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EFFECTS OF VARIETY REDUCTION ON EFFECTIVE MATERIALS CONTROL: A CASE OF AGRI-SEED COMPANY, NAIROBI, KENYA

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Abstract*: Materials control is widely discussed area yet continues to record poor performance in terms of its effectiveness. Most organizations face challenges of overstocking of materials, duplication of similar materials in different departments, large material size of item parts that are resource wastage. The difficulty is to acquire approaches that would enable minimization of such wastages and losses to improve on materials control performance. The study explored the effects of variety reduction on effective materials control at Agri-Seed Company, Nairobi, Kenya. The objectives of this study were to find out the effects of standardization, simplification, specification and rationalization on effective material control. The study was based on the Materials control System Theory (Cheung, 2007); Materials control Theory and the Resource Dependence Theory (Scott 2007) which were suited for this study. The study employed descriptive case study design, targeting 300 employees of Agri-Seed Company with a sample size of 169 to be selected for the study using a combination of purposive and multistage sampling procedures. Data was collected through distribution of questionnaire, which will contain semi structured questions. The collected data was analyzed with the help of Statistical packages for social sciences (SPSS version 20). The findings found that Standardization and Specification have no significant influence on effective material control,as Simplification and rationalization impact the effectiveness of material control at Agri-Seed Company, Nairobi Branch. The study recommended that further standardization is required by streamlining and aligning the company's demand with the supplier's and customer requirement. Additionally, there is need of the technical management to prioritize specification which should be conducted as a collaborative process inclusive of the various departmental representatives and relevant suppliers. Finally, there is need of the top management of Agri-Seed Company to adopt technology-based Supply Chain enhancement applications that can streamline the rationalization of the various inventories in the company for better visibility into the organization's inventory. The pilot study was carried out in Kitale town since this area was not being part of the three sub-counties proposed for the study. A total of 20 questionnaires were administered to 6 heads of departments, 7 supervisors and 7 randomly selected operation officers. Those selected for piloting were not included in the actual sample. They were requested to offer feedback on the wording and the formulation of the questions, which enhanced the final questionnaire to ensure it, obtained the richest data possible.

***Keywords:* Standardization, Simplification, Specification and Rationalization.**

I. INTRODUCTION

Background of the study

Variety reduction can be a fundamental technique of precepts for build-to-order and mass customizations are achievable which can be useful in ensuring that all parts are available at all points of use and not just somewhere in the organization. This eliminates the setup to find, load parts. This is critical in reducing cost and improves flexibility (Anderson, 2008).Susan Michael (2000) note that it can also make it easier for parts to be pulled into assembly instead of ordering and waiting. Moreover, it can be achieved by reducing the number of part types to the point where the remaining few

standard parts can receive the focus to arrange demand-pull just-in-time deliveries. The reduced variety of parts ordered in larger quantities reduces part cost and material overhead cost having end products that are dissimilar in appearance and performance so that variety of final products uses only a few basic components (Susan and Michael, 2000).At the same time, variety reduction can also ensure that compatibility with existing machinery in capital purchases, the range of spares carried to ensure against breakdowns can be substantially reduced. Although its benefits can provide solutions to the problems of materials control experienced (Susan, and Michael, 2000). This mechanism is not practiced. Most managers of organizations at especially purchasing and procurement heads rarely use variety controls (Aldridge and Colbert, 2004).

Variety reduction is associated with inventory control, which includes all the activities relating to the acquisition, handling and control, and movement of materials and supplies used in the production for a firm's final product and also can be viewed as a tool that can be used effectively in promoting profit maximization in a company(Kenneth and Kenneth, 2005).The objective of materials control is to maximize the use of the firms' resources by ensuring adequate supply of materials for production process and also minimizing cost of holding excessive inventories. This objective when achieved, leads to cost reduction and improve profitability. In order to meet the demand for variety, many firms widen their product ranges, increasing not only revenues but also operational inefficiencies (Kenneth and Kenneth, 2005).It is therefore important for organizations to make managerial choices that mitigate the negative effects on costs, but also limit the ability of a firm to deliver variety to the market within the timeframe and costs requested by clients Doblerand Burt, 2006). The variety actually offered in the market can be different from the level of variety that had been defined during, for instance, product development. Variety reduction aims to minimize the variety of all elements in the production or service delivery process (Doblerand Burt, 2006). Variety adds costs to any organization and variety management and reduction can immediately benefit profitability. The search for better and more economical ways of completing each operation is critical but not easy to achieve. Mechanisms that can help influence the elimination of wastes in the material and procurement system are critical yet missing. The procurement and material environment is faced with unorganized, unclean material, tools, machines, desks, inventories and storage locations among others leading to high level wastages.

Global perspective of effects of variety reduction on effective material control

In most organizations internationally, different numbers of types, size or grade of a product that can perform the same function are kept, thus duplication of items. At the same time, some organizations with different functional departments can keep the same parts under different names as classified by the specific department (Nagy, and Cenker, 2002). This can create increased costs of materials handling management. The cost of materials is the last remaining cost that is truly variable. A reduction of this cost would result in usual opportunity for profit improvement. This means that procurement and purchasing need to minimize waste and enhance maximum services within the organization. But this has not been easily realizable in most organizational operations. However, variety reduction can make a substantial savings in material by simplifying and rationalizing the range of materials, parts and component kept in store (Aldridge and Colbert, 2004).

The desire to operate at minimum transaction and production costs. Although this is necessary to enhance profit maximization realization, it is not often realizable. The success of financial management is judged by the action of the business executives in controlling materials processes. It means that effective materials control systems is critical in profitability of an organization (Osborne, and Plastrik, 2007). Material ordering and delivery are critical to the successful execution and completion of any project. The person in charge of procuring materials must ensure that the correct materials in the correct quantities, range and order are ordered. They also need to verify the release dates at which the material is needed and clearly specify those delivery dates as well as the location of delivery to the supplier. Other challenges that face the electrical contractor include bid procurement issues, where and when to purchase materials and material storage and distribution at the job site (Papastathis, 2003).These challenges need to be avoided but the current practices are insufficient in achieving the desired goal. To avoid these challenges, organized coordination and communication between the parties involved are essential. But most organizations experience the challenge of reducing materials parts resulting into many wastages and cost maximization eating on their profitability outcomes. Most organizations lack the ability to reduce active part numbers, for example, from 30,000 to 10,000, which can result in lowering material overhead (Papastathis, 2003). It needs to reach a threshold so as to eliminate part related setup, that would enable the plant to build products flexibly without delays and setups to get the parts, kit the parts, or change the part bins (Papastathis, 2003). In the process of materials management, most approaches have failed to reduce production and transaction costs, achieve improved quality, flexibility and responsiveness. Yet variety reduction can be useful in purchasing leverage, lowering material overhead, and spontaneous resupply possible (Silver, 2008).

It can also help in reduce overhead costs and subsidies, which allows to be more cost competitive, improve operational flexibility, resulting in better delivery, simplify supply chain management, free valuable resources to improve operations and quality, implement better product development practices, and introduce new capabilities like build-to-order and mass customization (Richard, and Colbert, 2009). Although these benefits are widely understood, inclusion of variety integration into the materials control system in organization is missing in the current practices. Further, inadequate research on this area complicates the understanding of the benefits of variety reduction in the materials control (Bailey, and Farmer, 2012).With the diversification of customer needs and short term demands, companies must have a large line up of materials and products to support these demands and needs to satisfy their customers (Burton, 2007). However, having many material ranges and product types contradicts the realization of effective and efficient material controls. This is because it will results in reduced effectiveness and efficiency from materials control. Most organizations are unable to increase material numbers and realize sales increase, increased profit yet inventories of parts, devices and products are large. The problem further include large amount of overtime work is spent on design operations due to new materials developments, increasing number of design diagrams all the time, and the number of parts is growing, shorter materials lifecycles while costs are piling up and many types of materials and it's very troublesome to change the development processes. But variety reduction techniques can allow for large number of materials while maintaining profitability (Buffa, andSarin, 2013). The tools that can maximize profitability through increasing materials types with the minimum numbers of parts, parts types, processes and process types are essential. However, materials control practices by most organizations are unable to capitalize on this.

The challenge is that customers often do not want overall materials or product changes. But how to achieve this is a problem most organizations are unable to solve. Their ability to reduce the number of part types while continuously adapting to customer demands has been hard to realize if not improve and maintain. Apart from that lack of capacity to multifunction and consolidate change forces organizations to operate with large number of parts varieties and production processes maximizing parts complicating materials and products structures. This makes these organizations unable to fulfil the targeted functional levels (Chun, 2007).

Regional perspective of effects of variety reduction on effective material control.

In Africa today, variety reduction has become an essential part of materials management activities. Leung, et al., (2016) who carried out a simulation research on the impact of inventory management on stock-outs of essential drugs in Sub-Saharan Africa, found that the use of average past monthly issues and failure to capture lead-time variability in inventory control policies. It was also noted that Inventory control policies widely recommended and used for distributing medicines in sub-Saharan Africa directly accounted for a substantial fraction of stock-outs observed in common situations involving demand seasonality and facility access interruptions and it is therefore critical in developing central capabilities in peripheral demand forecasting and inventory control Moreover,that various purchases are made often to meet the urgent requirements for specific purposes and a good percentage of these materials thus obtained, very soon become slow moving or even a totally dead stock item within a short period.

In most cases, approximately 90percent of the working capital is invested in inventories and over 50percent of costs relate to production and transaction costs. Capital which is fixed in the form of land and buildings, plant and machineries etc. is not amenable to reduction. So, almost nothing can be done to reduction (Coe, 2011). There remains then the working capital, of which a large part is invested in inventories. Materials in stores, in the process of fabrication and in the form of finished goods are crystallized capital. It is essential, therefore, to keep this form of capital investment at minimum. Since the numbers of items are reduced due to variety reduction, the increased quantity of an individual item can lead to more economical price, because of larger quantities. It is possible to establish specifications for parts and route wise purchase activities (Bounton, and KellWalter, 2008). The purchasing activity can be made truly competitive by eliminating special lots and brand names (Coe, 2011).Although the situation being experienced in the practice of material management today is disheartening; given the poor level of practices, the degree of inability in the use of models for materials decision making, the involvement of illiterates and non-experts in the management of raw materials and material; the prospects for improvement are evident (Financial Postman, 2004). This however, is hinged on the preparedness of managers to be responsive to suggestions from within the business and the academic communities and take steps towards achieving effectiveness and efficiency in the practice of material controls. Having this done, the prevailing problems of incessant stoppage of production, low level of capacity utilization, inability to meet production targets, poor liquidity and other identified problems will be addressed.

Local perspective of effects of variety reduction on effective material control

In Kenya, most well established firms embrace variety reduction which can be undertaken periodically to examine a range of stock items to determine the intended use for each item of stock, how many stock item serve the same purpose, the extent to which items having the same purpose can be given a standard description, what range of sizes is essential and lastly what items can be eliminated. All these are done to ensure effective material control. Therefore, variety reduction can be defined as the process of reducing the number of types, size or grades of a product that are purchased, made or stocked (Okoth, 2012).

Kenya's economy is highly reliant on agriculture and needless to say it is its biggest earner. Therefore, the government needs to do a lot in order to be self-reliant on agriculture and for exploring purposes with the growing export market. KARI, a government body management by the Ministry of Agriculture has partnered with NGOs in the agricultural sector so as to be able to be self-reliant on food reserves. This has been made possible by ensuring improved varieties resistant to diseases are promoted and farmers in various sector within agriculture adopt the new varieties (Achayo, 2012).Materials control deals with planning for purchasing, receiving, handling, storing, and releasing of materials for use in production with effective control measures. Materials include industrial goods that will become part of another physical product. These can include raw materials; semi-finished goods and processed materials and component parts and assemblies that are completely finished products (Okoth, 2012). Consequently, managing these materials is referred to as materials control. Therefore materials control has been defined by Lee and Dobler (2007) as the total of all those tasks, functions and routines which are concerned with the transfer of external materials and services into the organization and the administration of same until they are consumed or used up in the process of production, operation or sales.

Statement of the Problem

In the past, inventory management was not seen to be necessary. In fact excess inventories were considered as indication of wealth. Management by then considered over stocking beneficial. But today firms have started to embrace effective inventory management (Lenerd, 2005). Seventy percent (70%) of managers are most recently, more than ever before, need reliable and effective inventory control in order to reduce costs and remain competitive (Bassin, 2014). Most organizations are unable to control increasing large number of parts, increasing costs associated with this increase. These organizations are unable to allow large number of product types or range while maintaining profitability as this contradicts the realization of effective materials control as leads to reduction of effectiveness (Lenerd, 2005). Hence the result is losses realized (Sunil *et al*., 2008). These organizations find it common practices to duplicate similar materials, parts or products in various departments making costs incurred on a singular item higher. Moreover, there is the challenge of not able to meet customer demands without reducing the number of part types while continuously adapting to customer demands (Sunil *et al*., 2008).

Stock shortages are a headache for most organizations as expressed by Githendu,Nyamwange and Akelo (2008) and it leads to customer's dissatisfaction which eventually leads to low performance of a firm. Due to the manual system of checking and validating, the stochastic nature of demand and lead time is not achieved. Also, lack of automated systems, stock outs are experienced often and replenishment is done hurriedly leading to costly inventory management and likewise low performance standards. The study conducted by Githendu, Nyamwange and Akelo (2008) indicated that firms that have centralized stock holding have an advantage because they are able to control the stocks and avoid stock duplication in their subsidiaries. Since high value stocks are held, there are instances where the organization will have too much stock in their warehouse implying a huge part of their cash is tied down with stocks. The study did not address variety reduction techniques that enhance service levels ensuring stocks are distributed on time and at the right place meeting customer's demands.Finally, organizations are not able to reduce the parts varieties and production process to minimum parts and simple product structure while fulfilling the targeted functional level. Above all the current organizational practices have not applied variety reduction approach. Above all, literature is lacking especially in Kenya that link variety reduction to materials controls. This is especially lacking on the proposed four dimensions of variety controls that include standardization, simplification, specification and rationalization. It is therefore important to propose a study that can explore this area and provide academic knowledge to close this gap that currently is left unfilled.

Objectives of the Study

General Objectives

The main purpose of the research was to analyze the effects of variety reduction on the effectiveness of materials control in Agri-Seed Company.

Specific objectives

The specific objectives of the study were;

i) To examine the effect of standardization on materials control in Agri-Seed Company;

ii) To establish the effects of Simplification on effective materials control in Agri-Seed Company;

iii) To find out the effects of Specification on effective materials control in Agri-Seed Company;

iv) To determine the effects of Rationalization on effective materials control in Agri-Seed Company.

Research Questions

i) What is the effect of standardization on effective materials control in Agri-Seed Company?

ii) What is the impact of Simplification on effective materials control in Agri-Seed Company?

iii) What is the effect of Specification on effective materials control in Agri-Seed Company?

iv) What is the effect of Rationalization on effective materials control in Agri-Seed Company?

Hypotheses of the Study

$H0_1$: There is no association between standardization and effective materials control in Agri-Seed Company;

$H0_2$: There is no relationship between simplification on effective materials control in Agri-Seed Company;

$H0_3$: Specification has no influence on effective materials control in Agri-Seed Company;

$H0_4$: There is no relationship between rationalization and effective materials control in Agri-Seed Company

Significance of the study

Stocks of materials represent more than 50% of total investment cost of an organization. It is 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 effective materials control is paramount to ensuring that money is utilized appropriately. It is hoped that the findings of this study is intended to enhance understanding of the effect of variety reduction on materials control in Agri-Seed Company in Nairobi Kenya. It will also benefit key stakeholders in the seed industry in Kenya and the rest of the world. It will provide critical information on the influence of variety reduction and materials control effectiveness in changing organizational efficiency and also to change their benchmarking their best practices in materials control approaches. The research work finding are intended to also serve as a reference book to the other researcher and offer a guide on future directions of studying this area. Lastly, the research work is also a requirement in fulfilment for the award of an academic qualification to which is pursued by this study.

Scope of the Study

The study was confined to Agri-Seed Company, Nairobi branch. The focus was limited to the top, middle and operational management staff of the finance, procurement, production and sales departments. The study took place between the months of October and December.

2. LITERATURE REVIEW

Introduction:

This chapter discusses critically relevant literatures to the issue under study, which is variety reduction and effective materials control. The literature highlights the variables that have been found out, the key focus areas and gaps not tackled. This sets the foundation for research as it clarified and put in perspective the variables to the study and how they will be measured. This is critical to the determination of any links and influence that can exist between these variables.

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Theoretical Framework

This study will be guided by various theories of inventory control and variety reduction and firm level performance.

Materials control System Theory

The Materials control System refers to an organized combination of functions and procedures, within a complete system of controls established by the management and whose purpose is the successful function of the business (Cheung, 2007). The director of the company, the insurance of the capital, the prevention and the detection of fraud, as well as the early preparation of all the useful financial information (Meigs, 2004;Papadatou, 2005). According to Cook and Wincle (2008), the Materials control System resembles the human nervous system which is spread throughout the business carrying orders and reactions to and from the management.

Materials control Theory

The term was adopted by the Anglo-Saxons (Internal Auditing) and refers to the unit of Materials control which aims at the evaluation of the sufficient functioning of the Materials control System, that is the secondary functions (Controls) and suggests that there is room for improvements in cases where weaknesses are being discovered (Financial Postman magazine, 2004).What is indicative of the importance of Materials control is the sum of the definitions that have been given for this term. According to the AICPA, (2003) a system of materials control extends beyond those matters which relate directly to the functions of accounting and the financial statements. In addition, based on the ASOBAC (Committee on Basic Auditing Concepts, 2003), materials control is a systematic procedure which will lead to evaluate the degree of correlation between those established criteria and the real results of the business.Materials control, as defined from the Hellenic Institute of Internal Auditors (H.I.I.A., 2004) is an independent, objective, adequately designed and organized procedure, which through the technical and the scientific approaches; assess how adequately the system of materials control functions. From the above definitions, it is clear that the materials control is not just an one-sided tool for controlling the order and rightness of certain situations, but it is a method of detecting the value added up to a company, achieving the index of effectiveness and profitability of the company (Nagy and Cenker, 2002) (Goodwin, 2004). Besides, the purpose of this control is the intentional, the programmed and focused effect of the company on the current situation, so as this situation to be reformed in the future and become the one that ought to exist (Mcnamee and Mcnamee, 2005).

Bounton(2006) claimed that the objective purpose of Materials control is, on the one hand, the allowance of specific and high level of services offered towards the management, and on the other hand, the allowance of assistance towards the members of the organization for the most effective practicing of their duties. The Materials control Systems are being implemented in businesses as tools that add up value to the company. In this way, we can achieve a systematic approach towards the most effective operation of the organization, as a unity (Schleifer and Greenwalt, 2006).The report defines materials control and describes a framework for materials control. But the difference of this report is that it also provides criteria for the management to utilize so as to evaluate controls (Aldridge and Colbert, 2004).

Resource Dependence Theory

Resource dependence theory (RDT) argues that firms must exchange with their environments to gain resources (Scott 2007). It centers solely on resources that must be acquired from external sources for a firm to survive or thrive (Barringer and Harrison 2000). The need for external resources makes firms depend on others. To successfully manage dependencies, RDT argues that firms must gain control over vital resources to reduce reliance on others and increase others' reliance on them. It means firms should try to increase their power in their environments (Pfeffer and Nowak (2006); Thorelli (2006); Barringer and Harrison 2000). Supply chain collaboration provides such a way to helping firms to reach these goals. Extending the logic of resource dependence theory from the firm level to the supply chain level, supply chain partners as a whole are less relying on their environments through resources sharing.Firms collaborate with their supply chain partners to acquire vital resources and to increase their power relative to other supply chains. However, the power may be unbalanced between partners because of different ownership of resources. This unbalance of power may create conflicts between partners if not well managed. Min (2005) suggests the powerful firm in the supply chain should meet the less powerful partner's needs in mutually beneficial arrangements to strengthen the competitive power of the supply chain as a whole. Based on RDT, IOS are the instruments that, by easily accessing partners' resources, increase the supply chain's power over other firms or chains.While RDT has its merits, it has limitations in explaining supply

chain collaboration. RDT just argues that firms have to exchange with their environments to acquire necessary resources since no firm is self-contained. Transaction costs, competence development, and learning opportunities are not taken into consideration (Barringer and Harrison, 2000).

Conceptual Framework

The independent variables for Variety Reduction (VR) include: standardization, simplification, specification and rationalization. These variables are investigated to determine their influence on effective materials control in Agri-Seed Company Kenya.

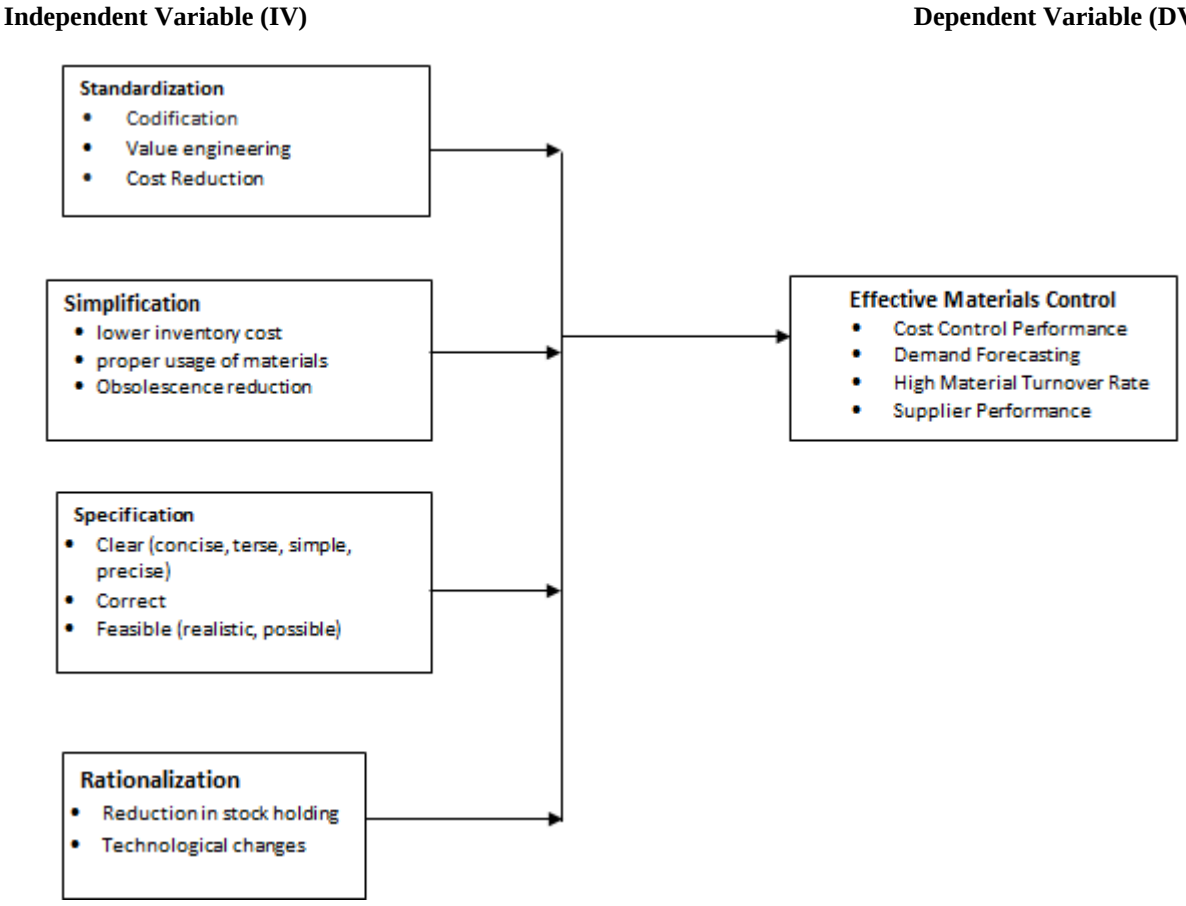

Figure 2.1: Conceptual Framework

Review of Related Variables

Effects of Standardization on material control

Materials control is critical to efficient production and operation of an organization. This cannot be over emphasized since the availability of the raw material in the right quality and quantity determine the availability, quality and quantity of the resultant output. In the case of a seed producing company, materials are essential to ensure that the quality and quality of seeds that meets different climatic conditions of various geographic locations in Kenya are available to farmers (Cheung, and Chen, 2009). It means that seeds must also be produced to meet the desired yields so as customers can plan their farming activities accurately. It implies that material management is critical to the overall performance of any organization concern (Cook, and Wincle, 2006). Beside demand and other forces like competitor's actions and general price index; material situation in terms of efficient management and effective planning determines the activity level, the turn-over and the ultimate profit in a given company (Lenard, and Roy, 2005). The determination of economic order quantity (EOQ), re-order level and minimum-maximum stock levels is important in raw material management in any manufacturing outfit. Materials can be organized and operated on an integrated basis. This is important for material forecasting, planning, material control, scrap control and disposal; providing management information regarding

purchases and inventories within the framework of the financial policies and norms (Lyson, 2006). According to Sharif (2011) material management basically aims at providing both internal and external customers with the required service levels in terms of quality, quantity and order fill rate, to ascertain present and future requirements for all types of material to avoid overstocking while avoiding bottleneck in production and to keep costs to a minimum.Mass production techniques of industrial production are based on the principle of uniformity and interchange ability of many parts, components and material used in the production process. Standard products can be manufactured on a mass scale and their production cost can be kept at minimum. Standardization can lead to cheaper and easier procurement and cost of replacement can also be reduced (Mara, 2001). Standardization enables industry to proceed on scientific lines to locate factors influencing preparation of effective materials control programmes, for achieving economy of materials and parts, avoiding wastages, disposal of unwanted stores and reduction in stock. Again through standardization and variety reduction, rationalized codification becomes easier. The role of standardization and variety reduction in inventory simplification has therefore real significance in industrial materials management field.

According to Cai (2007), standardization enables a firm to purchase fewer items, in large quantities and at lower prices. Due to this, fewer items are processed and stocked reduces purchasing, receiving, inspection and payment costs. Further, this enhances easier and less costly materials control because of stocking of fewer items being management. It is critical to understand the importance of standardization such as fewer parts to deal with material and in manufacturing, simpler and more routine purchasing, procedures of handling and inspection facilitates longer production runs and automation and helps in better understanding of customer requirements (Carter, and Price, 2003).

Coe (2011) argues that standardization aims to achieve maximum overall economy, ensure maximum convenience in use, ensure uniformity and reduction in variety and also help in quality assurance by improving quality in every activity and standardization acts as a means to minimum number of parts to serve the maximum number of purposes consistent with economical manufacture, minimum whole life cost and the quality or reliability to ensure maximum products and service delivery effectiveness (Doblerand Burt, 2006). Standardization has been well documented as essential part of variety reduction. However, the literature review lacks a comprehensive view for standardization influence on effective materials control. There is also inadequate practice of standardization as a functional strategy to help effectively manage materials in organizations. This has left a gap both in practice and research. Hence it is important to explore studies that can help close such a gap. According to Ogbadu (2009), there is a positive and significant relationship between materials management problems and the frequent breakdown of the plant. This is because the existence of materials management problems results in the breakdown of the plant. Out-of-stock and lack of spare parts hinder profitability.

Effects of Simplification on material control

The next dimension of variety reduction is the simplification. It is the reduction in the number of different sizes and shapes of material parts being stored for use in an organization (McNamee, D. and McNamee, 2005). This can eliminate superfluous varieties, sizes, dimensions and features among others. It thus can make the design, assembly or product simpler, less complex and less difficult to use. Organization holds different number of types, size or grade of materials that can perform the same function. This means that duplication of items, parts, the cost of materials is the last remaining cost that is truly variable, a reduction in the cost of material clearly offers on usual opportunity for profit improvement, therefore the need for purchasing to minimize waste and enhance maximum services within the organization has resulted in the use of variety reduction (Ogbadu, 2009). This study looked at effective materials control with particular attention on sourcing, receiving, storing and issuing materials. Prudent management of materials reduces depreciation, pilferage and wastages while ensuring availability of the materials as at when required (Ogbadu, 2009). Simplification is the process of reducing the variety of products manufactured. Simplification is concerned with the reduction of product range, assemblies, parts, materials and design. This is aimed at retaining only the material size efficient and effective enough to enable the organization realize its inventory goals. Simplification is a process of product analysis through which unnecessary varieties and designs are eliminated (Ogbadu, 2009). Only a limited number of grades, types and sizes of the product are retained. This is a very effective technique to reduce the number of different parts by simplifying on certain preferred parts. This usually applies to purchase parts but it could also apply to manufactured parts. This process involves the elimination of superfluous varieties, sizes, dimensions, features etc., making the design, assembly or product simpler, less complex and less difficult to use. Moreover, parts reduction efforts have to work hard to remove the clutter in the system, whereas simplification approaches exclude the clutter from the beginning. The clutter is the unnecessary

parts that would have not been needed if products were designed around common parts (Starling, 2003). Not only do these excess parts incur overhead costs to administer them, they also lower plant efficiency and machine utilization because of the setup caused by product that are designed to have more parts than can be distributed at every point of use. Materials account for more than half the investment capital in an organization. This means that failure to simplify materials control process threatens the wastage and losses minimizations. Expenditure directly or indirectly connected with materials, therefore, emerges as a major area for cost reduction (Starling, 2003).

Effects of Specification on material control

Most managers assume that they understand any description of materials in a purchase order or contract. Yet according to Starling (2003), participation by both critical suppliers and supply management in the development of clear specifications is critical for an organization to evolve to world class supply management. A Specification is a detailed description of a material, component part or a product, including physical measures such as dimensions, volume, weight, and surface finish. This eliminates the problem of assumptions that managers employ and fail in the end from lack of understanding the description of all materials given to them. Specifications form the purchase description. Moreover, this active involvement in the tactical and strategic development of specifications proactively reduces total costs of products and services. Organization can achieve reduced total costs of a product or service developed either in-house or externally. The importance of including supply management in the design process was established in our chapter on new product development (Starling, 2003).The purchase specification forms the heart of the procurement. Whether or not a purchase order or contract will be performed to the satisfaction of the buying organization frequently is determined at the time the specification is determined .Recognition that procurements should be made with the understanding of total cost of ownership requires supply managers to consider specifications that go beyond the tangible good or primary service needed (Meigs, Larsen, and Meigs, 2014). For example, seed specifications should include the quantity, germination rate, survival and yield expectation levels. However, in the case of most organizations, these descriptions offer no value. Development of specifications should be conducted as a collaborative process whenever economically justified. Through collaborative interactions of various departmental representatives and relevant suppliers, the specifications output can balance goals that often conflict with each other. Performance goals, such as quality and delivery, should be balanced against cost. Individual department goals should be balanced. Supplier goals should be considered. The balancing process is best done in an atmosphere of collaboration and mutual desire to develop specifications outcomes where all stakeholders benefit from the process. Multiple goals are balanced simultaneously (Miller, and Bailley, 2009). For example, in the design of a DVD player, high quality and timely delivery goals may conflict with cost containment goals. The objective in collaboratively developing the specifications would be to simultaneously achieve the quality, delivery, and cost goals (Okoth, 2012). Perhaps a supplier suggests that a standard part that the buying firm was unaware of could be used where the original specification used a nonstandard part. The standard part would decrease production time, improve quality, and cost less than the nonstandard part. Unfortunately, many companies do not pursue balanced specifications through collaborative efforts.

Effects of Rationalization on material control

According to Mahajan (2007), managers of companies repeatedly said that supply chain improvement initiatives and investments in systems are top corporate priorities. Successful initiatives can cut total supply chain management costs up to 50 percent and improved performance on inventory turns up to 100 percent among top industry performers. A lot of companies, however, focus on technology-based Supply Chain enhancements, and rightfully so, as advancements in Web-based optimization have convinced many executives that the time for breakthrough performance improvement is now. However, as companies are gaining experience with these initiatives, they are finding there is more to a solution than just installing software. Real gains depend on substantial changes in operating practices. One practice presenting challenges in supply chain is complexity management (Osborne, and Plastrik, 2007).

According to Patton and Steele (2000), materials complexity and stock-keeping unit (SKU) proliferation reduce the efficiency and effectiveness of a company's overall materials control. Materials complexity and proliferation impact areas of the organization that include: customer order processing, manufacturing planning and scheduling, purchasing, inventory management, and quality (Silver, 2008). The ability of an organization to manage materials complexity and proliferation generally results in cost avoidance and better control of operations. Rationalization supports the reorganization that is aimed at creating and improving effectiveness and efficiency. This reorganization may lead to an

expansion or reduction in materials types, range, a change of materials control policy, or an alteration of strategy pertaining to particular materials and inventory. Similar to reorganization, a rationalization is more widespread, encompassing strategy as well as structural changes (Sunil, and Sameer, 2006).

According to Susan and Michael (2000), engaging in applications rationalization, especially during mergers and acquisitions, helps companies reduce costs, operate more efficiently and focus on supporting deal objectives, legal and regulatory issues, systems and process integration and business continuity. Most businesses accumulate a vast information technology application portfolio over time, especially when companies grow and do not fully integrate operations and assets with each transaction. Many applications do not support the company's objectives after each merger or acquisition and need revision to support the new business. Examining a company's application portfolio is important to attain more efficient operations and cost integrations, reducing stranded costs left by a seller and streamlining the portfolio to best serve the business.

Product rationalization is an important part of managing a product's lifecycle. If products are not rationalized, their numbers continue to increase, adding complexity and increased support costs to the company's bottom line. According to the 80/20 Rule, the bulk of a company's revenue and profit (80%) comes from a fraction of its products (20%)(Zanakis et al., 2010). Therefore, when rationalizing a product line, executives needs to consider various factors. The portfolio effect describes how a product's addition or removal affects the rest of the company's products. Sales may go to other products or be lost completely. Although rationalization may reduce complexity in the supply chain, as well as redundancy in both the portfolio and support costs, the costs can be difficult to quantify. The percent of sales that will not transfer to other products needs to be estimated and compensated for by new products entering the portfolio or sales of existing products growing. In addition, when products leave the portfolio, fixed costs typically remain the same; the costs must be spread across the remaining product line, increasing unit costs. Production volume must be transferred to new or more profitable products to ensure the business remains solvent (Bounton, andKell-Walter, 2008). Also, customer migration becomes an issue, as sales and operations managers must create and carry out migration plans. This is especially important with customers buying multiple products who may leave a company that is no longer providing one-stop shopping.

Effective Materials Control

Lysons (2006) posits that effective materials control enhances profitability by reducing costs associated with storage and handling of materials. Effective materials control is means by which materials of the right quality and quantity are made available as when required with due regards to the economy of shortages, ordering cost, purchase price and working capital. Effective materials control determines the extent of stock holding of materials. It equally makes it possible for material manager to carryout accurate and efficient operation of the manufacturing organization through decoupling of individual segment of the total operation and it entails the process of assessing of stock into the store house and the issue of stock. Materials control has to do with standard control on the ordering size, ordering time, and the quantities of raw materials left in the store at a given time. For profitability and cost reduction, manager must therefore, maintain an optimum level of stock at all time. Too much stock and too little stock must be avoided.

According to Buffa and Salin (2007), there are several reasons for keeping inventory. These include protection against variations in demand, maintaining smooth flow of production by providing a decoupling function between stages of production and lowering total material cost by taking advantage of quantity discounts. In the same vein, too much stock could result in funds tied down increase in holding cost and the materials suffer deterioration, obsolescence and theft. On the other hand, shortage of materials can lead to interruption of products for sales; customer relations are hurt, while machines and equipment becomes underutilized. Therefore, a company can only realize substantial savings by using a rational procedure for inventory contro1.Previously, materials control was not necessary. In fact excess materials were considered as indication of wealth and over stocking were beneficial. However, this has changed and modern organizations need few parts to produce maximum a range of product outputs. Managers now need reliable and effective materials control. If this can be realized, costs can be reduced leading to organizational competitiveness. But most organizations face challenges of materials duplications at departmental levels, inability to reduce material parts numbers while continue to adapt and satisfy customer needs. As organization become large and more complex, the authoritarian-paternalistic patter gave way to increased functional specialization with many layers of middle and lower management for coordinating organization effort (Kenneth and Kenneth, 2005). According to Osborne and Plastrik (2007), the advantages of bureaucracy are many folds. Apart from consistent employee's behavior, it eliminates overlapping or conflicting jobs or duties and behavior of the system is predicable.

Despite the above advantages, bureaucratic organization has some significant negative and side effect. Too much red tapes and paper work not only lead to unpleasant experiences but also to inefficient operations (Osborne et al., 2007). Since employees are treated impersonality and they are expected to rely on rules and policies, they are unwilling to experience individual judgment and avoid risks (Osborne et al., 2007). Bureaucracy expects conformity in behavior rather than performance (Kenneth and Kenneth, 2005). These problems increase materials handling costs. However, through standardization determines the desire to have lesser variety of items to be purchased, stocked, transported and used by the organization. In any production organization, material costs account for approximately 50-60% of the total cost. Expenditure directly or indirectly connected with materials, therefore, emerges as a major area for cost reduction. Phenomenal success of Japan and USA in recent years can be attributed largely to effective management of materials. According to Dobler and Burt (2006), further states that materials alone account for more than 30% of the organization invested capital. Materials control is no longer considered a clerical function performed independently by untrained individuals within a governmental agency (National Institute of Governmental Purchasing, 2001). Qualified staff that is competent and skilled will help the organization to achieve its goals and objectives by being efficient and effective when carrying out their various functions. For an organization to succeed, qualification is therefore a pre-requisite and must be matched with job requirement, hence the need to hire and develop ambitious personnel. If staff involved in materials control is not qualified and competent, then there will be ineffectiveness in inventory control. Bailey and Farmer (2002) says that for Materials control function to achieve a superior performance, it's necessary to recruit, train and develop personnel with the capacity and motivation to do better job. Carter and Price (200) indicate that training of staff is vital if full use is to be made of their abilities and talents. Coe (2009) says that it's important to ensure that sufficient number of the appropriate caliber is available to the organization in pursuit of its objectives. Incompetent employees can render materials control virtually ineffective.

It's for this reason that the Government of Kenya through its Supplies manual (2007) have instituted procedures and techniques for the purpose of proper material control. Standardization establishes basic specifications for a set of commonly used characteristics of size, shape and performance for material parts. Thus standardization can help reduction in material, ease in design, production and procurement, ease in inspection, enhancement of interchangeability, reliability, safety and maintainability, uniform supply language between producer, purchaser, inspector and user, bulk procurement and overall economy and results in saving of time. But the challenge from study findings indicate that even in an material intensive manufacturing industry sector, materials control practices were poor (Rajeev, 2008). The growth of industrial activity and diverse kind of industrial requirements has influenced organisations to store a large number of items, parts often running into several thousands. This requires effective techniques of identifying them. This can be through describing them by individual names. The challenge is when an organisation has several functional departments that use the same parts or item. These departments will call the same item by different names and store them in different places. Although it is a common practice, it creates unnecessary costs to that organisation. One of the most useful techniques of Materials control is a rationalized codification system for properly classifying equipments, raw materials, components and spares to suit to the particular needs of any organization. As firms struggle to realize reduced costs of production and transactions, they need to be effective in their materials control practices. Yet these firms lack ability to management constant inter-departmental-act with one another on several aspects in a manner effective in cost minimization. Practices that provide common materials parts language be evolved. This is critical for uniformly understood by all concerned. This means that standardization of materials thus form a powerful tool in this respect. Materials handling makes production flow possible, as it gives dynamism to static elements such as materials, products, equipments, layout and human resources (Stock and Lambert, 2001; Chopra and Meindl, 2001). Groover (2001) highlights that despite its importance, materials handling is a topic that frequently is treated superficially by the companies. However, other authors have perceived its relevance. During the period in which Shingo (2006) contributed to the development of the Toyota Production System, he developed the Production Function Mechanism that proposes to explain how the production phenomenon happen. According to Shingo (2006), production was treated as a process of a sequence of operations. In the Production Function Mechanism, the concepts are directly related to a production analysis focus. A process analysis consists of an observation of the production flows that turn raw materials into final products. From this concept, the author highlights that the main analysis is the one associated with the process, because it follows the production object. The analysis of the operations comes later because it focuses on production subjects. When making this distinction, it is possible to perceive the relevance of materials handling. Beyond the basic function of movement, it is also relevant to cite the functions of storage and information transfer, which occurs simultaneously and has both strategic

and operational dimensions. Organizations are relying on information systems using tools like Electronic Data Interchange (EDI), or similar information technology resources, to gain in precision and reliability, in the interchange, and availability of information (Lambert and Stock, 2001; Milan, Basso and Pretto, 2007).

For Bowersox and Closs (2006), the main logistic responsibility in manufacturing is to formulate a master-program for the timely provision of materials, components and work-in-process. Stevenson (2001) understands that logistics (including materials and goods flowing in and out of a production facility as well as its internal handling) has become very important to an organization to acquire competitive advantages, as the companies struggle to deliver the right product at the correct place and time. The main challenge is to promote, with low cost, a flow whose velocity allows the execution of manufacturing process with the expected satisfaction level.

Critiques of existing literature

More than a decade now, there has been focus on the need of effective management practices both in the public and private sector (Okoth,2012) Further, the author argues that inventory control planning, having accurate inventory data, adopting of procurement and inventory management strategies that are important keys in inventory management but studies in this area are inadequate. Moreover, other studies elude that significant change in the inventory control planning strategies in inventory management which 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 stakeholders in the supply chain. Studies have been conducted by various researchers concerning the effectiveness of inventory control in both public and private body with the aim of identifying the causes of the ineffectiveness. Several have embarked on the problem of inadequate funds, long procurement procedure, inadequate qualified personnel, and inadequate materials control procedure. For instance, establish the effects of inventory management on performance of firms and specifically on inventory stock takes, inventory information management system, supplier partnerships, supply chain performance (efficiency and effectiveness) and lead time management practices. Moreover, there is also a lot of focus on the role of inventory management in maintaining production, cost control, and ensuring of continuous supply of materials. On inventory management techniques, its worthy to note that both traditional and modern approaches have been studied. From Material requirement planning 1 and 2, use of ERP systems for inventory planning in Manufacturing, Vendor managed inventory and Just-in-time approaches but did not focus deeply into the techniques and its' application and specifically in Agri-Seed Company, Nairobi.

Summary of the Literature Review

Schroeder (2000) established that there are three motives for holding inventories, which are transaction, precautionary and speculative motives. Lyson (2006) states that inventory serves as an insurance policy against the unexpected breakthrough, delays and other disturbance that could disrupt ongoing activities. According to review poor documentation/records keeping, bureaucratic procedure, poor funding are some of the factors that limit effective inventory control. Dobler and Burt (2006) emphasized that stock represents money and similar control measures should be taken on stock as it the case of cash. It's important to have a good stock record system as it help in preventing stock out, overstocking, deterioration, obsolescence and high carrying cost. A sound stores record system is therefore vital for procurement decision making. Effective stock records are important to an organization which expects to operate profitably or offer quality services. Late posting have undesirable effects.

Research Gaps

One might expect the seemingly infinite stream of materials control theory related research to be a key resource for managers seeking to gain a competitive advantage through materials control and variety reduction. However, some of these theories suggest 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 inventory practices (Wagner, 2002). This has created existence of knowledge gap between inventory theory and practice (Lenard and Roy, 2005; Silver, 2001; Wagner, 2002; Zanakis et al., 2000). 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 study based on practitioner-identified issues, is needed (Vigoroso, 2005). According to a survey carried out in Kenya by Mutwol (2013), on the impact of the collapse of most agricultural firms was found to be caused by lack of adequate commitment to timely funding of materials procurement, poor material planning, poor inventory control, purchasing problems, quality control problems; stores control problems, material movement and even surplus disposal problems.

Studies on effective inventory control in Kenya such as Mukopi (2015) focused on the relationship effective control has on procurement performance. Keitany (2014) assessed the role of materials management on organizational performance. Specifically, how inventory control systems and lead time affect organizational performance. Therefore, this study became inevitable in view of the developing and changing nature of the Kenyan economy given the nature of the environment: Economic, Political, changes in technological environment, government regulations, multiple taxation, environmental degradation and reduction in quality of raw materials as a result of shorter lead times and stiffer competition from global companies that offer seeds that mature quickly. Thus materials management should no longer be viewed as a drain-pipe, but as a serious stabilizing and economic growth potential factor. Unfortunately, few studies exist that extensively focus on effects of variety reduction on effective materials control in seed industry in Kenya and hence this study will be useful to be done to fill these gaps.

3. RESEARCH METHODOLOGY

Introduction

This chapter provides research methodology that was used to collect data for the study. It also covers data collection and administration of the questionnaire, pilot study, validity and reliability, data analysis and ethical consideration.

Research Design

This study adopted a descriptive survey research design. This will be appropriate for assessing whether Seeds Company in Nairobi County has experienced use of variety reduction in effective materials control. This was necessary to enable the formulation of a precise problem for investigation and developing the study hypothesis. It also enabled the study to present information regarding the immediate conditions, presentations of crucial issues, study of the unknown fields, theoretical base, and presentation of uncertain problem for study in research. This was crucial since this variety reduction and the four dimensions of effective materials control pursued in this study have not been thoroughly researched currently. Hence this design allowed the researcher to be acquainted with the problem and concept researched, and enabling the production of hypotheses tested.

Target Population

The target population in research is the specific population about which information is desired. According to Ngechu, (2004) a population is a well-defined set of people, services, elements, things or households under investigation. Kothari, (2004) defines population as all items in a field of enquiry. The study targeted the departmental heads, heads of sections and the supervisors from the following departments; Human resources, Finance, Procurement and Transportation, Production, Sales and Marketing, Public relation General Administration, Internal Audit, Factory, Information and Technology. The total target population therefore comprised of 300 respondents as illustrated by table 3.1 and the distribution of the sample respondents as shown in table 3.1

Table 3.1: Target Population

Category	Study Population
Department Heads	6
Heads of sections	27
Supervisors	42
Operating officers	225
Total	**300**

Sample Size and Sampling Technique

According to Kothari, (2004), the sample size should be optimum in order to fulfil the requirements of Technical, representation, reliability and flexibility. While deciding sample size, the researcher determines the desired precision as also an acceptable confidence level of the estimate (Kothari, 2004). The study applied a combination of purposive and multi-stage sampling techniques to select the sample size for the study. In multi-stage sampling, samples are selected by using combinations of different sampling methods and it is usually carried out in large and diverse populations. The study

considered this sampling technique since the respondents were obtained from different management levels and in different departments. The study adopted a purposive sampling technique since material management and control is a technical activity of procurement in liaison with other user departments and hence non-probability sampling method like purposive sampling helped in selecting respondents with technical knowledge and experience.

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. A sample size was determined based on these registrants. A formula propounded by Cochran (2003) 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)

By using the Cochran formula using confidence level of 95percent; level off error of 5percent and the target population of 300, the calculation generated a population of 169 respondents.

Table 3.2: Sampling frame

Category	Study Population	Sample size (Cochran formulae yield)
Department Heads	6	6
Heads of sections	27	12
Supervisors	42	18
Operating officers	225	133
Total	**300**	**169**

Data Collection Instruments and Procedures

In order to measure the influence of variety reduction on effective materials control, the researcher used questionnaires as the main data collection instruments to collect primary data from the respondents. Questionnaire is a device used to collect data in an objective and a systematic manner for the purpose of the research (Orodho, 2009). The items in the questionnaire were closed-ended, with few open-ended items. The open-ended items serve to clarify the responses in the closed-ended items and to capture participants' views on the effects of variety reduction on effective material control at Agri-Seed Company.

Pilot Study

The pilot study was carried out in Kitale town since this area was not be part of the three sub-counties proposed for the study. Pilot studies accumulate data from the ultimate subjects of the research project to serve as a guide for the larger study (De Vos, *et al.*, 2007; Zikmund, 2003).A total of 20 questionnaires were administered to 6 heads of departments, 7 supervisors and 7 randomly selected operation officers. Those selected for piloting were not included in the actual sample. They were requested to offer feedback on the wording and the formulation of the questions, which enhanced the final questionnaire to ensure it obtained the richest data possible. Furthermore, the participants were to also determine any necessary revisions needed to be made before actual administration of the questionnaire (Burns and Bush, 2010; Sarantakos, 2000).

Validity of the Instruments

In order to ascertain face validity, an initial questionnaire was passed through the routine editing after it will have been given to the panel of experts. They were asked to respond to the questionnaire. The result determined the degree of comments as will be received and needed adjustments will be done according to the comments from the panel of experts to enhance the clarity.

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Reliability of the Instruments

The reliability of the questionnaire was tested using Cronbach's alpha correlation coefficient.

This is provided by the formulae:

$$\alpha = n/(n-1)\left(1-\frac{\sum Vi}{Vtest}\right)$$

Where;

n Number of questions

V^i Variance score of each question

V^{test} Total variance of overall score (not %s) on the entire test

The closer Cronbach's alpha coefficient is to 1, the higher the internal consistency reliability (Sekaran, 2003). A coefficient of 0.7 is recommended for a newly developed questionnaire.Cronbach Alpha was established for every variable. If the variables will be reliable, then they will have Cronbach's alpha value exceeding the prescribed threshold of 0.7 (GliemandGliem, 2003). This will mean that constructs of variety reduction and effective materials control, as both independent and dependent variables respectively, have sufficient reliability. This implies that the study can be undertaken using the two variables that is variety reduction and Effective materials control.

Data Analysis

Data analysis as data that is statistically analyzed in order to determine whether the generated hypotheses have been supported (Sarantakos, 2000). The questionnaires collected were counted to ensure that all respondents had answered and completed the questions. They were checked for completeness with repeat calls made for incomplete questionnaires to maintain the number of respondents. Apart from that, these questionnaires were coded and captured in the computer. This allowed for order, structure and meaning to the mass of collected data (De Vos, *et al.,* 2007). Categorization was done and data entered in the computer through SPSS for windows version 20 which was also used for the carrying out of descriptive and inferential tests. Data was summarized using descriptive statistics. Techniques such as mean and standard deviation were used. Further frequencies distributions, pie charts and bar graphs were used to present the data. Regression analysis and Pearson's correlation coefficient were obtained to establish the influence and relationships between independent and dependent variables.

A multiple linear regression model was used to predict effective materials control using the four independent variables in the study: Standardization, Simplification, Specification and Rationalization. The R square, t-tests and F-tests and Analysis of Variances (ANOVA) tests were all generated by Statistical Package for Social Science SPSS to test the significant of the relationship between the variables under the study and establish the extent to which the predictor variables explained the variation in dependent variable. The research hypotheses were tested using the p value approach at 95% confidence level based on linear regression analysis output produced by SPSS. The decision rules were that the null hypothesis should be rejected if the calculated p-value is less than the significant level (0.05); and accepted if the calculated p-value was greater than the significance level (0.05). The significance of the independent variables was tested using F test and p value approaches. The decision rules were to reject the null hypotheses that the effect of independent variable(s) was insignificant if the computed F value exceeds the critical F value or if the P value was less critical value of 0.05. The regression model used to test is shown below:

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mathcal{E}}$$

Where; Y – Effective Materials Control (EMC)

$\boldsymbol{\beta_0}$ - Constant

β_1, β_2, β_3 and β_4 -Coefficient indicating rate of change of effective materials control as variety reduction by its four dimensions of Standardization, Simplification, Specification and Rationalization changes.

X_1 – Standardization (STD)

X_2 – Simplification (SMF)

X_3 – Specification (SPC)

X_4 – Rationalization (RNL)

Ɛ - Error term

All the above statistical tests will be analyzed using the Statistical Package for Social Sciences (SPSS), version 20. All tests were two-tailed. Significant levels were measured at 95 percent confidence level with significant differences recorded at $p < 0.05$.

4. RESEARCH FINDINGS AND DISCUSSIONS

Introduction

This chapter presents data that originated from the findings of the research. The content was analyzed according to the responses provided by the questionnaire respondents. The analysis and interpretation was done with the aid of secondary data in order to authenticate the results found.

The research data was collected using closed ended questionnaires that were covering the three different dimensions of effects of variety reduction on material control being the focus of the study. This made it possible to get clear responses from the respondents on their perception of the effects of variety reduction on material control at Agri-Seed Company.

Response Rate

Out of the 169 questionnaires that were administered, 110 questionnaires were collected reflecting that they offered 65% response. According to Kothari, (2008) a 50% response rate is adequate, 60% good and above 70% rated very good. This implies that based on this assertion, the response rate in this case a range between 60 - 70% is good. The results are shown in table 4.1 below.

Table 4.1: Response rate

Target Population	Questionnaires Issued	Questionnaires returned	Response rate
Heads of Departments, Section Heads and Operation officers	169	110	65

Pilot Results

Pilot study was assessed through the adoption of Cronbach's Alpha, which was generated from SPSS (version 20) and an overall Cronbach's Alpha of 0.757 for Standardization (STD), 0772 for Simplification (SMF), 0.709 for Specification (SPC) and 0.783 for Rationalization (RNL). According to (Sekaran, 2003), the general reliability coefficients around 0.9, are considered excellent, values around 0.8 as very good and values around 0.7 as adequate. These results indicated that the questionnaire was reliable as a data collection instrument. The results are shown in table 4.2 below.

Table 4.2: Pilot test

Variables	**Cronbach's Alpha**
Standardization	0.757
Simplification	0.772
Specification	0.709
Rationalization	0.783

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Experience

The study also sought to find out the number of years the respondents had been working in the company. Respondents were thus asked to indicate the numbers of years they had worked at Agri-Seed Company. The results of the respondents are shown in Table 4.3

Table 4.3: Numbers of years worked at Agri-Seed Company

	Frequency	Percent
0 - 5 years	62	56
5 – 10 years	30	27
10 – 15 years	10	10
15 years and Above	8	7
Total	110	100.0

The results in Table 4.3 indicate that all target groups were captured ranging from the new employees to those who have been employed for longer periods. The work experience that ranges from 0 – 5 years and 5 – 10 years which are 56 percent and 27percentrespectively.The findings indicate that most of the respondents had worked at Agri-Seed Company for less than 10 years. 10 percent of the respondents had experience of between 10 – 15 years as only 7 percent had experience of 15 years and above.

Academics Qualification of the Respondents

The study sought to find out the respondents highest academic qualifications. Respondents were thus asked to indicate their highest academic qualifications. The results are shown in Table 4.4.

Table 4.4: Academics Qualification

	Frequency	Percent
Primary / Secondary certificate	0	0
Diploma	45	41.1
Degree	50	45
Masters	14	13
Phd.	1	0.9
Total	110	100.0

The findings in Table 4.4 indicate that 0.9 percent of the respondents had a PhD degree, 13 percent had a Master's degree, 41.1 had a diploma, while 45 percent had a degree as their highest qualification. This indicates that most of the respondents had a minimum of a diploma qualification and were thus qualified to answer the questions in the questionnaires.

Descriptive analysis

The study sought to establish the effects of Standardization, Simplification, Specification and Rationalization on effective materials control at Agri-Seed Company, Nairobi Branch.

Effect of Standardization on the effective material control at Agri-Seed Company

The study sought to determine the effect of standardization on the effectiveness of material control at Agri-Seed Company. The results are laid out in this section. The descriptive statistics of respondent's opinions on standardization and material control is shown in Table. Respondents were thus asked to indicate the extent to which various standardization factors influence effectiveness of material control at Agri-Seed Company, Nairobi branch. The results of the respondents are shown in Table 4.5.

Table 4.5: effects of standardization on the effectiveness of material control (in percentages)

STATEMENTS	SA %	A %	N %	D %	SD %
Cost Reduction	52.7	18.2	10.1	19	9
Steady Quality improvement	46	26	13	11	4
Flexibility	44	24	12	12	8
Responsiveness	50	40	10	0	0
Reduce their overhead costs and subsidies	44	44	8	3	1
Free valuable resources to improve operations and quality	19	47	20	14	0
Simplify their supply chain management	44	32	23	1	0
Improve their operational flexibility	37	42	11	3	7

Results in 4.5 shows that the 50Percent of the respondents are of the opinion that standardization can reduce costs in the organisation and enhance the ability of the organisation to be responsive to demand. Moreover, 46Percent of the respondents strongly agreed with the fact that the company can realize steady quality improvement with utilization of standardization of materials, impacts on flexibility and simplifies the company's supply chain.47 Percent of the respondents agreed the adoption of standardization frees up valuable resources to improve operations and quality, as 14 Percent were of the opinion that standardization does not have that impact on valuable resources.79 Percent of the respondents also agreed that standardization as a variety reduction component improves the organization's operational flexibility, as 11Percent were undecided and 10Percent disagreed that standardization improves operational flexibility.

Regression Analysis

Regression analysis was done in order to measure the ability of the independent variable(s) to predict an outcome in the dependent variable where there is a linear relationship between them. ANOVA was used so as to test the hypotheses of the of the regression model that there is no significant relationship between the variety reduction elements and Effective material control at Agri-Seed company.

Regression Analysis for Standardization and Effectiveness of Material control

The first hypothesis of the study was that the nature of the Standardization does not have a significant contribution on Effective material control at Agri-Seed Company. This hypothesis was tested through regression analysis between Standardization and effectiveness of material control. The results of simple regression analysis for Standardization and Effective material control at Agri-Seed Company were done and the model summary was presented in Table 4.6

Table 4.6: Regression Analysis for Standardization and effective material control

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	-.647[a]	.332	.410	.15798

a. Predictors: (Constant), Standardization

b. Dependent Variable: Effective material control at Agri-Seed company

The results in Table 4.6 indicated that there was relationship between Standardization and Effective material control at Agri-Seed Company in which R^2 was 0.332 implying that 33.2percent of Effective material control at Agri-Seed Company was explained by Standardization. This shows that an increase in Standardization by one unit causes a decrease in Effective material control at Agri-Seed Company by 0.332. The adjusted R square of 0.41 means the Standardization without the constant explains 41percent variation in Effective material control at Agri-Seed Company. The remaining 59percent variation in Effective material control at Agri-Seed Company is explained by other variables which are not in this model.

Table 4.7: ANOVA Test for Standardization and Effective Material control

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	421.176	1	509.762	20.900242	.000[b]
	Residual	5.7	49	.041		
	Total	427.876	50			

a. Dependent Variable: Effective material control at Agri-Seed company

b. Predictors: (Constant), Standardization

The results for Analysis of Variance for Standardization with Effective material control at Agri-Seed company is shown in Table 4.7 in which computed F-Statistics value was 20.900242 which is greater than the critical value of 3.32 and p value was 0.000 which was less than 0.05 meaning that the relationship between Standardization and Effective material control at Agri-Seed company was significant. Thus the null hypothesis was rejected and concluded that the nature of the Standardization does have a significant contribution on Effective material control at Agri-Seed Company in Kenya.

Table 4.8: Beta Coefficients of Standardization and effective material control

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	18.4	.030		1215.09	.000
	Standardization	-1.411	.007	.647	-146.4	.000

a. Dependent Variable: Effective material control at Agri-Seed company

Table 4.8 shows beta coefficient summary in which the t-values are 1215.09 and -195.14 with p-values being 0.000 which are less than 0.05 hence the model was statistically significant. The model was defined as $Y = 30.4\text{-}1.411X_1$, indicating that every unit increase in Standardization leads to 1.411 decrease of Effective material control at Agri-Seed company in Kenya. This implies that Standardization negatively affects Effective material control at Agri-Seed Company in Kenya.

Table 4.9: Summary of Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.698[a]	.612	.426	.38493

a. Predictors: (Constant), Standardization, Simplification, Specification, Rationalization

b. Dependent Variable: Effectiveness of Material control

The results in Table 4.9 clearly indicate that there is a relationship between Standardization, Simplification, Specification, Rationalization and Effective material control at Agri-Seed Company in Kenya in which the *R* value represents the simple correlation and is 0.698 which indicates a high degree of correlation. The coefficient of determination (R^2) was 0.612 which implies how much of the total variation in the dependent variable (Effective material control) was explained by the independent variables (Standardization, Simplification, Specification, and Rationalization). In this case, 61.2percentcan be explained, which is very large. This also means there could be other factors which still explain Effective material control at Agri-Seed Company which accounts for 42.6 percent. The model summary shows that on the overall Standardization, Simplification, Specification and Rationalization have a significant influence on the Effective material control at Agri-Seed Company in Kenya.

Table 4.10: ANOVA Test for all variables

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.301	4	1.757	12.301	.000[b]
	Residual	11.261	46	.148		
	Total	25.121	49			

a. Dependent Variable: Effective material control at Agri-Seed Company

b. Predictors: (Constant), Standardization, Simplification, Specification, Rationalization

The ANOVA analysis results in Table 4.10 show that the model of effective material control at Agri-Seed company in Kenya and Standardization, Simplification, Specification and Rationalization was statistically significant with computed F-statistic of 12.301 which is greater than the critical value of 2.5 and p-value of 0.000 which was less than 0.05 ($p < 0.05$). Therefore, the overall regression model resulted in a statistically good prediction of Effective material control at Agri-Seed Company.

Hypothesis Testing

Hypothesis One

$H0_1$: There is no association between standardization and effective materials control in Agri-Seed Company, X_1 standardization (β= -0.417) was found to be negatively related Standardization and Effective material control at Agri-Seed Company. From the t- value was found to be -1.786 and p – value 0.110 statistically this null hypothesis was accepted Thus, the study did not accept the alternative hypothesis and it concluded that there is no association between standardization and effective materials control in Agri-Seed Company. This implies that standardization is not a determinant of effective materials control at Agri-seed with a unit increase in standardization, results in -0.417decreasein effective material control other factors held constant.

5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter includes summary of finding of the study, conclusion and recommendations. The responses were based on the objective of the study which sought to analyse the effects of Variety reduction on effective materials control in Agri-Seed Company, Nairobi branch.

Summary of the finding

Effects of standardization on effective materials control in Seeds Company.

Standardization at Agri-Seed Company has limited contribution to the company realizing reduction of cost associated with managing the inventories, and also the ability of the company to be responsive, offering a steady environment for quality improvement, simplifying supply chain processes, operations and allowing for the freeing of valuable resource to focus on value adding activities that improve the operations and quality of products and services.

Conclusion

Based on the findings, the study concluded as follows;

Standardization and Effective material control.

Standardization does not have significant influence on effective materials controlin Agri-seed Company. It was therefore not possible to infer that standardization has an impact on cost reduction, or having of steady quality improvement programmes, responsiveness to customer requirements and therefore leads to reduction of their overhead costs and subsidies. This indicated as well that the respondents were not optimistic about standardization and how it influences material control.

Recommendations

Recommendations made in this section were derived from the conclusions about the study findings as presented in the previous section and focus on the direct interventions. The following recommendations were therefore made based on the findings and the conclusions of the study:

There is need for further standardization by streamlining and aligning the company's demand and other aspects such as the competitor's actions and price index; material situation through the determination of economic order quantity (EOQ), re-order level and minimum-maximum stock levels so as to be in a position to organise and operate inventory on an integrated basis. This is important for visibility in material forecasting, planning, material control, scrap control and disposal; providing management information regarding purchases and inventories within the framework of the financial policies.

Areas for further research

The study focused on effect of variety reduction on effective material control in Seeds. The study was not able to explain conclusively the items included in the standardization and simplification aspects. Therefore the study recommends further research into an evaluation the effects of variety reduction, and specifically how each aspect influences on effective material control. Furthermore, to the supply chain as a whole. The study also suggests that further studies should be conducted on the influence of variety reduction inventory management techniques on performance of other firms that are not agricultural based companies using a larger sample size.

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