

Factors Affecting Implementation of Lean Purchasing In Controlling Inventory Storage Costs of Supermarket Services At Kitale, Kenya

Antony Charles Ambia & Proff. Gregory Simuyu Namusonge.

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Abstract: *The purpose of this research study is to determine those obstacles Supermarkets and especially those within Kitale town encounter when adopting a method of purchasing stock that aims at reducing the storage duration of the stock held and as a result minimizing inventory holding costs. The objectives of this research study is to determine how, when Supermarket service firms are looking to reduce costs, a great many times they ignore the inventory sitting in their warehouses and the cost of carrying that inventory. It is important for Supermarket businesses to carefully examine all the incremental costs of carrying inventory and determine where they can make changes to reduce that cost. The research design considered is the descriptive design as the best suited. Descriptive research designs especially survey research technique, helps to provide answers to the questions of who, what, when, where, and how this is associated with a particular research problem; a descriptive study cannot conclusively ascertain answers to why. Therefore the research study considers the use of empirical research design to provide answers as to why, especially from the secondary data collected. Descriptive research is used to obtain primary data concerning the current status of the phenomena and to describe "what exists" with respect to variables or conditions in a situation. The target population is the Supermarket service firms in Kitale town. The sampling technique used is the simple random sampling, the sample size consists of supermarkets' purchasing and finance departments, while the research instruments considered for collecting primary data are the questionnaire and interviews. Data collection is done mainly from purchasing staff in the retail outlets, while data processing is done by use of factor analysis, with the analysis of findings to be done through statistical analysis. The research findings observed that JIT purchasing practices potentially affected Supermarket service quality on multiple aspects; first, the use of a small number of inventory suppliers and the maintenance of a long-term relationship with Supermarket retailers increased supplier loyalty, which leads to suppliers' willingness to invest time and resources to not only guarantee but also improve quality. Second, the readiness to assist suppliers on various fronts provided suppliers with incentives to pursue continuous inventory and purchasing service quality improvement. Third intense exchange of information on quality assured that both suppliers and Supermarket retailers are informed of occurring problems and may even organize a joint effort to solve them. Finally, supplier - Supermarket retailer cooperation ensured that suppliers are fully aware of buyers' inventory quality requirements and the Supermarket retailers are familiar with suppliers' capabilities to meet these requirements in advance. The research recommendations included; Inventory quality; depletion of inventory through a more efficient merchandizing process and physical handling is reduced. Inventory purchasing staff; they should be trained on how to manage inventory replenishment practices in their duties. Purchasing processes; this should have procedures that are in favour with lean concepts and improve the inventory merchandizing process. Inventory merchandizing process; there should be a flexible and simple schedule to move inventory from the supplier to the supermarket shelves. Inventory arrangements; the arrangements of shipping inventory from one location of storage to supermarket shopping aisles should correspond to the Just in time concept in order to lean the transfer of inventory from the supplier to the Supermarket.*

I. Introduction

Supermarket retail service refers to the sale of goods and services from business firms through self selection aisles to the end-user. Supermarket retailers are part of an integrated system called the supply chain. A Supermarket purchases inventory products in large quantities from manufacturers directly or through a wholesale supplier, and then sells through shelf self selection in smaller quantities to the consumer for a profit. Supermarket retail services have struggled to utilize the concept of Inventory Proportionality as a technique which adopts demand-driven inventory management. The primary optimal outcome is to have the same number of days' (or hours') worth of inventory on hand across all products so that the time of running out of all

inventory products would be simultaneous. JIT purchasing draws special attention due to the important role of the purchasing function in a firm and the fact that many practices of JIT occur within this particular function (Vinod and Anh, 2005). In such a case, there is no "excess inventory," that is, inventory that would be surplus or left over of another product when the first product runs out. Excess inventory is sub-optimal because the money spent to obtain it could have been utilized better elsewhere, that is, to the product stock outs. The goal of inventory proportionality is inventory minimization. The technique of inventory proportionality is appropriate for inventories differentiated by the "trigger point" systems where product is reordered when it hits a certain level. For most Supermarket retailers, inventory is the largest expense item on most every Supermarket retail service firm's Income Statement. In this research, lean purchasing consists of four components which are the plan, the source, the inventory and the delivery: First the plan refers to the over-all strategy of how lean purchasing can be practiced. Second the source refers to those suppliers who'll provide the inventory and services necessary to run the Supermarket retail business. Third the inventory type variety required by the Supermarket retail services sector, whether it can be acquired through lean techniques. Fourth the delivery, which refers to the system for issuing orders to suppliers, developing a network of warehouses and getting the inventory to the Supermarket firms. The significance of inventory purchasing and storage costs can relate well to the Kraljic portfolio model, which is able to analyze the purchasing portfolio of the Supermarket retail service firm. The Kraljic framework is based on two dimensions for classifying a firm's purchased materials or components. First dimension, Profit Impact: "The strategic importance of purchasing in terms of the value added by the stock items, the percentage of inventory in total costs and their impact on profitability". Second dimension, Supply Risk: "The complexity of the supply market gauged by supply scarcity, pace of technology and/or inventory substitution, entry barriers, and logistics cost or complexity, and monopoly or oligopoly conditions". The Kraljic model distinguishes between the following four product categories: First, Leverage Items; - which are products that represent a high percentage of the profit of the Supermarket retail firms and there are many suppliers available. It is easy to switch supplier. The quality is standardized. Buyer-seller power situation: Supermarket retail firms dominate moderate level of interdependency. Second, Strategic Items; - these products are crucial for the Supermarket retail firms. They are characterized by a high supply risk caused by scarcity or difficult delivery. Buyer-seller power situation: balanced power, high level of interdependency. Third, Non-critical Items; - the products are easy to buy and also have a relative low impact on the financial results. The quality is standardized. Buyer-seller power situation: balanced power, low level of interdependency. Fourth, Bottleneck Items; - these are products that that can only be acquired from one supplier or their delivery is otherwise unreliable and have a relative low impact on the financial results. Buyer-seller power situation: supplier dominated moderate level of interdependency. The usage of the Kraljic portfolio model is to; analyze the Supermarket purchasing inventory portfolio and focus the purchasing departments to spend their time on those stock items that matters most so that with this approach; inventory purchase and storage is guided by not only stock turnover rate and sales, but also availability of warehouse inventory storage space and costs. The research study also considers the Kraljic matrix as a means of selecting the priority of purchasing different inventory items through lean purchasing, but will also provide additional knowledge on the factors preventing successful implementation of lean purchasing when controlling inventory holding costs in the Supermarket retail services sector within Kitale town.

Problem Statement

External resources to a business are managed through purchasing. Purchasing is the business management process that "deals with the management of those external resources brought into an organization to support its activities" (Kidd, 2012). It ensures that the external resources that an organization needs or may need to fulfill its strategic objectives are identified, sourced, accessed and managed. It exists to explore supply market opportunities and to implement strategies to deliver the best possible supply management outcome to the organization, its stakeholders and customers. With an increasing concern on product quality in today's highly competitive environment, a business can gain competitive advantage by utilizing the purchasing department's knowledge of supplier networks. Russill (2011) describes the suppliers of external resources as being critical to an organization's business success but difficult to manage because they sit outside of the business. The purchasing organization is therefore reliant on a resource that might have a different culture and priorities and that may resent the customer's intrusion into its activities (Russill, 2011). It is purchasing that provides the skills and systems that enable us to manage and motivate those external resources. Supermarket services hold inventory because this enables the firm maintain stock during the time linking the supply and demand of inventory; the time lags presented in the supply chain, from supplier, to the user at every stage, require that the retailer maintain certain amounts of inventory used in this lead time. Likewise uncertainty as to how inventory would flow into and out of the retail service firm through acquisition and sale of stock, inventories are maintained as buffers to meet uncertainties in demand, supply and movements of goods in retail firms, this avoids stock outs. Every Supermarket retail service firm has the challenge of matching its inventory supply

volume to customer demand. How well the retail firm manages this challenge has a major impact on its profitability. Supermarket retailers attribute the typical cost of carrying inventory is at least 30.0 percent of the inventory value. Also, the amount of inventory held has a major impact on available cash. When working capital is a premium, it's important for Supermarket retailers to keep inventory levels as low possible and to sell inventory as quickly as possible. Studies have shown a 77 per cent correlation between overall Supermarket retailing profitability and inventory turns. The challenge of managing inventory is increased by the "Long Tail" phenomenon which is a cause of greater percentage of total sales for many retail firms that come from large number of products with low sales frequency. Shorter and more frequent product cycles are required to meet the needs of more sophisticated markets by creating the need to manage supply chains that contain more inventory products. At the same time, planning frequencies and time-buckets are moving from monthly/weekly to daily and the number of managed stocking locations from dozens in distribution centers to hundreds or thousands at the points of sale (POS). This leads to a large number of time series with a high level of demand volatility. This explains one of the main challenges in managing modern supply chains, the so-called "bullwhip effect", which so often causes small changes in actual consumer demand to cause a much larger change in perceived inventory demand, which in turn can mislead Supermarket retail traders to make bigger changes in inventory orders purchased than are really necessary. This research involves identifying those factors affecting the implementation lean purchasing within Supermarkets when controlling and minimizing inventory storage costs also known as inventory holding costs, or inventory carrying costs. McGuire (2013) argues that value-for-money, when narrowly focused, goes only part way to measuring procurement's contribution to organizational success.

Research objectives

The general objective is to establish the factors affecting the application of lean purchasing when sourcing, ordering, acquiring and replenishment of inventory in Supermarket service firms within Kitale, Kenya.

Specific Objectives:

1. Identify the inventory storage costs incurred by supermarket service firms and the effect these costs have on their financial performance.
2. Determine how Supermarket service firms adopt the use of information communication technology computer applications when replenishing its inventory.
3. Determine how inventory merchandising becomes part of implementing lean purchasing to control inventory storage costs.
4. Determine the role of inventory suppliers' lead time in the implementation of lean purchasing.

Theoretical framework

P&SCM research is underpinned by a very diverse disciplinary base. Consequently, this area of research is also marked by the use of many different theories and associated models and conceptual frameworks. In an extensive review of organizational buying behavior research, Johnston and Lewin (2008), identify the use of several sociologically grounded decision-making process models and frameworks. Buvik (2007) identifies the use of theoretical perspectives drawing on sociology (organizational decision-making theory, resource dependency theory) and economics (agency theory, transaction cost analysis, game theory). Burgess et al. (2008) similarly identify the use of theories from sociology (inter organizational networks and organizational learning) and economics (transaction cost and agency theory), and they add theory drawn from strategic management (resource-based view of firm). The following three models provide the theory of this research and are discussed in relation to the research topic:

[a]. Organizational decision making theory

The organizational buying behavior literature focuses primarily on what is called the pre contract or the demand management phase of the inventory purchasing process. Implications of organizational buying behavior literature for P & SCM practice (March & Simon, 2008). Purchasing decisions differ in terms of the level of risk that they pose for the organization. Purchasing establishes and maintains the supplier base, seeing to it that adequate capacity and quality are available and that the level of service and price are optimal. To accomplish this requires purchasing to develop the inventory suppliers. Suppliers needed are those who are dependent upon a company's success and are willing to work closely with the firm. According to Gunasekaran (2009) JIT purchasing concept attempts to reduce replenishment lead time by utilizing suppliers located close to the buying firm and by ordering small quantities, which in turn reduces a supplier's workload per period. The most important aspects of the JIT purchasing concept focus on new ways of dealing with suppliers and a clear-cut recognition of the appropriate purchasing role in the development of corporate strategy. Suppliers should be viewed as "outside partners" who can contribute to the long-run welfare of the buying firm rather than as outside adversaries. The major actions focus on attempts to reduce the inventory ordering cost and

replenishment lead time values. By viewing organizational buying behavior as a multi actor, multi agenda process, this literature conceptualizes purchasing/buying decisions as being a potential locus of intra organizational politics. This, in turn, highlights the possibility for power to be used to resolve conflicts of interest, as explained by Smeltzer & Goel (2005). Deciding what to buy, drawing up a specification, choosing a shortlist of potential suppliers, assessing the bids submitted and selecting a supplier are seen as intensely political rather than purely technical decisions. The literature also acknowledges, though, that decision-making conflicts can be resolved without the use of power, through problem-solving and persuasion (Sheth, 2003). This literature has its roots in the seminal texts on industrial buying and marketing by Robinson et al. (2008), Webster (2010) and Wind (2010) and Sheth (2011). A core idea common to these early models is that organizational buying behavior should be treated as a process, in which there are a number of phases or stages representing a sequence of purchasing activities. Robinson et al. (2008) encapsulated this in their 'buy-grid framework', which presents a number of what they termed 'buy-phases'. All of these early models also suggest that there are contextual factors at three levels influencing the nature of buying decisions as Johnston & Whang (2002) identified.

At the first level there are environmental or situational factors, for example suppliers, competitors, technology, regulation, politics and culture. Second, there are organizational factors such as the buying organization's size, structure, orientation, technology, reward systems and goals. Third, there are factors associated with the characteristics of different types of purchase or what Robinson et al. (2008) call 'buy-classes', such as product type, purchase novelty, purchase complexity and time pressure. Finally, all three models posit a number of variables or dimensions that are used to characterize the actors involved in organizational buying decisions, the ways in which they are expected to behave and the decision-making criteria they are expected to use. Tanner (2010) suggests that these early researchers are thus exploring three different questions: who participates, what happens and what causes or influences a specific inventory purchase decision? The core concept drawing all of these strands together to explain variation in organizational buying behavior is the level of risk associated with a given procurement situation. Risk is seen as a function of purchase importance, complexity, uncertainty and time pressure, and the key antecedents of these variables are primarily found in the contextual factors discussed above: environmental, organizational and purchase characteristics. Concerning the relationship between procurement risk and organizational buying behavior, it is argued that, as the risk associated with a buying decision increases, the group of actors involved in making the decision, known in this literature as the buying centre, will become larger and more complex. In other words, more people will be involved in high-risk buying decisions and they will be drawn from a wider range of departments or organizational subunits with different preferences and agendas. The participants involved in a high-risk buying decision will also typically be more highly qualified and experienced, and will be motivated to commit greater attention throughout each stage of the procurement process.

[b]. Transaction cost economics theory

In SCM context, TCE aims to reduce the costs associated with carrying out a transaction when deciding whether to make-or-buy. TCE is concerned more with issues of buyer-supplier interaction, focusing on the question of how to organize business transactions most efficiently (Williamson, 2009). According to Williamson (2009) there are three attributes which influence a firm's decision to make or buy: frequency of transaction, inventory specificity and degree of uncertainty associated with a transaction. In general TCE theory argues that different control and governance mechanisms should be employed to mitigate the risk of opportunistic behavior of supply chain firms when outsourcing. The use of information technology (IT) has facilitated the reduction of transaction costs of inventory purchasing, which has been extensively documented in the literature (Bakker et al., 2008). For example, electronic market places, facilitated through IT, reduce the cost of searching for obtaining information about inventory offerings and prices (Bakker et al., 2008). Also, collaboration facilitated by information sharing can lower transaction costs (in particular purchasing and coordination costs) as companies can thereby reduce supply chain uncertainty and thus the cost of contracting. This can be explained with this example: If a supplier is unable to accurately predict the price of its product inputs, it will be reluctant to enter into a contract, which locks it into a fixed price for an extended period of time (Arrowsmith, 2002). Koufteros (1999) explains that uncertainty in the context of supply chains and more specifically in inventory retailing is caused by supply uncertainty, demand uncertainty, new product development uncertainty, and technology uncertainty. Supply uncertainty relates to unpredictable events that occur in the upstream part of the supply chain. Among the causes to supply uncertainty are shortages of materials and late deliveries. Clearly, supply uncertainty can disrupt purchasing and have an adverse affect on sales, where distributors and retailers down the chain are also affected. Demand uncertainty can be defined as unpredictable events that occur in the downstream part of the supply chain (Koufteros, 1999). Demand uncertainty (or demand risk) can result from seasonality, volatility of fads, new product adoptions, or short product life cycles (PLCs) (Johnston, 2005). Furthermore, Choi & Krause (2005) identify three sources for the

uncertainty of demand arising. The concept of uncertainty is central to TCE, which assumes that individuals have bounded rationality and act opportunistically. Approaching the concept of uncertainty from the transaction cost economics (TCE) point of view might provide further insight into the value of information sharing between organizations. The presence of demand uncertainty and the lack of information sharing in the supply chain can lead to a problem known as the bullwhip effect: the amplification of demand variability as orders move up the supply chain indicated by Featherman and Pavlov (2003). Johnson and Whang (2002) provide evidence for this finding from the food industry, whereas Nagle et al. (2006) report on the bullwhip effect in the automotive sector. There are four sources of the bullwhip effect: The bullwhip effect can be alleviated through sharing demand information in the supply chain, which reduces information asymmetry and uncertainty (Lee et al., 2003). Thus, limiting uncertainty through information sharing can in turn reduce companies' internal risk as companies' can optimize inventory, purchasing, and capacity planning. Nevertheless, uncertainty as a factor might affect companies' incentives to share information. This also agrees with contingency theory (Larsson et al., 2008), which states that the amount of uncertainty and rate of change in an environment affects the development of internal features in organizations. Hold-up is an opportunistic behavior, discussed using a TCE in particular explains Williamson (2009). This refers to a situation where a supplier is able to cease (hold up) delivery of a good or service until the buyer agrees to a deal more favorable to the supplier.

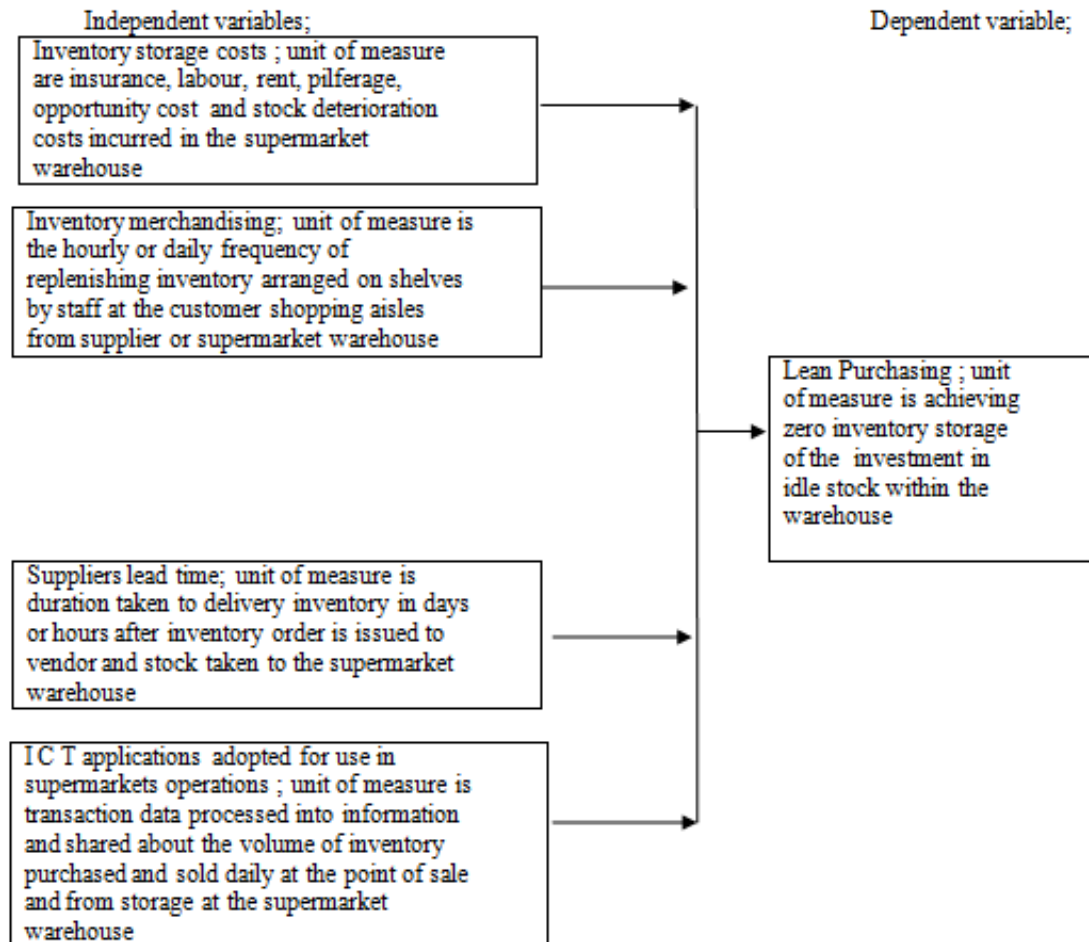
[c]. Network perspective theory

Network Theory argues that firms rely not only on their relationship with direct partners but with the extended network of relationships with supply chain firms. It argues that competitive advantage can only be achieved through efficiently and effectively orchestrated supply chains. Therefore the focus of the NT is to develop long-term, trust based relationship between supply chain firms (Oliver, 2003). Implications of inter organizational relationships literature for P&SCM practice. It is important to see individual buyer-supplier relationships as part of and interacting with a wider network of relationships. NT is adopted through innovative purchasing approaches, for instance electronic procurement strategy as conceptualized which does not represent a radical departure from the traditional concept of purchasing strategy; the only difference is that internet based technologies are used as tools to carry out the firms purchasing and corresponding corporate strategies, explains William et al. (2006). Brun et al. (2004) identified a number of strategic objectives of the purchasing function which include; continuous quality management, total cost management, time based competition, technology access and control, and risk reduction. Emiliani (2000) explains more that they included driving the lowest possible purchase price, identifying sources of high quality products/services, simplifying the purchasing and supply management processes and reducing transaction costs "Beyond the e-auction hype" metals, computer equipment, measuring and analyzing instruments, and electrical equipment (Zairi & Al-Mashari, 2005). Where E-procurement is the usage of online technology to assist with the procurement function. It is considered an operational imperative in today's competitive environment, it is also a growth area and one of the key issues purchasing and supply executives need to face now and in the near future explains Davila & Palmer (2003). Although forecasts on the use of e-procurement have been downgraded with the burst of the internet bubble in 2001 (Davila, 2003), statistic still show an increased growth in the use of e-procurement, for example a recent survey indicated that e-procurement of direct goods is now exceeding that of indirect goods (Bartels, 2004). Reason for the continued growth in e-procurement use is due to the significant benefits both supplier and buyer organizations achieve through its use. Benefits include; lower transaction costs, lower purchase staffing requirements, shorter procurement cycles, reduced inventory levels, higher degree of transparency and increased communication between supplier and buyer organizations (Davila et al., 2003). Yet, for all the benefits outlined there are many organizations that are taking a 'wait and see' approach to the implementation of e-procurement technologies (Davila et al., 2003). According to Bielefeld (2006) electronic procurement is the business-to-business purchase and sale of supplies and services through the internet, as well as other information and networking systems, such as EDI and ERP. E-procurement lacks an overarching definition and encompasses a wide range of business activities. For example, Choi & Rungtusanatham (2001) state that e-procurement remains a first generation concept aimed at buyers, which should progress into e-sourcing and ultimately into e-collaboration. E-collaboration allows customers and suppliers to increase coordination through the internet in terms of inventory management, demand management and production planning (Lee, 2003). This facilitates the so-called frictionless procurement paradigm (Brousseau, 2000). Despite the fact that business-to-business (B2B) trade has enjoyed a quieter existence online than business-to-consumer (B2C) according to Barratt & Rosdahl (2002) the benefits of e-procurement in a B2B setting are significant. Min & Galle (2002) explain that indeed it has been claimed that e-procurement has become the catalyst that allows companies to finally integrate their supply chains from end-to-end, from supplier to the end user, with shared pricing, availability and performance data that allows buyers and suppliers to work to optimum and mutually beneficial prices and schedules (Morris et al., 2000). Usually companies adopt e-procurement systems to manage the purchase of low critical products and a service explains Min & Galle (2002).

Conceptual Framework

According to Mathieson (2001), a conceptual framework is a virtual or written product, one that explains, either graphically or in narrative form, the main things to be studied- the key factors, concepts, or variables and the presumed relationships among them. This study will adopt a conceptual framework that illustrates the relationship between the two main variables.

The Conceptual Framework is presented on the diagram below:



II. Research Method

The research methodology mainly includes the research design selected for this research study. This elaborates the overall strategy chosen to integrate the different components of this study in a coherent and logical way, thereby, ensuring that the research problem is effectively address; it constitutes the blueprint for the collection, measurement, and analysis of data related to the independent and dependent variable, which were lean purchasing and inventory holding costs respectively. This research study considers two research design types; the empirical design to collect secondary data, while the Descriptive design and the survey method to collect primary data. These are best suited research methodology, which determines; the sample design, data collection methods and data analysis.

Research Design: The research design is a master plan that specifies the methods and procedures for collecting and analyzing needed information. A research design provides a framework or plan of action for the research. Objectives of the study determined during the early stages of research are included in the design to ensure that the information collected is appropriate for solving the problem. The sources of information are determined, the design technique, the sampling methodology and the schedule as well as cost of the research.

The goal of empirical research is to gather secondary data and information from written sources such daily newspapers like the Daily Nation, retailer business magazines and other academic research journals on similar topic; the factors affecting implementing lean purchasing as a method to control inventory holding costs within the target population. These secondary data included; suppliers’ lead time, inventory carrying costs and the existence of inventory management computer software applications.

Descriptive research designs help to collect primary data which assists to provide answers to the questions of who, what, when, where, and how associated with the research problem; however it is observed that a descriptive study cannot conclusively ascertain answers to why, and hence the need for empirical research study to make conclusive remarks. Descriptive and survey research designs are used to obtain data and information concerning the current status of the independent and dependent variables, and to describe "what existed" with respect to variables or conditions in the Supermarket retail service industry within Kitale town.

Most of the empirical studies focusing on the impact of lean implementation on operational performance are constrained to one or two facets of lean, often JIT or TQM. Improved operational performance associated with JIT practices (Koufteros et al., 2011) has been shown to outweigh the results associated with TQM practices (Samson and Terziovski, 2010; Powell, 2008). In a study of JIT and TQM, Flynn et al. (2011) found incremental performance effects attributed to JIT and infrastructural practices common to both JIT and TQM, but not specific TQM practices. In case of TQM practices by themselves, while Choi and Eboch (2013), and Samson and Terziovski (2010) found a significant direct impact of TQM practices on operational performance, Adam (2012) and Powell (2008) found little impact of TQM practices on operational and other measures of performance. Powell (2008) found positive support for only 3 out of 12 TQM practices that he studied.

The target population considered for this survey study is the purchasing departments of the Supermarket retail service firms within Kitale town. The research study relied on sampling techniques because some objects within the population have a common, binding characteristic or trait. The subjects of the survey are the Supermarket retail purchasing and finance managers because these high-ranking respondents would possess the type of information required for this study.

Sampling frame: Before a sample unit is taken, members of the study population, the Supermarket retail service firms, are identified by constructing and including them in a list called a sampling frame. Each member of sampling frame becomes a sampling unit. A sampling frame is the source material or device from which a sample is drawn. According to Orotho (2003) a sampling frame is a list of all those within population who can be sampled. The sampling fraction or the ratio of sample size to study population size was decided at 35% of the total population of Supermarket retail outlets in Kitale town. The sampling units consist of the finance and purchasing staff of the Supermarket retail service firms selected as the sampling units. Determining the sample size to be selected is an important step in this research study. The choosing of Supermarket retail service firm sample size units depend on non-statistical considerations and statistical considerations. The non-statistical considerations include availability of resources, manpower, budget, ethics and sampling frame. The statistical considerations include the desired precision of the estimate of prevalence and the expected prevalence.

Sample and sampling technique: According to Mugenda and Mugenda (1999) at least 30% of the cases per group are required for the research. In this study Supermarket firm sample unit was a subset of the whole population of Supermarket service firms within Kitale town. The sample unit refers to a representative of the target population being the Supermarket retail service firms, from which it is drawn and it has a good size to warrant statistical analysis from the primary inventory data to be collected.

Sampling Technique: Any member or object of the defined Supermarket retail service firms could be included in the sample. A theoretical list of Supermarket retail service elements that make up the population is the sampling frame. The sampling procedure that the researches study considered; is the simple random sample which is a form of non probabilistic sampling. In this method, all subject, members or elements had an equal probability of being selected. The research study prefers the simple random sample which is used as a basis of selecting which Supermarket retail service firm would provide the respondents and a source of primary data.

Data collection procedure: Whilst there are slightly different variations according to the design, the methodology is divided into a few sections; identify the instruments of data collection materials such as questionnaires and equipment used for interview with respondents in this research mainly to record primary data. Explaining how the samples units mainly the Supermarket retail service firms in Kitale town were selected, by the use of randomization techniques useful when selecting sample units of this type. Explaining how the measurements are determined when considering the roles of different types of lean purchasing techniques as a measure of controlling inventory holding costs, in the selected Supermarket retail service firms, and how these measurements are decided, made and what quantitative calculations were performed upon the raw data collected from survey methods of primary data collection.

III. Discussion Of Research Findings

Data collected from the different questionnaires received from respondents formed part of the descriptive research design, this was both qualitative and quantitative. The qualitative data, such as actual purchasing staff performance, was not computable by arithmetic relations. These are labels that advised in which category or class an individual, object, or process fall. They are called categorical variables. Quantitative

data sets consist of measures that take numerical values for which descriptions such as means and standard deviations are meaningful. They can be put into an order and further divided into two groups: discrete data or continuous data. Discrete data are countable data, for example, the number of inventory items ordered from a supplier. Continuous data, when the parameters (variables) are measurable, are expressed on a continuous scale. For example, suppliers lead time. The first activity in statistical data analysis is to measure or count. Measurement/counting theory is concerned with the connection between data and reality. A set of data is a representation that is, a model of the reality based on a numerical and measurable scales. From the questionnaire the following table was compiled;

Table of Benefits of the application of lean purchasing to Supermarket services

Respondents	Respt 1.	Respt. 2.	Respt.3.
Decrease in inventory duration	99	80	80
Minimum supplier lead time	90	90	95
Reduction of inventory storage costs	70	90	60
Better purchasing staff performance	100	85	90
Improved inventory merchandising		10	50
Use of ICT in inventory replenishment		95	60
Improved profitability		95	80
Better supplier relationships		80	90

The research study considered structural equation modeling techniques used to study relations among variables. The relations are typically assumed to be linear. There was a need to determine the possibility of a linear relationship between an independent variable and one or more dependent variables, the statistical technique used was the linear regression. When determining the regression line mathematically a method is used to find the values of the constants a and b in the equation (linear equation);

$Y = a + bX$, and this is done with the least squares method, as the line obtained is that which minimizes the sum of the squares of the vertical deviations of the points from the line. The equation of the least squares line is: $\hat{Y} = a + bX$ where the symbol \hat{Y} is used to indicate the predicted rather than the actual value of Y. The values of the gradient 'b' and the intercept 'a' can be calculated from the least squares method formulas; 'b' and 'a' are termed the regression coefficients (and b also represents the gradient). The expression for the regression line in this case was calculated with formula of least squares method for finding 'a' and 'b' of the expression $Y = a + bX$ as shown.

Values used to calculate the regression line using the least squares method obtained from the table showing the benefits of lean purchasing to supermarket service firms

X	Y	X ²	Y ²	XY
90	70	9100	4900	6300
90	90	8100	8100	8100
95	60	9025	3600	5700
Totals 275	220	25225	16600	20100

The regression line expression now becomes; $\hat{Y} = 1841 + (- 200) X$

Where; X represents the independent variable, inventory storage costs which were recorded on the questionnaire. Y; represents the dependent variable, lean purchasing which is indicated by minimum supplier lead time or JITP.

While, a = 1841 is the intercept (when X = 0 this assumes that the supplier lead time is instantaneous with the inventory purchase order issued or that inventory is delivered immediately an order is issued. Then the inventory storage costs are at minimum because it's possible to have zero inventory storage).

Also; b = - 200 is the slope or gradient of the linear expression (X against Y axis) and this is a negative gradient which indicates that as inventory storage costs positively increase, then the supplier leadtime (JITP) becomes less implementable. Whereby (vis-à-vis) if supplier lead time decreases beyond zero (X = 0, 1, ..., n) then the need for inventory storage and warehousing reduces by the supermarket and thereby minimizing the inventory storage costs.

The linear regression expression was calculated with the values of the table above. The regression line and the expression which were determined, represent the regression of Y on X, the regression of Y on X, denoting the variable that is being influenced as Y (the dependent variable/lean purchasing as indicated by minimum supplier lead time for JITP) and the variable that is doing the influencing as X (the independent variable/inventory storage costs). The method used is that which graphically puts Y on the vertical axis and X on the horizontal axis. The degree of correlation between two variables is a good guide to the likely accuracy of the estimates made from the regression equation. If the correlation is high then the estimates are likely to be reasonably accurate, and if the correlation is low then the estimates will be poor as the unexplained variation is

then high. With the values used to determine the linear regression equation used to calculate with the correlation coefficient formula resulted to; Correlation coefficient (r) = 0.7559

The correlation of 0.7559 shows a strong relationship between minimizing supplier lead times because this assist the implementation of lean purchasing especially as Just in Time Purchasing (JITP), which is the dependent variable, versus reduction in inventory storage costs considered as the independent variable. When there is an increase of the effort to minimize inventory supplier lead time and hence implement the practice of JITP and lean purchasing, the result is that the need for inventory storage is reduced, because the requirement for holding inventory to cater for consumer stock demand uncertainty and possibility of inventory stock out is no longer necessary. Thus decreasing inventory holding costs and this explains the negative correlation coefficient. Correlation for n cases above 0.5 shows a fairly strong relationship.

Research findings according to the research objectives

[a]. Lean purchasing

A lean purchasing process is a major modification of the traditional system of acquiring Supermarket retail organizational needs. The objective of the modifications is to improve the system of inventory purchasing regarding issues about: Long lead time before an inventory is received, inasmuch as long lead times equate to non-value-added costs before a particular transaction or retail activity can be performed. Maintaining the inventory at an optimized level to ensure that all stocks or materials stored or kept on hand are those that meet the immediate needs of the Supermarket service organization and are ready for distribution to customers at a moment's notice is the goal of lean purchasing. The incremental inventory holding costs can thus be minimized by reducing the duration that stock stored in the retail premises by the use of JITP inventory replenishment and lean purchasing. The different procurement and inventory acquisition processes considered for adoption when putting to practice lean purchasing in the Supermarket service firms included the following:

JIT purchasing; agreements define delivery dates or times according to the Supermarket retail service buyer's schedule, as opposed to shipping dates and times based on the supplier's schedule. JIT purchasing emphasizes supplier evaluation based on product quality, delivery performance and price. Under JIT purchasing, achieving product quality through a long-term contract at a fair price receives the highest priority. Furthermore, most importantly, inventory items must be delivered in exact quantities, neither more nor less as per consumer demand.

Economic order quantity (EOQ); the framework used to determine the inventory order quantity is also known as Wilson EOQ Model or Wilson Formula. The model was developed by Ford W. Harris in 1913 but R. H. Wilson, a consultant who applied it extensively, is given credit for his in-depth analysis. Where by; suppose annual inventory requirement quantity (D). Cost per inventory order (K). Cost per inventory unit (c). Inventory carrying cost percentage (h/c) (percentage of c). Annual carrying cost per inventory unit (h). Were by Economic

order quantity $EOQ = \sqrt{\frac{2D * K}{h}}$ or $EOQ = (2DK/h)^{0.5}$. These two formulae show that to minimize the total annual cost of holding inventory in supermarkets requires that ordering of optimal (EOQ) inventory quantity, then total cost becomes proportional to the square root of any of the factors (D, K and h) involved. For example, if K is reduce by a factor of 4 then total cost is reduced by a factor of 2 (EOQ would also change). This is the basis of Just-in-Time (JIT) purchasing as a means of implementing lean purchasing, to reduce (continuously) K and h so as to drive down total inventory holding and operations cost. The supermarket management costs are ignored for the justification that the total cost, does not operate a policy with a very low EOQ (JITP) or a very high EOQ – such that the management costs are effectively fixed for a wide range of EOQ values. If this is so then such costs do not influence the decision as to what inventory order quantity EOQ to adopt.

Electronic purchasing (e-purchasing); this involved the automation of the supermarket inventory purchasing process and extends to the manual buying and selling processes, from the creation of the inventory requisition through to payment of the suppliers. The term e-purchasing encompassed back-office ordering systems that lean purchasing may adopt through the use of e-marketplaces and inventory supplier websites. In the emerging digital era, Supermarket businesses increasingly used electronic systems for more efficient, predictable, transparent and secure management of their inventory management needs. E-purchasing systems provided up-to-date information on the status of the retailers' inventory needs. They allowed the establishment of an agreement with a supplier to automatically ship inventory materials when a retailer's stock reached a low point. This also applied to the solicitation phase where supermarket retailers could track incoming offers prior to supplier selection. Electronic purchasing provided predictability as suppliers knew what to expect and could review a supermarket order's progress, often in real time. Also, the status of the goods could be followed in real time. An inventory product would show as having been delivered, accepted and processed for payment without the supplier having to call and request information from accounting staff. Transparency and accuracy was facilitated, with inventory data exchanged and stored electronically instead of through paper-based documents.

E-purchasing systems require various Supermarket retailer and supplier systems to have the electronic capability to exchange information and electronic documents. This entailed common standards. XML (eXtensible Markup Language) is emerging as the basis of such standards. The XML standard defined the content in communication and in the selection of general trade data format. Development of an e-purchasing system in a retail business environment would enable it to be linked to other partner business systems for interoperability and this simplified its upgrading for the purpose creating information network coordination between for example the retailer and supplier. Because of the legal nature of inventory order and payments, the system must have mechanisms for identifying and authenticating the user who places the order (e-signatures). Lean purchasing therefore can be implemented through Supermarket retail firms that have considered adopting e-purchasing when restocking their inventory requirements.

[b]. Inventory storage costs incurred by supermarket retail service

Once the full costs of holding inventory for a Supermarket retail service firm, have been measured and quantified, those costs could be evaluated and managed. And what became immediately apparent was not just the purchase cost of the inventory that was essential to the business, but also the cost of the inventory storage that was excess, dead stock or underperforming, and the financial drag this inventory had on the retail firm. Reduced unneeded inventory, whether tightened up stocks of frontline, essential inventory, or liquidated dead or under-performing inventory had the benefit of freeing up capital for other uses and reduced costs directly variable with inventory levels, and also provided the opportunity to re-assess both mixed and fixed costs to identify other potential cost savings. Supermarket retail business organizations furnish its inventory needs through an established system of acquiring inventory and services. The costs that are considered so that a retail firm can decide on the amount of stock to hold can mainly be identified as inventory holding costs. These are the incremental carrying costs associated with keeping inventory over time, and include the following: Warehouse rent for unsold inventory storage over long durations. Depreciation of unsold inventory stored for long durations. Labour such as wages and salaries of the staff involved in inventory management. Storage expenses overheads such as heating, lighting, and security of retail warehouse. Money tied up in stored inventory due to loss of interest and opportunity cost. Obsolescence costs when inventory is left stored to the end of its useful product life. Stock deterioration when money is lost if product that deteriorates in quality is held in the store instead of being sold to create room for new inventory. Theft of inventory not sufficiently secured in the supermarket retail service premises. Insurance costs of supermarket retail premises and inventory held within its stores. Adopting use of information technology to monitor and control supermarket stock levels, this will require the development of expensive warehouse inventory management software. Inventory items handling, movement during storage and repackaging to facilitate storage. A stock out occurs when there is insufficient inventory to sale to customers from supermarket retail outlets. Usually stock outs occur in the inventory order lead time, the time between placing an order and the arrival of that order. Given a stock out the order may be lost completely or the supermarket customer may choose to backorder, that is, to be prepared to wait until there is sufficient stock to supply their order. Before inventory holding costs is the stock ordering costs which are associated with placing orders and receiving an order of inventory from the supplier. These costs include the following: Clerical and labour costs of processing inventory orders from suppliers. Inspection and return of poor quality inventory products back to suppliers. Transport costs of inventory from supplier to supermarket retailer. Handling costs of inventory received from different suppliers.

[c]. Information communication technology application in inventory control

Supermarket services firms utilized ICT computer systems applications when implementing the lean purchasing through the involvement of; logistics information systems, shift of inventory distribution from inventory-based logistics (push) to replenishment-based logistics (pull), and inventory demand management information systems. A closer integration between inventory supply and demand enabled a more efficient supermarket services provision system with fewer wastes in terms of unsold inventory. Logistics has thus becomes a fundamental component of efficiency improvements in a supermarket retail industry to ensure faster physical movement of inventory items from the supplier to the retailer. The supply chain bundles together all this by inventory information flow, communication, cooperation, and, by physical distribution between the supplier and supermarket retailer.

[d]. Inventory merchandising

The indicators that shows changes in inventory holding cost of those Supermarket retail firms that adopts the use of lean purchasing, this required the involvement of; merchandizing, information communication technology (ICT), inventory distribution was a shift from inventory-based logistics (push) to replenishment-based logistics (pull). Demand, particularly in the supermarket services sector, was very difficult to anticipate accurately. A closer integration between inventory supply, merchandizing and demand enabled a more efficient

inventory management system with fewer wastes in terms of unsold inventory. Merchandizing has thus become a fundamental component of efficiency improvements in a Supermarket industry to ensure faster physical movement of inventory items from the supplier to the supermarket shopping shelves. The supply chain bundles together all this by inventory information flow, communication, cooperation, and, by physical distribution between the supplier and supermarket retailer. While many supermarket businesses like Khetia Gigamart have their in-house transportation departments, increasingly the complex needs of logistics and merchandizing to deliver inventory needs of supermarket firm are being contracted out to third parties. Depending on the strategy and costs, supermarket service firms can outsource in whole or in part their merchandizing and distribution operations. This involved the following developments: Distribution time and lead time, notably the possibility to set a very specific time schedule for inventory supplies deliveries to supermarket retailers and a low tolerance for delays. The reliability of inventory merchandizing measured in terms of the availability of the ordered inventory and the frequency at which orders are correctly serviced in terms of quantity and time. Lean purchasing with an efficient inventory merchandizing processes aimed to reduce waste, inventory sourcing inefficiencies and improve quality, bringing a whole range of benefits to supermarket businesses of any size, as well as retailers with complex supply chains. These benefits included: First, reduced storage costs; lean purchasing minimized inventory storage costs. Many supermarket businesses found that purchasing only the inventory they need for their current jobs, improved cash flow and minimized the amount of money tied up in stock because most stock items are available on shelves for shopping through merchandizing.

[e]. The supplier lead time

Just-in-time (JIT) purchasing was the purchase of inventory so that they are delivered just as needed for Supermarket retail sales, this required that supplier lead time when inventory is ordered and physically delivered be controlled and minimized substantially. The approach used to reduce supplier lead time included: How far is the supplier to the supermarket, how many distribution centers should they have, where should they be, and what inventory products will they supply through just in time purchasing? How many inventory suppliers should be selected, how large should they be? What inventory variety should they supply, and which supermarket premises should they service? Which products should be delivered by local suppliers and which should be source from distant firms? If sourced from outside inventory supplier firms, which suppliers should be chosen? How much does it cost to improve the inventory supply distribution and merchandising service level? How to meet the requirements inventory demand growth while maintaining JITP techniques? These are the issues that determined how reduced supplier lead time could substantially improve the practice of lean purchasing.

IV. Conclusion

This research study concludes that lean purchasing is a form of managing the purchasing function through use of JIT purchasing, VMI, EOQ, e-purchasing, e-ordering, e-sourcing, and total system approach among other purchasing techniques efforts which minimize the inventory order quantity to match inventory supply and inventory demand to zero deficit and zero storage requirements. Inventory purchasing decisions are often about more than risk mitigation, however. Where there is an interest in the benefits that can flow from P&SCM practice (value appropriation, value-creating innovation, or improved efficiency and responsiveness), then the mechanisms associated with the supplier - buyer relationships are the appropriate focus explains William et al. (2006). Today's supermarket business environment was defined by constant change and increasing competitive pressures. This research observed that as retailers strived to maximize business results through growth and increased sales and profit margins, they faced more demanding customers, new regulations, government control, increased taxation, use of electronic tax register (ETR) machines and the destabilizing effects of technological advancement affecting how business was practiced, were by “it was no longer business as usual”. All of these critical factors have changed the retail landscape significantly and introduced new challenges and generated new requirements for the retailers. Remaining competitive in the retail services industry environment required Information technology investments which increased employee impact on business processes and drive business value, while kept a tight control on costs especially inventory holding costs which formed the core function of retailer firm that was to sale different inventory products. Service orientation strived to help retailers in integrating existing applications and components and to make data available for reuse. Only a few top national enterprise retailers such as Khetia and Nakumart supermarkets have achieved the level of integration that provides them with visibility into the enterprise in real time. One of the common areas where retailers face huge challenges was the availability of the right inventory information, at the right time, and at the right place—for example, making inventory levels information available in near real time to the store managers, regional managers, and merchandising managers in the headquarters. Making

retailer inventory information flow available in near real time required systems that can generate near real-time data, send it to the right places, and consume it in near real time. Service orientation addressed these challenges by centering on rapidly evolving computer software tools such as; XML and Web services standards that are revolutionizing how application program developers composed information systems and integrated them over distributed networks. The emergence of this new methodology has helped to develop new approaches specifically for Web-based distributed computing. This revolution was transforming the retail business by integrating disparate computer software systems to establish a real-time management of inventory through Just in time (JIT) sourcing and replenishment of retail stock to facilitated lean purchasing. Retailers were under relentless pressure to streamline processes, survive shrinking profits, monitor inventory, summon up innovative sales and inventory purchasing programs and share information in real-time across store, channel and system boundaries. Retailers were expected to: Create rich customer experience through their inventory stocks at affordable prices; creating engaging customer experience dealt with how quickly and smoothly an inventory item can be checked out, availability of information for the customer, right products on the right shelf at the right time, and with affordable prices. These issues were dependent on the quality of in-store information system solutions such as in-store warehouse management system. Also, a real-time inventory tracking system will alert the staff to order and/or restock the shelf based on the sales data. Develop a transparent, collaborative, real-time supply chain; this issue was related to the ability of the enterprise retailer to manage inventory and orders in real time to optimize the inventory stock and minimize the out of stock situation, or Just-in-Time (JIT) inventory replenishment. Offer multichannel data management, especially with regard to their call center; as devices proliferated in the stores and broadband availability grows, the gap between different retailing channels narrowed. This was related to providing customers the ability to order a product over the phone or web and pick it up from the store. The experience was seamless to the end customer. Consider price management; this issue was related to the ability of retailers to upload consumer stock price updates seamlessly to all the retail stores. This can include promotional price updates, and new item introductions. Consider point-of-sale (POS) transformation.

This research concluded that the function of lean purchasing as a means of inventory optimization strategy should be derived from the need of maintaining the right inventory order fulfillment and replenishment. Inventory demand conditions are such that it is difficult to meet consumer expectations as either some supermarket retailers will be required to expedite shipments at a high cost or hold high levels of inventory. High levels of storage space requirements for stock adversely affect profitability and as such stocks should be replenished continuously from suppliers. To coordinate demand requests inventory management to utilize the benefit of lean purchasing techniques such as information technology to lower and make inventory ordering more efficient and effective. This real – time information in regard to inventory levels throughout the supply chain assists in lowering the costs of back orders, lost orders and obsolescence. In long-term relationships continuity of the relationship relies on the perception of each party that the relationship itself constitutes an investment. These observations draw attention to the work of writers such as Kraljic and Fisher who offer portfolio models of P&SCM practices. Kraljic suggests that buying organizations should categorize their purchases along two dimensions: the level of supply market complexity and the importance of the purchase. Using these dimensions Kraljic identifies four types of purchase (strategic, leverage, bottleneck and non-critical), and he suggests how each should be managed in terms of the characteristics of the procurement process (i.e. specification, supplier selection criteria, negotiation style, contract design, relationship style).

Adaptations may generally be considered to have a positive impact on the long-term well-being of the relationship. The preparedness of a supplier to take part in various types of adaptations, whether they be technical, knowledge based, economic or legal (Emiliani, 2000) means that he considers it beneficial for the relationship and is committed to its future. However, when adaptations are continually placed upon one party by the other, and decisions about their appropriateness and necessity are unilaterally rather than bilaterally decided, the adapting firm may lose the capability to make its own decisions about the future of the relationship. In so doing it may lose its commitment towards the other firm. Thus investment through adaptations may be felt to be for the benefit of the other firm rather than the relationship itself, and goodwill towards that firm may be lost. One of the common areas where retailers face huge challenges was the availability of the right inventory information, at the right time, and at the right place - for example, making inventory levels information available in near real time to the store managers, regional managers, and merchandising managers in the headquarters. Making Supermarket retailer inventory information flow available in near real time required systems that can generate near real-time data, send it to the right places, and consume it in near real time. However due to the competitive supermarket industry, availability of inventory movement data within the premises was considered only available to the senior procurement managers and proprietor. This made it difficult for the inventory supplier to use ICT network connection to share inventory movement data with the purchasing staff of the supermarket. Therefore the suppliers were expected to inquire of the stock levels of their products before they could replenish their stock on supermarket shopping shelves or stores. Hence the practice

of lean purchasing and JITP was fully controlled by the supermarket management with little or no input from the inventory suppliers.

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