EFFECT OF INVENTORY MANAGEMENT SYSTEMS ON PERFORMANCE OF RETAIL SUPERMARKETS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT
Retail industry has seen growth in the past years with the formal retail reaching penetration rates of between 25 to 30 percent and the average value of a shoppers’ basket has also increased by 67% in the last five years, placing Kenya the fastest growing retail market. The study sought to establish the effect of inventory management systems on retail supermarkets performance in Nairobi City County to achieve this, the study reviewed both theoretical and empirical literature and proposed the research methodology that addressed the gaps identified in literature as well as answering the research questions. The Literature was reviewed along themes and theories that was used to access the observation and opinions related to the study and the study used four variables, resource based theory, agency theory, theory of constrains, adaptive structuration theory to explain the four independent variables. The study has adopted a descriptive research design which has enabled the researcher to have an open mind in achieving the in-depth study of the main objective of the study. The population of the study comprised of officers in the inventory management department of the 52 supermarkets of study in Nairobi City County. Two inventory officers from the supermarkets were selected to represent the population through a simple random technique. Questionnaires were issued and data was collected using the issued self-administered questionnaires. The collected data was analysed by use of descriptive and inferential statistics. The quantitative data generated was keyed in and analysed by use of Statistical Package of Social Sciences (SPSS) version 23 to generate information which will be presented using tables, charts, frequencies and percentages. Multiple regression models was used to show the relationship between the dependent variable and the four independent variables in this study. The response rate of the study was 95% and the findings of the study indicated that enterprise resource planning, vendor managed inventory, electronic data interchange and just in time have a positive relationship with retail supermarket performance. Conclusively the study recommended that retail supermarkets should embrace the use of inventory management systems in order to improve overall organisation performance and further researches should to be carried out in other industries to find out if the same results can be obtained.

Key Words: Enterprise Resource Planning, Electronic Data Interchange, Just In Time, Vendor Managed Inventory and Performance Of Retail Supermarkets
Introduction

Inventory management involves balance between customer services, product availability and cost of inventory (Wisner et al., 2014). Inventory management is the act of ensuring that there is balance between optimal stocks, stock-out, excess stock and dead stocks (Gupta & Gupta, 2012). Inventory is described as quick or liquid assets in any organisation. Inventory takes the bigger pie of the total firms assets and in order to have a well-balanced stock levels in any organisation, substantial resources are required to run the inventory department and ensure smooth flow of inventories (Mittal, 2014). Inventory management systems is the backbone of the organisation in enhancing the operational performance, reduction of costs, organised management and improved efficiency in working capital. According to Gupta & Gupta, (2012) the business objective should be reduction of cost in inventory management since it has great impact on organisational growth, performance and profitability. Chalotra, (2013) also expounded that a well-established inventory management levels enable the firm to have competitive ability and a better market share of firm. A study by Isakson and Seifert, (2013) indicated that firms that experience high ranking competition and a high level of financial performance have embraced inventory management systems in their operations. Implementation of inventory management system also ensures development of firm’s prosperity as well as quality products and quality service which results to high sales volume and high profits (Anichebe & Agu, 2013).

In the current economies, markets have become more dynamic and competitive, companies are pressured to remain responsive and efficient, in response to these pressure many companies globally have been forced to adopt better strategies in order to stay competitive, this has seen many firms adopt different inventory management systems like Just in time (JIT), Material requirement planning (MRP), Enterprise requirement planning (ERP) and Vendor managed inventory system. Taylor & Francis, (2011) concluded that inventory cannot be managed without good inventory systems. A survey in Europe on logistics management showed that inventory cost consumes up to 13% of the total cost, Baker, (2007). An inventory management system enables firms to reduce these cost, improve the product quality and customer service, Jeffrey et al, (2008). In Kenya, we have seen the growth of the retail industry in the past few years with the formal retail reaching penetration rates of between 25 to 30 percent. The average value of a shopper’s basket has also increased by 67% in the last five years, placing Kenya as the fastest growing retail market (KPMG, 2015). In a study by Dan Virgillito, (2017) showed that up to 43% of retailers globally do not use inventory management systems but they still depend on spreadsheet, pen and paper to manage the flow of inventories. This is a great challenge in all firms to manage inventory costs which includes, carrying cost, ordering cost, stock out costs and handling cost, Wickersham, (2016). This calls for substance measures of using systems to manage inventories.

Global perspective of inventory management systems

International Companies in automobile manufacturers like the Toyota Corporation, computer manufacturers like Dell have implemented Just in time system as the key strategy to manage the inventory flow; this has contributed immensely to their lean supply chain by working with their suppliers to have supplier inventory pods close to their facilities to meet their demanding manufacturing schedules. They also collaborate with their suppliers to a greater extent of Sharing demand information so that suppliers can adjust their production and distribution schedules to satisfy their demand; this has greatly impacted positively on their customer satisfaction hence...
making them world best performers in the market. The UK's largest supermarket group, Tesco, reported a return to profit for the 12 months. Evaluation in the efficiency of Tesco's inventory management systems brought out the need for efficient stock control management. (Curthoys, 2003). According to business writer (Ken Cottrill), In April 2001 Tesco announced their 1 billion profits breakthrough due to the seamless innovation process of Enterprise resource planning (ERP). Another multinational organisation (Unilever) has a wide range of different products in the market ranging from personal care category, homecare category, food and refreshment category. These are products sold globally in different brands of about 400 brands of Unilever and others on behalf of the organisation. In 2011 Unilever made a turnover of € 46.5 billion, which was 5% higher than in 2010, Operating Profit of € 6.4 billion, which was 1% higher than in 2010 and Net profit of € 4.6 billion which was 1% higher than in 2009, this was contributed to the high investment on quality EDI and ERP systems in managing their inventory (Freek van Eijndhoven, 2012). Unilever has been using these systems to control and manage their inventories by distributing them to different markets, the continuous use of these inventory management systems has mapped Unilever as a world leading company in personal care and homecare products.

Peel and Wilson, (2005), on their study of 84 small businesses in England on how inventory management practices where applied, they found out that, only 20% of these entities reviewed their inventory turnover frequently using inventory management systems and about 73.8% of small businesses did not apply correct inventory management systems, while only 14.1% of these entities reviewed their inventory level frequently. In another related study in Asia, (Nguyen 2001) investigated on inventory management of 150 small and medium sized enterprises in Vietnam. The study revealed that only 2% of these entities used inventory Management systems to manage their inventories while 98% of these entities indicated that they used owners or managers experience to manage their inventory. A paper by Meng, (2006) aimed at identifying cost factors, assessing cost components, calculating economic order quantity and effect of inventory on supply chain suggested that there is a great connection between inventory management systems, cost and performance. The empirical study was conducted in Sandviks Electricity plant and further implied that effective inventory Management, procurement goal would be achieved and whole supply chain optimized. Since the study was conducted in Sweden energy service sector, similar test with data from retail supermarkets to test this hypothesis would be of value.

A study conducted in the United States of America on supply chain performance focused on issues such as forecast, planning and exchange communication. Such factors would need to be evaluated in the context of retail supermarkets in Nairobi County. A paper by Wong et al (2005) investigated on effectiveness of demand and supply chain management concluding that the relationship between the levels of seasonality and volatility in inventory management practices during ordering are one off in the just in time system and in mixed inventory system. However, the study noted that supply chain management is not yet capable of managing the level of volatility and seasonality. Since the study was conducted in Denmark toy industry, a similar study would be of value if conducted in the larger retail supermarkets industry. Vikram et al (2012) conducted a study on inventory management systems and supply chain collaboration concluded that inventory management departments were more willing to have vendor managed inventory system to maintain consistent supply and collaboration amongst stakeholders. A related study by Adeyemi et al (2010) focused on inventory management optimization tool in
Coca-Cola Bottling industry in Nigeria. The researcher concluded that right quantity, quality and timing of inventory is achieved by use appropriate inventory management systems.

**Regional and Local Perspective of inventory management systems**

Pitamber and Dhurup (2014) examined the inventory control and valuation procedures amongst 173 small and medium sized enterprises in South Africa and found out that 53.5% of the respondents of the use of inventory management systems whereas a smaller percentage (36.4%) of respondents used theories in managing their inventory. In addition, 58.4% of the respondent’s indicated that they reviewed the inventory level using inventory management systems, thus concluding that inventory systems are widely used in South Africa organisations in small and medium enterprises. Safaricom has strengthened its leadership and performance in the mobile market in Kenya over the past five years, increasing its market share from 57% in 2002 to 80% as of December, 2008. A report of 2011/2012 financial year by Kenya revenue authority ranked Safaricom as the top taxing company. Over the years, the company's profits and sales have been increasing due to its efficient JIT inventory management systems. JIT has enabled Safaricom Ltd to serve their internal and external customers well, Safaricom have outsourced these systems to supply and distribute its products securely and effectively throughout its countywide dealer’s networks. DHL has been contracted by Safaricom to provide these systems which have all aspects of shipping, tracking, and distributing handsets, connection packs and scratch cards, thus reducing waste and holding cost in Safaricom. Nyakagwa and Muthoni (2014) did a study on factors affecting implementation of lean procurement in multinational enterprises: a case study of British American Tobacco (Kenya) and established that integrating suppliers through vendor managed inventory (VMI) creates a Continuous improvements and development with suppliers which gives significant opportunities for the organisations to perform better in the market. In Kenya a beer producing company, East Africa Breweries (EABL) has seen competition intensify in recent years from small local brewers and imports of international brands such as Heineken and SABMiller, but East African Breweries Limited still controls around 90% of the Kenyan beer market, (EABL, 2015) and continues to expand into the rest of East Africa. With breweries, distilleries, support industries and a distribution network across the region, the group’s diversity is an important factor in delivering the highest quality brands to East African consumers and long-term value to East African investors. A proficiency and inventory management system is proof of their commitment to be the market leader. ERP is one of their inventory management systems which has enabled them to be at the forefront in the beer industry, and positioned them to continue increasing the scope of their customer solutions and services.

**Supermarkets in Nairobi County**

A supermarket is a marketing intermediary that sells to ultimate consumers for their own use. Supermarkets create utility for consumers, that is, the need-satisfying ability and worth that an institution adds to commodities and services by making them more valuable or available to customers. The expansion of Kenyan supermarkets is similar to that of South Africa. Presently, Kenya has more than 300 supermarkets distributed across the country (Economic Survey, 2015). Supermarkets have a structure of three tiers, (Mageto, 2009) the first tier composes of the market leaders and they a domestic-capital representing 65% of the supermarket sector. (Nevem&Reardon.2004), Example of first tier in Nairobi County includes Naivas, Carrefour and Tuskys supermarkets. The second tier composes of 28% huge design stores and are increasing
more rapidly, growing their supremacy over time. The third tier consists of small chains of which are about 40 and autonomous (single stores) supermarkets in Nairobi have are increasingly growing in number and size and are expected to grow further in the future.

**Statement of the Problem**

According to Panigrahi and Kumar (2013), retail industry has experienced the growth and downfall in different parts of the world. Lack of inventory management systems, inefficiency and improper inventory management systems has led to fall of many retail firms across the world (Anichebe & Agu, 2013) and Kenya has not been left out, we have experienced rise and fall of giant supermarkets like Nakumatt holding and Uchumi supermarkets. diverse problems such as low quality goods, low levels of technology, inflated cost of operation, unreliable customers and lack of innovation skills has greatly affected the retail sector (Gok, 2015).in order to balance these problems affecting retail sector (Kumar & Bahl, 2014), indicated that it’s important to implement inventory management system. Globally the retail industry has indicated a growth 80% .the world’s top retailers posted an increase in retail turnover revenue, Sales-weighted, currency-adjusted retail revenue rose by 5.1% to US$4.271 trillion in fiscal year 2012. Despite this growth in the developed countries, supermarkets in Kenya have experienced decline in profitability and growth of 25% (Delloite, 2012). According to KPMG (2015), retail giants like Uchumi and Nakumatt in Kenya are hardly surviving in the local market due to lack of proper inventory systems and structures, but foreign outlets like Carrefour are continually gaining ground. Inventory management systems has effects on profit maximization, customer satisfaction and market share growth of firms, study by (Kamau & Kagiri, 2015) at Safaricom Ltd. Kenya’s retail sector has been growing by about 30% in the past decade (Neven, Reardon, Chege, & Honglin, 2006), but the retail firms are faced with a major challenge in providing quality service due to the many different types of products that they stock and the varied demand to each type of product they stock (Gennady & Elena, 2015).

A study by Thogori and Gathenya, (2014) indicated that high down fall of many retail business in Kenya has been contributed by poor inventory management systems which led to over stocks, stock-outs and poor customer services in return the firms are unable to sustain the competitiveness in the market hence giving in to the pressure of closing down or selling their shares. In another study by Sitienei and Memba (2015) in one of cement manufacturing firm indicated that its profit declined due to introduction of more production capacity without setting proper inventory management systems to maintain the inventory level. Other several studies have been done on effect of inventory management systems, Oballah, Waiganjo and Wachiuri did a study at Kenyatta National Hospital which indicted the institution performance was declining due to lack of proper inventory management system, Mwangangi (2016) in his study on logistics management in manufacturing industry Kenya also talks about inventory management. While Kariuki and Shale (2015) established moderating effect of vendor managed inventory system in Uchumi supermarkets in integrating supply chain performance. There exists a gap in literature on the inventory systems, structures and performance of the Kenyan retail sector to influence the development vision in Kenya. The study therefore sought to address the gaps on the effect of inventory management systems on performance in retail supermarkets Nairobi City County in Kenya.
Research objectives

i. To establish the effect of ERP systems on performance of retail supermarkets in Nairobi City County, Kenya

ii. To assess the effect of EDI systems on performance of retail supermarkets in Nairobi City County, Kenya

iii. To determine the effect of VMI systems on performance of retail supermarkets in Nairobi City County, Kenya

iv. To evaluate on the effect of JIT systems on performance of retail supermarkets in Nairobi City County, Kenya

Literature Review

Theoretical Review

Resource Based Theory.

Resource based view theory was used to explain how the internal resources of a firm’s sustains competitive advantage (Kraaijenbrink, Spender & Groen, 2010) The RBV theory in a firm also demonstrates how resources internal to the firm are sources of enabling factors of inventory control in the firm to have better performance (Tukamuhabwa, Eyaa & Derek, 2011). Such resources are valuable, rare, unique and difficult to substitute. Resources believed to be valuable are those that are capable of facilitating conception or implementation of strategies that improve performance, exploited market opportunities or neutralized impending threats (Barney & Clark, 2010). In the study of Bradford and Florin, (2003) RBT has proven a positive framework for analysing the sources and sustainability of competitive advantage, it’s also important to know that organizational growth and resource-based theory both pursue the Objective of generating a sustaining competitive advantage and these appears logical for organizational growth to be identified as a strategic resource within resource based view. Business planning, decision making and setting business objectives requires ERP system to effectively enhance business information processing flow in the whole organisation (Hus, 2013). Resource base theory helped to explain how ERP system is a unique resource in the organisation, Masquefa (2008) indicated that it’s difficult to imitate and transfer a well implemented ERP system which operates in an information system based on internet technology such as intranet which connects only within the firm and enables the business routine flow well. Hsu, (2013) define how a well-integrated ERP system and E-business has a great impact on business performance when it’s well managed as a key resource. Application of ERP system improves efficiency and productivity in a firm (Gorla, et al, 2010) thus improving the accumulation and assimilation of resources to growth of the firm.

Agency Theory

Agency theory originated from the problems of risk sharing between the principle and agents (Dong et al, 2014).the theory explains the operational relationships and party-interests in business organisations by describing the relationship between the principle, agent and delegation of controls in the relationships. The theory tries to explain how best to organise relationships in which one party(principal) determines the work and the other party(agent) performs or makes decisions on behalf of the principle (Jensen &Meckling,1976; Schroeder et al,2011,thus the theory demonstrated how the vendor and the supplier will share risks and gains in their relationship. VMI system is an inventory and supply chain management system in which the supplier has taken the responsibility for making decision on the timings, quality and lead time for inventory
replenishment (Stadtler, 2015) the study adopted agency theory to demonstrate the effects of supplier - retailer relationship in the retail supermarkets and how to manage the flow of inventory (Kondo, 2015). Adoption of VMI system has difference levels of risks thus agency theory demonstrated how to address the problems arising between the goals or desire between the principal and agent (Gordon, 2015).

**Theory of Constraints**

TOC is a set of principles which uses all activities that would cause a bottleneck in different process operations in organisation by increasing total process throughout (Coller & Evans, 2006). Stevenson, (2013) defined TOC as a planning and scheduling approach that focuses on bottleneck operations. The bottleneck operations as defined by Jacobs, Berry, Whyback and Vollman, (2011) is a resource which has the same or lower than required demanded capacity. Stevenson, (2013) in his book, operation management theory and practice, indicated TOC approach as a bottleneck operation which limits the output of the system and therefore organising the non-bottleneck operation system like EDI would reduce the period when the bottleneck operations were idle. The study used TOC theory to explain how EDI system through automation planning and scheduling reduced constrain and bottlenecks of inventory flow. According to Collie and Evans (2006) constraints limit the production output to their own capacity therefore determining the production output and causing a constraint in the value stream as described by Melton (2005). A firm with an operating EDI system has the basic database which is used by the TOC, just like with other applications, and implementing TOC as an extension is a logical extension (Jacobs, et al., 2011). According to Chan and Lin (2008) firms using TOC can achieve reduced lead time, improved operations, fall in inventory and increased return on investment. Constraints limit a manufacturing firm from achieving more of its goal as confirmed by Jacobs et al., (2011) who found out that by focusing on constraining resources, TOC automation provides improved performance to manufacturing firms. The EDI system provides adequate information regarding the flow of materials for an efficient process. The Theory of Constraints was used in the study to help in identifying where constraints could arise in the system and give an insight on how to manage them through use of EDI system.

**Adaptive Structuration Theory**

Anthony Giddens, (1984), was the first to propose AST theory as a system which attempts to reconcile the social systems in the micro and macro perspective of organisational structure. The study intends to determine the effects of information Technology (IT) on how it can improve the performance of the retail supermarkets. Shin, Ennis and Spurlin, (2015) in their study stated that Just in Time system has been used to improve business performance by ensuring inventory availability at the right time, reduce excess and stock-out inventory as well as reducing inventory cost. The study will adopt AST theory to demonstrate how JIT system will help in inventory management. AST provides a good common ground whereby the interaction between advancing information technologies, social structures, and human interaction is described, and which social structures, rules, and resources provided by IT as the basis for human activity. AST examines the change from distinct perspectives thus making it viable approach in studying how JIT affects inventory management in terms of accountability, cost and lead time. AST is also a relevant theory in today’s inventory management practice due to the expanding influence that advancing
technologies have with regard to the human-interaction aspect of AST and its implication on socio-biologically inspired structuration in security software applications (Ramakrishna, 2005). AST theory presents specific advances in information technology that are driving organizational changes in the areas of inventory accountability lead time and IT planning. Development shows that AST was used as a driving force of effective management of inventories within organizations.

**Theory of Performance**

Theory of Performance is considered relevant in understanding the effect of inventory management systems on performance of retail supermarkets in Nairobi City County and hence provides the theoretical background for this study. Elger (1962) argued that the Theory of Performance (TOP) develops and relates six foundational concepts to form a framework that can be used to explain performance as well as performance improvements. To perform is to produce valued end results. This theory was anchored on performance of retail systems which was the dependent variable in the study. According to Schrettle et al. (2013), performance calls for greater awareness of and attention to formal elements of textual representation and also calls for greater focus on context. Performance theory situates stories to a particular event and credits a narrator who assumes responsibility for the performance. Each performance is key, and relies on a performer’s assumption of responsibility for the emergent event. According to Taylor (2014) work environment and intentions to use IT may be based on its anticipated impact on job performance, regardless of the individual's overall attitude toward that system. In other words, even though an employee may dislike a system, that employee may still use the system if it is perceived to increase job performance.
Enterprise resource planning
- Inventory turnover
- Quality merchandising
- Material utilization

Vendor managed inventory
- Replenishment levels
- Strong supplier relationship
- Lead time

Electronic data interchange
- Innovation
- Information management
- Department synchronization

Just in time (JIT)
- Waste elimination
- Reduced buffer stock
- Quality improvement

Retail performance
- Profits
- Market share
- Customers satisfaction

Independent Variables

Figure 1 Conceptual Framework

Enterprise Resource Planning
EPR is a business system that is supported by multi-module application software that integrates all the departments or functions of an enterprise thus improving the inventory turnover (Ken et al, 2010). Implementation of EPR system in organisation precipitates a profit driven organisations through enhancement of its productivity and lowering the cost of doing business, Almgren and Bach (2014). A study by Chitiou, (2009) showed that 70% of the most profitable firms and 90% of the leading firms in market capitalization have implemented ERP system. Other studies of Abugabah and Sanzogni, (2009) and Njihia and Mwirigi, (2014) have also suggested that profitability is one of the basic indicator of ERP performance. ERP innovation has been expanded to include business intelligence (BI) and the efficient handling of front-office functions such as sales force automation (SFA), marketing automation and e-commerce which increases organisational growth by 40% in different range of industries (Dirisu, Iyiola & Ibidunni, 2013). Park & Park, (2015) indicated that application of ERP system improves efficiency and profitability of an organisation, while Lwiki et al., (2013) emphasised that maximization of profitability and growth of a business will be affected by the application of a structured EPR. Other Multiple
business value of ERP such as improved business insight, lower organizational inventory costs, stock availability as well as between the organization and other stakeholders through effective data sharing in requisitions, contracts and purchase orders has enhanced growth and profitability (Al-Mashari, 2003; Fosser, et al., 2008; Dirisu, et al., 2013). Furthermore, ERP systems have been appraised for their potential impact on improved efficiency, reduced risks and lower inventory costs (Mahmoudi & Ahmadi, 2008).

**Vendor Managed Inventory (VMI)**

Zacharisson et al (2014) defined VMI as an inventory control strategy which involves a coordinated partnership between two parties, supplier and vendors with the aim of managing the flow inventory. In VMI system which has been described as an inventory and a supply chain management tool, the supplier takes the responsibility of ensuring timely and quality products are replenished in the vendor’s premises through a system called continuous replenishment process, or automated replenishment (Stadtler, 2015). According to a study by William et al, (2014) implementation of the VMI system in the retail firms can reduce inventory cost of the firm by range of 12% to 15%. A similar study by Zhao et al (2016) while studying the biggest world global retailers such as Walmart and Foodex indicated that they realized a 13% increase in its gross profit after integration of VMI system in Africa. Shoprite a giant supermarket in South Africa also recorded 18% increase in total revenue after full integration of VMI system in their supply chain (Njura, 2015). A well-managed VMI system can diminish the bullwhip effects that are linked up with incorrect forecasting of demand, improve the set-up time of machines, decrease administrative costs, reduce inventory cost, truckload rate, stock-outs, overstocks and improve the overall organisation growth (Wisner, 2016). Other researches like, Irungu and Wanjau (2011), (Dong, Dresner & Yao, 2014) also noted that implementation of VMI system has the advantage of reducing cost, increasing customer service level and overall business growth. A study by Wambua, et al, (2015) on supply chain in Kenyan, indicated that VMI has great potential of reducing inventory—carrying cost and stock out problems while at same time increase the ability to synchronize both inventory and transportation operations.

**Electronic Data Interchange (EDI)**

According to Carter & Price (2010) reliance on information it’s very important to its performance and existence. EDI is defined as a computer-to-computer communication of business information and documents in an electronic format between organisations magutu et al, (2010). To effectively manage inventory, information technology is needed to facilitate tracking and recording of inventory. The use of computers helps to keep proper records and maintain the relevant inventory levels at an optimum level through information technology. Electronic Data Interchange (EDI) system is used to manage inventory through direct communication between different organizations involved in the handling of inventories for the purpose of facilitating business transactions, it involves transmitting and receiving of data in a structured manner by trading partners without the intervention of people (Jessop, 2006). EDI helps to link organizations with the suppliers making it possible to place an order anytime need arises. Schneider, (2013) argued that through EDI, computers of organizations and suppliers are linked making it easy to monitor inventory levels and reduce possible delays where a need arises thus
improving the overall performance. This helps to reduce paper work, increase the level of accuracy, and reduce labour cost and possible delays due to instant communication.

**Just In Time**

JIT system is a model based on four crucial principle, continuous improvement of product and services, defects and waste elimination, improvement of planning and implementation of firms strategies(Obiri yeboah,Ackah & makafui,2015). A study by Shin, Ennis and Spurlin,(2015) indicated that JIT system improves the overall business performance by ensuring availability of inventories at the right time ,right quality ,reduced lead time ,reduced inventory cost and also waste minimization. Organisations have integrated JIT system to identify their value chain challenges and help in reducing inventory cost and waste management thus improving the quality of products and services which helps them to remain competitive in the market (Kootanaee, Nagendra & Hamidreza, 2013).

**Research Methodology**

The study adopted a descriptive research design and targeted 104 employees drawn from the sampled retail supermarkets in Nairobi City County. The study adopted a sampling formula from Cooper and Schindler (2014) to derive a sample of 83 respondents. The study used questionnaires with open and close ended questions to collect captured through a 5-point likert scale. Inferential and descriptive statistics was used to analyse data. Results of the analysis were presented by use of tables and figures. Inferential statistics was used to establish the association between independent variables and dependent variable. The study used the following regression model:

\[ Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon \]

Where \( Y \) = Performance of retail outlets in Nairobi City County, \( \beta_0 \) =Constant; \( \beta_1, \beta_2, \beta_3\) and \( \beta_4 \) =Regression coefficients; \( X_1 \) =Enterprise resource planning; \( X_2 \) = Vendor managed inventory; \( X_3 \) =Electronic data interchange; \( X_4 \) = Just in time; \( \epsilon \) =Error Term.

**Results**

The study administered 83 questionnaires where 75 questionnaires were filled and returned. This represented a response rate of 95%. This agrees with the study by Mundy (2008) who stated that a response rate of 50% in a survey is adequate to determine the implication of the accuracy of the final data.

**Descriptive statistics and Analysis**

**Enterprise resource planning**

Results indicated that majority of the respondents as indicated by a mean of 3.67 agreed on the statement that ERP system plays a significant role in material utilisation. The variations in the responses were shown by a standard deviation of 0.935. The respondents also by a mean of 4.03 agreed that ERP system has increased coordination between departments with a variation of a standard deviation of 0.852. Furthe results indicated that majority of the respondents agreed by a mean of 4.14 that ERP system played a significant role in quality merchandising in the retail supermarkets. The variations in the responses were shown by a standard deviation of 0.843. Majority of the respondents as indicated by a mean of 4.12 also agreed on the statement that ERP system has minimised ordering cost with a variations in
the responses shown by a standard deviation of 0.853. Results indicated that majority of the respondents as indicated by a mean of 4.22 agreed on the statement that ERP system plays a significant role in reducing the decision making process. The variation in the responses was shown by a standard deviation of 0.847. These echoed findings by Ballou (2004) that implementation of quality systems is an essential aspect of both inventory management and performance in order for an organization to achieve competitive advantage.

Table 1 Enterprise resource planning

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP has improved material utilisation in the outlet</td>
<td>3.67</td>
<td>0.935</td>
</tr>
<tr>
<td>EPR has increased coordination between departments</td>
<td>4.03</td>
<td>0.852</td>
</tr>
<tr>
<td>ERP has improved quality merchandising</td>
<td>4.14</td>
<td>0.801</td>
</tr>
<tr>
<td>ERP has improved inventory turnover</td>
<td>4.06</td>
<td>0.843</td>
</tr>
<tr>
<td>ERP has minimised ordering cost in the outlet</td>
<td>4.12</td>
<td>0.853</td>
</tr>
<tr>
<td>ERP has reduced decision making process</td>
<td>4.22</td>
<td>0.847</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>4.04</strong></td>
<td><strong>0.855</strong></td>
</tr>
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**Vendor managed inventory system**

The respondents commented fairly on the statements regarding the effect of VMI system. The analysed results indicated that majority of the respondents agreed by a mean of 3.68 that VMI system reduces the lead time with a variation was 0.89. Results indicated that majority of the respondents indicated by a mean of 3.99 agreed on the statement that VMI system has enhanced supplier relationship. The variation was 0.764. Results indicated that majority of the respondents indicated by a mean of 3.99 agreed on the statement that VMI system has reduced customer complaints and the variation was 1. Respondents indicated by a mean of 3.97 agreed on the statement that VMI system has improved stock availability with a variation of 0.772. The results also indicated that majority of the respondents indicated by a mean of 4.19 agreed that use of VMI system has reduced paperwork. The variation was 0.807. Results indicated that majority of the respondents indicated by a mean of 4.09 agreed on the statement that VMI system has enhanced information sharing between supplier and vendor and the variation was 0.807. Results indicated that majority of the respondents indicated by a mean of 4.09 agreed on the statement that use of VMI system has reduced storage and holding cost. The variation was 0.759. Results indicated that majority of the respondents indicated by a mean of 4.14 agreed on the statement that VMI system has reduced for inventory acquisition. The variation was 0.864. These results were echoed by Gordon (2004) that supplier-customer relationships has shifted from a focus on the organizational traits associated with relationships to a focus in which personal trust between the parties has been acknowledged as an important ingredient and is a function of individual behaviour, accountability and interaction frequency.

Table 2 Vendor managed inventory

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMI has reduced lead time from 2weeks to 1week</td>
<td>3.68</td>
<td>0.89</td>
</tr>
<tr>
<td>VMI has enhanced better vendor supplier relationship</td>
<td>3.99</td>
<td>0.764</td>
</tr>
<tr>
<td>VMI has reduced customer complaints in the outlet</td>
<td>3.99</td>
<td>1</td>
</tr>
</tbody>
</table>
VMI has improved stock availability in the outlet 3.97 0.772  
VMI has reduced paperwork in the outlet 4.19 0.807  
VMI has improved information sharing with suppliers 4.09 0.809  
VMI has reduced storage cost and holding cost 4.09 0.759  
VMI has reduced period of inventory acquisition 4.14 0.864  
Average 4.02 0.833  

**Electronic data interchange.**

The respondents in the study commented on statements regarding the effect of EDI system. The concluded results indicated that majority of the respondents indicated by a mean of 3.68 agreed on statements that EDI system improved management of information with a variation of 1.041. Majority of the respondents indicated by a mean of 3.91 also agreed on the statement that EDI system has enhanced department synchronisation with a variation 0.825. The results indicated that majority of the respondents indicated by a mean of 3.97 agreed on the statement that EDI system has improved innovation in inventory management and the variation was 0.897. The respondents in the study agreed by a mean of 4.13 that EDI system has improved stock availability with a variation of 0.827. Results indicated that majority of the respondents indicated by a mean of 4.05 agreed that use of EDI system has improved inventory acquisition process. The variation was 0.952. Results indicated that majority of the respondents indicated by a mean of 4.17 agreed on the statement that EDI system has improved on management of vendors and the variation was 0.796.

**Table 3 Electronic data interchange**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDI has improved information management in the outlet</td>
<td>3.86</td>
<td>1.041</td>
</tr>
<tr>
<td>EDI has improved department synchronization in the outlet</td>
<td>3.91</td>
<td>0.825</td>
</tr>
<tr>
<td>EDI has improved innovation in inventory management</td>
<td>3.97</td>
<td>0.897</td>
</tr>
<tr>
<td>EDI system has improved stock availability in the outlet</td>
<td>4.13</td>
<td>0.827</td>
</tr>
<tr>
<td>Use of EDI has improved inventory acquisition process</td>
<td>4.05</td>
<td>0.952</td>
</tr>
<tr>
<td>EDI system has improved vendor supplier management</td>
<td>4.17</td>
<td>0.796</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>4.015</strong></td>
<td><strong>0.890</strong></td>
</tr>
</tbody>
</table>

**Effect of JIT system on performance**

Respondents were asked to comment on statements regarding the effect of JIT system. Results indicated that majority of the respondents indicated by a mean of 3.85 agreed on statements that JIT system improved quality of inventory leading to customer satisfaction. The variation was 1.082. Results indicated that majority of the respondents indicated by a mean of 3.83 agreed on the statement that JIT system has reduced idle time in processing orders. The variation was 0.973. Results indicated that majority of the respondents indicated by a mean of 3.88 agreed on the statement that JIT system has reduced shrinkage, damages and defects thus improving profits and the variation was 0.98. Results indicated that majority of the respondents indicated by a mean of 3.91 agreed on the statement that JIT system has reduced inventory buffer stocks.
variation was 0.983. Results indicated that majority of the respondents indicated by a mean of 3.81 agreed that use of JIT system has improved customer service and the variation was 0.968. Results indicated that majority of the respondents indicated by a mean of 3.91 agreed on the statement that JIT system has improved on inventory control process and the variation was 1.034. Results indicated that majority of the respondents indicated by a mean of 3.83 agreed on the statement that JIT system has increased customer confidence and the variation was 0.986. These echoed findings by Chang (2006) that demand and supply management is focused on a fast and adequate integration of supplier systems and needs in order to balance customer demand with operational capability of the organisation.

Table 4 Just in time

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>JIT has improved quality of inventory</td>
<td>3.85</td>
<td>1.082</td>
</tr>
<tr>
<td>JIT has reduced idle time in order processing</td>
<td>3.83</td>
<td>0.973</td>
</tr>
<tr>
<td>JIT has reduced shrinkage, damages and defects</td>
<td>3.88</td>
<td>0.98</td>
</tr>
<tr>
<td>JIT has reduced inventory buffer stocks</td>
<td>3.91</td>
<td>0.983</td>
</tr>
<tr>
<td>Use of JIT has led to improved customer service</td>
<td>3.81</td>
<td>0.968</td>
</tr>
<tr>
<td>JIT has improved inventory control process</td>
<td>3.91</td>
<td>1.034</td>
</tr>
<tr>
<td>JIT has increased customer confidence</td>
<td>3.83</td>
<td>0.986</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>3.86</strong></td>
<td><strong>1.001</strong></td>
</tr>
</tbody>
</table>

Inferential statistics

Correlation analysis

Chikkodi and satyaprasad (2009) defined correlation as the possible connection or relationship between values of two or more variables of the same phenomenon. It clearly indicates the strength of the relationships. Correlation coefficient ranges from -1.00 to +1.00. A correlation coefficient of -1.00 denotes a perfect negative correlation while a value of +1.00 represents a perfect positive correlation. Correlation analysis was used to determine both the significance and degree of association of the variables and also predict the level of variation in the dependent variable caused by the independent variables. The correlation technique is used to analyse the degree of association between two variables. The results of the correlation analysis are summarized in Table 5.
The correlation summary indicates that the associations between each of the independent variables and the dependent variable were all significant at the 95% confidence level. The correlation analysis to determine the effect of inventory management systems on performance in retail supermarkets in Nairobi city county, Pearson Correlation Coefficient computed and tested at 5% significance level. The results indicate that there is a positive relationship \( r=0.498 \) between enterprise resource planning system and performance in retail supermarkets in Nairobi city county, Kenya. The researcher also found the relationship to be statistically significant at 5% level \((p=0.000, <0.05)\). The correlation analysis to determine the relationship between vendor managed inventory system and performance in retail supermarkets in Nairobi city county, Kenya, Pearson Correlation Coefficient computed and tested at 5% significance level. The results indicate that there is a positive relationship \( r=0.530 \) between vendor managed inventory system and performance in retail supermarkets in Nairobi city county, Kenya. In addition, the researcher found the relationship to be statistically significant at 5% level \((p=0.000, <0.05)\). The correlation analysis to determine the relationship between electronic data interchange system and retail supermarket performance in Nairobi city county, Kenya, Pearson Correlation Coefficient computed and tested at 5% significance level. The results indicate that there is a good relationship \( r=0.527 \) between electronic data interchange system and retail supermarket performance in Nairobi city county, Kenya. In addition, the researcher found the relationship to be statistically significant at 5% level \((p=0.000, <0.05)\). The correlation analysis to determine the relationship between just in time system and retail performance of supermarket in Nairobi city county, Kenya, Pearson Correlation Coefficient computed and tested at 5% significance level. The results indicate that there is a positive relationship \( r=0.428 \) between just in time system and retail performance of supermarket in Nairobi city county, Kenya. In addition,
the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05). and all the independent variables could explain the retail supermarket performance in Nairobi city county, Kenya on the basis of the correlation analysis.

**Regression analysis**

Regression analysis was used to determine the significance of the relationship between the dependent variable and all the independent variables pooled together. Regression analysis was conducted to find the proportion in the dependent variable (retail supermarket performance), which can be predicted from the independent variables (Enterprise resource planning, vendor managed inventory, electronic data interchange and just in time). Table 6 presents the regression coefficient of independent variables against dependent variable. The results of regression analysis revealed there is a significant positive relationship between dependent variable (Retail supermarket performance) and the independent variables (Enterprise resource planning, vendor managed inventory, electronic data interchange and just in time).

From the illustrated output summary below from SPSS, the value of R square was 0.604≈ 60%. This implied that 60.4% of the effects in the performance of retail chain in Kenya were explained in the model throughout the factors under consideration: enterprise resource planning, vendor managed inventory, electronic data interchange and just in time, leaving 39.6% of the effects unexplained. This implied that there could be other factors influencing the performance of retail supermarkets in Kenya other than the ones already investigated on. R square in table 6 is called the coefficient of determination which indicates how retail supermarket performance varied with variation in effects of factors which includes enterprise resource planning, vendor managed inventory, electronic data interchange and just in time. The results of regression analysis revealed that there was a significant positive relationship between dependent variable and independent variable at (β = 1.329), p=0.000 <0.05).

**Table 6 Model Summary**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.777&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.604</td>
<td>0.567</td>
<td>0.694</td>
</tr>
</tbody>
</table>

According to Kothari (2010) analysis of variance (ANOVA) a statistics method normally used to test the differences between two or more means from a group, it is basically used more when testing general rather than specific means and their related procedures. The significance value is 0.000 which is less that 0.05 thus the model is statistically significance in predicting how enterprise resource planning, vendor managed inventory, electronic data interchange and just in time affect the retail supermarket performance. The F critical at 5% level of significance was 6.22. Since F calculated which can be noted from the ANOVA table above is 10.865 which is greater than the F critical (value = 6.22), this shows that the overall model was significant. The study establishes that, enterprise resource planning, vendor managed inventory, and electronic data interchange and just in time were important systems which influenced the retail supermarket performance. These results agree with Asaari and Razak (2010) results which indicated that inventory management systems have a positive and significant impact on performance of retail supermarket in Nairobi city county, Kenya.
The regression equation has established that taking all factors into account (Enterprise resource planning, vendor managed inventory, electronic data interchange and just in time) constant at zero, retail supermarket performance will be at the index of 1.329. The findings presented also shows that taking all other independent variables at zero, a unit increase in enterprise resource planning will lead to a 0.167 increase in retail supermarket performance. The P-value was 0.00 which is less than 0.5 thus concluding that the relationship was significant. The study also found that a unit increase in vendor managed inventory will lead to a 0.218 increase in better retail supermarket performance. The P-value was 0.00 which was less than 0.5 thus concluding that the relationship was significant. In addition, the study found that a unit increase in electronic data interchange lead to a 0.176 increase in betterment of retail supermarket performance. The P-value was 0.001 and thus the relationship was significant because the p-value was lower than 0.005. Lastly, the study found that a unit increase in just in time will lead to a 0.106 increase in the retail supermarket performance. The P-value was 0.002 and hence the relationship was significant since the p-value was less than 0.05. The findings of the study has showed that, vendor managed inventory contributed most to the retail supermarket performance in Nairobi city county, Kenya.

Table 8 Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Std. Error</th>
<th>Standardized Coefficients</th>
<th>B</th>
<th></th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>1.329</td>
<td>0.419</td>
<td></td>
<td></td>
<td></td>
<td>3.174</td>
<td>0.000</td>
</tr>
<tr>
<td>1</td>
<td>Enterprise resource planning</td>
<td>0.167</td>
<td>0.110</td>
<td></td>
<td></td>
<td>0.206</td>
<td>1.525</td>
<td>0.000</td>
</tr>
<tr>
<td>1</td>
<td>Vendor managed inventory</td>
<td>0.218</td>
<td>0.120</td>
<td></td>
<td></td>
<td>0.246</td>
<td>1.811</td>
<td>0.000</td>
</tr>
<tr>
<td>1</td>
<td>Electronic data interchange</td>
<td>0.176</td>
<td>0.144</td>
<td></td>
<td></td>
<td>0.181</td>
<td>1.226</td>
<td>0.001</td>
</tr>
<tr>
<td>1</td>
<td>Just in time</td>
<td>0.106</td>
<td>0.130</td>
<td></td>
<td></td>
<td>0.105</td>
<td>0.813</td>
<td>0.002</td>
</tr>
</tbody>
</table>

The optimal regression model becomes:
Retail Performance $= 1.329 + 0.218\text{(Enterprise resource planning)} + 0.176\text{(Electronic data interchange)} + 0.167\text{(Enterprise resource planning)} + 0.106\text{(Just in time)}$

**Conclusion**

On enterprise resource planning, all the Likert scale items had a tendency toward positive responses and this leads the study to conclude that enterprise resource planning is significant when implemented. There is a positive improvement of the inventory turnover, minimised ordering cost, improved material utilization and improved quality merchandising which leads to a positive relationship with retail performance. On vendor managed inventory, the study concludes that supplier relationships currently in place at retail supermarkets were very effective in the retail performances. The study also concludes that supplier-customer relationships has shifted from a focus on the organizational traits associated with relationships to a focus in which personal trust between the parties has been acknowledged as an important ingredient and is a function of individual behaviour and interaction frequency. The study examined the effects of electronic data interchange and concluded that the computer to computer communication was very effective in the enhancement of retail performance. Innovation and department synchronisation were the key drivers of the improved inventory management. The study also concludes that the system enables the stakeholders easily monitor inventory levels and reduce possible delays where a need arises thus improving the overall retail performance. On Just in time the study concluded that just in time has a great impact on the management of the inventory flow, currently many retail supermarkets especially those who deal with the perishable inventory supply chain applies these system to manage their inventory. The study also concludes that just in time is focused on a fast and adequate integration of supplier needs in order to improve and balance the expected demand, customer satisfaction and supply with operational capability in the retail supermarkets.

**Recommendations of the Study**

The study recommends that Adoption of ERP system injects efficiency in organizational processes, which allow organizations to react promptly and simultaneously to certain environmental turbulences and opportunities which might affect the business. Implementation of ERP system in the firms ensures quality merchandise through the computerised process of inventory control checks. ERP system can also be associated with improved inventory turnover and management, as well as higher productivity and greater efficiency hence diminishing operation costs, improved customer satisfaction and enhanced profits. The study also recommends that a well-managed VMI system can diminish the bullwhip effects that are linked up with incorrect forecasting of demand, improve the set-up time of machines, decrease administrative costs, reduce inventory cost, truckload rate, stock-outs, overstocks and improve the overall organisation growth, through the control strategy which involves a coordinated partnership between two parties, supplier and vendors with the aim of managing the flow inventory. Implementation of VMI system has the advantage of reducing cost, increasing customer service level and profits because it has been identified as an inventory and a supply chain management tool. The study recommends all retail supermarket to have all suppliers on board in the inventory management through the VMI system. The study further recommends that, to effectively manage inventories, EDI system is need to facilitate tracking and recording of
inventories, as defined EDI system is a computer to computer communication of business information which involves transmitting and receiving of data in a structured manner by trading partners without the intervention of people. The use of computers helps to keep proper records and maintains the relevant inventory levels at an optimum level through information technology and also enables the stakeholders easily monitor inventory levels and reduce possible delays where a need arises thus improving the overall performance. This also helps to reduce paper work, increase the level of accuracy, and reduce labour cost due to instant communication. The study finally recommends use of JIT system because it is model based on four crucial principles, continuous improvement of product and services, defects and waste elimination, improvement of planning and implementation of firms strategies, these JIT system models are key to overall business performance by ensuring availability of inventories at the right time, right quality, reduced lead time, reduced inventory cost and also waste minimization. The study recommends that all retail supermarkets should integrate JIT system to identify their value chain challenges and help in reducing inventory cost and waste management thus improving the quality of products and services which helps them to enhance customer satisfaction as well as remaining competitive in the market.

Acknowledgement
I acknowledge JKUAT University for allowing me to undertake my studies and for providing a supportive learning environment. I also thank the University lecturers and support staff for their encouragement. My sincere gratitude goes to my supervisor Dr. George Ochiri for his unwavering support and guidance towards actualizing my professional mission.

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