TECHNOLOGY AS A COMPETITIVE ADVANTAGE IN SUPERMARKET OPERATIONS IN NAIROBI COUNTY

BY

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DECLARATION

This research proposal is my original work and has never been presented for any degree in this or any other university.

Signed..... Date 02/11/2015

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D61/70914/2014

This research report has been submitted for examination with my approval as the university Supervisor.

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DEDICATION

I thank the almighty God for His providence. My wife Joyce kept the family together as I was busy with my studies. My daughter Kasese too sacrificed a lot to keep me awake till late for my assignments and this project too. God bless you all.

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LIST OF ABBREVIATIONS

BPR	- Business Re-engineering Process
CCTV	- Closed-Circuit Television
EDI	- Electronic Data Interchange
EPS	- Electronic Payment System
ERP	- Enterprise Resource Planning
GPS	- Global Positioning System
IT	- Information Technology
ICT	- Information Communications Technology
JIT	- Just In Time
KAM	- Kenya Association of Manufacturers
POS	- Point of Sale
SC	- Supply Chain
SCM	- Supply Chain Management
SPSS	- Statistical Package for Social Sciences
TQM	- Total Quality Management
VMI	- Vendor Managed Inventory

ABSTRACT

Technology is a prerequisite for globally competitive organizations. The study aimed at investigating technology as a competitive advantage in supermarket operations in Nairobi County, Kenya. The study sought to answer the following specific objectives: to determine the extent to which technology is applied as a technique to gain competitive advantage, to establish the impact of implementation of technology on the supermarkets' competitive advantage, and to determine challenges faced in the implementation of technology in supermarkets. A cross sectional survey design was adopted, targeting 46 employees of the supermarkets in Nairobi County. Out of the 46 questionnaires distributed, 42 were returned which represented 91.3% response rate. Primary data was used in the study leading to collection and analysis of quantitative data using descriptive statistics. Statistical Package for Social Sciences (SPSS version 22.0) as a tool of analysis presented results through percentages, means, and standard deviations. The inferential analysis which includes regression and correlation was done to establish the relationship between independent variable and operational performance of supermarkets in Nairobi County. The study concluded that the adoption and applications of technology improved operational performance of the supermarkets. There were certain limitations such as company policy prohibiting staff from providing certain information without prior authorization from the Headquarters which was also against the time allocated. It was difficult to collect the questionnaires on times agreed because most managers had very busy schedules. Although the study was on technology as a competitive advantage in supermarkets operations in Nairobi County, it is recommended that the study be carried in other sectors and industries in the Kenyan economy so as to create value in those sectors.

CHAPTER ONE: INTRODUCTION

1.1 Background

A common feature of the environment in which all types of organizations operate is the presence of ever-accelerating rate of change. Management and the information systems that support the organizations must lean towards changing proportionately in order to survive and prosper. The typical changes taking place today within organizations are; more competition, faster pace leading to shorter cycle times, and increased globalization (Lucey, 2005). Internet and global communications have greatly reduced the economic and cultural advantages of developed countries because the Western world is competing for markets and resources with the highly educated and motivated populations from the developing countries (Friedman, 2007).

Veila (2012) posits that in order to stay competitive globally in a complex business world, companies are today incorporating technology into their supply chain management systems; and this is due to customer demands on quality and service. Managers equally have realized that technology can help them ensure accountability and visibility, production tracking, mistake proofing, quality improvements, vehicle tracking through GPS, electronic invoicing, bar-coding, CCTV surveillance, stocks management, and easier communications through smart phones.

Technology, as the knowledge and application of tools, techniques, systems, and methods of organization, dates back to the era when human beings started use of tools, but the use was geared up during the industrial revolution era so as to achieve mass production. These include manual stock taking techniques such as ABC analysis, and delivery systems such as JIT.

Information communications technology (ICT) is an essential infrastructural system for gathering, storing, retrieving, processing, analyzing and transmitting information and is the back bone of digitized firms and a platform for e-commerce (Wikipedia). These include internet based technologies such as transport management systems, vendor managed inventory systems, enterprise resource planning systems, and electronic payment systems.

According to Laudon and Laudon (2012), digital firms sense and respond to their environments far more rapidly than traditional firms, giving them more flexibility to survive in turbulent times. There is a growing interdependence between a firm's ability to use information technology and its ability to implement corporate strategies and achieve its corporate goals. Increasing market share, becoming high-quality product, innovation, and employee productivity depend more on the quality of information systems in the organization. Businesses invest heavily in information systems to achieve six strategic business objectives: operational excellence, innovation, services and business models, customer and supplier intimacy, improved decision making, and competitive advantage.

1.1.1 Technology in Business

According to Sople (2011), technology is playing a major role in operational effectiveness and efficiency of various functional areas of management. The importance of technology is today being directed to the value addition in organizations' competitive capacity (Chase and Jacobs, 2010). The ability by managers to forecast demand, manage order fulfillment, inventory levels and production schedules is necessary for a logistical performance. Information technology

enables real time information processing and analysis, accuracy, reliability and speed in information flow in the supply chain leading to productivity; hence profits for the organizations. Companies use technology and ICT in their logistics and transportation functions mainly to achieve cost reduction, customer satisfaction, and revenue and market share growth objectives. Langley, Coyle and Novack (2009), and Sople (2011) concur that in support to the three objectives, and to provide practical solutions, technology and ICT in SCM should be accessible, integrated, relevant, accurate, timely and transferable. When functions are integrated through technology, information is readily available to consumers for decision making, and operations are synchronized and synergized for efficiency, the right decisions are made based on accurate and reliable information, channel decisions transform to goods availability on timely basis.

Chopra and Meindl (2010), and Burt, Dobler and Starling (2010) agree that Wal-Mat, the largest discount retailer in the world, built its competence by leveraging point-of-sale technology. The scanning is able to speed up customer movement and gather information on items sold. The aggregated information is then electronically sent to supply collaborator for replenishment. This has improved customer service and decreased inventories. Sople (2011) traces use of bar code to retail markets in storage, retrieval, dispatch and transit of products. The bar codes are assigned to particular inventory item, and then scanners are used to identify the product at the point of sale or retrieval.

Use of technology and information systems to provide firm integration is necessary for customer and supplier relationship, and also leads to organized transport systems. Handfield (2013) posits that information systems can use optimization modeling and simulation to decide how many

units to transport from one warehouse of the retail markets to another. Planning and execution of networks, routes, and modes through use of technology provides information for decisions on costs, customer locations and transport selection. Murphy and Wood (2008) write that global positioning system (GPS) has dramatically changed the ability of the businesses to manage the actual movements in the distribution system.

Strategic procurement decisions require use of information systems and technology for online quotations, e-negotiations and e-payments; making it efficient to purchase goods and services without leaving one's desk. Processing and Packaging - Processing and conveyance of good around the manufacturing facility performs optimally with technology. The volumes of materials handled in a day through the use of technology save on costs as well as promoting economies of scale Chopra *et al.*, (2010).

1.1.2 Competitive Advantage

Gunasekaran and Ngai (2008), bring a view of responsive supply chain in relation to competitive advantage of a firm. Knowledge management in the design of supportive systems creates an enabling infrastructure, strategic planning follows in the implementation of the right information systems, and then a network of partnering firms lead to speed to the market for customer satisfaction. Supply chain management includes long term and short term relationships between main stakeholders with the orientation for customer service, sharing information, profits and risks. Kopczak and Johnsons (2003) define this action as the cause and effect that provides the mutual competitive advantage. This increases effectiveness relative to the competitors by

reducing costs, increasing profits and customer satisfaction (Elmuti, 2002; Wisner, Long & Tan, 2012).

Competition today is on value chains and calls for collaboration between functions, across and beyond the value chain; caused by a shift in expectations on the supply chain to deliver operational excellence in the performance organizations (Council of Supply Chain Management Professionals, 2013). Supply chain management is seen as the internal and external integration of the enterprise process with the customers and suppliers creating value for the customers (Cooper & Ellran, 1993; Cooper & Lambert, 1997).

Johnson and Scholes (2002) define strategy as the direction and scope of an organization over a long term which achieves advantage for the organization through its configuration of resources within a challenging environment with an aim to meet the needs of market and fulfill stakeholder expectations and is often stated explicitly in the organization mission statement. Ansoff (1998) posits that competitive strategy is the distinctive approach which the firm uses or intends to use to succeed in her market and adds that the formulation of competitive strategy include the consideration of strength weakness opportunities and threats.

Porter (1985) describes the competitive strategy model with three main pillars as cost leadership, differentiation and focus, with a stuck in the middle positions for firms that do not proactively embrace strategy. In cost leadership, some of the supermarkets in Nairobi offer competitive pricing of their products across board to attract the masses. Kariuki (2011) established that Naivas and Ukwala supermarkets were in this category of targeting low income earners through

offering low priced goods leading to volume sales. The niche market is differentiated by some supermarkets like Nakumatt targeting customers whose mentality is value for money coupled with 24 hour service and also placement of their stores in upper markets. On focus strategy, some other supermarkets target estate customers because they cannot compete effectively in suburbs and city centre.

Building on Porter's strategy, Turban, Lee and King (2006) cited 12 competitive strategies among which is growth strategy with web-based selling strongly quoted as a supporting pillar. Thomson, Strickland and Gamble (2007) observe that a company strategy is management action plan for running the business and conducting operations. Collaboration links vendors and the firm to share common infrastructure that leads to significant reliability of service delivery. Technology and automation adoption have led to better planning, transaction processing, monitoring and tracking, and better material handling methods.

1.1.3 Supermarkets in Nairobi County

The supermarkets, like any other marketing channel today, have realized the potential of customer demographics, lifestyles and purchasing power. A study by Kariuki (2011) examined the cost and product differentiation as generic competitive strategies applied by supermarkets in Nairobi and identified modernization and consumer behaviour influence business operating environment. This operating environment could be turbulent if technology applied by competition is directly affecting internal business competitiveness. Due to customer preferences, deregulations and globalization, innovation via use of technology has revolutionalised the retail industry leading to market growth. Mutegi (2013) studied supermarkets operations in Nairobi

and established that supermarkets use differentiation strategies such as market and innovation strategies in a bid to remain competitive in the market only to a little extent. Use of technology is a key factor in innovativeness especially in supermarkets operations where the rate of change in customer expectations is very high. Service line, geographical areas and customer characteristics inform focus strategies by supermarkets affects performance to a little extent.

According to Richbell and Kite (2007), shoppers in the UK supermarkets showed a trend of evening and early morning shopping. Majority of the workers were on shift schedules. Owuor (2009) looks at 24-hour economy in Kenya; in reference to supermarkets operating round the clock as a solution to nocturnal customers with hustle free service. With this kind of a service, there is increased trade, with night sales volumes increasing to being equal to day sales.

According to Ouma, Mwangi and Oduk (2013), the supermarket chains have continued to grow tremendously because of the self service operations and the nature of the Kenyan customer on touch and feel mentality. The latest information on each of the firms' websites indicates that Nakumatt operates 16 branches, Uchumi supermarket has 13, and Naivas has 14, with Tuskys having 23 branches in Nairobi County. Other supermarkets include: Ukwala, Eastmatt, Chandarana, Rikana, Cleanshelf, and others not in any order of size. Supermarkets are very demanding customers because they command very high and complex supply chain management for goods, services and information flow as well as reverse logistics.

A study by Kestrel Capital (2012) classified Nakumatt, Uchumi, Tuskys, and Naivas supermarkets as the large retails stores based on the fact that each one of them controlled a

revenue market share above 10%. According to the report, Nakumatt stores control 39.5% market share with an annual turnover of about 25 billion Kenya shillings. Tuskys supermarkets control 33.1% of market share with a turnover of Ksh. 18 billion annually. Uchumi supermarkets control 14.2% market share with a turnover of Ksh. 12 billion annually. Naivas supermarkets control 14.2% market share with an annual turnover of Ksh. 10 billion. Nakumatt, Tuskys and Uchumi supermarkets have regional presence. The rest of the supermarkets listed under this study fall under the medium category. Small sized supermarkets then are those operating at the estate level with 3 to 5 employees and with a turnover of below Ksh. 5 million; these are several thousands in Nairobi with majority operating traditionally.

The supermarket concept is 40 years in Nairobi with Uchumi Supermarkets being the pioneer in the mid seventies. Nairobi alone has about 122 supermarket branch network; with millions of SKU's that must be managed and updated on a daily basis. Supermarket categories range from chains dealing general merchandize to those dealing in clothes such as Woolworths, Deacons, and Mr. Price. Ibrahim's Electronics are an example of an electronics supermarket; Zucchini is a grocery supermarket (Kenyaplex Business Directory, 2015). Although a considerable majority of people in Kenya who live in urban centres including Nairobi are low income earners, they constitute demand that supermarkets can thrive on (Pralahad & Hammond, 2002).

1.2 The Research Problem

With almost daily global technological advancement, organizations need to synchronize by adopting and implementing new e-commerce and SC technology to maintain market share and have market penetration. Businesses today face a more complex competition than ever before

(Ellram, 1991; Srinivasan & Kekre, 1994; Porter & Stern, 2001). The expansion of information technology capability has reduced communication cycle to an almost an instant game. This has led to enhancing the competitor capacity to display their products on the any electronic platform faster and cheaply (Garten, 1998).

In Nairobi Kenya, it is important to clearly understand if there is collaboration through systems such as Vendor Managed Inventory (VMI) systems that are supported by suppliers of goods to the supermarkets. Improving firm performance through technology depends on the combination of IT infrastructure, integration, relevant skills and supportive relationships (Armstrong & Sambamurthy, 1999). As customers have become more discriminating and demanding (Ellinger & Daugherty 1997), product life cycles has been reduced forcing companies to contract the window of opportunity and provide higher customer service levels. With a 24 hour economy, Owuor (2009) looks at Nairobi as a hub with millions of working class people who look to the supermarkets for their shopping solutions. On the flip side, with this kind of a service, there is increased trade for the supermarkets that contribute to the national growth.

Effective SCM in retail markets require supportive elements from external sources provided by partners (Bensaou, 1997), and the effectiveness of the SCM depends on the support of a cluster of suppliers (Lee & Tang, 2000). Some of the inter-organizational factors that may influence adoption of technology in business are coercive pressure from the partners or industry (Premkumar & Ramamurthy, 1997) in order to standardize and coordinate communication.

Studies have been done in related areas, for example; Omwansa (2011) studied the information and communications technology and operational efficiency in supermarkets in Nairobi and found out that supermarkets with higher extent of use of ICT had a higher rate of operational efficiency. Makori (2013) studied real-time information processing and supply chain optimization among supermarkets in Nairobi, Kenya and found out that use of real-time information processing technology had benefits such as improved inventory management, reduced labour costs and supply chain visibility. Lagat (2010) also investigated the state of marketing intelligence activities in Kenya's retailing sector "The case of supermarkets in Nairobi" Kenya.

From all the above, it is evident that operational efficiency achieved is dependent on the industry the firms operate in and technology implemented by organizations in each industry. Although research has been done on supermarkets in Nairobi, none has focused on application of technology as a competitive strategy by supermarkets in Nairobi. Direct competition among the supermarkets creates a turbulent environment whose complexity requires implementation and use of technology. Therefore the research questions that arise are: To what extent is technology applied in the management of supermarkets operations in Nairobi, Kenya? What is the impact of the implementation of such technology in achieving competitive advantage by the supermarkets? What are the challenges faced in the implementation of the technology in the supermarkets?

1.3 Objectives of the study

The objectives of this study are:

i. To determine the extent to which technology is applied as a technique to gain competitive advantage in supermarkets in Nairobi County.

ii. To establish the impact of implementation of technology on the supermarkets' competitive advantage, and

iii. To determine challenges faced in the implementation of technology in supermarkets and possible solutions suggested.

1.4 Value of the Study

The study will be of importance to supermarket management for critical decisions on competitiveness. The management in the supermarket operations wants to base their decisions on empirical evidence that this study will provide. Business people will make investment decisions based on the dynamics and operations relate to retail business and supermarkets business. Researchers and academicians will use the information as a basis for further interrogation of literature. Competitors in the supermarkets operations will utilize the study for benchmarking and service delivery improvement. The analytical information provided through the data will keep the management of the supermarkets informed to make the standards necessary for benchmarking. Policy makers will use the information for infrastructural and technology regulations in the supermarket industry. The government and other policy stakeholders will utilize the information for a basic legislation and regulatory framework. The government for example can use the applied technology for taxation purpose since the POS systems can clearly show the total sales periodically.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter lays focus on review of theoretical, conceptual and empirical literature along the study's conceptualization. The chapter presents literature on theoretical underpinnings of the study followed by conceptual and empirical literature on use of technology as a competitive advantage by supermarkets in Nairobi.

2.2 Theoretical Perspectives of Technology Adoption

There are existing theories about technology as viewed in the perspective of being a human extension. The theories are essential in the understanding the technology evolution, different forms and their applications in business today.

2.2.1 Instrumentalization Theory

This theory analyses technology at two levels: the first level brings out the superiority of the human beings in manipulating tools to their advantageous use in solving their daily practical problems. This perhaps is the inherent basic functionality of the tools in relation to reality and the affordances that can be mobilized to the devices and systems to make them useful properties. The second level designs are then introduced to the devices and systems for social, technical and environmental integration (Heidegger & Marcuse, 2004). Though the design might have some differences with final aesthetics of the final product, the flow in the instrumentalization brings

about the team as one. For instance, the designers for ERP systems will not work in isolation with users and technical teams.

2.2.2 Unified Theory of Acceptance and Use of Technology

The theory explains the intentions for using information technology and also the subsequent usage behaviour. The theory holds four constructs: performance expectancy, effort expectancy, social influence, and the facilitating conditions. Gender, age and experience are moderating factors in the intentions and behaviour (Venkatesh, Morris and Davis, 2003). The intentions are the driving force in the implementation while the behaviour is what is formed out of the outcome.

2.2.3 Critical Theory of Technology

This theory argues that the technical order is more superior to the sum of tools or structure that is assembled to make things happen. The order shapes the future in a more autonomous way and not the modernity caused by consumer behaviour. The level of civilization according to this theory is not determined by the level of technology rather by human action. The ruling elite make choices on the type of technology to utilize and design it with social attributes for development. Michel (1980) advocates for a form of resistance of exercise of power through technical strategies. Worldwide environmental crisis has forced in the culture of responsibility and that advancement of technology inherently has become synonymous with management decisions.

2.2.4 Diffusion on Innovation (DOI) Theory

This theory is about how, why and what rate technology ideas spread through cultures, operating at individual firm level. According to Rogers (1995), individuals are seen as having different levels of willingness to adopt and implement technology in their organizations. The theory proposes inclusivity of complexity, formalization and interconnectedness. In complexity, members posses high level of knowledge and expertise on technology. In formalization, the organization calls to its members to adhere to rules and procedures of existing systems. Interconnectedness is the degree to which units of a social systems links to interpersonal networks. Laudon et al (2012) refers to information technology as a social system that interconnects several people in communication.

2.2.5 Institutional theory

This theory views organizational decisions as driven by social and cultural factors and concern for legitimacy rather than by rational goals for efficiency only. Dimaggio and Powell (1983) explain that firms in the same field become homologous as competitive and customer pressure forces them to copy the industry leader. This pressure could lead to some disposition towards a shared IT system, adopting a practice and innovation imitating competitors.

The above theories are essential in linking the literature with the study objectives. They will also guide the questionnaire structure in preparation of data collection. The theories form a strong basis from which analysis will directly inform management of the supermarkets on the importance of the study to their organizations. The significance of this was premised on the zeal to ensure all target beneficiaries of the study have a well founded and informed research.

2.3 Technology Applications

Recent improvement and adaptation of diverse technologies in many firms has led to effectiveness and efficiency in inventory management. Customers also have access to product information in terms of its availability among other variables; this has been made possible by technology (Langley *et al.*, 2009). There are several technological applications and techniques in supporting sound business strategic management:

2.3.1 Information Communications Based Technology

Chopra *et al.*, (2011) states that e-commerce is related to web-based sales while e-business relates the holistic use of information technology; though in many cases it refers to the use of internet. Ngugi (2014) found out that there were 16.2 million internet subscribers in Kenya by December 2012. Mobile internet dominated the penetration due to social media among the youth. According to McGaughey and Mason (1998), internet and World Wide Web have continued to make it easier, simpler, cheaper, and more accessible for customers and suppliers to interact and conduct commercial transactions electronically. The internet has altered the customer shopping behaviour because they spend minimal time to get the right product and purchase online thus reducing their shopping time.

2.3.1.1 Transport Management Systems

Transportation is a major cost element in supply chain in the supermarkets. Vehicle routes are planned to have wider distribution coverage for those with several branch networks in order to minimize costs. The information system here is required to provide information about distance

between branches, replenishment requirements. Some linear programming software may be needed for critical optimality and sensitivity analysis Sople (2011).

According to Murphy and Wood (2008), global positioning system (GPS) has dramatically changed the ability of the businesses to manage the actual movements in the distribution system which enhances accountability among the drivers thereby improving speed to the market. The monitoring of the trucks makes the drivers more accountable on their trips. The trip reports also help managers with proper periodic analysis on performance.

2.3.1.2 Enterprise Resource Planning

Enterprise Resource Planning is a business management system that through modular application software, integrates all the departments or functions of an enterprise (Farrington *et al.*, 2012). A marketing module is linked with the inventory module, and then integrated with the transport module. The inventory module helps the warehouse manager to known on a real time basis the stock levels within the warehouse and is able to plan for more production. He/she will determine the location of the stock keeping units for ease of loading. The information contained in this module is important in servicing pending orders.

The ERP system picks orders on an aging sequence and keeps the distribution manager informed on stocks availability and also trucks available for loading for the next delivery. The manager can assess the transport module and the stock levels through a touch of a button thanks to ERP system. The system is ideal in procurement in authorizing purchase orders and payments on approved deliveries.

2.3.1.3 Vendor Managed Inventory

Vendor Managed Inventory places the supplier as the in charge of inventory management of products and replenishment process based on age and shelves off take with information flowing from the customer to suppliers on a set platform. Sople (2011) explains that in VMI, partnership is based on mutual trust, which implies a willingness on the part of the buyer to share information and capabilities with the supplier. Farrington (2012) posits that VMI assists manufactures or distributors to eliminate the need for customers to reorder, reduce or exclude inventory and obviate stockouts.

With VMI, customers no longer "pull" inventory from suppliers. Rather, inventory is automatically "pushed" to customers as suppliers check customers' inventories and respond to agreed stock levels. Lee (2000) found that VMI greatly reduced inventory-carrying costs and stock-out problems while, at the same time, it enables synchronization of both inventory and transportation decisions. Fox (1996) noted that VMI's advantages included improved customer service, reduced demand uncertainty, reduced inventory requirements and reduced cost. Due to the real time stock level visibility, replenishment is done promptly therefore eliminating unnecessary long lead times.

2.3.1.4 Bar coding

This is an automatic identification system that captures data at the point of goods receiving and at the point of sale (POS). The benefits gained by organizations such as Wal-Mat, is labor savings and faster customer service (Leenders & Fearon, 2010). Bar coding can be integrated with VMI such that the information on the bar code label can be scanned at the point of sale to

generate packing list to the buyer; and communicate replenishment information to the suppliers (Sople, 2011). This also fastens stock taking in inventory management to eliminate pilferages. At the point of sale, this system can also be linked with the VMI for transmission to the suppliers; replenishment therefore is fastened.

2.3.1.5 Electronic Payment Systems

According to Sumanjeet (2009), the e-payment can be any form of payment for business transactions or bank transfers using telecommunications or electronic network. For use in e-commerce or m-transactions, the system, according to Turban *et al.*, (2006), requires high security to safeguard the client and suppliers' money. VISA and MasterCard have continued to use this type of payment system and have made it very convenient for retail shoppers especially supermarkets.

The cashless systems continue to guarantee customers peace of mind because they do not have to carry cash around; they can also shop conveniently at any time of the day. Kemibaro (2010) studied on M-Pesa usage in m-commerce and found out that it is a more acceptable method of payments in Kenya today. Most supermarkets today have M-Pesa till numbers for payment transactions.

2.3.2 Non-Information Communications Based Technology

2.3.2.1 ABC Analysis

This type of analysis in made on the basis of the annual monetary consumption and items are ranked in order of their average inventory investment. The analysis provides basis on which funds will be allocated and managed (Burt *et al.*, 2010). The classification may be done following either; by velocity, by sales volume, by quantities sold, by inventory investment, or by margin (Sople, 2011).

The proper arrangement of the products by class helps in picking and loading efficiencies. Periodic stock taking exercise is also made easy because items are stacked at their respective marked bays. This technology can work even where there are no electronic identification devices.

2.3.2.2 Just In Time

Just-In-Time, as part of the technology used in managing inventory, is a concept widely practiced by Toyota in Japan, but has its origin from America, having been invented by Henry Ford. JIT approach seeks to minimize inventory by reducing or eliminating safety stocks as it views inventory as a waste since it ties capital which could have been utilized elsewhere to generate more money (Murphy et al, 2008).

When faced with trade-offs between cost of stock outs and the cost of excess inventory, firms find themselves in a dilemma. Stock out cost is difficult to quantify because dissatisfied clients walk off quietly and lack of their return purchase may not be monetarily estimated. Excess

inventory can be estimated through calculating interest rates at current market prices. JIT therefore plays the role of eliminating the excess inventory by ordering only when an item is demanded; therefore releasing the tied capital for re-investment.

2.4 Technology and Competitive Advantage in Business

According to Langley *et al.,* (2009), management use of technology in supply chain decisions must consider issues related to costs and customer service requirements. There are gains from the use of technology in business management. Cost reduction and revenue collection; waste is the biggest cost in any organization and therefore skills on the reduction of wastes using technology are a key requirement for firms' survival. Information sharing is a basic tool in consolidation of functions in any supply chain enables managers to work closely together and establish market needs for their customers with ease. Through use of the VMI system, TMS or GPS systems, reordering costs, management monitoring time are eliminated, and paper computer entries and printing are done away with.

The interface between logistics and marketing links the functions closely and enables speedy servicing of orders by the dispatch staff (Nigel *et al.*, 2012). The role of the ERP system therefore is to keep real time information that firms' managers will utilize to execute informed decisions that will improve customer satisfaction through timely and efficient delivery of ordered products. Both the internal and external customer demands are met through effective availability of goods and information. Farrington et al (2012), writes that, technology such as the ERP also gives a firm the power to proactively examine accounts receivable early in advance before problems occur, which improves cash flow.

Swink *et al.*, (2011) introduce the importance of better demand forecasting and smoothing and state that it will determine the acceptable lead time a customer is willing to wait for the product to be delivered. The use of VMI information improves demand forecast from customers which enables the firm to determine with certainties the amount to be produced by the manufacturers and delivered to the retail markets within a given time.

With the use of JIT, materials are delivered only when needed; eliminating a chance of ordering the wrong item since demand is known in advance and delivery timing attached to the demand. According to Burt *et al.*, (2010), a major driver of the 2001-2002 recessions was the proliferation of errors in forecasts which were not identified and led to billions of accumulated inventories in some supply chains. The primary cause of inaction was lack of use of techniques in demand management by several players. Excess inventories force forms to incur storage costs, security and staff costs, costs of obsolescence, insurance, handling and damage costs. This is a case of proof how important technology and its use is to the organization and the general economy.

According to Sople (2011), in relation to reduction of lead times, JIT concept is based on the fact that an activity should not take place until there is need for it. Hence an inventory item should not be bought into the system until it is required for making the final product. JIT involves close coordination of buyer and suppliers on a real time basis, reducing lead time to a manageable level. According to Handfield *et al.*, (2013), JIT reflected the idea that the timing and level of inventory and production activities are matched to demand. With an average inventory level of only two hours, Toyota was receiving parts "just" before they were needed.

While systems keep upgrading, MRP plays a key role in managing manufacturing requirements and equally accounting for the inventories consumed during the production processes. Since production scheduling can be executed with certainty based on market demand, order to delivery cycle time is drastically reduced Aquilano *et al.*, (2010). There is reduction of order to delivery cycle times - Bill of materials contains information on all the materials, components and sub-assemblies required to produce each end item which is sold to the consumer either as a finished product or work-in-progress item for further processing.

2.5 Challenges in the Implementation of Technology

Farrington *et al.*, (2012) posit that JIT may not be applied in situations where suppliers have relocated to greater distances since they end up sending several trucks to take care of small batches of orders leading to road congestion and high transportation costs. Lack of skills leads to problems such as low setup times and high defect rates, making JIT work to become more costly because of the adoption approach and capabilities. In the absence of skills, appropriate ethics are not applied and hence become a challenge in applying the JIT techniques.

According to Langley *et al.*, (2009), ERP system as a technique may face the challenge of high capital investment which many organisations may not be able to acquire due to high costs involved. Even for organisations that are able to acquire it, they find employee training very expensive and time consuming. Lack of labour specialization, resistance to change, and unwillingness in sharing information by departments or functions is equally another challenge Kitheka (2012). ERP systems tend to focus on operational decisions and have relatively weak analytical capabilities. Farrington et al (2012) concurs that implementation involves fundamental

change from a functional to a process approach to a business. This means that even for those large firms that can afford it, their functional integration process is characterized by slow change process which may affect the business running

One drawback of VMI arises because retailers ignore the impact of product substitution when making inventory forecasting decisions. As a result, inventories at the retailer will be higher than optimal. Munyui (2011) establishes that lack of knowledge by local players was a limitation to the implementation of technology in inventory management. He also established that lack of efficient supply chains and better management of partnerships was also a challenge in the implementation of inventory management techniques.

According to Burt (2010), planning for handling and control of the items classified in the ABC model has limitations as well. The class C has thousands of items which by laxity of management control in them poses and renders them less important yet there is capital tied on the items. Control may therefore be a challenge, providing a loophole for pilferage and theft in the warehouse. Changes in customer preferences may render a class A item a C item within a short time and therefore making it difficult to project future investment planning. According to Lulu (2011), some of the challenges experienced in technology in inventory management were; adherence to procedural control, demand forecasting, overstocking due to number of franchise and variant models.

Esselaar and Miller (2001) in reference to Africa, relate barriers to implementation of e-commerce and m-commerce to monopolized telecommunications providers, making it costly to end-users. High communications costs, especially M-Pesa transactions costs are restrictive to the number of purchases one can make on a daily basis.

2.6 Summary of Literature Review and Knowledge Gap

Although this summary is not exhaustive, it provides an overview of the reviewed literature and research gap that motivated the study of the above topic. Research shows that information technology plays a key role in improving information sharing and coordination (Love, 1996). The information technology has been implemented largely by firms for strategic planning, virtual enterprise, E-commerce and knowledge management (Gunasekaran & Ngai, 2004). With internet penetration rate rising in the Kenyan market, there are still a large number that still needs to be tapped to realize full service capacity.

EDI and VMI in retail markets play an important role of enhancing faster purchase order processing, invoicing, order confirmation and payments; reducing inventory levels and adopting just-in-time. This leads to reduced costs and improving business processes, shortened lead times, reduced stock outs, accelerated response, and better demand forecast (Vijayasarathy & Tyler, 1997). With high costs of implementing these systems, medium sized supermarkets are less privileged and are therefore not able to reap similar benefits and are not competing at the same playing field.

Use of bar coding systems by retailers improves on the coordination of processes. Many retailers are now looking for partnerships with suppliers who can integrate the systems for continuous improvement (Power, 2003). The benefits from use of technology include: reduced check-out time for customers and reduced errors (Cassidy, 1994), improved inventory management (Weber & Kantamneni, 2002), increased traceability and improved collaboration between partners, enhanced competitiveness (Iacovou *et al.*, 1995), better customer service (Angeles et al., 1998), improved communication and information accuracy, and improved cash flows (Ferguson et al., 1990, Murphy & Daley, 1999). Small scale manufactures who do not use bar codes may find themselves locked out of supplier base; supermarkets can device a method of coding for such small scale suppliers as a collaborative and supplier development strategy.

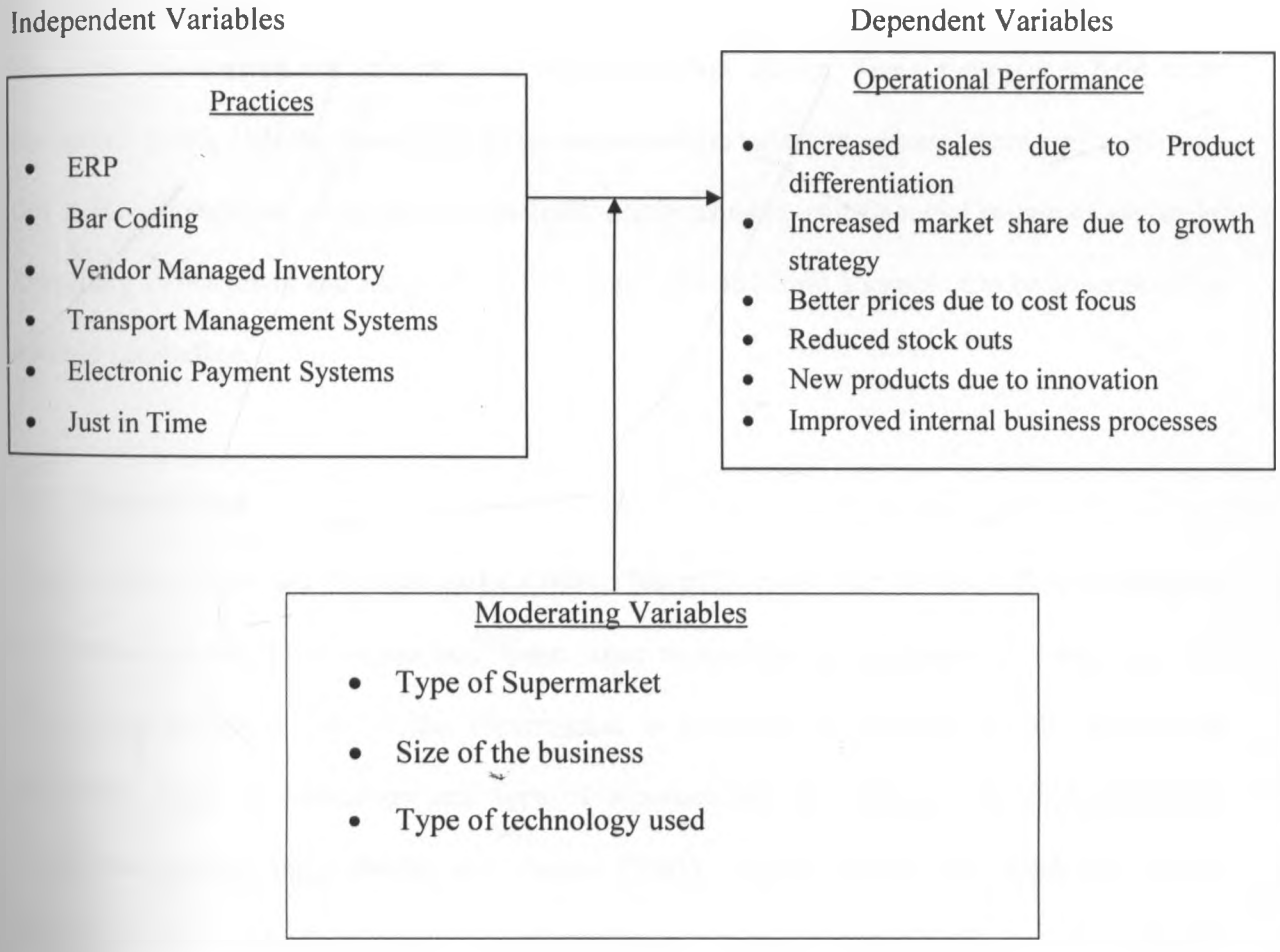
Table 2.1: Summary of Literature Review

Author	Study	Major Findings	Research Gap
Murphy and Wood (2008)	Global Positioning System as a transport management system.	The system is key in tracking fleet for efficiency and better customer satisfaction.	How savings from the efficiency can be translated to lower prices for customers.
Farrington *et al.*, (2012), Makori (2013)	Use of Enterprise Resource Planning for real-time information processing	The system integration improved inventory levels, reduced labour costs and visibility of transactions.	There is no guidelines on how different firms can share a platform for cost savings
Lee (2000) and Swink *et al.*, (2011)	Vendor Managed Inventory (VMI) System	VMI improves demand forecasting, eliminates excess inventory and chances of wrong orders	Studies did not cover customer substitution forecasting methods, and collaborative criteria
Sople (2011) and Handfield *et al.*, (2013)	Just-In-Time Concept	Key in reduction of cost of inventory; goods are ordered only when needed, and matched demand to production schedules.	The study did not cover customer – supplier collaborative techniques that must be applied to ensure JIT works
Chopra *et al.*, (2011) and Ngugi (2014)	Use of Internet as an infrastructure in operational efficiency	Internet Connectivity rate, enabling use of social media as an enabler for communications between the business and its customers.	Cost of operating the internet still high with no mitigating factors such as offline mobile applications that can operate affordably.
Leenders *et al.*, (2010), Turban *et al.*, (2006), Sople, (2011)	Point of Sale and electronic payment systems	Faster customer service and labour savings, convenience of shopping, and cashless transactions	How telecommunications interconnectivity can lower the transactions costs
Munyui (2011), Lulu (2011), Kitheka (2012), and Farrington *et al.*, (2012)	Challenges in the implementation of technology in business	High capital investment, Lack of necessary skills, Resistance to change,	The study did not reveal how systems providers can link organizations for a collaborative approach in operations.

2.7 Conceptual Framework

Competitive advantage is the resultant output which is the dependent variable. The practices are the independent variables. The objectives by management to use ERP, bar coding and scanning system, VMI, JIT, and transport management systems is to achieve operational performance as a competitive advantage through reduced costs, speedy deliveries, enhanced productivity and customer satisfaction.

Table 2.2: Conceptual Model



CHAPTER THREE: RESEARCH DESIGN

3.1 Introduction

This chapter sets out the research methodology that was adopted so as to meet the objectives of this study. The research setting, the population of interest, sampling and sampling design, data collection instruments and data analysis techniques was used.

3.2 Research Design

The study was carried out through cross sectional survey design. The survey was a field study conducted within Nairobi, since most of the supermarkets have concentrated networks in Nairobi due to the convenience in terms of accessibility, time schedule and financial resources available. According to Mugenda and Mugenda (2003), data collected from a sample can be generalized to a whole population.

3.3 Population

The population included 23 supermarkets within Nairobi County that the researcher investigated in reference to the study objectives. Since some technology is applicable in integrating and networking branches, size of the supermarket is important in determining the technology applicable. Type of technology and type of supermarkets are important in determining the operational performance. Burns and Grove (2003), define criteria for eligibility into a populations as the salient individual characteristics each member must possess in order to qualify inclusion into the population. Since the branch network utilizes a common technological

platform, data from one branch will be replicated to all other branches. A census was carried out due to the relatively small number of supermarkets in Nairobi and that fact that the researcher wants a total appreciation of practices in all the firms.

3.4 Data Collection

Primary data was used in the study to obtain first hand information on use of technology and appreciate if indeed there exists and benefits leading to competitive advantage in the operations of supermarkets in Nairobi. A structured questionnaire was used to collect data that was organized in four parts: Part A; Organizational profile, part B; the extent and impact of the adoption of technology in achieving considerable competitive edge by the supermarkets, part C; establishing the impact of technology implementation, and part D; determining the challenges faced in the implementation of the technology. The questionnaire is popular because the researcher has control over types of data at the time of data gathering.

The respondents were presented with descriptive statements about the management involvement in implementation of technology and contribution to competitiveness; this was done in a Likert scale that was used for scoring. This is because Likert scale is an important tool for rating responses from respondents on various identified variables (Kothari, 2004; Cooper *et al.*, 2011). The questionnaires were administered through drop and pick later method. Operations managers, Procurement Managers or their equivalents were the target group to answer the questionnaires since they are well placed to understand the application and benefits of use of technology within their operations. Therefore two questionnaires per supermarket were administered; making a total of 46 questionnaires.

3.5 Data Analysis

The nature of data collected was largely be quantitative; thus the study made use of descriptive statistical tools for analysis (Mean scores, Standard Deviation and Percentages) to analyze the data that was collected. According to Mugenda and Mugenda (2003), percentages show the proportion of respondents who score in different variables. Findings were presented in a tabular form for ease of interpretation and reporting. Tables enable the reader to compare the trend of distribution more vividly than simply looking at the numbers.

The data analyzed was directly from the questionnaire which captured the three research objectives. Section A was to provide general information about the organizations, Section B was to describe the extent of technology implementation; Section D was to describe challenges faced in implementation of such technology. Section C was to analyze the relationships among independent and dependent variables using a regression model;

$Y=a+b_2x_2+b_2x_2+b_3\ x_3+b_4x_4+b_5x_5+b_6x_{6+}e$ where:

Y = Operational Performance

a = The Y Intercept, b_1, b_2, b_3, b_4, and b_5 are the regression coefficient of respective variables;

e = is the error term;

X_1 =Enterprise Resource Planning

X_2 = Bar Coding

X_3 = Vendor Managed Inventory

X_4 = Transport Management Systems

X_5 = Electronic Payment Systems

X_6 = Just in Time

Table 3.1: Summary of Methodology used

Objectives	Data Type	Collection Technique	Data Analysis
General Information	Secondary Data	Questionnaire Section A	Descriptive
Determine the extent of technology implementation	Primary data	Questionnaire Section B	Descriptive Statistics
Establish impact of technology implementation	Primary data	Questionnaire Section C	Correlation and Regression Analysis
Determine challenges faced in the implementation of technology	Primary data	Questionnaire Section D	Descriptive Statistics

CHAPTER FOUR: DATA ANAYSIS, RESULTS AND DISCUSSION

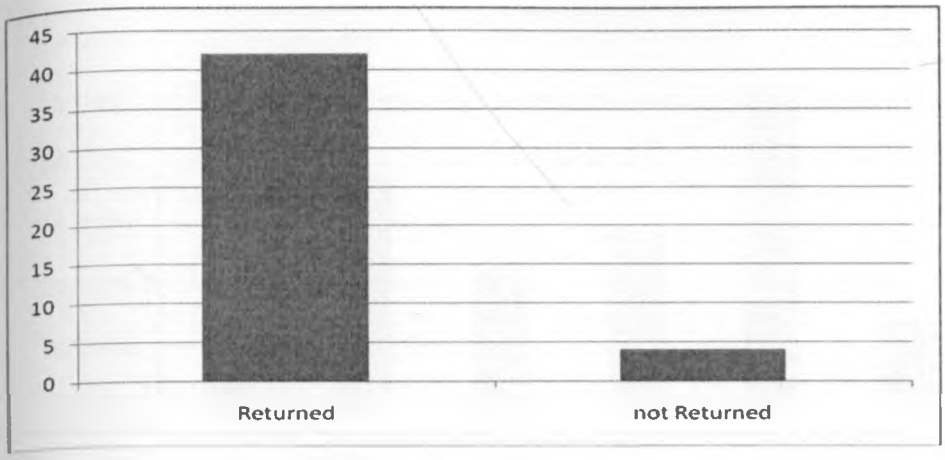
4.1 Introduction

This chapter provides a summary of the data analysis, results of the study and the discussion of the results of the study. The results were presented on the technology as a competitive advantage in supermarket operations in Nairobi County. The study was based on the following specific objectives: To determine the extent to which technology is applied as a technique to gain competitive advantage in supermarkets in Nairobi County, to establish the impact of implementation of technology on the supermarkets' competitive advantage, and to determine challenges faced in the implementation of technology in supermarkets and possible solutions suggested.

4.2 Response Rate

The study targeted a sample size of 46 respondents from which 42 filled in and returned the questionnaires making a response rate of 91.3%. This response rate was satisfactory and representative to make conclusions for the study. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Based on the assertion, the response rate was considered to be excellent.

Figure 4.1: Response Rate

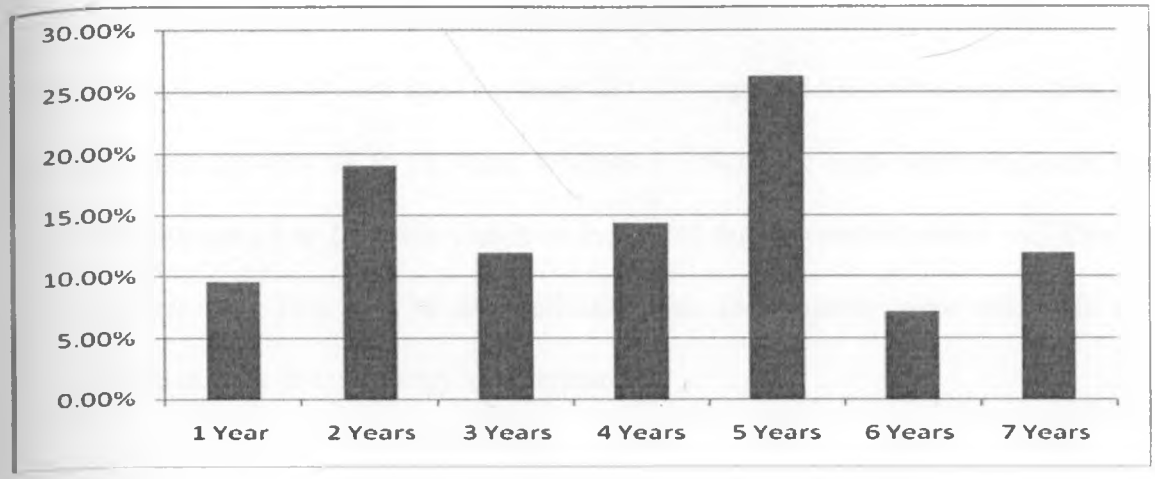


Source: Research data, (2015)

4.3 General information

The study sought to establish the information on the respondents employed in the study with length of period of work at the supermarket, type of supermarket, highest level of education attained, and age of the respondents. These bio data point at the respondents' appropriateness in answering the questions. When asked the duration of time they had worked for the supermarket, 26.2% of all respondents reported to have worked for 5 years, 19% had worked for a period of 2 years, 14.3% for 4 years, 11.9% was shared equally between those respondents who had worked for 7 and 3 years, 9.5% had worked for 1 year and the remaining 7.1% had worked for 6 years. This is the product of the supermarket culture of attracting and retaining the best and hence the extensive experience resource, internal capabilities, the organization enjoy in building its competitiveness as reflected in its technology.

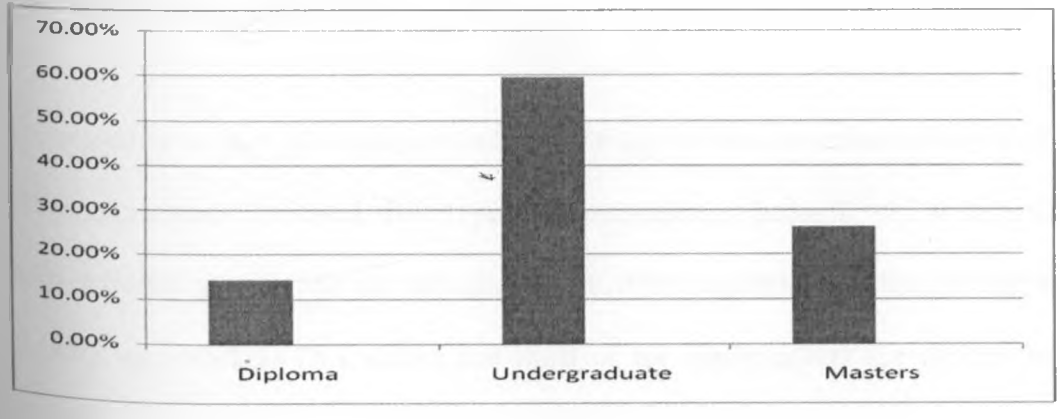
Figure 4.2: Work Experience



Source: Research data, (2015)

As pertaining to their highest level of education attained the distribution of the respondents indicated 26.2% had master's degree, 59.5% had undergraduate degree, while 14.3% were Diploma holders in various fields indicating clearly their level of articulation of the subject matter and their ability to contribute to the supply value chain as was evidence in the research findings. This is also the reflection of the supermarkets culture change philosophy of continuous training for best results.

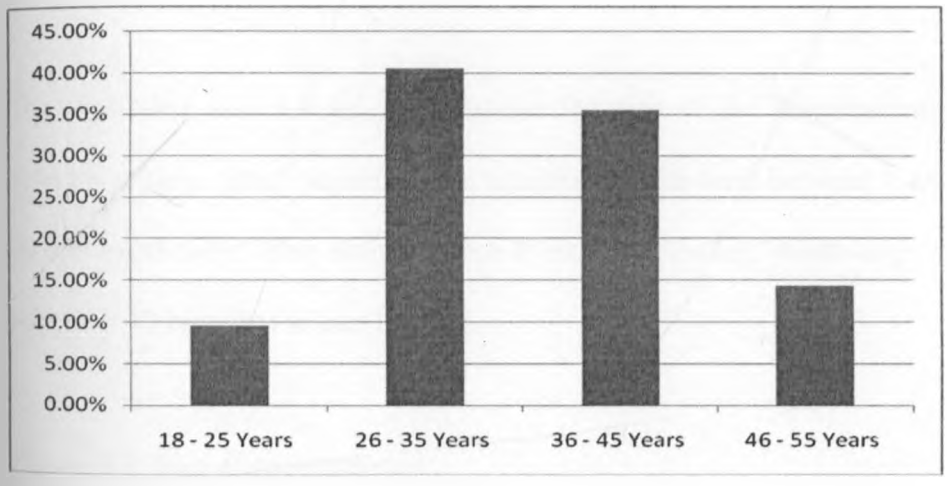
Figure 4.3: Level of Education



Source: Research data, (2015)

The researcher requested the respondents to indicate their age category. From the findings it was established that, 40.5% of the respondents were aged between 26 to 35 years, 35.5% of the respondent indicated they were aged between 36 to 45 years, 14.3% of the respondents indicated they were aged between 46 to 55 years, whereas 9.5 % of the respondents indicated that they were aged between 18 to 25 years. This is an indication that respondents were well distributed in terms of their age. This also is an implication that the majority were able with adequate experience in matters of technology in supermarkets.

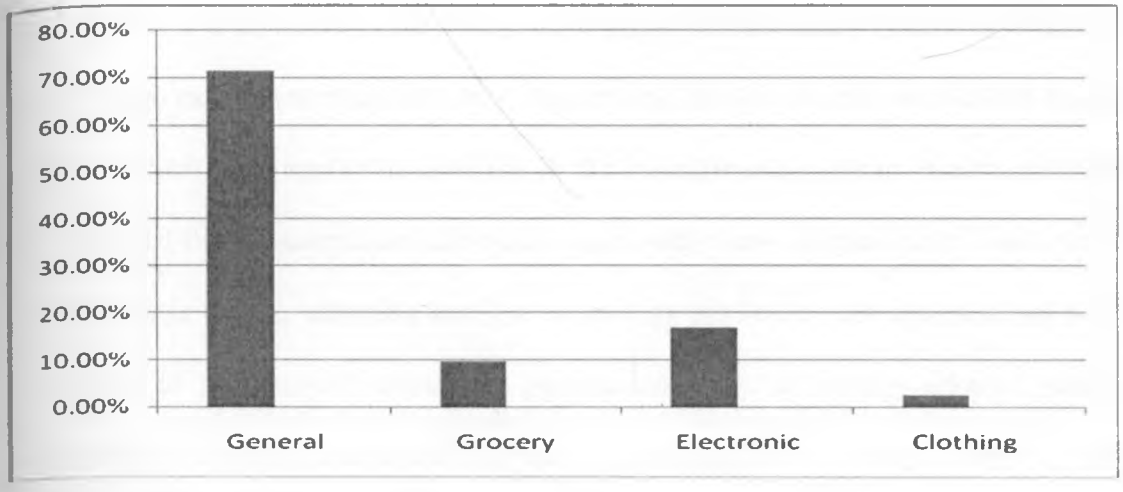
Figure 4.4: Age of Respondents



Source: Research data, (2015)

The respondents were also asked to indicate the type of the supermarket they work with, 71.4% of the respondents indicated their type of supermarket is general, 16.7% indicated electronic, 9.5% indicated grocery and the remaining 2.4% of the respondents indicated their supermarket is clothing supermarket. This shows that most of the supermarkets are general hence provides variety of goods and services in the same building and floor.

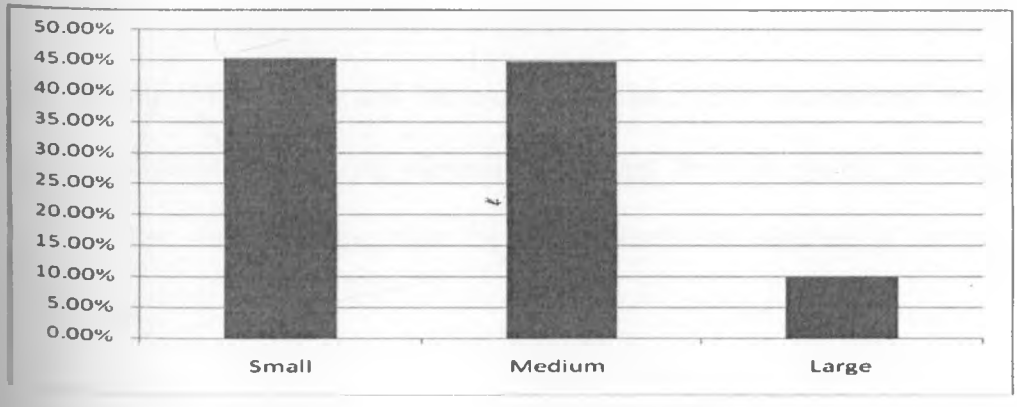
Figure 4.5: Type of Supermarket



Source: Research data, (2015)

The researcher also wanted to determine the size of the supermarkets by using the branch network criteria. Small supermarkets comprised those with between 1 and 5 branches; medium supermarkets were those with between 6 and 10 branches; while large supermarkets are those with over 10 branches within Nairobi.

Figure 4.6: Size of supermarket



Source: Research data, (2015)

4.4 Extent to which technology is applied in the management of supermarkets operations

On a scale of 1 to 5, where (1) to a very small extent (2) to a small extent (3) to medium extent (4) to a large extent where (5) to a very large extent, the respondents were asked to indicate the extent to which they applied technology in the management of their supermarkets operations. The Table 4.1 below summarizes the mean scores with a low margin above 3 and average of 4/5 to a very large extent; affirming that the technology applied by the supermarkets have greatly contributed to its competitiveness and performance. The technology adopted mostly by the supermarket is scanning used at the point of sale terminals with a mean of 4.095 as indicated by the respondents; followed by use of internet in communications at 3.90; and JIT for goods deliveries only when needed at 3.83. This concurs with the literature review that some of the factors that may influence adoption of technology in business are coercive pressure from the partners or industry (Premkumar & Ramamurthy, 1997) in order to standardize and coordinate communication.

Even the small supermarkets are adopting these types of technology to cope with the industry pressure. Some of the pressures, according to the literature review are that use of internet has increased the interaction between customers and suppliers to conduct commercial transactions electronically (McGaughey and Mason, 1998). The internet has altered the customer shopping behaviour because they spend minimal time to get the right product and purchase online thus reducing their shopping time; thus the push towards the adoption of internet in supermarkets operations.

Table 4.1: Extent to which technology is applied in supermarkets operations

	N	Mean		Std. Dev
	Statistic	Statistic	Std. Error	Statistic
Scanning used at the point of sale terminals	42	4.0952	0.15168	0.98301
Internet use in communication with suppliers and customers	42	3.9048	0.16629	1.07770
Goods delivered only when needed to avoid overstocking	42	3.8333	0.15586	1.01011
Stocks for classification for ease of identification and picking	42	3.7143	0.14573	0.94445
Inventory systems networked with suppliers	42	3.7143	0.16445	1.06578
Enterprise Resource Planning used to integrate functions	42	3.6667	0.11641	0.75439
Fleet use global positioning tracking systems	42	3.6667	0.16579	1.07446
Mobile transactions used for goods payments	42	3.6429	0.11211	0.72655
Social media is used for communication with customers	42	3.6190	0.15223	0.98655
Purchase orders raised and sent electronically	42	3.5000	0.13309	0.86250
Valid N (list wise)	42			

Source: Research data, (2015)

4.5 Impact of the adoption of such technology in achieving competitive advantage

On a scale of (1) to a very small extent (2) to a small extent (3) to medium extent (4) to a large extent where (5) to a very large extent, the respondents were asked to indicate the impact of the adoption of such technology in achieving competitive advantage.

Table 4.2: Impact of the adoption of such technology in achieving competitive advantage

	N	Mean		Std. Dev
	Statistic	Statistic	Std. Error	Statistic
Higher stock turn over increasing revenue due repeat and referral customers	42	4.1429	0.1159	0.75131
Increased customer satisfaction due timely deliveries	42	4.0952	0.1266	0.82075
Easier identification of products through classification	42	4.0714	0.1200	0.77752
Better demand forecasting through supplier collaborations	42	4.0476	0.1403	0.90937
Optimal stock levels maintained through supplier collaboration	42	4.0476	0.1075	0.69677
Improved delivery times due to distribution efficiency	42	4.0000	0.1229	0.79633
Better, faster and informed decisions through analytical data	42	3.9762	0.1341	0.86920
Better after sales service supported by internet communications	42	3.9524	0.1227	0.79487
Accountability by all drivers through fleet tracking systems	42	3.9286	0.1380	0.89423
Improved operational efficiencies through human skill and technology utilization	42	3.9286	0.1200	0.77752
Improvement and visibility of internal processes at all levels due to use of online systems	42	3.9048	0.1312	0.84995
Increased sales due to product differentiation	42	3.9048	0.1355	0.87818

Faster feedback from market through online infrastructure	42	3.8095	0.1455	0.94322
Improved information sharing due to internet and integration	42	3.7857	0.1653	1.07149
Increased market share achieved through better customer service and market focus	42	3.7381	0.1408	0.91223
Faster inbound and point of sale transactions	42	3.7381	0.1773	1.14890
Minimal labour intervention due to real time systems	42	3.6905	0.1543	0.99971
Competitive pricing due to cost reduction achieved from functional integration	42	3.5238	0.1746	1.13133
Valid N (list wise)	42			

Source: Research data, (2015)

The Table 4.2 above summarizes the mean scores with a low margin above 3 and average of 4/5 to a large extent; affirming that the technology adopted by the supermarket have greatly contributed to its competitiveness. The improved competitive advantage is mainly reflected through increased customer satisfaction due timely deliveries, easier identification of products through classification, optimal stock levels maintained through supplier collaboration, higher stock turn over increasing revenue due repeat and referral customers, improved delivery times due to distribution efficiency and better demand forecasting through supplier collaborations as indicated by respondents. This indicates supermarkets drives out inefficiencies from business processes.

The findings above concur with the literature review data to the effect that supermarkets that adopt technology have better performance and hence competitive advantage. Swink *et al.*, (2011) introduce the importance of better demand forecasting and smoothing and state that it will

determine the acceptable lead time a customer is willing to wait for the product to be delivered. The use of VMI information improves demand forecast from customers which enables the firm to determine with certainties the amount to be produced by the manufacturers and delivered to the retail markets within a given time. With the use of JIT, materials are delivered only when needed; eliminating a chance of ordering the wrong item since demand is known in advance and delivery timing attached to the demand hence improved performance and competitive advantage in the supermarkets industry. This achieved through close coordination of buyer and suppliers on a real time basis, reducing lead time to a manageable level.

The results also confirm that goods are delivered only when needed to avoid overstocking and inventory systems are networked with suppliers. This indicates that supermarkets reduce costs and use the capital for reinvestments by avoiding holding costs. According to Lee (2000), vendor managed inventory reduces inventory-carrying costs and stock-out problems while, at the same time, it enables synchronization of both inventory and transportation decisions. JIT minimizes inventory by reducing or eliminating safety stocks as it views inventory as a waste since it ties capital which could have been utilized elsewhere to generate more money (Murphy et al, 2008).

Other technologies used by supermarkets as indicated by the respondents includes Enterprise Resource Planning used to integrate functions, stocks classification for ease of identification and picking, fleet using global positioning tracking systems, mobile transactions used for goods payments, social media is used for communication with customers and purchase orders raised and sent electronically. The findings agrees with the literature review in that the ERP system picks orders on an aging sequence and keeps the supermarket distribution manager informed on

stocks availability and also trucks available for loading for the next delivery. It also module helps the supermarket warehouse manager to know on a real time basis the stock levels within the warehouse and is able to plan for more production. Kemibaro (2010) found that M-pesa is more acceptable method of payment by supermarkets as they have till numbers for transactions purposes hence guarantees customers peace of mind as they do not have to carry cash around.

Also the purchase orders are raised and sent electronically to enhance faster purchase order processing, invoicing, order confirmation and payments and reduce inventory levels. This leads to reduced costs and improving business processes, shortened lead times, reduced stock outs, accelerated response, and better demand forecast (Vijayasarathy & Tyler, 1997). The above results generally agree with the literature data to the effect that supermarket that applies technology in the management of operations have better performance and hence increase their competitive edge. Supermarket, just like any other organization that practices sound technology strategies as was reflected in the literature review, has grown and sustained its competitive edge, no wonder its market leadership position. Supermarkets continuously reviews these technology for relevance given the rapidly changing business environment and diversification and growth strategies.

4.6 Pearson Correlation Analysis

The Karl Pearson's coefficient of correlation (simple correlation) is a measure of the degree of relationship between two variables and is denoted by r. Basically, a Pearson product-moment correlation attempts to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient was conducted to examine the relationship between variables, r, indicates

how far away all these data points are to this line of best fit (how well the data points fit this new model/line of best fit). The Pearson correlation coefficient, r, can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables.

As cited in Wong and Hiew (2005), the correlation coefficient value (r) range from 0.10 to 0.29 is considered weak, from 0.30 to 0.49 is considered medium and from 0.50 to 1.0 is considered strong. However, according to Field (2005), correlation coefficient should not go beyond 0.8 to avoid multi co-linearity. The results show that there is high correlation between, vendor managed inventory and operational performance with a value of 0.713, Enterprise Resource Planning and operational performance with a value of 0.684 and just in time and operational performance with a value of 0.609. The correlation coefficients on the main diagonal are always 1.0, because each variable has a perfect positive linear relationship with itself.

Table 4.3: Pearson Correlation Coefficients Matrix

Pearson Correlation	Operational Performance	ERP	Bar Coding	VMI	TMS	EPS	JIT
Operational Performance	1.000	.684	.557	.713	.506	.426	.609
ERP	.684	1.000	.725	.456	.743	.561	.611
Bar Coding	.557	.725	1.000	.632	.478	.700	.534
VMI	.713	.456	.632	1.000	.484	.618	.662
TMS	.506	.743	.478	.484	1.000	.444	.557
EPS	.426	.561	.700	.618	.444	1.000	.576
Just in Time	.609	.611	.534	.662	.557	.576	1.000

**. *Correlation is significant at the 0.01 level (2-tailed).*

Source: Research data, (2015)

4.7 Regression Analysis

The regression analysis is concerned with the distribution of the average value of one random variable as the other variables which need not be random are allowed to take different values. A multivariate regression model was applied. The regression model specifically connects the average values of y for various values of the x-variables. A regression equation is in no way a mathematical linking two variables but serves as a pointer to questions to be answered. Basically, the regression analysis is used in two distinct ways; (1) as a means of considering data taking into account any other relevant variables by adjustment of the random variable; and (2) to generate mathematical forms to be used to predict the random variable from the other (independent) variables.

The regression model was as follows:

$y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + e$

Where:

Y = Operational Performance

β_0 = Constant Term

β_1= Beta coefficients

X_1 =Enterprise Resource Planning

X_2 = Bar Coding

X_3 = Vendor Managed Inventory

X_4 = Transport Management Systems

X_5 = Electronic Payment Systems

X_6 = Just in Time

ε= error term

Table 4.4: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.931[a]	.867	.849	.219	.867	42.212	14	53	.000	2.211

a. Predictors: (Constant), Enterprise Resource Planning, Bar Coding, Vendor Managed Inventory, Transport Management Systems, Electronic Payment Systems, and Just in Time

b. Dependent Variable: Operational Performance

Source: Research data, (2015

The model summary is presented in Table 4.4. The model summary was highly significant (p=0.000) showing that the model was functional. The model had an R square value of 0.867 indicating that the percentage of the dependent variable variance that was explained by the independent variables was 86.7%. The P- value of 0.000 (Less than 0.05) implies that the model of operational performance is significant at the 5 per cent significance. R is the correlation coefficient which shows the relationship between the study variables. From the findings shown in the table above there was a strong positive relationship between the study variables as shown by 0.931.

Durbin-Watson is number that tests for autocorrelation in the residuals from a statistical regression analysis. The Durbin-Watson statistic is always between 0 and 4. Values close to 2 means that there is no autocorrelation in the sample; values approaching 0 indicate positive autocorrelation, while values toward 4 indicate negative autocorrelation. The findings shows that

Durbin-Watson value is 2.211 hence no autocorrelation in the sample. The Standard Error of the Estimate is the standard deviation of the data about the regression line, rather than about the sample mean. This statistic is used with the correlation measure, the Pearson *R*. It is used to construct a confidence interval within which the true population correlation will fall. The computations derived from the r and the standard error of the estimate can be used to determine how precise an estimate of the population correlation is the sample correlation statistic.

ANOVA findings (P- value of 0.00) in Table 4.5 show that there is correlation between the predictor's variables and response variable. An F ratio is calculated to represent the variance between the groups, divided by the variance within the groups. A large F ratio indicates that there is more variability between the groups (caused by the independent variable) than there is within each group, referred to as the error term (Pallant, 2005). Therefore, this is an indication of a better the predictor model. A significant F test indicates that we can reject the null hypothesis which states that the population means are equal. The F value of 146.75 indicates that the overall regression model is significant hence it has some explanatory value. This indicates that there is a significant relationship between the predictor variables Enterprise Resource Planning, Bar Coding, Vendor Managed Inventory, Transport Management Systems, Electronic Payment Systems, and Just in Time and operational performance. At 95 percent confidence interval i.e. P–value ($p=0.00<0.05$) it implies that all the independent variables combined do influence the decisions to impact operational performance.

Table 4.5: Analysis of variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.912	6	1.819	37.895	.043[a]
	Residual	1.680	35	.048		
	Total	12.592	41			

a. Predictors: (Constant), Enterprise Resource Planning, Bar Coding, Vendor Managed Inventory, Transport Management Systems, Electronic Payment Systems, and Just in Time
b. Dependent Variable: Operational Performance
Source: Research data, (2015)

Table 4.6: Coefficients

	Un-standardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Co-linearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1(Constant)	.080	.416		.192	.847	-.743	.904		
ERP	.429	.100	.383	4.29	.000	.231	.627	.293	3.411
Bar Coding	.040	.014	.157	2.857	.005	.112	.268	.768	.302
VMI	.239	.086	.317	2.779	.007	.568	.411	.448	2.231
TMS	.120	.060	.159	2.000	.049	.361	.239	.919	1.088
EPOS	.345	.123	.331	2.805	.035	.427	.434	.856	5.031
JIT	.079	.234	.267	.338	.018	.189	.504	.600	4.021

a. Dependent Variable: Operational Performance

Source: Research data, (2015)

From the table 4.6, the variable had no multi co-linearity since the variance inflation factors (VIF) were less than 10. The established multiple linear regression equation becomes:

$Y = .080 + .429 X_1 + .040 X_2 + .239 X_3 + .120 X_4 + .345 X_5 + .079 X_6$, Where:

$\beta_0 = 0.08$, shows that if the level of independent variables are held at constant zero, operational performance would be 0.08.

$\beta_1 = 0.429$, shows that one unit change in Enterprise Resource Planning would results in 0.429 units increase in operational performance

$\beta_2 = 0.040$, shows that one unit change in Bar Coding would results in 0.040 units increase in operational performance

$\beta_3 = 0.239$, shows that one unit change in Vendor Managed Inventory would results in 0.239 units increase in operational performance

$\beta_4 = 0.120$, shows that one unit change in Transport Management Systems would results in 0.120 units increase in operational performance

$\beta_5 = 0.345$, shows that one unit change in Electronic Payment Systems would results in 0.345 units increase in operational performance

$\beta_6 = 0.079$, shows that one unit change in Just in Time would results in 0.079 units increase in operational performance

The Standard Errors are the standard errors of the regression coefficients. They can be used for hypothesis testing and constructing confidence intervals. The Standardized coefficients (Beta) are what the regression coefficients would be if the model were fitted to standardized data, that is, if from each observation we subtracted the sample mean and then divided by the sample SD.

The t statistic tests the hypothesis that a population regression coefficient is β is 0, that is, H_0: β= 0. It is the ratio of the sample regression coefficient B to its standard error. The statistic has the form (estimate - hypothesized value) / SE. Sig. labels the two-sided P values or observed significance levels for the t statistics. The degrees of freedom used to calculate the P value is given by the Error DF from the ANOVA table. The P value for the independent variable tells us whether the independent variable has statistically significant predictive capability. From the table above the significance values are less than 0.05 hence the independent variables are significant.

95% Confidence Limit for B Lower Bound and Upper Bound, these are the 95% confidence Intervals for the coefficients. The confidence intervals are related to the p-values such that the coefficient will not be statistically significant if the confidence interval includes 0. These confidence intervals helps to put the estimate from the coefficient into perspective by seeing how much the value could vary.

4.8 Challenges faced in the implementation of the technology

In examining the possible challenges the supermarkets experiences when implementing the technology, the respondents were asked to rate some possible limitation on a scale of 1 to 5, where, (1) to a very small extent (2) to a small extent (3) to medium extent (4) to a large extent where (5) to a very large extent.

Table 4.7: Challenges faced in the implementation of the technology

	N	Mean		Std. Dev
	Statistic	Statistic	Std. Error	Statistic
Resistance to change by part of management and staff	42	4.4762	0.70689	4.58118
Cost of purchase and maintenance is high	42	4.0952	0.11205	0.72615
Fear of job losses	42	3.9524	0.1273	0.82499
Training is time consuming	42	3.7619	0.15546	1.00752
Lack of expert support locally	42	3.7619	0.16975	1.1001
Lack of skills necessary in the adoption	42	3.5476	0.14934	0.96783
Top management support lacking	42	3.2381	0.15546	1.00752
Valid N (list wise)	42			

Source: Research data, (2015)

The challenges pointed out by the respondents when implementing technology included resistance to change by part of management and staff with a mean of 4.48, high cost of purchase and maintenance with a mean of 4.1, fear of job losses with a mean of 3.95, time consumption in training with a mean of 3.76 and lack of local expert support with a mean of 3.76.

The findings concur with the literature review in that lack of skills necessary in the adoption of technology leads to problems such as low setup times and high defect rates, making JIT work to become more costly because of the adoption approach and capabilities. In the absence of skills, appropriate ethics are not applied and hence become a challenge in applying the JIT techniques (Farrington *et al.*, 2012). The cost of purchase and maintenance is high as indicated by respondents hence a challenge. According to Langley *et al.*, (2009), ERP system as a technique

may face the challenge in high capital investment which many supermarkets may not be willing to acquire due to high costs involved. Even for supermarkets that are able to acquire it, they find employee training very expensive and time consuming.

Management and staff resistance to adopt the change due fear of change connected to difficulties of interpretation, the complexity involved, and the underlying business logic with its clear focus on financial aspects, all contribute to the inertia in reaching adoption of technology (Abbasi and Nilsson, 2012). The respondents indicated that top management support is a challenge to a medium extent as they do not participate and share necessary information to implement the technology.

CHAPTER FIVE: SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Examining technology as the knowledge and application of tools, techniques, systems, and methods of organizations to make or improve goods and services, this chapter provides a summary of findings, challenges faced in the implementation of technology, impacts of implementing technology on competitive advantage, adoption of sustainable technology, conclusion, recommendations, implications of the study on policy, theory and practice, limitation of the study, and suggestion for further research.

5.2 Summary of the Findings

The study findings revealed clearly that supermarkets adopts specific technology in management of their operations that are aligned to its corporate strategy in running its value chain function and these technologies have significantly contributed to the performance and hence creating competitive advantage in the very supermarket industry by focusing on operational effectiveness and efficiency.

The findings concur with the literature review on other similar studies of other organizations. At this age of very uncertain, sporadic business environment and stiff competition coupled with a very knowledgeable customer, supermarkets are turning inward, tapping as much value from

their core competencies to establish a sustainable competitive edge through operational effectiveness and efficiency to improve the organizational performance.

5.2.1 Adoption of technology in management of operations

Supermarkets adopt various technologies in their operations to improve their performance and hence creating competitive advantage. Enterprise Resource Planning used to integrate functions it helps supermarkets to maximize the efficiency of business process across the entire organization, increase on time delivery, increase ability to forecast demand to supplies, increase order capacity, and improve customer service. An ERP system also integrates all supermarket management functions, and hence decreases level of inconsistency information from different systems thus; managers gather correct information and make a right decision. Scanning used at the point of sale terminals allows staff to tend to revenue generating tasks such as helping customers. It eliminates the need to double-check inventory disparities and cash register reconciliation, it reduces the effort required to do inventory and other repetitive paperwork hence improved efficiency leading to higher customer satisfaction, lower costs and higher sales.

Goods delivered only when needed to avoid overstocking helps the supermarket to reinvest the in profitable projects, internet use in communication with suppliers and customers and inventory systems networked with supplier's increases the interaction between the supplier and customer hence improved performance. Having a diverse supplier network ensures products are produced on time and delivered to customer on time as this reduces the chances of customer to switch to other competitors in the market

5.2.2 Impact of technology on competitive advantage

As earlier indicated, supermarkets have managed to consolidate and sustain market leadership position over the years through diverse technology applications as confirmed by the respondents of this study. The adoption of various technologies have impacted positively on the operational performance and consequently on building its operational efficiency. Technology provides a very fertile ground of creating competitiveness and hence the move by some supermarkets to reposition this technology to operation to enhance customer satisfaction. Increased customer satisfaction is enhanced through timely deliveries; easier identification of products through classification helps a business design and executes an effective marketing plan and customer to make informed decisions about the product.

Optimal stock levels maintained through supplier collaboration reduces the holding costs hence reinvest in viable projects, higher stock turn over increasing revenue due repeat and referral customers, improved delivery times due to distribution efficiency and better demand forecasting through supplier collaborations creates a competitive edge.

5.2.3 Challenges faced in adopting technology

As leaders world over are realizing the value in adopting the technology and now viewing supply chain as strategic imperative, they grapple with serious adoption challenges. In this study, respondent site some challenges as: top management and staff resistance to adopt the change due fear of change connected to difficulties of interpretation, and the complexity involved. Employees become comfortable with the way the business is run. They know the expectations

and their role within the company. When a major change disrupts their familiarity, some employees become upset. They don't want to relearn their jobs or change the way they do things. Lack of Support from top management and minimal local expertise support leads to unnecessary frustrations in work place. Also, it will cause delay in operations and ineffective decisions in supermarkets; Cost of purchase and maintenance is a challenge since some supermarkets do not have enough funds to acquire the right properties. Lack of skills necessary in the adoption, knowledge is an essential strategic resource in order for a supermarket to retain sustainable competitive advantage. As knowledge is created and disseminated throughout the supermarket, it has the potential to contribute to the supermarket's value by enhancing its capability to respond to new and unusual situation. Lack of knowledge in managing and implementing technology, is a major challenge to the success of implementing and practicing management in the supermarket industry.

5.3 Conclusion

Based on the findings of the study and the forgoing discussions, it is clear that there exists very strong technology strategies that have contributed to good performance within the operations and supply chain and conversely impacting on the supermarket overall performance and its competitive strength in the challenging business environment.

From the study findings the study concludes that the adoption of technology improves the operational performance. The improved performance is reflected through increased customer satisfaction, easier identification of products through classification, optimal stock levels maintained through supplier collaboration, higher stock turn over increasing revenue due repeat

and referral customers, improved delivery times due to distribution efficiency and better demand forecasting through supplier collaborations. This shows that technology was well customized process to suit the supermarket's change needs as supermarket had very well defined technology strategies. This technology would give the supermarket the higher success rate to the change process hence competitive advantage.

From the study, findings the study concludes that the technology being adopted supermarkets in Nairobi County faced various challenges which hindered the effectiveness of the adoption process. The main challenges included; top management and staff resistance, lack of Support from top management and expert support locally, cost of purchase and maintenance, lack of skills necessary in the adoption and fear of job loss. Therefore, the supermarkets faced diverse challenges that slowed down the technology adoption process.

5.4 Recommendations

Technology need to be embraced to help the management team appreciate the direct impact of these initiatives. Adoption of flexible technological practices through appropriate research will help efficiently and effectively meet the business diverse yet drastic changing needs as well as address challenges arising from a dynamic global business environment. Management should embrace both qualitative and quantitative aspects in their decision making and more sustainable technological strategies integration across the group will yield synergies.

5.5 Implications of the study on policy, Theory and practice

The technology is an important technique for improvement of goods and services, as evident from the study, clearly reflecting how they marry with corporate strategy to yield improved performance and hence creating competitive advantage. To achieve effective adoption of the various technological practices, it requires clear policies to be formulated, implemented and monitored to ensure they remain relevant to the business.

The theory as captured at the literature review stage is such that organization that adopt sound technological practices outperform those that do not and indeed the gap keep widening as such supermarkets continue to innovatively implore fresh technology practices targeting further and faster creation of value given immense competition and pressure from the stake holders such that sustainability of those that do not embrace such best technology strategies is at stake. The outcome of this study on supermarkets clearly supports this theory.

With the globalization and stiff competition, there is not much time left to slow copying supermarkets, proactively and innovatively investing in appropriate technologies should be the core calling of top management if their supermarkets are to grow.

5.5 Limitations of the Study

The study was faced by several limitations. Firstly, the sample size in this study may be adjudged to be small. To this extent the results for the study may suffer from sampling bias, therefore it lead to the narrow understanding of the population. Secondly, a resource constraint was a major challenge. Due to financial constraints, the study did not cover the national geographical area

that would have given the study a different view of technology applied outside Nairobi. Thirdly, some information was deemed by respondents as too confidential, thus they did not wish to diverge. There was lack of response from some of the targeted respondents. Others failed to return the questionnaires claiming that they had no time to fill them, while others argued that it was against the supermarket's policy to disclose any information relating to their supermarket making support from their supermarket a challenge.

5.6 Areas of further Research

The study sought to explore the technology as a competitive advantage in supermarket operations in Nairobi County in Kenya. The study recommends that an in-depth study should be accrued out on factors influencing adoption of technology supermarkets in Kenya. Since this study explored the technology as a competitive advantage in supermarket operations in Nairobi County, the study recommends that; similar studies should be done in other sectors of the Kenyan economy for comparison purposes and to allow for generalization of findings on the technology in Kenya.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

Technology as a Competitive Advantage in Supermarket Operations

Part A:

Organisation Profile

Name of the Supermarket: .....

Year of Establishment: .....

Number of Branches in Nairobi County: .....

Type of Supermarket: General.....Grocery.....Electronic.....Clothing..... Please Tick One.

Management Profile

Management Level: Supervisory..... Mid-level..... Senior Manager..... Executive.....

Position held.....

Number of years worked in the supermarket.....

Level of Education: Diploma..... Degree..... Masters degree..... Other.....

Age: 18 – 25..... 26 – 35..... 36 – 45..... 46 – 55..... Above 55.....

Part B: Extent to which technology is applied in the management of supermarkets operations

Please rank in a scale of 1-5; (where: 1- to a very small extent, 2- to a small extent, 3- to medium extent, 4- to a large extent and 5- to a very large extent). Tick as appropriate.

Extent of application of technology **Ranking**

	1	2	3	4	5
Enterprise Resource Planning used to integrate functions					

Scanning used at the point of sale terminals					
Stocks classification for ease of identification and picking					
Fleet use global positioning tracking systems					
Mobile transactions used for goods payments					
Inventory systems networked with suppliers					
Social media is used for communications with customers					
Internet use in communication with suppliers and customers					
Purchase orders raised and sent electronically					
Goods delivered only when needed to avoid overstocking					

Others (Please Specify)

.....

.....

.....

PART C: Impact of the adoption of such technology in achieving competitive advantage

Please rank in a scale of 1-5; (where: 1- to a very small extent, 2- to a small extent, 3- to medium extent, 4- to a large extent and 5- to a very large extent). Tick as appropriate.

Impact of the technology adoption **Ranking**

	1	**2**	**3**	**4**	**5**
Competitive pricing due to cost reduction achieved from functional integration					

Minimal labour intervention due to real-time systems					
Improvement and visibility of internal processes at all levels due to use of online systems					
Accountability by all drivers through fleet tracking systems					
Increased sales due to product differentiation					
Increased market share achieved through better customer service and market focus					
Faster inbound and point of sale transactions					
Increased customer satisfaction due to timely deliveries					
Improved operational efficiencies through human skill and technology utilization					
Faster feedback from market through online infrastructure					
Easier identification of products through classification					
Better after sales service supported by internet communications					
Improved information sharing due to internet and integration					
Better, faster and informed decisions through analytical data					
Better demand forecasting through supplier collaborations					
Improved delivery times due to distribution efficiency					
Higher stock turn-over increasing revenue due to repeat and referral customers					
Optimal stock levels maintained through supplier collaboration					

Others (Please Specify)

.....

.....

.....

PART D: Challenges faced in the implementation of the technology

Please rank in a scale of 1-5; (where: 1- to a very small extent, 2- to a small extent, 3- to medium extent, 4- to a large extent and 5- to a very large extent). Tick as appropriate.

Challenges faced in implementation of technology **Ranking**

	1	2	3	4	5
Top management support lacking					
Lack of skills necessary in the adoption					
Resistance to change by part of management and staff					
Fear of jobs losses					
Cost of purchase and maintenance is high					
Training is time consuming					
Lack of expert support locally					

Others (Please Specify)

.....

.....

.....

Thank you for your cooperation and support

APPENDIX II: LIST OF SUPERMARKETS IN NAIROBI

1) Chandarana Supermarkets
2) Cleanshelf Supermarkets
3) Deacons Ltd
4) Eastmatt Supermarkets
5) Ibrahim's supermarkets
6) G-Mart Supermarkets
7) Jaharis Supermarkets
8) Kassmart Supermarkets
9) Maguna Andu Supermarkets
10) Naivas Limited
11) Maathai Supermarkets
12) Mr. Price Ltd
13) Nakumatt Holdings Limited
14) Quickmart Supermarkets
15) Rikana Supermarkets
16) Selfridges Supermarkets
17) Tumaini Supermarkets
18) Tuskys
19) Uchumi Supermarkets
20) Ukwala Supermarkets
21) Karrymatt Supermarkets
22) Woolworths Ltd
23) Zucchini Groceries

Source: Kenyaplex Business Directory 2015

APPENDIX III: SUPERVISOR ALLOCATION FORM

UNIVERSITY OF NAIROBI

SCHOOL OF BUSINESS

DEPARTMENT OF MANAGEMENT SCIENCE

MBA PROJECT SUPERVISION ALLOCATION FORM

SECTION A: (To be completed by the student)

Name of Student: MUTISYA HARLEY KISYULA Reg. No: D61/70914/2014

Mobile Phone No. 0722758125 Email. hmutisya@yahoo.com

Proposed Title of the Study: USE OF TECHNOLOGY AS A COMPETITIVE ADVANTAGE IN THE PERFORMANCE OF SUPERMARKETS IN NAIROBI COUNTY.

Specialization (Tick as appropriate):

Operations Management [ ]

Management Information Systems [ ]

Procurement & Supply Chain Mgt. [✓]

Suggested Supervisors: (1) ONSERIO NYAMWANGE (2) MR. MICHAEL CHURCHIR

Signature of Student: ..... Date: 08/06/2015

SECTION B (To be completed by the Department)

Name of Supervisor Allocated: Michael Churchir

Allocated Moderator: Alala E.O.

Total number of students allocated to the supervisor within the year to date.....

Acceptance by Supervisor:

Name: M.K. Churchir Signature: ..... Date: 25.6.15

Approval by the Thematic Coordinator:

Name: Alala E.O. Signature: ..... Date: 08/06/15

Approval by Chairman of Department:

Name: DR. NJIHIA Signature: ..... Date: 29/6/15

Note:

APPENDIX IV: PROPOSAL CORRECTION FORM

UNIVERSITY OF NAIROBI

SCHOOL OF BUSINESS

PROPOSAL CORRECTION FORM

Student Name..MUTISYA HARLEY KISYULA.....

Registration Number...D61/70914/2014.....

Department...MANAGEMENT SCIENCE.....

Specialization...PROCUREMENT & SUPPLY CHAIN.

Title of Project Proposal..TECHNOLOGY AS A COMPETITIVE ADVANTAGE IN SUPERMARKET OPERATIONS IN NAIROBI COUNTY.....

The student has done all the corrections as suggested during the Proposal Presentation and can now proceed to collect data.

Name of Supervisor.....Michael K. Chirchir.....Signature.....Date.27/7/2015

APPENDIX V: DATA COLLECTION FORM

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
MBA PROGRAMME

Telephone: 020-2059162
Telegrams: "Varsity", Nairobi
Telex: 22095 Varsity

P.O. Box 30197
Nairobi, Kenya

DATE 28TH JULY 2015

TO WHOM IT MAY CONCERN

The bearer of this letter ... MUTISYA HARLEY KISYULA

Registration No... D.61/70914/2014

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
28 JUL 2015
P.O. Box 30197 - 00100, NAIROBI

PATRICK NYABUTO
MBA ADMINISTRATOR
SCHOOL OF BUSINESS