INFLUENCE OF LEAN INVENTORY MANAGEMENT TECHNIQUES ON PERFORMANCE OF MANUFACTURING FIRMS IN NAIROBI CITY COUNTY KENYA

Rono, E., & Miroga, J.

The Strategic JOURNAL of Business & Change MANAGEMENT
ISSN: 2312-9492 www.strategicjournals.com

Vol. 6, Iss. 4, pp 527 - 541 October 16, 2019. www.strategicjournals.com, ©Strategic Journals

INFLUENCE OF LEAN INVENTORY MANAGEMENT TECHNIQUES ON PERFORMANCE OF MANUFACTURING FIRMS IN NAIROBI CITY COUNTY KENYA

Rono, E.,[1*] & Miroga, J.[2]

[1*]Msc. Candidate, Jomo Kenyatta University of Agriculture & Technology [JKUAT], Kenya
[2]Ph.D, Lecturer, Jomo Kenyatta University of Agriculture & Technology [JKUAT], Kenya

Accepted: October 13, 2019

ABSTRACT

Procurement managers are bound to embrace the essence of adopting lean production which is a business initiative to reduce waste in manufacture production. To this extent therefore, this initiative leverage companies to achieve long term competitive advantages by putting in place the proper production systems and technologies particularly with regard to product quality, shortening product design time, the reducing of wastage improving end customer satisfaction and inventory management. The study was guided by the following objectives, the material requirement planning, the just in time technique, Analysis based costing and vendor managed inventory. The research objectives and research questions set out and the scope of study limited to manufacturing firms in Nairobi County, Kenya. The research used descriptive research design. Data was analyzed using both descriptive and inferential statistics where regression analysis was used to establish the effect of independent variables on the dependent variable. The population was 455 respondents drawn from manufacturing firms in Nairobi County with a sample size population of 213. The data was analyzed with SPSS version 23. The study findings showed that the four variables had a significant influence on firm performance. The study recommended that a similar research should be conducted with an aim at investigating the effects of inventory management techniques on firms' performance with other variables or of other firms in other sectors, including the service industry in the Kenyan market. The study indicated that there had been limited amount of research on effects of lean inventory management techniques on firms' performance of manufacturing firms in Kenya. Thus, the findings of this study served as a basis for future studies on lean inventory management. The lean inventory management techniques and firm performance of manufacturing firms had not been widely studied which presented gaps in African and Kenyan contexts.

Key Words; *Material Requirement Planning, Just in Time, Vendor Managed Inventory System, ABC Analysis Performance*

CITATION: Rono, E., & Miroga, J. (2019). Influence of lean inventory management techniques on performance of manufacturing firms in Nairobi City County Kenya. *The Strategic Journal of Business & Change Management,* 6 (4), 527 – 541.

INTRODUCTION

Lean inventory refers to a business model that emphasizes on meeting customers' expectations by delivering quality products at the least cost when required. The Lean Aerospace Initiative (2002) has defined Lean thinking as the dynamic, knowledge driven and customer focused process through which all people in a defined enterprise continuously eliminate waste with the goal of creating value. According to Bruce and Larco (1999) Lean is both a concept that can be viewed and implemented at a number of level and also a commitment process of relentless improvement that can significantly impact upon an organizations health, wealth and competitiveness. James & Daniel (1996) states that lean can resolve severe organizational problems and additionally can be a powerful approach to gather and unite several change initiatives that are running through.

Lean practitioners often acknowledge that successful lean implementation can require a real or perceived business crisis to justify or foster receptiveness to the significant transformation that lean requires to an organization culture and process. Studies have been done to show the role of lean production system. According to a case study of Kodak Canada Inc., Kodak's Director of Global Manufacturing and Logistics, Charlie Brown steered the company towards adopting lean productions in 1998, by adopting Kodak Operating System (KOS). Lean therefore has not only improved procedure, reduced inventory and enhanced ergonomics, but it allows the company to fine-tune its chemistry and keep pace with changes in demand''

Lean inventory are characterized by pull-production systems, which produces what is actually demanded by the customer at the necessary time and quantity. With regard to quality management, lean practices encourage mutual effort between participants who strive for continuous improvement and zero defects (Womack & Jones, 2003). Practice also advocates for set-up time reduction which is critical in any production system, be it production of services or manufacturing (Kannan& Tan, 2005).

Lean in services practice was introduced in the pioneering article followed by lean thinking concept towards the year 2000 (Suarez-Barraza, Smith &Dahlgaard-Park, 2012). The literature discussing lean service although dominant by conceptual and case studies (Holm & Ahlstrom, 2010), covers a wide range of service industries and rapidly develops over time. Bhasin (2011) posits that organizations on a lean journey must embrace lean as an ideology; when it embraces that this state exists, it enables them to reap the full benefits Lean professes to offer. In order to realize this study, a set of four lean practices were adopted which includes; quality management; waste management; customer orientation and cost management. Regulation is the moderation variable in determining the relationship between lean practices and operational performance in this study.

Leans supply chain management techniques have been implemented widely in the developed countries such as United States of America, United Kingdom, and Japan while in developing countries, lean supply chain practices is still a new concept, its adoption is low, this is because in most parts of Asia and Malaysia the concept is yet to gain popularity. Different firms have noticeable implemented lean inventory management that has been vertically integrated with the procurement department. For instance, Toyota Company in Japan, which has an established global market, has been able to conquer new customer segments due to their products offering. They have been able to meet customer's demands for personalization (Banjoko, 2000). They deliver the right product for the specific use as outlined by customers at the right time. This has been possible due to proper specification of materials, which is one of achievement meet through proper inventory management (Chase et al., 2009).

According to the Supply chain digest (Gilmore, 2011), the data analysis on inventory show

continued upward pressure on inventory levels, with average inventories across all industry sector up by 2.5% in 2010. The largest driver of this increase is thought to be the rise in off shoring. Due to this increase the level of inventories rise as higher inventories are used to buffer the impact of longer supply chains and increased inventory risk. Lewin (2012) observed that the extent of emphasis on inventories among American firms reached the financial markets where there were rules favoring firms that controlled inventories and punishing those that did not do so. In recent years, a good number of manufacturing firms have faced numerous challenges where there have been cases of materials overstocking which eventually get expired or rendered obsolete, under stocking, lack of stock taking, theft of materials by employees, delays in deliveries of materials into the firms among others.

In the western countries, there have being a decline in performance of manufacturing industry. In Europe and particularly in Australia, its total contribution to the GDP is less than half of what it was four decades ago. This was as a result of poor lean inventory management techniques leading to increased cost of production resulting to the gross operating profit margins for the manufacturing firms falling from 9.5% in 2013 to 7.8% in the year 2014 (Omonge, 2012).

In Africa, most of firms have been facing the challenge of managing inventory within their firms, which has greatly influenced the performance of the procurement of firms and thus the entire firm's profits (Drurry, 2011). According to Bonjoko, (2000) stressed that firms stays shaky if inventory are overstocked, under stocked and also if poorly managed. For instance, the Food and Beverage sector in Nigeria has been poorly performing and has actually been unable to meet expectation of stakeholder. According to a study by Monday, (2008) poor lean inventory management was the core causes of non-realization of profits. From the study, it was noticeable that materials management had influenced the performance of the procurement in the brewing sector. It was evident that many costs were being incurred in acquisition of inventory from outside the organization and costs from inventories.

Statement of the Problem

Lean Inventory management techniques are critical to an organizations success in today's competitive and dynamic market (Dimitrios, 2008). In most organizations, direct materials represent up to 50% of the total product cost, as a result of the money entrusted on inventory, thereby affecting the profitability and entire performance of the organization (Rajeev 2010). According to vision 2030, the manufacturing sector should account for 20% of GDP by 2030. However, this has not been achieved with the sector's contribution stagnating at an average of 10% for more than ten years with a growth of 3.1% percent which is lower than the overall countries economic growth of 5% (WB 2015).

According to KNBS (2012) poor performance in manufacturing firms in Kenya led to decline in GDP to 4.4 percent in 2011 from 5.8 percent in the year 2010. According to Amoro (2011), most manufacturing firms in Kenya face problems of stock outs, over supply, over stocking, stock obsolescence, poor forecasting, stock pilferage, poor responsiveness to customer needs and lack of proper lean management application techniques resulting into poor performance.

Empirical studies include; Anichebe (2013) reviewed the effects of inventory management on organizational effectiveness in selected organizations in the Nigeria Bottling Company. The findings indicated that there was a significant relationship between good inventory management and organizational effectiveness and organizational productivity. Edewin (2015) conducted a research on the effect of inventory management on profitability of Bamburi Cement Company in Kenya. Findings showed that proper streamlined inventory management systems had a positive impact on the profitability in the company. Wilfred (2014) carried out a study on the effect of the effective system of

inventory management on organization performance in the seven-up bottling company in Nigeria. The study revealed that organizations benefit from inventory control management by way of easy storage and retrieval of material, improved sales effectiveness, and reduced operational cost. The study bridged the knowledge gap by finding out if lack of Material Requirement Planning (MRP), Just in Time (JIT), Vendor Managed Inventory (VMI) and Activity based analysis affect performance of manufacturing firms in Kenya.

Objective of the Study

The general objective of the study is to assess the effect of lean inventory management techniques on performance of manufacturing firms in Nairobi County. The study was guided by the following objectives;

- To determine the influence of material requirement planning on performance of manufacturing firms in Nairobi.
- To establish the influence of just in time on performance of manufacturing firms in Nairobi Kenya.
- To assess the influence of vendor managed inventory system on performance of Manufacturing firms Kenya.
- To examine the influence of ABC analysis on performance of manufacturing firms in Nairobi.

LITERATURE REVIEW

Theory of Constraints (TOC)

Theory of Constraints was developed by Goldratt (1970). It is a methodology used in identifying the most important limiting factor, which is termed as the constraint. The major concept of TOC is that every process has a single constraint and the total throughput of the process can only be improved through the improvement of the constraint. Brigham and Gapenski (2013) supported this theory by describing that for every profit making firms there must be at least a constraint that limits the entire system from achieving more of what it strives for and ultimately determines the output of the system.

A constraint is any factor that deprives any organization from meeting its objectives as it affects the operational processes. If a firm fails to manage this constraint, it adversely affects its production process and ultimately leads to decline in profits margin (Blanchard, 2010). The TOC is applicable to the supply chain network whereby the weak link limits the efficiency and effectiveness of the entire supply chain process. For the case of poor specification of materials affects the operations of the supply chain. Specification of materials is the constraint in the supply chain system.

TOC views organizations as systems consisting of resources, which are linked by the processes they perform. The goal of the organization serves as the primary judge of success. Within that system, a constraint is defined as anything that limits the system from achieving higher performance relative to its purpose. The pervasiveness of interdependencies within the organization makes the analogy of a chain, or network of chains, very descriptive of a system's processes. Just as the strength of a chain is governed by its single weakest link, the TOC perspective is that the ability of any organization to achieve its goal is governed by a single, or at most very few, constraints.

While the concept of constraints limiting system performance is simple, it is far from simplistic. To a large degree, the constraint/non-constraint distinction is almost totally ignored by most managerial techniques and practices. Ignoring this distinction inevitably leads to mistakes in the decision process. The implications of viewing organizations from the perspective of constraints and non-constraints are significant. Most organizations simultaneously have limited resources and many things that need to be accomplished. If, due to misplaced focus, the constraint is not positively affected by an action, then it is highly unlikely that real progress was made toward the goal.

Lean Theory

Lean theory is an extension of ideas of just in time. Kros, Falasca and Nadler (2009) elaborate that just

The Strategic Journal of Business & Change Management. ISSN 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

in time as a pull-based system was designed to align the production and business processes throughout the supply chain. Green and Inman (2005) assessed the impact of lean theory on service delivery and noted that the theory may eliminate buffer stock and minimize waste in production process. On the other hand, Eroglu and Hofer (2011) found that leanness positively affects profitability of a business firm and therefore the best material control tool. The theory elaborates on how manufacturers gain flexibility in their ordering decisions, reduce the stocks of material held on site and eliminate material carrying costs. Feinberg and Keane (2006) discussed their findings of reducing inventories at firm level. They go on saying that at the aggregate level, the empirical strength of the lean explanation lies both in the timing and the magnitude of the adoption. However, in the theory, material constrains a firm's ability to respond to fluctuations in demand (Feinberg & Keane, 2006).

Scholarly studies indicate that companies successfully optimize material through lean supply chain practices and systems to achieve higher levels of asset utilization and customer satisfaction leading to improved organizational growth, profitability and market share (Waller, Tangari & Willians, 2008). Another study suggesting a positive relationship between material management and performance was that of Eroglu and Hofer (2011) in which their study focused on US manufacturing firms covering the period of 2003-2008. They found that leanness positively affects profit margins. According to Eroglu and Hofer (2011) firms that are leaner than the industry average generally see positive returns to leanness. They used empirical leanness indicator as a measurement for material management. Contrary to the present study, their study focused on assessing the relationship between material performance and overall firm performance. Criticism leveled against the theory is that it can only be applicable when there is a close and long-term collaboration and sharing of information between a firm and its trading partners.

Stock Diffusion Theory

Stock diffusion theory outlines a dynamic approach to inventory management used for non-stationary items with non-constant means and variance. According to stock diffusion theory, stock consumption is modeled as a Markov process with a slow diffusion term. Fokker Planck equation is used to derive the probability distribution of stock consumption and reorder time. Management of the inventory distributed in this manner makes it possible to keep safety stock at minimum levels (Braglia, 2013). Similarly, it ensures the inventory costs are kept at minimal levels without interrupting the internal operations of the organization (Eaton, 1999).

This theory also takes into account the fluctuations in market. The market environment is dynamic and hence the nature of distribution of items. When fluctuations occur in supply market, the outcome is directly experienced by the product buyers and users (Angel, 2005). Stock diffusion concept can also be applied in supply environment with random and controllable demand and continuous input flow with fixed uncontrollable rate under finite storage capacity (Kitaeva, 2014). To control inventory in such an uncertain environment, there is need to develop internal inventory control systems that allows direct and real time flow of information on materials; information flow between suppliers and the organization. Organizations must develop internal structures, policies and procedures upon which all internal inventory control operations are based (Eaton, 2009).

Resource Dependency Theory

According to resource dependency theory, firms seek to reduce uncertainty and manage dependence by purposely structuring their exchange relationship, establishing formal and semi-formal relationship with other firms' (Mito, 2015). Through the developed linkages and relationships, organizations can reduce inconveniences that come as a result of market dynamics. This theory can be applied in internal inventory control. Organizations can form strategic,

long term relationships with suppliers and product users to ensure smooth and timely delivery of materials (Angel, 2005). With long term supplier-customer relationship, the organization is able to buffer itself from internal and external organizational and environmental changes and achieve optimal inventory control (Kitaeva, 2014). Resource dependency theory is based on six assumptions. Firstly, organizations depend on resources for their internal operations. The second assumption is that the resources originate from outside the organization; they are bought from other organizations. Thirdly, the resources are scarce and competitive and therefore require strategic decisions to be made about what to buy, in what quantity and at what times. Lastly, resource dependency is directly linked to the organization's power which a rational, situational and mutual (Gerald, 2009).

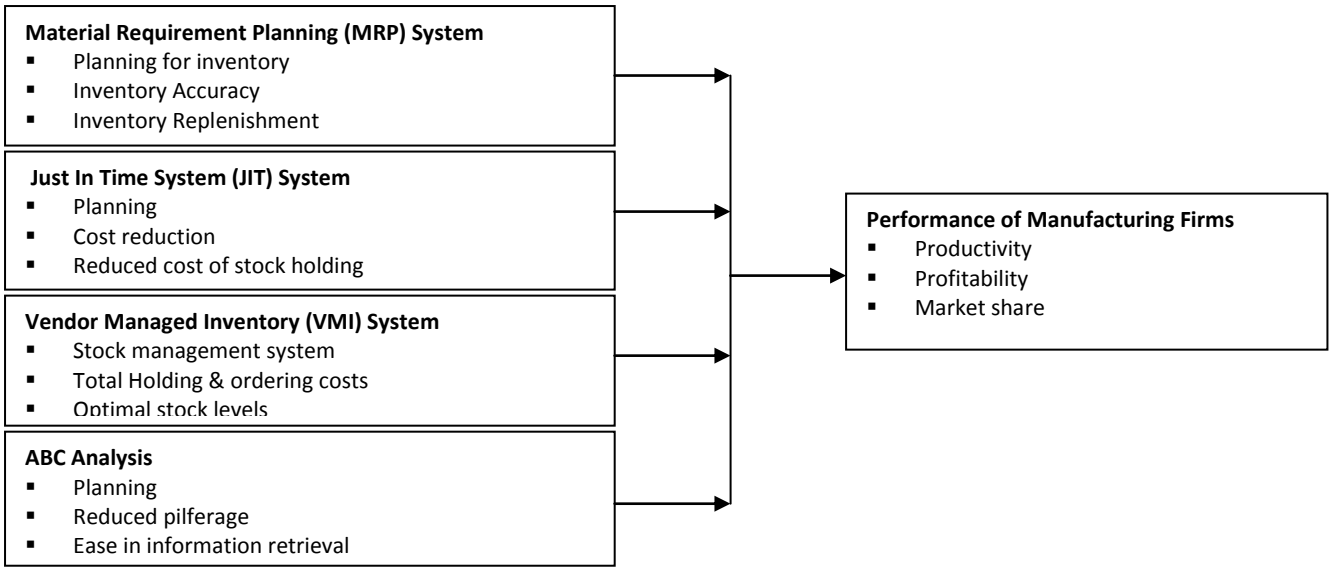

Figure 1: Conceptual Framework

Empirical Review

Jonsson and Mattsson (2006) did a longitudinal study of material planning applications in manufacturing companies in Sweden. The study sought to describe the state-of-the-art, reasons for selecting various material planning methods, and modes of applying methods for initiating inventory replenishment of purchased items. Empirical survey data was collected from Swedish manufacturing companies in 1993, 1999 and 2005. The MRP, re-order point, fixed interval ordering, run-out time, and Kanban methods were studied. The study found that MRP is the most commonly used method and its position has strengthened since 1993. A common way of determining parameters such as order quantities and safety stocks is to use judgment and experience. Parameters used in material planning methods are reviewed relatively infrequently. The planning frequency has increased, with daily planning now being typical.

Imeti and Lutovac (2015) researched on project scheduling method with time using MRP System – a case study: construction project in Libya. MRP system was applied to project of 5000 housing units in Solug area, which is close to Benghazi city, Libya, with the aim to provide necessary cash flow to pay dues on time without delay to all involved project sub-contractors and material suppliers, to ensure the smooth flow of operations, as well as to diminish costs by reduction of temporary storages and rented areas. There was a correlation between time and cost of each activity. If the required time is shorter than the scheduled time of the certain activity, it would demand more resources, which further leads to the increase in direct costs of the given activity. Therefore, the output of MRP is

The Strategic Journal of Business & Change Management. ISSN 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

important since commands are issued through planning in order to launch the suggested orders with the required quantities and within the limited time period.

Bagaka (2017) researched on the role of material management on performance of sugar manufacturing industries in Kenya. This study sought to establish the effect of material management on performance of Mumias Sugar Company Limited. The study adopted the descriptive design. The population under consideration which was the unit of analysis comprises of Mumias Sugar Company. Stratified random sampling was used to select 79 respondents in the Company. The study utilized a research questionnaire. At the completion of the data collection process, the questionnaires were sorted, coded and analyzed. The Statistical package for social sciences (SPSS) was used to generate the required frequencies and percentages to answer the research questions. The study found that materials procurement and inventory control positively influenced the performance of sugar manufacturing industries in Kenya.

Radzuan (2015) did a study on inventory management practices and its effects on vendor managed inventory performance. This study tried to shed the lights on the effects of inventory management practices, which include visibility of demand, replenishment decision, inventory ownership, inventory location, and inventory control limits on VMI performance. Quantitative methodology was chosen as the method to gather the data where those manufacturing companies being selected according to the list from the Federation of Malaysian Manufacturer (FMM). The data was gathered from 101 manufacturing companies whose manufacturing based located in Malaysia. Data analysis was conducted by employing descriptive analysis, factor analysis, reliability analysis, and a simple multiple regression. The findings showed that visibility of demand and inventory control limits were the main predictor of service performance. Meanwhile, only inventory location contributed to cost performance of VMI.

Migwi and Kwasira (2016) studied the success factors for the implementation of vendor managed inventory systems in retail supermarkets in Nakuru Town, Kenya. This study aimed at examining the effect of supplier relationship on successful implementation of VMI. target population was employees of procurement departments of ten retail supermarkets in Nakuru town. A census of all the procurement employees in the retail supermarkets was undertaken. The study utilized descriptive design. Data was collected using structured questionnaires and analyzed using both descriptive (measures of central tendencies) and inferential statistical techniques (Pearson correlation). Analysis was done using Statistical Package for Social Sciences (SPSS) version 24. The study established that supplier relationship was significant in determining the success of VMI implementation.

Maina and Were (2018) studied the influence of vendor managed inventory on performance of retail outlets in Kenya. a case of Tuskys supermarket limited. The main objective of the study was to investigate the influence of vendor managed inventory on performance of retail outlets in Kenya with specific reference to Tuskys supermarkets Limited. The study reviewed relevant design with survey of a total of 400 employees working at Tuskys supermarket headquarters offices situated in Nairobi. The employees were selected from; supply chain management department, focusing on top management, middle level management and junior staff. The study adopted a descriptive research design, with stratified random sampling technique to select a sample size of 80 respondents. Questionnaires were used as the main data collection instruments and a pilot study were conducted to pre-test questionnaires for validity and reliability. Data were analyzed using descriptive statistics and inferential statistics. This was done by the use of SPSS Version 23. The findings indicated that Information sharing, Strategic Partnerships,

information communication technology and Inventory control limits shared a variation of 52.8 % of performance of retail outlets.

Zhang, Mohammad and Che (2017) did an investigation on the empirical effect of ABC stages on the performance of companies. The major aim of this study was to investigate the moderating effect of the stages of ABC application on the firms' performance. This study selected 106 Chinese manufacturing companies and employs multiple regression technique and structural equation modelling. It examined whether successful application of the ABC directly affects the firm's performance, and tests whether the stages of ABC application could produce a moderating effect on the firms' performance. Results indicated that successful application of ABC, significantly affects achievement of the costs and quality, while sales volume is only marginally affected by ABC application, and there is an insignificant effect of the relationship between ABC application and achievement of the targets pertaining to productivity, services, and profits.

Zaman (2009) studied the impact of activity based costing on firm performance: the Australian experience. The objectives of this exploratory study was to develop a scale that best capture the perception of the practitioners related to activity-based (ABC) costing, and subsequently, develop a model that predicts the impact of perception of ABC on overall firm performance. The Cronbach's alpha showed apparent superiority of the scale. The factor analysis found four dimensions, namely, overall performance, strategic cost allocation method, increased efficiency and increased effectiveness having the factor loadings of over ±0.3. The regression results were positive and significant at the 5% level.

Azzouz and Zhang (2013) studied the relationship between activity based costing, business strategy and performance in Moroccan Enterprises. This study highlighted the results of an empirical study on the relationship between ABC, business strategy and organizational performance in 62 Moroccan enterprises. 12.9% of the responding companies reported using the ABC method. The results using logistic regression indicated that the business strategy has not a significant influence on the use of this new method of the management accounting. Also, the study found that the management accounting system based on ABC method results in a better performance for enterprises that have adopted it.

METHODOLOGY

The study adopted a descriptive research design. The target population for this study was 455 employees of manufacturing firms in Nairobi Kenya. Sampling size was the list of all 455 employees, from where the respondents were selected. The questionnaire was the selected instrument or tool for data collection for the study. The research used descriptive research design. Data was analyzed using both descriptive and inferential statistics where regression analysis was used to establish the effect of independent variables on the dependent variable. The population was 455 respondents drawn from manufacturing firms in Nairobi County with a sample size population of 213. The data was analyzed with SPSS version 23.

RESULTS

Material Requirement planning

The research sought to determine from the respondents the extent to which they agreed the firms implemented the material requirement planning in lean inventory management in an effort to improve performance in the manufacturing firms. From the research findings, majority of the respondents indicated that they neither agreed nor disagreed that the firms based on the average mean of 3.68. Majority of the respondents neither agree nor disagree that the firm introduced timely delivery criterion with the user department into purchasing process as shown by a mean of 3.65; the respondents also had agreement stand that the firm formally had integrated the concerns into to assessment of the inventory received and storage in the organization as shown by a mean of 3.90;

The Strategic Journal of Business & Change Management. ISSN 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

respondents also were in agreement on implemented use of exemplary review to avoid redundancy and holding excess stock in the characteristics of the products acquired in the organization as shown by a mean of 3.66. Majority of the respondents were in agreement that spot-checking on budget planning was applied in inventory management.

This implied that majority of the firms had started recognizing the role of lean inventory management techniques on enhancing performance with other firms in the manufacturing sector. The findings of this study are in tandem with literature review by silver, (2007) who observed that lean inventory management techniques that are enhance issues such as using effective purchasing strategies, waste reduction, and budget review and planning of the materials.

Table 1: Descriptive Analysis of Material Requirement Planning

	1	2	3	4	5	Mean	Std. dev
Organization use the MRP on timely delivery of materials influence the performance of procurement function	10.2%	6.8	13.6	46.6	22.7	3.65	1.2
Availability of storage space influence the performance of procurement function	8.0%	4.5	15.9	33.0	38.6	3.90	1.2
Budget estimates influence the performance of procurement function.	13.6%	11.4	10.2	35.2	29.5	3.56	1.38
Timely delivery with user department influence performance of procurement function	11.4%	13.6	12.5	22.7	39.8	3.66	1.41
Organization uses MRP on reduction of lead time	11.4%	3.4	21.6	39.8	23.9	3.61	1.22
Average						**3.68**	**1.28**

ABC Analysis

The research sought to determine from the respondents the extent to which they agreed the firms implemented the Analysis Based Costing in inventory management in an effort to improve performance function in the manufacturing firms. From the research findings, majority of the respondents indicated that they agreed that the firms based on the average mean of 3.89. Majority of the respondents agreed that the stock class A influences performance as shown by a mean of 3.78; the respondents also had agreement stand that the class B stock influences performance in the organization as shown by a mean of 3.91; respondents also were in agreement on influence use of class C products in the organization in the organization as shown by a mean of 3.67. Majority of the respondents were in agreement that ABC Analysis in general influences performance and reduces holding cost shown by mean of 3.68 and 3.79 respectively.

This implied that majority of the firms had started recognizing the role of ABC Analysis on enhancing performance with other firms in the manufacturing sector. The findings of this study were in tandem with literature review by Shapiro, (2009) who observed that lean inventory management techniques that are enhance issues such as using effective purchasing strategies, and proper classification of the materials.

Table 2: Descriptive analysis of ABC Analysis

	1	2	3	4	5	Mean	Std. Dev
The class A materials classification on the planning of inventories influence the performance of firm	5.7	8.0	20.5	34.1	31.8	3.78	1.15

The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

The class B materials classification on the cost of holding stock on influence the performance of firm	8.0	10.2	11.4	23.9	46.6	3.91	1.31
The class C materials classification on the availability of storage space influence the performance of firm	4.5	15.9	17.0	33	29.5	3.67	1.19
The organisation use Activity Based Costing (ABC) Analysis when considering inventories to be procured	10.2	10.2	12.5	35.2	31.8	3.68	1.3
The organization use of Activity Based Costing (ABC) Analysis on the reduction of cost of holding stock	10.2	6.8	5.7	38.6	38.6	3.89	1.28
Average mean						**3.79**	**1.25**

Just In Time Techniques

The research sought to determine from the respondents the extent to which they agree the organization implemented the Just in time to boost their performances. From the research findings in majority of the respondents neither agreed that the firm has formally introduced just in time techniques that enhances just in time purchasing, as shown by average mean 3.80. just in time in waste reduction, the contribution of just in time technique in lean production as shown by average 3.88 how just in time helps the organizations to act on holding cost and improvement performance and use of just in time in total quality management shown by average mean of 3.85. The respondents agreed that the firm has formally introduced just in time techniques as shown by mean of 3.77. This implied that majority of the firms have started recognizing the role of just in time techniques on enhancing performance with other firms in the manufacturing sector. The findings of the study are in agreement with literature review by Porteus (2008), who indicated that just in time techniques improve productivity and performances of the firm.

Table 3: Descriptive Analysis of Just in Time Techniques

	1	2	3	4	5	Mean	Std. dev
Just in time purchasing influences performance of a firm	8.0%	9.1	12.5	38.6	31.8	3.77	1.22
Waste reduction influences performance of a firm	6.8	9.1	11.4	31.8	40.9	3.91	1.23
Lean production influence performance of a firm	5.7	6.8	15.9	37.5	34.1	3.88	1.13
They say Just-in-time helps organizations cut on holding cost and improve customer satisfaction. Does this hold for your organization	8.0	11.4	18.2	40.9	21.6	3.57	1.18
Use of just in time in total quality management	5.7	10.2	13.6	34.1	36.4	3.85	1.19
Average						**3.80**	**1.19**

Vendor Managed Inventory

The research requested the respondents to indicate the extent to which they agreed the firms had implemented the vendor managed inventory in an effort to enhance their performances in the manufacturing sector. From the results, majority indicated that they nether agreed nor disagreed that the firm had formally introduced vendor managed inventory aimed at enhancing supplier relationships efficiently as shown by a mean of 3.84; the organization had formally implemented effective transmission of accurate information in their organizations as shown by a mean of 3.73 and an up-to-date supplier appraisal and checklist in the firm as shown by a mean of 3.83 and 3.58 respectively.

The above findings corroborated with literature review by Sandeep (2007) who indicated that

vendor management control is achievable through; vendor appraisal, random sampling of goods received and keen handling and verification of the products. According to Song and Zipkin (2011), the long term relationship with suppliers is another important aspect of inventory management.

Table 4: Descriptive Analysis of Vendor Management Techniques

	1	2	3	4	5	Mean	Std. dev
Organization uses VMI to enhance Supplier relationship influence performance of a firm	6.8%	4.5%	22.7%	29.5%	36.4%	3.84	1.17
Accuracy of the information influence performance of a firm	8.0%	14.8%	10.2%	30.7%	36.4%	3.73	1.31
Supplier appraisal influence performance of a firm	4.5%	10.2%	12.5%	43.2%	29.5%	3.83	1.11
Vendor management inventory system eases management's work for inventory replenishment	8.0%	13.6%	14.8%	39.8%	23.9%	3.58	1.22
The organisation uses VMI to reduce risk of obsolescence and redundancy	4.5%	9.1%	17.0%	37.5%	31.8%	3.83	1.12
Total overage						**3.78**	**1.12**

Procurement a firm

The research requested the respondents to indicate the extent to which they agree firms implemented the inventory management techniques to enhance their performances in their firms. From the research findings, majority of the respondents neither agreed that; the firm's implementation of analysis based costing influences positively to the performance, as such all the classes of stock have influence on the performance of the firm as an important element in its inventory management. The firms incorporated that inventory management also has positive impact on the cost budget and timely delivery.

Inferential Analysis

Correlation Analysis

After the descriptive analysis, inferential analysis was conducted using correlation and multiple regressions to determine the extent and direction of relationship between material requirement planning, ABC Analysis, Just in Time techniques and vendor management inventory.

Table 5: Correlation Matrix

		MRP	ABC	JIT	VMI
MRP	Pearson correlation	1			
ABC	Sig	0.414	1		
	Pearson correlation	0.000			
JIT	Sig	0.215	0.321		
	Pearson correlation	0.003	0.000		
VMI	Sig	0.553	0.462	0.34	
	Pearson correlation	0.000	0.001	0.001	
Procurement	Sig	0.613	0.587	0.405	0.414
Performance	Pearson correlation	0.000	0.000	0.000	0.000

The study used Pearson correlation analysis to establish the association among the variables used in the study. A Pearson correlation was used since the data was discrete. Correlation indicates the direction in one variable if another variables change. A negative Pearson correlation value indicates negative correlations while a positive Pearson correlation value indicates a positive

The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

correlation. The strength of the association increases as the value approaches either negative or positive. Correlation findings were presented in Table 6 Above.

Indicated that the correlation between Material requirement planning and performance at manufacturing firm was 0.613 with a corresponding p value of 0.000. The correlation coefficient was therefore significant and positive implying that if material requirement planning increases the performance at manufacturing firms also increases. The findings concurred with shapiro (2009) findings who also revealed that accountability, budget planning and timely delivery affected procurement process of supplies in the Manufacturing sector to great extent. The results further revealed that the correlation between analysis based costing and procurement performance at manufacturing level was 0.587 with a corresponding p value of 0.000. the correlation coefficient was also significant and positive which implied that if increase analysis based costing increases the performance at Manufacturing firm. This finding conforms to those of palevich (2012) who found out that there is a strong relationship between procurement inventory techniques and performance, therefore the study concluded that the presence of a procurement portfolio.

The findings also indicated that the correlation between just in time techniques and performance at manufacturing firm was 0.405 with a corresponding p value of 0.000. The correlation coefficient revealed a significant and positive association implying that if just in time techniques increase the performance also increases silver (2007) also emphasizes that the scope of just in time techniques is determine whether the organization's control and governs processes as designed and represented by management, is adequate and functioning in a manner which ensures that risk are appropriate identified and managed. The finding results indicated that the correlation between vendor management techniques and performance at manufacturing firms was 0.414 with a corresponding p value of 0.000. The correlation coefficient revealed a significant and positive association implying that increase in vendor management techniques increases the performance. According to Porteus (2008) transparent and fiscal management promote accountability in suppliers and thus enhancing accuracy of information.

Multivariate Regression Analysis

The findings revealed a relationship R=0.87.9, indicating a strong positive association between MRP, ABC Analysis, JIT techniques and performance. R^2 =0.772 indicate that 77.2% of variation in the performance can be explained by Material requirement planning, ABC analysis, just in time techniques, vendor management techniques and performance.

Table 6: Multivariate Regression Analysis

Model	R	R^2	`Adjusted R^2	Std. error of the estimate
1	0.879	0.772	0.768	0.40065

The result of ANOVA test showed that the F value was 62.14 with a significance of p value =0.000 which was less than 0.05, meaning that there is a significant relationship between material requirement planning, Analysis based costing, just in time technique, vendor management technique and performance. The ANOVA statistics at 5% level of significance showed that the value of F calculates (F computed) was 62.14 and the value of F critical (F tabulated) at 4 degrees of freedom and 83 degrees of freedom at 5% level of significance is 2.482. F calculated (F computed) was greater than the critical (F tabulated) (62.14>2.482), this showed that the overall model was statistically significant at 5% significance level.

Table 7: Analyze of Various (ANOVA)

Model		Sum of squares	Df.	Mean square	F	Sig
1.	Regression	32.065	4	8.016	62.14	.000[b]
	Residual	20.804	161	0.129		
	Total	52.869	165			

a. dependent variable: Procurement performance

b. Predictors: (constant), MRP, ABC Analysis, JIT technique, VMI technique, .

Table 8: Regression Coefficient Results

	B	**Std error**	**T**	**Sig.**
(constant)	0.742	0.254	2.921	0.000
Material requirement plan	0.284	0.067	4.238	0.000
ABC Analysis	0.173	0.065	2.661	0.000
Separation of duties	0.162	0.062	2.612	0.000
Documentation	0.137	0.057	2.403	0.000

Dependent Variable: organization structure

The multiple Model $Y=\beta_0+ \beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X_4+\epsilon$, therefore became, performance=0.742 + 0.284 (Material requirement planning) + 0.173(ABC Analysis) + 0.162(just in time techniques) + 0.37(Vendor management techniques) +ϵ

Y=performance

β_0=0.742(constant)

β_1=0.284(coefficients for material requirement planning)

β_2=0.173(coefficients for analysis based costing)

β_3=0.162(coefficients for just in time technique)

β_4=0.137(coefficient for vendor management techniques)

ϵ=represents the error term

The coefficient of material requirement planning was (β=0.284, p=0.000, <0.05) showed a statistically significant relationship between material requirement planning and performance. The results implied that a unit increase in material requirement planning would result to an increase of 0.284 units in performance. Similarly, Ayom (2013) study concluded that documentation affected performance of an organization. It was therefore recommended that the implementation of material requirement planning be reviewed especially in the area of procurement and budgetary control.

The coefficient of Analysis based costing was (β=0.173, p=0.000, <0.05) showed a statistically significant relationship between Analysis based costing and performance. The results implied that unit increase in Analysis based costing would result to an increase of 0.173 units in performance. This finding conformed to those of Navon & Berkovich (2006) who found out that there is a strong relationship between procurement Analysis based costing and procurement performance, therefore the study concludes that the presence of a inventory techniques positively affects performance in organization.

The coefficient value of just in time technique was ((β=0.162 p=0.000, <0.05) this shows statistically significant relationship between just in time and performance. The results is tandem with the research done by Walter (2013) who found out that just in time is effective in utilization of time in an organization.

The coefficient of vendor management techniques was (β=0.137, p=0.000, <0.05) shows a statistically significant relationship between vendor management techniques and procurement performance. The results implied that a unit increase in vendor management techniques would results to an increase of 0.137 units in performance. Palevich (2012) also emphasized that the scope of vendor management is to determine whether the organization's control and governance process a designed and represented by management, is adequate and functioning in a manner which

ensures that risk are appropriately identified and managed.

CONCLUSIONS

The study found that material requirement planning had impact on the performance. The extent of user involvement and consultation in development of specification, value analysis, review and management of specification amendment improves the performance of manufacturing firms. This is because specifications provide basis for purchase orders therefore they provide most important elements of purchasing therefore, enhancing suitability and competitiveness of the firms.

The study found that effectiveness of inventory management system contributes to ability to maintain optimum stocks. Dependability of demand forecasting, planning for production requirement and reduced lead times also contributes to optimal stock levels which ultimately improves the performance of the firm. This is because of the ability to forecast the demand of raw materials and the consumables while minimizing the inventories held within the firm.

From the study, control of materials coming into a firm affects the performance of procurement function. The proximity of the receiving facility contributed to the effectiveness of the receiving process. Frequency of inspections would results to quality assurance. Through application of materials handling equipment, handling time would be minimized and also the extent of traffic would be minimal thus improving the performance of firms.

The study found that vendor management techniques elements have an impact in delivery were as a result of poor communication with suppliers which resulted to quantity and time cost and also lack of supplier delivery appraisals which lead to quality costs. Many respondents agreed that much time was incurred during inspection and testing of materials. Therefore, the performance of firms was being undermined because of extra costs incurred and thus inability to save on purchases.

RECOMMENDATIONS

Manufacturing firms should embrace expertise in formulation of documentation at early stages of materials design. User departments should always be involved and consulted in development of material requirement planning. This will improve the performance of procurement function as it was able to meet the requirements of users and also reduce disputes among suppliers.

Manufacturing firms should adopt the technique of keeping the minimal amounts of inventories. These should be done by having a definite automated inventory control system, improving the production scheduling, having flexible manufacturing processes and adoption of best supplier sourcing technique to ensure inventories are held and controlled at suppliers' premises.

The receiving process of materials coming into the firms should be effectively and efficiently controlled through just in time techniques and ensuring that the receiving bay or section is at most proximal location. Materials techniques of handling should be used for handling outlined materials correctly while putting the consideration that extra handling does not add value.

Manufacturing firms should practice long-term relationship with suppliers and develop strategies to develop them so that they can be able to deliver the quality required without errors and defects. Firms should outsource logistical services from expertise firms so as to minimize damages and delays in materials in transport. These activities improve the performance of the firm as they reduce or prevent costs from deviations in delivery.

Areas for Further Research

The objective of the study was to assess the influence of lean inventory management techniques on performance of manufacturing firms in Kenya. It recommended that a similar research should be conducted with an aim at investigating the influence of lean inventory management techniques on performance with other variables or of other firms in other sectors, including the service industry in the Kenyan market.

The Strategic Journal of Business & Change Management. **ISSN** 2312-9492 (Online) 2414-8970 (Print). www.strategicjournals.com

REFERENCES

Azzouz E. & Zhang Y. (2013). The Relationship Between Activity based Costing, Business Strategy And performance In Moroccan Enterprises. *Accounting and Management Information Systems*, 12(1), 22–38.

Bagaka, C. (2017). Role Of Material Management On Performance Of Sugar Manufacturing Industries In Kenya Case Of Mumias Sugar Company Limited**.** *The Strategic Journal of Business & Change Management,* 4(12), 227 - 245,

Jonsson, P. and Mattsson, S. (2006). A longitudinal study of material planning applications in manufacturing companies. *International Journal of Operations & Production Management,* 26(9), 971-995

Maina, A. W., & Were, S. (2018). influence of vendor managed inventory on performance of retail outlets in Kenya. a case of Tuskys supermarket limited. *The Strategic Journal of Business & Change Management,* 5(4), 567 - 581*,*

Migwi, B.M. & Kwasira, J. (2016). Success Factors For The Implementation Of Vendor Managed Inventory Systems In Retail Supermarkets In Nakuru Town, Kenya. International *Journal of Economics, Commerce and Management, United Kingdom,* 4(9).

Monday, J. U (2008). *Effects of Efficient Materials Management on Performance of Firms in Food and Beverage Manufacturing Industry in Nigeria,* MBA Dissertation, Nigeria: Obafemi Awolowo University.

Mugenda, O.M and Mugenda, A.G (2003) *Research Methods, Quantitative and Qualitative Approaches*, Nairobi: Acts Press

Navon, R., &Berkovich, O. (2006). *An automated model for materials management and Control*, Construction Management and Economics, 24(6), 635-646.

Palevich, R. (2012). *The lean sustainable supply chain: how to create a green infrastructure with lean technologies*, Pearson Education, Inc., London

Porteus, E. (2008). *Stochastic inventory theory*, *Journal Operations Research and Management Science* 2, 605-652

Radzuan, K. (2015). Inventory Management Practices and its Effects on Vendor Managed Inventory Performance. *Advanced Science Letters*, 21, 2115-2118

Sandeep, K. (2007). *Supply chain management*: New Trends and Strategies, Infosys.

Shapiro, J. (2009). *Modeling the supply chain (2nd ed.).* Cengage, USA: Cengage Learning

Silver, A. (2007).*Inventory management:* University of Calgary, Haskayne School of Business, Calgary

Song, J. & Zipkin, P. (2011). Inventory control with information about supply condition, *Management Science* 42, 1409-1419

Yin, R. K. (2009). *Case study research;Design and methods.* CA: Sage productions.

Zaman, M. (2009). The Impact Of Activity Based Costing On Firm Performance: The Australian Experience. *International Review of Business Research Papers*, 5(4), 200-208

Zhang F., Mohammad N. and Che R. I. (2017). Investigating the Empirical Effect of ABC Stages on the Performance of Companies. *Iranian Journal of Management Studies (IJMS)*, 10(1), 175-205