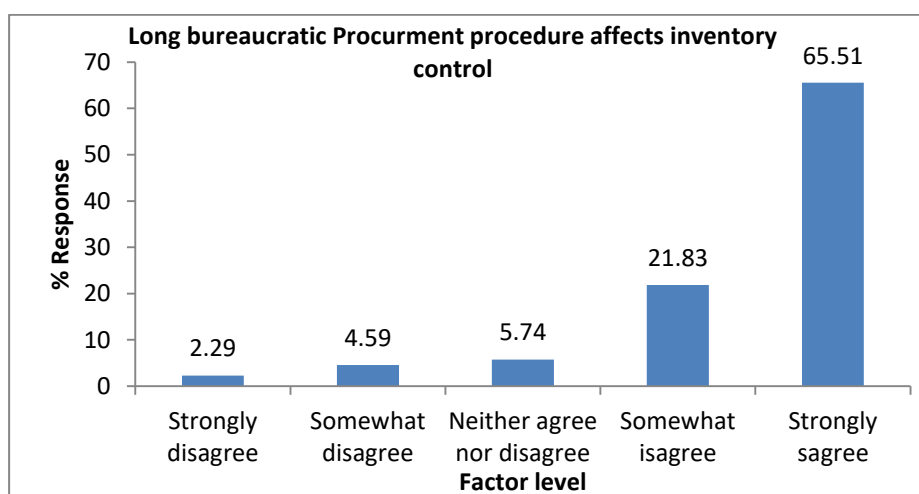


Figure 4.5.5: Long bureaucratic procurement procedures effects on inventory control

The effects of long bureaucratic delays on the effectiveness of inventory control as indicated by majority of respondents. The finding agrees with the Osborne et al. (2007) finding who indicated that bureaucratic organization has some significant negative and side effect. According this Scholar, too much red tapes and paper work not only lead to unpleasant experiences but also to inefficient operations.

Table 4.6 : Effects of staff skills and experience on Inventory Management Efficiency in Kenya Seed Company.

Factor	N	Mean	SDEV
Number of years in service affects inventory efficiency	87	2.92	1.2223
Post-employment training affects inventory control	87	4.16	0.8505
Level of entry training affects inventory efficiency	87	3.12	1.4522
Field of education affects inventory control	87	4.00	0.8660

From the above table the respondents agreed(4.16) that post employment training affects inventory control in Kenya seed company while they were neutral (3.12) on the level of entry training that affects inventory efficiency and they disagreed(2.92) on the number of years in service affects inventory efficiency as show in the above table 4.6.

Table 4.7: Effects of level of technology used on Inventory Management Efficiency in Kenya Seed Company

Factor	N	Mean	SDEV
Satisfaction with the current inventory record system	87	3.08	1.4112
Record update frequency affects inventory control	87	3.60	1.2582
Poor stock record practice affects inventory efficiency	87	4.12	0.7253
Manual record systems should be abandoned	87	2.82	0.6552
Adoption of e-procurement boost inventory control	87	4.33	0.5646



Table 4.7 indicated that respondents agreed (4.33) that adoption of e-procurement boost inventory control while they disagreed (2.82) on manual record system should be abandoned and also on satisfaction with current inventory record system they were neutral (3.08) also record update frequency the respondents were neutral (3.60).

**Table 4.8: Effects of inventory audit practices used on Inventory Management Efficiency in Kenya Seed Company**

Factor	N	Mean	SDEV
Frequency of stock taking affects inventory control	87	2.84	1.2132
Record review frequency affects inventory control	87	3.68	0.8020
Experienced stock balance discrepancies	87	4.16	0.6877
Stock audit procedures affects inventory control	87	3.59	1.2212

From table 4.8, it was evident that the respondents agreed (4.16) on experienced stock balance discrepancies and disagreed (2.84) on frequency of stock taking affects inventory control while they were neutral (3.59) on the stock audit procedures and also on record review(3.68) the respondents were also neutral.

**Table 4.9: Effects of procurement policies on Inventory Management Efficiency in Kenya Seed Company**

Factor	N	Mean	SDEV
Stock out frequency is affected by bureaucratic procedures	87	4.28	0.6782
Compliance with PPLnegatively affects inventory efficiency	87	4.60	0.5000
Management support help navigate tedious PPL	87	4.33	0.5023
PPL need to be revised to enhance inventory efficiency	87	4.62	0.6333

It is clear from table 4.9 that majority of the respondents agreed that stock out frequency is affected by bureaucratic procedures, compliance with PPL negatively affects inventory efficiency, management support help navigate tedious PPL and PPL need to be revised to enhance inventory efficiency(4.28-4.62) as shown in the table.

#### Regression Analysis:

The relationship between the dependent variable and independent variables were analyzed using regression analysis. In this case, the dependent variable was performance of procurement functions whereas the independent variables were competency, stocks record system technology, inventory auditing systems and bureaucratic procurement procedure. The summary regression results produced by SPSS V 20 show that the regression model had a correlation coefficient of  $R = 0.705$  indicating that the dependent variable and independent variable had a high degree of regression.

The model also showed that 49.7% of the variation in performance of procurement functions was explained by the variation in competency, stocks record system technology, inventory auditing systems and bureaucratic procurement procedure. This was shown by the coefficient of determination value of  $R^2=0.497025$ . The adjusted coefficient of determination (Adj R Squared) was less than the unadjusted Coefficient of determination as it should always be (Adj R Squared=0.240 < R Squared = 0.497025). This implied that about 24% of the variation in performance of procurement functions was actually explained by the variations competency, stocks record system technology, inventory auditing systems and bureaucratic procurement procedure. See Table 4.6 below.

#### Regression model summary:

Regression Model	Correlation Coefficient	Coefficient of Determination	Adjusted Coefficient of Determination	Standard Error
1	0.705	0.497025	0.2407	2.206

The analysis of variance results predicted the dependent variable by illustrating how the regression best fits the model. The results showed that the significance probability value of  $P=0.00194$  of the regression model was less than the level of significance of 0.01 at 95% confidence levels indicating that the regression model is significant. See Table 4.7 below.

Table 4.10: Analysis of Variance

Sum of Squares	DF	Mean Squares	F-Statistic	Sig of Probability
Regression	87	4	10.4231	0.00194
Residual	331	31		
<b>Total</b>	<b>4.8</b>	<b>35</b>		

The regression results based on the standardized beta coefficients show that staff competency improves performance of procurement functions by 0.463 standard deviations on average holding the other factors constant. Stock record system technology of employees on the other hand improves performance of procurement functions by 0.332 standard deviations on average holding other factors constant. Inventory audit system improves performance of procurement functions by 0.412. Finally, the study established that bureaucratic procurement performance reduces the performance of procurement functions at Kenya Seed Company by 0.530 standard deviations on average holding other factors constant.

## 5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study had four objectives. To evaluate the effect of procurement policies on the effectiveness of inventory control, to analyze the effect of poor stock record practice to the effectiveness of inventory control, to examine the effects of staff skill procedures to the effectiveness of inventory control and to determine the effects of stock audit/evaluation practices to the effectiveness of Inventory control. The four variables were found to have an effect on the effectiveness of inventory control at Kenya Seed Company.

### Staff Skill and experience:

The study revealed that, the skills mix and experience of respondents working in the inventory control sections within the organization showed considerable variation. In effort to determine the highest level of education, the findings reveals that at all personnel had attended formal education but attained different level of educational qualifications. The findings showed that it is almost only half percentage of staff involved in inventory control function have undertaken pre/post-employment training in different aspects of inventory control. The study also revealed that post employment training was not a common means for preparing staff before deployment to inventory control sections.

### Stock Record system technology:

The study found that lack of a fully computerized system for posting inventory data was one of the factors that affect the effectiveness of inventory control to a great extent. The study revealed that majority of the respondents was not satisfied with the current system used. The study also revealed that lack of specific time or date for posting stores records had a direct effect on inventory control. Majority of respondents believe that poor stock record practice affects inventory control of Kenya Seed Company Poor stock recoding have a negative effect on inventory control activity.

The study also found out that stock record facilities were not adequately provided; only partial automation of stock control systems and software were available and therefore the principle merit of a good and proper system stock record and benefits of perpetual stock verification system could not be attained, additionally sound stock record system vital for procurement decision making was also not accomplished.

### Inventory Audit system:

The study revealed that there was no specific time in which the stock taking exercise was set to take place, discrepancies between actual and physical stock balances is evident. The respondents attributed the discrepancy between the physical stock balance and balances reflected in stock control record to be attributing factor for theft and pilferage, frequent stock out of some crucial items and poor planning. Thus stock audit practice affected negatively the inventory control of the organization. The study also revealed that there was no specific time in which the review of inventory records and reports was set to take place which had a direct effect on inventory control. Majority of respondents believed that stock audit practice affects inventory control of the organization.

### Bureaucratic Procurement Procedure:

The study found that long bureaucratic procurement procedures are being experienced in Kenya Seed Company making the purchase of goods difficult. As a result, delays in procurement of goods cannot be avoided. Having cumbersome

procurement procedures was the cause of long bureaucratic delays. The study revealed that long bureaucratic procurement procedure affects inventory control of the organization. The study also revealed that: delays in procurement of goods, frequent stock-outs, and poor inventory control were some of the effects of long bureaucratic procedure which have a negative effect on effectiveness of inventory control.

#### **Conclusions:**

##### **Staff Skill and Experience:**

It is showed that most of the officers working in inventory control units have less than five year work experience which was a factor that influenced the effectiveness of inventory controls. Most of the officers working in inventory control section do not have the necessary professional qualifications in inventory management. Post- employment training is not common in inventory control sections. Staff skill and experience contributed to ineffectiveness of inventory control due to deficient of stores officer qualifications, lack of training & record procedure violation.

##### **Stock record practice:**

It can be concluded that aspects of existing stock records practice had influence on the effectiveness of inventory control of the organization. The lack of immediate update of inventory records used in stock control leading to inefficiencies in updating previously accumulated documentation work and finally indirect violation of inventory control regulations due to late entry. Failure to have a specific time or date for posting of inventory records greatly affected inventory control. Manual recording systems and delays in posting of inventory records causing discrepancies between actual and physical stock balances influenced inventory control of the organization.

##### **Stock Audit systems technology:**

It can be concluded that aspects of existing stock audit practice had influence on the effectiveness of inventory control of the organization. There was no specific time in which the stock taking exercise was set to take place, reviewing of stock records and reports, discrepancies between actual and physical stock balances is evident. The discrepancy between the physical stock balance and actual balance reflected in stock control record to be attributing factor for frequent stock out of some crucial items and poor planning.

##### **Procurement Procedure:**

There are long bureaucratic procurement procedures being experienced in the organization arising as a result of intra-departmental communication and planning, decision making processes and having a very elaborate procurement procedure. The long bureaucratic procedures have various negative effects that include delays in procurement of goods, frequent stock-outs /under-stocking, and poor inventory control.

##### **Recommendations:**

In light of the findings outlined herein, the following recommendations were made:

Warehouse staff should be adequately equipped with appropriate qualifications, proper training & supervision, ensure adherence of stock record procedures & proper work allocation to promote effectiveness of stock record systems. The organization should ensure that inventory control function is only handled by competent well trained supply chain officers, stock record facilities must be adequately provided and full automation of stock control systems and software availed coupled with proper integration with other areas of supply chain management to attain the benefits of perpetual stock verification system, the current inventory audit practices and procedures need to be reviewed and redesigned while a fully computerized stock record system for posting inventory control data is adopted. Also stock records practice should be complied with fully during receipt, issuing, control and recording to ensure accurate and timely inventory management information, too much cumbersome rules and reliance on rigid rules and policies that slow down procurement process should be avoided by adopting a recent technology. Modernize the procurement process through computerization of the systems for example embracing the E-procurement, which will realize real time procurement thus increasing transparency in procuring goods and services .However, it also help in overhauling the paper based system that is inefficiency and lower transactions cost.

**Areas of Further Research:**

Despite the successes scored during the study, some factors have not been properly accounted for due to its scope. It is therefore suggested that further research should be done on some topics related to this one. In this regard, the researcher recommends further research in the following areas: How to reduce the long bureaucratic procurement procedure at Kenya Seed Company, to determine stock record practice improvement at Kenya Seed Company and to identify the relevance of improved staff skill in inventory control at Kenya Seed Company.

**ACKNOWLEDGEMENT**

I give my gratitude to almighty God who gave me the courage and strength to do this project and my beloved mum Mrs. Jane, my brother Mr. Felix Alex & Mrs Felix Alex for their moral and financial support during the study.

**REFERENCES**

- [1] Allal-Cherif, O. and Babai, M. Z. 2012. Do electronic marketplaces improve procurement Performance? : Supply chain forum. *International journal*, 13(3): 40.
- [2] Achua, J. K. 2011. Anti-corruption in public procurement in Nigeria: Challenges and competency strategies. *Journal of public procurement*, 11(3): 323-326.
- [3] Naidoo, V. & Wu, T. (2011). Marketing strategy implementation in higher education: A mixed approach for model development and testing. *Journal of marketing management*, 27(11): 1125.
- [4] Kazare. B. (2009), Assessment of the Effectiveness of Inventory Management and Control Process in Higher Learning Institutions in Tanzania, Saint Augustine University of Tanzania (SAUT) – Mwanza.
- [5] Osborne, D., &Plastrik, P. (1997).*Banishing Bureaucracy: The Five Strategies for Reinventing Government* (NY): Addison-Wesley.
- [6] Carter, R.J., & Price, P.M. (1993). *Integrated material management*, London: Pitman. International data interchange association
- [7] Ngunyi, W. I. (2014). *Procurement Practices and Performance of Parastatals in Kenya*. Nairobi: Univeristy of Nairobi.
- [8] Ahmad, F. S. (2015). The Influence of Inventory Management Practices Towards Inventory Management Performance in Malaysian Public Hospitals. *International Academic Research Journal of Business and Technology*, 1(2)142-148.
- [9] Abadzic, A., Umihanic, B. and Cebic, M. 2012. Analysis of methodology and models strategic planning of local development in Bosnia and Herzegovina.
- [10] Achua, J. K. 2011. Anti-corruption in public procurement in Nigeria: Challenges and competency strategies. *Journal of public procurement*, 11(3): 323-326.
- [11] Akcali, E. and Bayindir, Z. P. 2008. Analyzing the effects of inventory cost setting rule in a disassembly and recovery environment. *International journal of production research*, 46(1): 272-274.
- [12] Allal-Cherif, O. and Babai, M. Z. 2012. Do electronic marketplaces improve procurement performance?: Supply chain forum. *International journal*, 13(3): 40.93.
- [13] Allal-Cherif, O. and Maira, S. 2011. Collaboration as an anti-crisis solution: the role of the procurement function. *International journal of physical distribution & logistics management*, 41(9): 709.
- [14] Alles, M., Amershi, A., Datar, S. and Sarkar, R. information and incentive effect of inventory in JIT production. *Management science*, 46(12): 1528.
- [15] Angell, P. A. 2007. *Business communication design. Creativity, strategies, and solutions*. 2nd ed. New York: McGraw-Hall.

- [16] Arnold J. R.T, Chapman S.N and Clive L.M. (2008), *Introduction to Material Management*, 6th edition, Pearson Prentice Hall.
- [17] Aroge, S. T. and Hassan, M. A. 2011. The responsibility of human resource management and development professionals in the development of low skilled workers in the Nigeria public sector. *International journal of business & management*, 6(11):229.
- [18] Atkinson, C. L. and Sapat, A. K. 2012. After Katrina: comparisons of post disaster public procurement approaches and outcomes in the New Orleans area. *Journal of public procurement*, 12(3): 360-363.
- [19] Bailey, P., & Farmer, D. (2012). *Managing materials handbook*. Aldershot: Gower Press.
- [20] Baker, F. W., Chow, A., Woodford, K. and Maes, J. D. 2012. Applying continuous improvement techniques to instructional design technology (IDT) for greater organizational effectiveness. *Organization development journal*, 30(1): 55-58.
- [21] Bauso, D., Blanchini, F. and Pesenti, R. 2006. Average flow constraints and stabilizability in uncertain production-distribution systems. *Journal of optimization theory an applications*, 144(1): 1255.
- [22] Bauso, D., Blanchini, F. and Pesenti, R. 2006. Robust control strategies for multi inventory systems with average flow constraints. *Automatica*, 42(8): 1255.
- [23] Beamon, B. M., & Kotleba, A. S. (2006). Inventory management support systems for Emergency humanitarian relief operations in South Sudan. *The International Journal of Logistics Management*, 17(2), 187-212.
- [24] Bijulal, D., Venkateswaran, J. and Hemachandra, N. 2011. Service levels, system cost and stability of production-inventory control systems. *International journal of production research*, 49(23): 7085-7088.
- [25] Birley, G. and Moreland, N. 2007. *A practical guide to academic research*. 5th ed. London: Kogan Page.
- [26] Bose, C. D. (2006). *Inventory management*. New Delhi: PHI Learning Pvt. Ltd.
- [27] Braglia, M., Gabbrielli, R. and Zammori, F. 2013. Stock diffusion theory: a dynamic model for inventory control. *International journal of production research*, 51(10):3018.
- [28] Burton, J.A (2011). *Effective warehousing*. (2nd ed.). Plymouth: MAC Donald and Evans limited.
- [29] Capkun, V., Hameri, A. P., & Weiss, L. A. (2009). On the relationship between Inventory and financial performance in manufacturing companies. *International Journal of Operations & Production Management*, 29(8), 789-806.
- [30] Chou, Y., Lu, C. and Tang, Y. 2012. Identifying inventory problems in the aerospace industry using the theory of constraints. *International journal of production research*, 50(16): 4686-4688.
- [31] DeSanctis, G., & Poole, M. S. (1994). Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organization Science*, 5(2), 121-147. INFORMS. doi:10.1287/orsc.5.2.121
- [32] Dobler, K & Burt, H (2006). *Purchasing management*. (6th ed.). McGraw hill international Edition.
- [33] Downe, J., Grace, C., Martin, S. and Nutley, S. 2010. Theories of public service improvement. *Public management review*, 12(5): 665-674.
- [34] Dragoni, L., In-sue, O., Vankatwyk, P. and Tesluk, P. E. 2011. Developing executive leaders: the relative contribution of cognitive ability, personality, and the accumulation of work experience in predicting strategic thinking competency. *Personnel psychology*, 64(4): 830-831.
- [35] Drury, C. 2011. *Cost and management accounting*. 7th ed. British: South-Western Cengage Learning.
- [36] Francis, A. (1998). *Business mathematics and statistics* (5 Ed.). Nottingham: Ashford Colour Press.
- [37] Fried, O. H., Lovell, C. A., & Schmidt, S. S. (2008). *The measurement of Productive efficiency and productive growth*. New York: Oxford University Press, Inc.



- [38] Gerald O.O and Odhiambo O.M (2012), *Assessment of Materials Management in Kenyan Manufacturing Firms*, Journal of Business Studies Quarterly, Vol. 3, No. 3, PP. 40 – 49.
- [39] Giddens F. (1984). *Constitution of Society: An analysis*. *International Journal of Management*, 23 (4), 845-850
- [40] Golder, P. N., Mitra, D. and Moorman, C. 2012. What is quality? An Integrative framework of processes and states. *Journal of marketing*, 76(4): 1-2.
- [41] Greenley, E. 2011. Does strategic planning improve company performance?: *Long range planning*, 19(2): 108.
- [42] Gunasekaran, A., Patel, C., &Tirtiroglu, E. (2001). Performance measures and metrics in a supply chain environment. *International Journal of Operations &Production Management*, 21(1/2), 71-87.
- [43] Gupta, D. P., Gopalakrishnan, B., Chaudhari, S. A. and Jalali, S. 2011.Development of an integrated model for process planning and parameter selection for machining processes: *International journal of production research*, 49(21): 6301.
- [44] Hailing, D. and Guochao. J. 2011. Limit distribution of inventory level of perishable inventory model. *Mathematical problems in engineering*, 1(1): 1-2.
- [45] Heard, E. L. 1982.Bridging the gap between theory and practice in production and inventory control. *Engineering costs & production economics*, 1(1-4): 119.
- [46] Hynes, G. E. 2012. Improving employees' interpersonal communication competencies: Aqualitativestudy.*Business communication quarterly*, 75(4): 466.
- [47] Intaher M, A. and Johanna, A. B. 2012. Procurement challenges in the South Africanpublic sector. *Journal of transport and supply chain management*, 6(1): 242-255.
- [48] Jones, T. C., & Riley, D. W. (1985). Using inventory for competitive advantage through supply chain management.*International Journal of Physical Distribution & Logistics Management*, 15(5), 16-26.
- [49] Jonsson, P. and Mattsson, S. A. 2008.Inventory management practices and their implications on perceived planning performance.*International journal of production research*, 46(7): 1788-1789.
- [50] Keith F. S. and Rene G. R. 2008. Public procurement policy: implications for theory andpractice. *Journal of public procurement*, 8(3): 310.
- [51] Kenneth, A., & Kenneth, D. A. (2005, November 2). Explorations in classical Sociological theory: *Seeing the Social World*. Pine Forge Press. pp. 172–176.
- [52] Kinnear, T. C. and Taylor, J. R. 2010.*Marketing Research.An applied approach*. NewYork: McGraw Hill.
- [53] Kothari, C. R. (2008). *Research methodology: methods and techniques*. (2nd Ed.). Delhi: NewAge International (P) Ltd.
- [54] Lai, K. H., Wong, C. W., & Cheng, E. (2006). Institutional isomorphism and the adoptioninformation technology for supply chain management. *Computers in Industry*,57(1), 93-98.
- [55] Lapan, S. D. and Quartaroli, M. T. 2009.*Research essentials: An introduction to designs and practices*. San Francisco: Jossey-Bass, A Wiley imprint.
- [56] Larson, P. D. 2009. Public vs. Private sector perspectives on supply chain management.*Journal of public procurement*, 9(2): 222.
- [57] Leedy, P. D. and Ormrod, J. E. 2012.*Practical research: Planning and design*. 8th ed.New Jersey: Pearson Education. 102
- [58] Lodding, H. and Lohmann, S. 2012. INCAP – applying short-term flexibility to control inventories. *International journal of production research*, 50(3): 909. London: SAGE Publications Ltd.
- [59] Lysons. K (2002), *Purchasing and supply chain management,2ndedition*, Bail and Bam ltd, Great Britain.

- [60] Malhotra, N.K. and Birks, D.F. 2011. *Marketing research an applied approach*. 2nd ed.London: Prentice-Hall, Inc.
- [61] Mangan, J., Lalwani, C., & Butcher, T. (2008).*Global logistics and supply chainmanagement*. New Jersey: John Wiley & Sons.
- [62] Maree, J. G. 2010.*First steps in research*. Pretoria: van Schaik Publishers.
- [63] Mathaba, S., Dlodlo, N., Smith, A. and Adigun, M. 2013. The use of RFID and web 2.0 technologies to improve inventory management in South African enterprises.*Electronic journal of information systems evaluation*, 14(2): 228.
- [64] Minner, S. and Transchel, S. 2010.Periodic review inventory-control for perishableproducts under service-level constraints.*OR spectrum*, 32(4):978-980.
- [65] Mishra, U. and Tripathy, C. K. 2012.An EOQ model for time dependent Weibulldeterioration with linear demand and shortages.*Log forum*, 8(2): 125-129.
- [66] Mohammaditabar, D., Hassan, G. S. and O'Brien, C. 2012. Inventory control system design by integrating inventory classification and policy selection.*Internationaljournal of production economics*, 140(2): 655. 103
- [67] Morgan H.C (2009), *Inventory Management Performannceto Alien Technology Corporation (ATC) in United States of America*.
- [68] Mugenda, O. M., &Mugenda, A. G. (2003).*Research methods: quantitative and qualitaive approaches*. Nairobi: Acts Press. American Management Association.
- [69] Muijs, D. 2011. *Doing qualitative research in education with SPSS*. 2nd ed. California:SAGE Publications Inc.
- [70] Musara M. (2012), *Impact of just in time (JIT) Inventory System on Efficiency, Quality and Flexibility among Manufacturing Sector, Small and Medium Enterprise (SMEs) in South Africa*. African Journal of Business Management Vol. 6 (17), PP. 5786 – 5791.
- [71] Namagembe Sheila (2010), *Information Sharing, Inventory Management and Customer Satisfaction in the Downstream Chain of Manufacturing Firms In Uganda*, Makerere University – Kampala.
- [72] Nyabwanga, R. N., &Ojera, P. (2012).Inventory management practices and business performance for small-scale enterprises in Kenya.*KCA Journal of BusinessManagement*,4(1), 11-28.
- [73] Olson, A. (2012). *The bottom-line impact of poor inventory management*.Retrieved January 12, 2014, from <<http://blog.ecrsoft.com/bid/163429/The-Bottom-Line-Impact-of-Poor-Inventory-Management>>.
- [74] Osborne, D., &Plastrik, P. (2007).*Banishing Bureaucracy: The Five Strategies forReinventingGovernment* (NY): Addison-Wesley.
- [75] Parlar, M., Perry, D. and Stadje, W. 2011.FIFO versus LIFO issuing policies forstochastic perishable inventory systems. *Methodology& computing in applied probability*, 13(2): 410.
- [76] Pier, A. M. and Nicola, D. 2010. The economics of procurement contract awarding:problems and solutions in theory and practice. *Journal of public procurement*, 10(1):94-95.
- [77] Power, D. (2005). Supply chain management integration and implementation: A literaturereview. *Supply Chain Management: An International Journal*, 10(4), 252-263.
- [78] Saleem N. A. (1997), *Storekeeping and Stock Control Simplified*, 1<sup>st</sup>edition, Nairobi: N.A. Saleem Publishers.
- [79] Sapsford, R., &Jupp, V. (2006).*Data collection and analysis*. California: SagePublications.
- [80] Sekaran, U. and Bougie, R. 2010. Research Methods for Business.*A skill BuildingApproach*.5th edition.Chichester: John Wiley and Sons Ltd.
- [81] Singh, S. R. and Kumar, V. 2010.Two Storage inventory model for deteriorating itemswith exponential demand and shortages.*International transactions in appliedsciences*, 2(4): 771.

- [82] Smaros, J., Lehtonen, J. M., Appelqvist, P., & Holmstrom, J. (2003). The impact of increasing demand visibility on production and inventory control efficiency. *International Journal of Physical Distribution & Logistics Management*, 33(4), 336-354.
- [83] Smith, A. D. (2005). Accountability in EDI systems to prevent employee fraud. *Information Systems Management*, 22(2), 30-38. NJ: John Wiley & Sons.
- [84] Sourirajan, K., Ramachandran, B. and An, L. 2008. Application of control theoretic principles to manage inventory replenishment in a supply chain. *International journal of production research*, 46(21): 6166.
- [85] Stimson, T. 2012. Software is Replacing Hardware as Subject Matter and Inventory. *Rental & Staging Systems*, 12(4): 13.
- [86] Weber and Rick (2008), *Are you on top of inventory? A Report on Inventory Management Practices in United Kingdom*, British Business and Economics Journal, Vol. 21, No. 2, PP. 205 – 227.
- [87] Welman, J. C., & Kruger, S. J. (2001). *Research methodology for the business and administrative science*. (2nd Ed.). Cape Town: Oxford University Press.
- [88] Williams, B. D., & Tokar, T. (2008). A review of inventory management research in major logistics journals: Themes and future directions. *International Journal of Logistics Management*, 19(2), 212-232.
- [89] Wood, F., & Sangster, A. H. (2008). *Business accounting 1*. New Jersey: Financial Times Prentice Hall