INVENTORY MANAGEMENT PRACTICES AND PUBLIC HEALTH INSTITUTIONS PERFORMANCE IN NAIROBI CITY COUNTY, KENYA

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DECLARATION

This project is totally my novel work and hasn't been submitted to any other educational institution for a degree or other award. It is prohibited to copy any aspect of the aforementioned project prior to the author's or Kenyatta University's permission.

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This project has been forwarded with my consent as the University Supervisor.

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DEDICATION

The project is dedicated to my spouse Monicah Wacera and my kids Enock Muthomi Kirimi, and Nyla Makena Kirimi for their patient.

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I recognize the following individuals for their support: Firstly, I would want to say thanks to my supervisor, Dr. Morrison Mutuku, for all of his advice and guidance with this piece of writing. In addition, I appreciate my loved ones and friends' unwavering support and inspiration.

God's blessings on you

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ABBREVIATION AND ACRONYMS

ABC	Activity Based Costing
EIMS	Electronic - Inventory Management Systems
EOQ	Economic Order Quantity
JIT	Just-in-time
KEPH	Kenya Essential Package for Health
KMPDB	Kenya Medical Practitioners and Dentists Board
MoH	Ministry of Health
MRP	Materials Requirement Planning
PHEI	Private Higher Education Institution
SPSS	Statistical Package for Social Sciences
TCE	Transaction Cost Economics
TI	Transparency International
UHC	Universal Health Care
VMI	Vendor Managed Inventory

OPERATIONAL DEFINITION OF TERMS

Activity Based Costing System	An approach of dividing up overhead and indirect costs into direct costs for products and services like salaries and utilities.
Electronic-Inventory Management System	Is an automated system developed for the customer to manage the company's stock or inventory as well as customers, suppliers, sales, and generating reports.
Lean IMSs	A methodical strategy for increasing the value of a business's inventory by the detection and elimination of wasteful spending of resources, time, and effort.
Vendor-Managed Inventory	An approach of inventory management where the distributor's inventory is optimized by the product's provider, often the producer.
Organization Performance	Is the result of an organization's or investor's activity over a certain amount of time.

ABSTRACT

The functioning of Kenya's public health system has long caused the country's citizens much anxiety. Health is a prerequisite for better social development, less poverty, and the accomplishment of the social pillar goal of Kenya Vision 2030. In Kenya, it is anticipated that a decentralized health system would increase service delivery efficiency, encourage innovation across the board, enhance access to and equality of available services, and encourage accountability and transparency in service provision. The Kenya Health Policy 2014- 2030 offers direction to the health sector in defining and describing the necessary actions in accomplishing the government's health objectives. The policy is in line with Kenya's Constitution and global responsibilities to health. As a comprehensive platform for managing the success of immunization programs, the inventory optimization systems in public hospitals enable managers at all levels to manage stock and keep an eye on the supply chain. The general objective of this research was to ascertain how inventory management techniques affect public health facilities' performance in Nairobi City County, Kenya (NCC). The study specific objectives were to ascertain the effects of vendor-managed inventory, lean IMS, electronic-inventory management system (EIMS) and activity based costing system (ABS) on the performance of public health institutions in NCC. Theories of economic order quantity, lean manufacturing, and transaction cost economics served as the study's theoretical underpinnings. Descriptive research methodology was used for this study. 180 county employees, including the county pharmacist, sub county pharmacists, the pharmacist in charge, and hospital administrators, participated in the study. The respondents were picked using purposive sampling and simple random sampling. Primary data was gathered by utilization of questionnaires which were tested for reliability and validity. Quantitative data was analyzed using both descriptive and inferential statistics in this study. The average, mode, and standard deviation described data. While SPSS was used for the descriptive statistics, regression and correlation analysis constituted the inferential statistics. According to the research, public health facilities in Nairobi County, Kenya benefited greatly from adopting lean inventory management, electronic-inventory management, and activity-based costing systems. The research found that the primary objective of vendor controlled inventory was to cut down on inventory-related expenditures for both parties involved. In addition to minimizing holding costs and limiting loss from obsolescence, rotting, and dead stock, effectively managing lean inventory can also avoid out-of-stocks, which can irritate customers and affect sales in the long run. This is because out-of-stocks can eliminate the need for the company to order more inventory than it needs, which in turn lowers holding costs. The use of an EIMS eliminates the need for double-entry bookkeeping and streamlines the transfer of inventory costs and assets between applications. Managers are able to get a clearer picture of production costs with activity-based costing, allowing them to make better decisions about which items to develop and how to make them at lower costs. The study recommends that the hospitals should openly share information with the vendor to build confidence that it is able to fulfill customer needs and every order that comes through. The hospitals should maintain a minimal amount of inventory by ordering goods or materials only when they are needed in the production process. Hospitals ought to leverage artificial intelligence to enhance their inventory management by offering insights, forecasts, and suggestions derived from their inventory data. The hospitals should first identify the activities that consume overhead costs in your business process, such as ordering materials or setting up machines.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The global community has come to understand how crucial it is to the attainment of key global health objectives for medical supply firms to be strengthened as a whole. starting with the broad health goals of the Millennium Development Goals (MDG) and ending with the more targeted goals of the several distinct global health initiatives. In order to achieve universal health coverage, access to critical medications has been regarded as a key component of a functioning healthcare system (Kenya Healthcare Federation, 2016).

At its second national health sector strategic plan, the Kenyan government acknowledged that the lack of vital medications and other medical supplies, especially at government-run hospitals, had a substantial impact on the current poor quality of healthcare services. Continuous shortages of necessary medications and medical supplies plague public health institutions (MOPHS, 2018). The Kenyan government has committed substantial financial resources to the Ministry of Health for the purpose of funding the provision of necessary medications. medicines make up the majority of public health sector expenses in poor countries, accounting for 8 to 12% of recurrent health budgets; as a result, prudent inventory management of medicines or health commodities is required (SIHFW 2010).

Transparency International (TI) (2011) recognized that the majority of Kenya's public hospitals suffer from a severe lack of medications and other vital supplies. Despite several stop-gap measures being put in place over time, the issues still exist. In public health facilities, the majority of patients get the proper prescription after a consultation, after which they must buy the medications from pharmacists scattered around the facility at exorbitant costs. Patients are required to purchase needles, syringes, and gloves from private pharmacies or clinics nearby the public facility if the doctor prescribes an injection (TI 2011). In Kenya's rural regions, it is especially challenging to have enough access to functional healthcare systems. High rates of morbidity and death from malaria,

diarrhea, and HIV/AIDS are the consequence of health facilities being underutilized, which is attributed in part to a lack of a reliable medicine supply. (Mungu, 2013).

According to Yi-Hui (2015), a well-developed inventory optimization system is crucial to the smooth running of public health systems. It lessens the likelihood of severe gaps in inventory management, monitoring, and assessment, as well as a weakened public health system, due to a lack of fundamental needed medicines. This is mostly due to inefficient public health IMS, a failure to do ABC Analysis, and the use of FIFO ordering principles.

Inventory performance is an indicator of how successfully and efficiently inventory is utilized and supplied. Comparing actual dollars on hand with anticipated cost of goods sold is the aim of inventory performance measures. The strongest measure of a facility's total operational success, according to many Lean practitioners, is inventory performance, according to Masudin and Dewi (2018). Shajema (2018) argues that since previous month's consumption is unrelated to how much inventory would be utilized the next month, inventory performance is always assessed based on anticipated demand as opposed to past use. In other words, the demand component of inventory performance has to be foresighted.

In a global economy, inventory management is a key strategic component for boosting competitiveness that is competitive and dynamic (Roman, Parlina, & Veronika, 2013). Inventory control in retail establishments has changed from being a mostly passive and cost-cutting activity to becoming a crucial success element for company competitiveness (Spillin, Mcginnis, & Liu, 2013). Accordingly, a growing body of evidence suggests that retailers should prioritize fixing their stock problems ahead of other concerns (Tuttle & Heap, 2015). Delivery time, inventory price, and financial outlay were frequently connected with an inventory system's efficiency. Manufacturing was likely the most conducive to understanding inventory management given that there was a tangible movement of goods. Customers expected faster delivery times and more accurate services, and this sector probably comprehended inventory management the easiest. Inventory management in retail establishments plays a crucial role in contributing to the economy, and as a result, numerous economies have already attained a substantial level

of market inventory. Inventory management is essential for providing additional value, as successful retail stores throughout the globe have long understood (Spillin et al., 2013).

According to Yi-Hui (2015), health care in the UK is a devolved issue due to the fact that Northern Ireland, England, Wales and Scotland each have their own publicly funded healthcare systems that are responsible to and funded by different governments and parliaments. The field of public health aims to improve people's quality of life by measures like disease prevention and treatment, particularly for mental health issues. This is accomplished by keeping an eye on instances and health indicators, as well as by promoting healthy habits. Promoting hand washing, breastfeeding, and administering immunizations are examples of common public health programs. precise projections of vaccine inventories and needs estimation, sufficient stock ordering that adheres to delivery schedules, in compliance with cold chain capacity through an optimized inventory system, and adequate stock ordering that complies with delivery schedules are all necessary for effective vaccine management. This ensures that essential medicines are accessible for emergency situations.

According to Sainathan and Greenbelt (2019), healthcare in Rwanda has traditionally been of low quality, but recent decades have witnessed significant improvements. One of the best health systems in Africa, Rwanda's universal healthcare program, is now in operation. The achievement was made possible by inventory management systems, which made it possible to estimate vaccination demand accurately. The accuracy of this forecast depends on both the level of implementation (national, district, or local service delivery) and the forecasting timeframe (month, year, or multi-year). The quality of the data utilized and the Programme Manager's familiarity with particular programming circumstances both had an impact on the estimation's accuracy.

1.1.1 Organization Performance

Barasa, Simiyu, and Iravo (2015) aver that performance is the aptitude of an organization to effectively and efficiently use its own resources to achieve its goals. Depending on the objective for which they are set, organizational objectives might differ. If objective performance measurements are available, use them; if not, use subjective performance

measures instead since there aren't any reliable objective performance measures accessible.

The fundamental goal of companies is to lower the expenses of inventory management since doing so would improve an organization's overall performance. This study examined how inventory management techniques affect consumer goods manufacturing enterprises in Kenya relating to the ideal production, efficacy, production targets, on-time delivery, and quality (Dess &Robinson, 2014).

The organizational performance of any particular corporate company determines its likelihood of success, which depends on its capacity to successfully implement strategies that are connected to the achievement of institutional goals (Randeree & Al Youha, 2009). The actual output as compared to the equivalent expected outputs may be thought of as an essential component of organizational success (Tomal &Jones, 2015). Performance is defined precisely as the level at which a business, as a social system equipped with a variety of material resources, intangible resources, and skills, has the capability to realize both short-term and long-term goals. According to Javier's (2002) theory, an organization's performance is roughly similar to the economy, efficiency, and effectiveness with which its planned social activities are carried out.

For a very long time, determining organizational performance was mostly restricted to financial metrics such as revenue, profit, ROA, net operating income, return on sales, ROE, and other indications of revenue and yield (Novak, 2017). Nevertheless, a number of academics have argued for the inclusion of non-financial metrics in the assessment of firm success (Norton & Kaplan, 2003). In order to address these issues, the balanced scorecard model was developed. It incorporates drivers of future success in order to counteract the flaws of an over-reliance on financial metrics and organizational performance indicators (Kaplan & Norton, 1996; Niven, 2002). The utilization of lead or non-financial metrics viewed as performance metrics with purported predictive value was founded on the inadequacy of financial measurements, likewise recognized as lag indicators, to anticipate future performance of a company. Traditional cost-based and financial statistics are inadequate for capturing the value creation processes of

contemporary corporate organizations, but they were ideal for the industrial age (Neely, 2002; Gica & Moisescu, 2007).

Public hospitals need to reduce their costs, increase profit and ensure continuing operations need to monitor their financial performance and forecast financial problems (Meesala & Paul, 2018). The financial performance of Kenya's public hospitals is a necessity for the country's economic development since it improves Kenyans' lives and, as a result, supports economic growth by reducing poverty and increasing people's health (Mwatsuma, Mwamuye & Nyamu, 2018). According to WHO (2018), the core of the principle of hospital quality improvement is the assessment of public hospital performance. One may characterize what hospitals really accomplish by measuring hospital performance. Efficiency is the primary metric used to evaluate the financial success of hospitals.

1.1.2 Inventory Management Practices

Wisner & Leong (2011) describe inventory management as successfully managing the entry and exit of units from an existing inventory. This process often requires regulating the transfer of units so as to avoid the inventory from increasing too much or dropping too extensively and endangering the capacity of the organization to operate. Agus & Noor (2010) avows that reducing costs associated with the inventory is another goal of good inventory management, both in terms of the overall cost of the items included and the tax burden generated by the inventory's aggregate value.

Dryden *et al.* (2012) assert that in preserving accurate records of completed items that are prepared for transportation is an essential component of inventory management. This often involves deducting the newest shipments of finished products to customers from the inventory totals in addition to recording the production of recently finished products. Inventory management procedures are important because they allow sales representatives to get information regarding what is readily accessible and prepared for shipment at any time quickly.

According to Brigham *et al.* (2013), the company ought to develop an inventory management system that strikes a healthy equilibrium between the levels of demand and

supply in order to reduce the expenses associated with inventory, reduce the amount of time required for cycle times, and improve information sharing. As a consequence of this, the company is able to effectively manage its inventory and coordinate its supply chain system, both of which will lead to improvements in performance.

Organizations employ various actions and processes to manage their inventories of completed goods, semi-finished goods, and raw materials. When these actions are carried out properly, the company is able to reduce waste, expenses, and improve income (Zer and Wei, 2016). Just-in-Time (JIT), Materials Requirement Planning (MRP), Vendor Managed Inventory (VMI), and barcoding are a few of the concepts included in this group. Even individuals who operate in this field do not like thinking about inventory management in great detail. That's why it's good to implement best practises that simplify inventory management.

The technique used by a company to manage its investment in stocks is known as inventory management procedures (Stevenson 2010). The recording and monitoring of inventory levels, estimation of subsequent demand, choosing when to purchase and how to buy it, and other inventory management procedures are all part of this process (Adeyemi &Salami, 2010). Miller (2010) posit that inventory management is connected to all procedures put in place to ensure that consumers may get a certain item or service. It makes it possible to coordinate buying, production, and distribution tasks in order to satisfy marketing requirements and make sure that consumers can get items.

Vendor Managed Inventory (VMI) is a term used to refer to a method of managing inventory and the supply chain in which the seller is liable for determining when and how much inventory needs to be refilled. It is commonly known that adopting VMI has benefits for the downstream member, who is often a large retailer. The primary benefits of VMI were decreased expenses and improved customer service for either one or both of the participants (Lee, 2015).

Lean inventory is a business strategy that places a focus on exceeding consumers' expectations by providing high-quality goods at the lowest possible price when needed. Lean thinking is described as a dynamic, knowledge-driven, and customer-focused

approach by the Lean Aerospace Initiative (2012) that enables all individuals in a specified company to continually remove waste with the aim of generating value. Lean is, in accordance with Bruce and Larco (2019), a philosophy that can be used at many levels as well as a dedication to constant improvement that has a substantial positive influence on the health, wealth, and competitiveness of an organization.

Shardeo (2015) posit that electronic inventory management systems (EIMS) are a procedure for electronically planning, ordering, and managing stock products in a way that improves business performance. Electronic data exchange, electronic point of sale, bar coding, and radio frequency identification are some of the activities that Blanchard (2010) theorized the e-inventory systems will include.

Profs Robin Cooper 7 Robert Kaplan initially developed activity-based costing for manufacturing firms to correct the erroneous allocation of overhead costs to goods or services. Since then, significant improvements have been made, and nowadays, activity-based costing is applied to all economic sectors, including service businesses. ABC is a costing approach that, in accordance with the cited source, recognizes organizational activities and applies costs associated with each task to all products and services based on individual consumers' real consumption (Gruen, 2017).

1.1.3 Health Sector in Nairobi City County

Kenya's health care system is extremely varied. National, county, and municipal governments, the for-profit private sector, religious organizations, pharmacies, pharmacists, conventional healers, and community healthcare professionals all contribute to the public's health. Kenya has both legitimate and unofficial medical sectors. In order to stay on the right side of the law, the healthcare sector overseen by the Ministry of Health must regularly report to the Health Information Systems Department. Due to the lack of oversight from the Ministry of Health, traditional practitioners fall within the purview of the unofficial structure (Sudhinaraset, Ingram, Lofthouse, & Montagu, 2013).

According to the 2010 Constitution's fourth schedule, the health sector is one of 14 responsibilities that have been devolved to the 47 county administrations. Kenya's healthcare system is structured like a pyramid. Rural health care pyramids often consist

of freestanding dispensaries, health centers, and mobile clinics. There are six levels of medical care: Houses and communities make up the first tier; medical facilities including clinics and hospitals make up the second and third tiers, respectively. Nairobi's level 4 County Hospitals (CH) and county referral hospitals are Mama Lucy and Mbagathi. Level 5 hospitals, formerly known as provincial hospitals, are now known as county referral hospitals (CRH). Kenyatta National Hospital, Moi National Hospital, Mathare Hospital, and the Spinal Injury Referral Hospital are the country's four Level 6 National Referral Hospitals. These hospital grades are described in the Kenya Essential Package for Health (KEPH; Ojakaa, Olango, & Jarvis, 2014).

According to the Ministry of Health, level four and five hospitals are the backbone of the county's healthcare system, which serves an extremely varied geological landscape. Regional centers for diabetes management, they bridge the gap between district hospitals and the national referral hospital. Level four and five medical professionals are family physicians, pediatricians, advanced practice nurses, and midwives, according to Ojakaa et al. (2014).

There are five hospitals in Nairobi, both public and private. The Chief Health Officers' Association of Kenya (CHAO), a division of the Ministry of Health, is responsible for sending out the gazette notices to the top-five public hospitals in Kenya. Multiple authors (Godia et al., 2013) The Ministry of Health is responsible for it. Private hospitals at levels four and five in Kenya must be registered with the Kenya Medical Practitioners and Dentists Board (KMPDB). Not the Ministry of Health is responsible for them, but rather the Kenya Episcopal Conference-Catholic Secretariat (KEC), the Christian Health Association of Kenya (CHAK), the Supreme Council of Kenyan Muslims (SUPKEM), and the local community. These facilities are not governed by the Ministry of Health. The administration of a level five private hospital may be split between a family or group of professionals. There must be at least one operating room, outpatient and inpatient services, four distinct departments, 50 inpatient beds, minimal X-ray services, a resident medical officer, and an emergency medical services department in level five private hospitals, as mandated by the KMPDB. According to Echoka (2013), a hospital license from the KMPDB is required. There is a cap on the number of patients treated in level

four and level five private hospitals because of the high cost of providing care to international standards. This is so even though the services and infrastructure at private hospitals are superior to those at public institutions. Level four and five hospitals tend to hire a varied group of executives.

1.2 Statement of the Problem

Expanding access to medical products requires a strong supply chain, and inventory management procedures must be effective, flexible, and have high levels of financial integrity (Yadav, 2015). Kenya is one of several Low- and Middle-Income Countries (LMICs) with supply chains that confront many constraints that are impeding the development of Universal Health Care (UHC) (Kariuki et al., 2015).The Kenyan public health sector is currently dealing with a number of issues, the majority of which disrupt service delivery to the the general public. These issues include strikes and go-slows, shortages of infrastructure and equipment, a shortage of human resources, and others (Agbozo, Owusu, & Atakorah, 2017). As stated by Caillier (2010), devoid of excellent inventory management procedures, the health systems cannot operate effectively and efficiently. For any company to accomplish this, more expenses must be paid to ensure good standards.

Mungu (2013) claims that contrary to procurement in other sectors, inventory management in hospitals is designed to preserve a suitable stock level of medication in general and vital medicine that allows for appropriate service that effects human life. Public procurement in the health sector is allegedly governed by the public procurement and disposal Act 2005 and Regulations 2006. Emergencies offer health risks that develop quickly, are out of a person's or community's control, and, if untreated, are either potentially fatal or will permanently affect a person's or a community's health. Inventory management is the foundation of the pharmaceutical system, and inadequate management leads to wastage of financial resources, shortages of vital pharmaceuticals, and average accessibility to drugs, all of which will quicken the expiration and deadline for high-quality healthcare. Despite the warnings, most public hospitals routinely refuse patients owing to a lack of necessary medications and infrastructure. Sadly, in most companies in

the health sector in poor nations, supply chain management is not given a primary position in overall strategy (USAID, 2012).

There has been several research on the relationship between inventory control and business success. According to Akintonye (2014), inventory management helped German service companies operate better. Lapide (2010) and Mehra (2014) are also found that manufacturing and service companies were more productive when they used technology for inventory management. Gakuru (2012) avers that ordering system frustrations are the biggest obstacle to the use of the inventory model. Lack of computers to monitor inventory levels and ignorance of the best methods for putting the models into action were other issues highlighted as being restrictive. The effectiveness of supermarkets was impacted by computerized inventory management, according to Kitheka (2012).

The studies mentioned above focused on automated inventory management and model-based inventories. The context of the study is also different with little evidence on studies conducted in the public health sector, to fill in the gaps this study looked at the effects of inventory management practices on the public health facilities performance in NCC.

1.3 Objectives of the study

1.3.1 General objectives

To examine how inventory management practices affect public health facilities' performance in Nairobi City County, Kenya (NCC).

1.3.2 Specific Objective

i) To ascertain the effects of vendor-managed inventory on the public health institutions performance in NCC.
ii) To find out the effects of lean inventory management systems on the public health institutions performance in NCC.
iii) To access the influence of electronic-inventory management system on public health institutions performance in NCC.
iv) To determine the influence of activity based costing system on the public health institutions performance in NCC.

1.4 Research Questions

i) Does vendor-managed inventory influence on the public health institutions performance in NCC?

ii) Does lean inventory management systems influence on the public health institutions performance in NCC?

iii) Does electronic-inventory management system influence on the public health institutions performance in NCC?

iv) Do activities based costing systems influence on the public health institutions performance in NCC?

1.5 Significance of the Study

The NCC government is expected to be the primary beneficiary of this study. The government is expected to benefit from this study's findings by acknowledging how inventory management practices and performance of the institutions in the health sector. This should enable the county government to make key decisions in line with procurement practices to ensure that its employees are working in harmony to attain the intended performance.

For research groups and academics that desire to do more research in this field, the study would provide background knowledge. It would pinpoint elements that, if recognized, recorded, and documented, may help the public sector perform better. These elements include those that affect how institutions in the health sector manage their inventories and their performance.

The study would enable them governmental institutions understand and appreciate factors that affect inventory management practices and performance of the institutions in the health sector. This would help these firms to look for suitable methods to accentuate the good aspects while fixing the flaws.

1.6 Scope of the Study

The goal of this research was to find out how public health institutions in NCC may benefit from better inventory management. We used inventory management procedures as the independent variable and the effectiveness of public hospitals as the dependent

variable. Lean IMS, EIMS, automated cycle counting, and vendor-managed inventory were all markers of good inventory management. Participants were recruited from a number of hospitals and clinics in NCC.

1.7 Limitations of the Study

Some participants were hesitant to provide the right information to the researcher. However, to overcome this restriction, the researcher allayed the respondents' fears by ensuring them that a high level of confidentiality was observed in order to protect their privacy. Through the consent letter from the university granting permission to conduct research; they were assured that the exercise would be legitimately carried out as an academic degree requirement.

Another limitation was associated with unavailability of the respondents to fill the questionnaire on time due to their busy schedules. Accessing medical facilities and responses would provide certain challenges. The researcher dealt with the issue by hiring study assistants who helped with the questionnaire distribution to the participants. The research assistant got enough training on the research instrument, and as they lived in the study region and were familiar with the locations of the institutions that participated in the study, they had no trouble reaching the respondents. Additionally, some participants could take longer than expected or even decline to complete the surveys, which could possibly impede the timelines for the research. The researcher contacted the participants in order to follow up with them through phone calls, emails, and in-person visits.

1.8 Organization of the Study

The five chapters that make up this study project are chapters one, two, three, four and five. Chapter one includes the context, issue statement, research purposes, research questions, significance, study scope, study limits, and study structure. The theoretical review, empirical review, literature review summary, and conceptual framework are all included in chapter two. Highlighted in Chapter 3 are the study's design, sample size and method of sampling, data collecting instruments validity and reliability, data gathering method, data analyzing and presenting, and ethical considerations. The findings of the research as well as the debates are presented in chapter four. The findings, conclusions,

recommendations, and proposals for additional research are summarized in Chapter Five of the report.

CHAPTER TWO

LITERATURE REVIEW

2.1 Chapter Overview

The chapter evaluates underlying theories to this research and discusses the empirical literature on the inventory management practices and organization performance. A conceptual framework depicting the link between the study variables is also included in this chapter.

2.2 Theoretical Review of the Related Literature

This research is based on the application control theory, theory of economic order quantity, lean theory and the transaction cost economics theory.

Theory of Application Control

The theory was postulated by Ortega and Lin (2004). The theory's proponent wanted to lessen inventory variance, lessen demand amplification, and improve ordering procedures (Sourirajan & Ramachandran, 2008). Bijulal, Venkateswaran, and Hemachandra (2011) stress out that the utilization of control theory has a significant role in dealing with demand fluctuations. Other firms may have concerns about inventory management in a variable demand environment. Parameters for process reordering, including when and how much to reorder in an irregular demand environment, are provided by the theory. Demand unpredictability is obviously susceptible to intervals and might result in substantial effort being spent upon procurement as there is no established lead time between demand and the degree of reordering. Customers' needs in this circumstance may also call for sophisticated procurement methods that put theory into action and strong management support (Minner & Transchel, 2010). In order to comprehend how lean inventory techniques affect the effectiveness of the supply chain, it is crucial to grasp the theory.

Theory of Economic Order Quantity

This theory was brought postulated in 1913 by Haris and can also be referred to as Wilson Economic Order Quantity (EOQ) model, who conducted a critical analysis of the

model (Ogbo, 2011; Ogbo and Onekanma, 2014). Haris is within operation management authors who have come up with models to establish the maximum levels of inventory that the organization must be keep. Blackburn, (2010) agreed that this model is commonly applied in many industries when managing inventory. The use of the model has shown a decline in some cost and an increase in others. The cost of ordering declined with the holdings of inventory, whereas holding costs rose and the associated cost to total inventory costs curve at a lower point. This point can also be referred to as the minimization total inventory cost point. Economic order quantity is the amount of inventory at which the sum of the expenses associated with ordering and keeping inventory is minimized (James, Samson & Mbura, 2018)

Further Coleman (2002) &Ogbo (2011) defined this model as the model that order amount of quantities which reduce the cost balance between re-order cost and inventories holding cost. Assumptions of the model that Ogbo (2011) describes include; that holding costs stock are constant and known; constant ordering costs is known; the demand rate are constant and known; there is known and constant time lead cycle; the unit price constant; the replacement is made promptly, no stock-outs are allowed because the batch is supplied at once. One challenge of EOQ is that it does not take into consideration of safety stock which are kept to cater for difference in lead-time (Kyalo, Charle and Iravo, 2019).

The EOQ holds that for each and every item stocked in stores there should be a determination level of orders and it should be cost effective. The EOQ model suggests that even though risk and uncertainties are regular and common in all business all other variables should be kept constant. For instance, some of the uncertainties in this model include demand change, damage at the time of transportation and delivery delays, therefore, demand Uncertainty will force the model to be altered to moderate against uncertain business atmosphere (Oballah, Waiganjo and Wachiuri, 2015). Due to experienced business atmosphere altered economic order quantity, where there is common occurrence in fluctuation demand EOQ model can be used. The model is mostly applicable in organization where the demand cannot be accurately projected due to its dependence on several external factors. There are more aspects of resource management

that influence inventory level. These factors can influence the activities being carried out in the University (Ogbo and Onekanma, 2014).

Lean Theory

John Krafcik proposed the Lean Theory in his essay from 1988. Lean is a collection of methods that help identify waste and gradually eliminate it. Production time and cost are decreased when waste is removed, and quality rises (Krafcik, 1988). According to Kros et al. (2016), lean is a development of the concepts of just in time, This is further described as a pull-based approach designed to match the supply chain's business and production operations. The impact of the lean paradigm on financial outcomes recommends using lean theory to reduce waste in the manufacturing process and get rid of buffer stock (Green &Inman, 2005).

Eroglu & Hofer (2011) posit that leanness has a favorable effect on a company's viability. They claimed that inventory leanness is the best inventory management strategy. Less inventory is kept on-site, there are no carrying expenses for inventory, and manufacturers may place orders with greater flexibility thanks to the lean method. Overall, both the timeliness and the size of the adoption contribute to the empirical validity of the lean explanation. In order to comprehend how lean inventory methods affect the performance of the supply chain, it is crucial to grasp this idea.

Lean theory expands upon ideas introduced by Just in Time (JIT). Womack (2013) argues that JIT is a pull-based approach meant to coordinate commercial and industrial activities all along the supply chain. As a result of this theory, buffer stock can be eliminated and production waste can be minimized (Green & Inman, 2015). When it comes to inventory management, leanness is your greatest bet for improving your company's bottom line. According to Eroglu & Hofer (2011), companies that are more efficient than average in their field typically get financial benefits from their efforts to cut costs. Bicheno (2014) assessed the impact of lean theory on business results. The goal of lean theory is to help manufacturers eliminate inventory carrying costs, increase ordering flexibility, and reduce the amount of stock stored on-site. In order to maximize growth, productivity, and

market share, businesses can benefit from optimizing their inventories with the use of lean supply chain practices and technologies (Balle & Balle, 2001).

Lean theory eradicates buffer stock and lessens waste in the production process as an addition to JIT's ideas (Green and Inman, 2005). Inventory leanness is the finest inventory management technique and unquestionably affects a company's ability to produce. In an attempt to decrease costs associated with the shipping of products, the theory articulates how manufacturers' versatility in their request may lower stock stockpiles. Feedback opposing the idea suggests that when addressing long-term cooperation, which involves the dissemination of data and information and the exchange of partners across organizations, supplies are required.

Theory of Transaction Cost Economics (TCE)

The TCE theory is connected to the reduction of transaction costs and the management of transactions via the utilization of ICT according to Alchian and Demsetz (1972), Coase (1937), and Williamson (1975). The fundamental goal of this approach was to stress how an organization may increase its performance and efficiency by reducing expenses associated with its responsibilities (Williamson 1985). It also underlined the benefits of collaboration across various groups. This thesis demonstrated how engaging in joint negotiations with a number of other groups might expose an organization to the risk of opportunism. The year is Presutti. It also concentrated on the benefits of using several suppliers rather to just one since doing so boosts bargaining power and opens up more opportunities for procurement agreements, which lowers the risks associated with using just one supplier. Their ability to maintain balance via coordination and risk reduction was made possible by the increased number of suppliers and organization (Whitin 1955).

Information Technology (IT) facilitated cost reduction since procurement procedures were automated and standardized, and it also placed a strong emphasis on collaboration with many suppliers. The procedure mostly benefits businesses that purchase commodities. By partnering with low-cost suppliers, IT focuses on cutting expenses so they can buy more products at a lower price and pass those savings forward to their consumers. The year is Presutti. IT-using businesses are able to help reduce expenses in a

meaningful way. Using IT to deliver the pricing and offers on items reduces the cost of looking for and acquiring information. Catherine (2005) through online marketplaces. Collaboration with other businesses has helped several nations expand and thrive thanks to information sharing. This has been accomplished through exchanging information amongst businesses about how to cope with demand rates and fluctuations in demand (Carlos, Wills, and Plant 2008).

The manufacturing industry has been plagued by a variety of uncertainties, including those related to supply, demand, technology, and the creation of new products (Erridge 2007). Supply chain uncertainties are difficulties that emerge unforeseen in the course of the supply chain. Examples of these difficulties include material shortages and late delivery. These difficulties have an impact on the production process, which has an impact on sales, which then has an impact on distributors, who then has an impact on retailers. If the issues are not handled in a timely manner, these problems might result in significant losses for a corporation and perhaps the collapse of the institution (Geoffrey 2015).

Another uncertainty might arise throughout the process of product creation, including during the prototype, design, and market research phases as it relates to the production of goods. The decision on the best technological platform to utilize during the production of goods is another area of ambiguity (Giunipero 2008). By coordinating information sharing across businesses, which lowers risks by allowing them to share knowledge on the most efficient methods for planning, producing, and maintaining inventories, these uncertainties may be reduced. When the incorrect or unsuitable information is sent from one company to another, information sharing may have a number of benefits but also a number of drawbacks. Thus, Kaliannan, Raman, and Dorasamy (2008) concluded that an organization's internal operations may be impacted by the speeds at which external changes are occurring and the implications of uncertainty.

2.3 Empirical Review of the Related Literature

2.3.1 Vendor-Managed Inventory

How well an organization keeps tabs on its stockpile of goods is a major factor in how quickly it can improve its efficiency, productivity, and expertise. Many companies now use VMI systems to keep track of their customers' inventory turnover, which in turn benefits the supplier. Since the vendor will have already restocked the shelves, clients can avoid stock outs with the VMI system's support. Since the supplier will already be aware of the required quantity and which products will be shown, there will be no costs associated with keeping inventory.

Atnafu, Balda and Liu (2018) investigated on Vendor-Managed Inventory and firms competitiveness together with organization performance of SMEs in Ethiopia. The target group of interest was the 188 SMEs in the manufacturing sector. It was found that firm competitiveness is enhanced through increased level of inventory management. Further, it was discovered that inventory management has a direct and favorable effect on an organization's performance. The research came to the conclusion that the inventory control system and new stock reordering system had a favorable and substantial impact on business performance.

Agu, Ozioma and Nnate (2016) investigated on Vendor-Managed Inventory and firms performance in the manufacturing sector. The target group of interest was 285 employees working in the selected firms. The study intended to revealing the impact of Vendor-Managed Inventory and inventory control on firm performance. It was discovered that Vendor-Managed Inventory influences performance of any business organization. Further, it was found that inventory as an asset in any firms is vital and implementation of inventory systems ensures effectiveness in the performance of the organization. The research revealed that Vendor-Managed Inventory influence organization performance.

Musau *et al* (2017) studied the relationship between VMI and productivity in Kenya's textile industry. The 196 people employed in the procurement departments of the chosen businesses were the primary focus. Convergent and parallel mixed methods were used to

find that inventory management significantly improved business outcomes. The survey also found that textile companies have adopted VMI and put in place transparent processes to guarantee the uninterrupted movement of both raw materials and finished items. Efficiency in stock control was found to result from the widespread use of inventory management strategies. The study also found that inventory management and demand forecasting systems have a beneficial effect on business outcomes.

Owuor and Noor (2019) focused on the impact of Vendor-Managed Inventory on service delivery in the public health institutions in Kenya. Through descriptive survey design, the study revealed that service delivery in the health institutions is positively influenced through Vendor-Managed Inventory and accuracy of inventory records. Findings revealed that service delivery in the healthcare industry as well as pharmacies has greatly improved as a result of adoption of inventory management. This study further indicated that proper adoption and implementation of inventory management is concerned with taking the correct product, in the required quantity, at the right price and from the right seller at the right time.

2.3.2 Lean IMS

In order to save expenses, increase flexibility, and spend more time focusing on customers, businesses use lean practices in inventory management, according to iCepts Technology Group (2020). In order to decrease waste and boost inventory, a company may benefit from using lean inventory practices to maximize profitability and efficiency.

In order to be lean, inventory should be as near to zero as feasible, according to a research by Krar (2020). Additionally, being lean means delivering high-quality services while doing things on the cheap. Lean inventory management decreases costs and lead times while increasing on-time delivery, according to a Green (2018) research. According to a research by Green (2018), businesses are attempting to make their suppliers leaner since a firm's inventory management practices may influence suppliers' level of leanness. As a result, increased productivity may be attained if purchasing companies and suppliers

get along well. JIT, a key component of inventory leanness, was included in Ahmed's (2016) research.

Mogere, Oloko, & Okibo (2013) looked into how Lean IMS affected Gianchore Tea Factory performance and discovered that these systems aid in inventory control, enhance customer-supplier relationships, and improve lead time management, all of which increase competitive advantage. Wambua et al. (2015) found that the inventory storage systems at Adventist Book Centers (ABC), Kenya, are crucial to the success of all departments financially. According to research conducted by Kitheka and Ondieki (2014), automating retail inventory management increases output, decreases expenses, and improves service quality. Mohamad *et al.* (2016) conducted a case study of a Malaysian textile chain shop to investigate the relationship between lean IMS and business performance. They discovered that the number of days an organization kept inventory had a significant impact on the company's return on assets. Unskilled laborers were found to be at the root of the textile chain store company's disorganized inventory system, long inventory days, and inaccurate shop balances, as shown by the investigation. Using a Rwandan manufacturing company as a case study, Victoire (2015) investigated how implementing lean IMS improved the bottom line. The findings point to the importance of inventory management to the bottom line of the business.

Anichebe & Agu (2013) researched on the effects of lean IMS on the organizational efficiency in a few particular organizations, including Yemenite, Hardis & Dromedas, and the Nigeria Bottling Company in Enugu State. The analyses showed that even though the study companies seemed to be adhering to the guidelines for efficient inventory management, they sometimes struggled with having enough inventories. This therefore had an impact on their manufacturing, resulting in a shortage of one or both of their product brands, severely impacting their profitability and ensuing efficacy. The results show that proper inventory management has a direct effect on the success of businesses. A company's output benefits greatly from a more efficient method of stock management. The study found that effective inventory management is critical to a company's growth and profitability.

2.3.3 Electronic-Inventory Management System

Kitheka (2010) looked at how automated inventory management affected supermarket output in Western and Nyanza areas of Kenya. Kitheka (2010) found that the EIMS positively influenced supermarket performance based on a survey method in which the investigator explicitly targeted all supermarkets (eleven functional supermarkets) in Kakamega, Bungoma, and Kisumu. Kitheka (2010), on the other hand, focused on Kenyan businesses that provide services to consumers rather than manufacturers of goods.

Momanyi and Lelei (2014) conducted research on Kenyan manufacturing companies' organizational performance and their utilization of the EIMS. This investigation has two goals. First, one must ascertain the motivations for Kenyan industrial companies' use of ERP. The second sought to ascertain the link between Kenyan manufacturing companies' organizational performance and the implementation of ERP systems. The necessity to comprehend the link between implementing the system and organizational performance by manufacturing enterprises in Kenya, where no conclusive study has been done, was a major driving force behind this. Kenyan manufacturing companies were the focus of the investigation. The factory and production team, the supply chain, the ICT team, and senior management were surveyed to gather the main data.

Workalemahu (2018) conducted a research on the variables impacting the EIMS at the Mugger Cement Factory in Addis Abeba Ethiopia. ? research question employed in the study was; The How much do the distribution performance of the mugger cement factory's financial resources, logistics outsourcing, and information systems affect each other. Study’s conclusions show that the factory's distribution performance was positively impacted by the factors of financial resources, logistics outsourcing, and information system. The most significant factors influencing distribution performance are, in order, monetary ability, information system, and logistics outsourcing. This suggests that if the manufacturer wants to improve their distribution performance, monetary resources, logistics outsourcing, and information system ought to be given the proper attention.

King'ori (2013) investigated how e-procurement affected TSC's supply chain management. The study discovered a strong link between e-Procurement, ICT literacy, and e-Procurement usage. This evidences the close connection between supply chain management and e-Procurement tools and techniques. However, the e-Procurement system has weak backing from upper management. As a result, management should expand the use of e-Procurement software and procedures since they seem to have a favorable effect on Supply Chain Management.

2.3.4 Activity Based Costing System

The theory behind this approach of stock management is that a relatively small number of goods can account for a disproportionately high dollar worth of production inventory, whereas a relatively big number of products can come from a relatively tiny store value. This is the basis for how we handle inventory.

Nakuru Central subcounty agrochemical distributor effectiveness in purchasing and activity-based costing was studied by Onchoke and Wanyoike (2016). This research takes a look at the internal control and procurement efficiency in the agrochemical distribution sector. Data collection and analysis may have happened at the same time thanks to the cross-sectional survey design. More data analysis was produced as a result. The participants of the study were those working for distribution companies. Descriptive and inferential statistics were used to examine data gathered via structured questionnaires. According to the numbers, using the ABC method improves output in the procurement process.

Lwaki (2013) researched on influence of ABS on financial performance of sugar companies. A survey design was used to conduct the manufacturing firms from 2002-2007 period. The study also adopted Descriptive and correlation. The current study adopted only correlation research design. According to Jessop and Morrison (2010), inventory control involves determination of the principles and procedures for maintaining inventory at the appropriate levels to meet operational needs.

Kithae and Achuora (2017) investigated the activity based costing practices of Kenya's private commercial banks. The study employed a descriptive research strategy, and the

142 subjects were picked from commercial banks using a simple random sample technique.

Mwangi and Nyambura (2015) investigated how the adoption of activity-based costing techniques in the food processing industry affected productivity. The study used multiple regression analysis and descriptive research methodologies to zero in on the importance of inventory management to the success of the food processing sectors. Production upkeep, cost management, loss reduction, and constant supply play significant roles in this.

The effect of Safaricom Kenya Ltd's inventory management system on the company's competitiveness was studied by Wangari and Kagiri (2015). Questionnaires with pull-down choices were used to compile the data. Investment in inventory, inventory shrinkage, and inventory turnover were all found to be significant determinants of competency and, by extension, organizational affordability for Safaricom Ltd. in a regression analysis.

2.4 Summary and Gaps in Literature

The research gap will be presented in the table 2.1

Table 2.1: Literature Review Summary and Gaps

Author (s) and year	**Study's Focus**	**Findings of the study**	**Study gap**	**Contemporary Focus**
Atnafu, et al (2018)	VMI and firms competitiveness together with organization performance of SMEs in Ethiopia.	New stock re-ordering system and inventory control system exhibit considerable and favorable effects on firm performance.	The study is not in the service industry	The study was in the service industry
Agu, et al (2016)	VMI and firms' performance in the manufacturing sector.	It was discovered that Vendor-Managed Inventory influences performance of any business organization	Study focused on just one inventory management practice	Study focused on more than one inventory management practice
Musau *et al* (2017)	VMI and organization performance amongst firms in the textile sector in Kenya.	Discovered that inventory management significantly and favorably affects how well a	Study focused on just one inventory management practice	Study focused on more than one inventory management practice

		business performs.		
Owuor et al (2019)	VMI on service delivery in the public health institutions in Kenya.	Study revealed that service delivery in the health institutions is positively influenced through Vendor-Managed Inventory and accuracy of inventory records	The study population is not clear	The study population was well brought out
Green (2018)	Lean inventory management and organizational performance	Lean inventory management lowers costs, shortens lead times, and improves delivery punctuality.	The context of the study is not clear	The study looked at public health institutions in NCC
Mogere, et al (2013)	Lean Inventory Management Systems affects performance of Gianchore Tea Factory, Nyamira County, Kenya	Lean IMS aid in inventory control, enhance customer-supplier relationships, and strengthen lead time management, all of which increase competitive edge.	The study is not in the service industry	The study was in the service industry

Mohamad, et al (2016)	looked at the link between lean inventory management systems and business performance in Textile chain store Malaysia.	ROA and inventory days were highly correlated.	The study context is developed country	The study context was developing country
Anichebe et al (2013)	The effects of lean inventory management systems on organizational effectiveness in selected organizations.	The findings demonstrate a close link between effective inventory management and superior organizational performance..	The research methodology is not clear	This study used descriptive research design
Kitheka (2010)	Examined the level of inventory management automation and its effects on the productivity of supermarkets in Kenya's Western and Nyanza regions.	Discovered that effectiveness of supermarkets is favorably impacted by EIMS.	The study population is not clear	The study population was well brought out
Momanyi et al (2014)	Electronic-Inventory Management System and organizational	ERP system adoption and organizational	The study is not in the service industry	The study was in the service industry

	performance of manufacturing firms in Kenya.	performance for Kenyan manufacturing companies were related.		
Workalemahu (2018)	Factors influencing EIMS at mugger cement factory in Addis Ababa Ethiopia	The performance of the factory's distribution network was boosted by its financial resources, outsourcing of its logistics, and IT.	The study is not in the service industry	The study was in the service industry
King'ori (2013)	The impact of e-procurement on supply chain management at the TSC.	Supply Chain Management, Supply Chain procedures, and e-Procurement software are interrelated.	The research methodology is not clear	This study used descriptive research design
Onchoke et al, (2016),	Activity based costing system and procurement performance of Agro-chemical Distributors in the sub-county of Nakuru Central.	A significant effect of activity based costing system on procurement performance.	The study population is not clear	The study population was well brought out

Lwaki (2013)	Influence of ABC system on financial performance of sugar companies.	ABC system influences financial performance of firms	The context of the study is not clear	The study looked at public health institutions in NCC
Mwangi et al, (2015)	The impact of the ABC approach on the productivity of businesses involved in food processing.	ABC system influence the performance of companies	The context of the study is not clear	The study looked at public health institutions in NCC
Wangari et al, (2015)	Influence of ABC system in inventory management at Safaricom Kenya Ltd	inventory investment, inventory shrinkage, and inventory turnover were strong determinants of affordability In Safaricom Ltd.	The research methodology is not clear	This study used descriptive research design

2.5 The Conceptual Framework

A conceptual framework is an analytical technique for organizing concepts and drawing conceptual differences. Strong conceptual frameworks provide an easy-to-remember and practical manner to portray reality.

Independent Variable

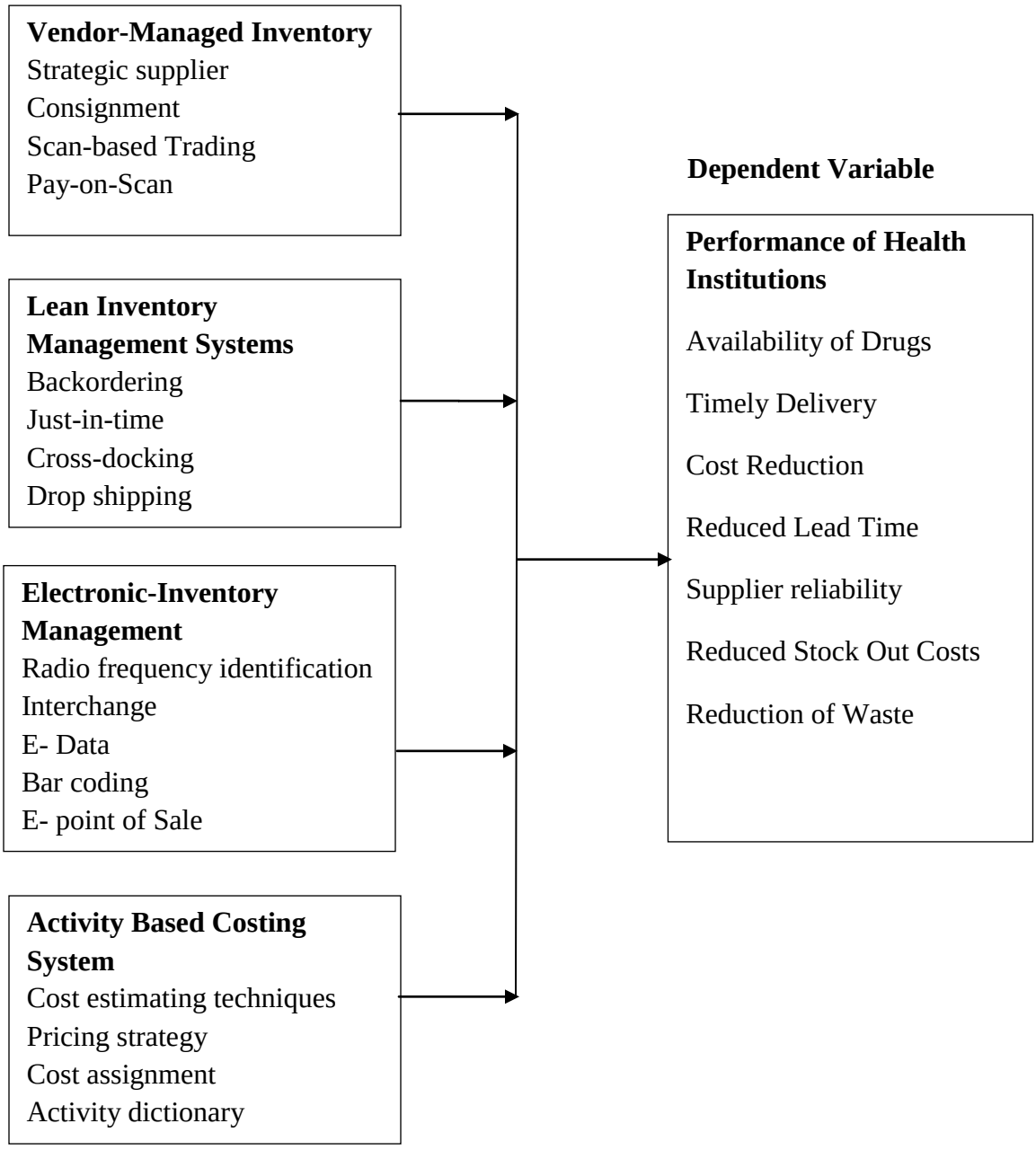

Figure 2.1: The Conceptual Framework

CHAPTER THREE

METHODOLOGY

3.1 Chapter Overview

The chapter serves as a comprehensive guide to the systematic evaluation of the study's objectives. It meticulously outlines the research approach adopted, delineates the intended target audience, elucidates the intricacies of the sample design and procedure, elaborates on the selection and validation of the data collection tool, examines the reliability of said tool, expounds on the chosen data collection method, details the planned data analysis techniques, and conscientiously addresses ethical considerations. In doing so, it provides a structured and thorough framework for the rigorous examination and execution of the research, ensuring the integrity and validity of the study's findings.

3.2 Study Research Design

It is the general framework for data collecting, measurement, and analysis. By presenting important options, research design helps scientists allocate their resources more effectively. It is an investigation's design and organizational structure that was created to find answers to specific research questions (Cooper & Schindler, 2011). A descriptive research design with a cross-sectional approach was used for this study. In a descriptive study design, data are gathered without being altered or the setting being changed. Lambert (2012) claims that a descriptive research design involves watching and characterizing participants without applying outside influence. Given that a descriptive research approach by its very essence captures the crucial aspects of a situation from a detached point of view with clear linkages to the factors. With the help of a cross-sectional survey, conclusions can be drawn about a universes (or population's) current state. This particular research strategy allows you to gather information from a large number of people all at once.

3.3 The Target Population

Included groups of persons, businesses, organizations, associations, families, or even the services the researcher is examining (Cooper & Schindler, 2011). The study population

consisted of 180 county staff consisting of the county pharmacist, sub county pharmacist, pharmacist in charge and hospital administrators.

Table 3.1: Study Population

Cadre	**Total number**
County pharmacist	1
Sub-county pharmacists	17
Pharmacist In charges	81
Hospital administrators	81
Total	**180**

Source (NCC, 2023)

3.4 Study Sample Size and the Sampling Technique

A sample consists of individuals who are selected randomly and are presumed to be representative of the larger population (Bryman and Bell, 2015). Sampling is done so as to avoid the problems that come with examining the entire population. Individuals are chosen to represent the whole population. Oso and Onen (2015) argue that sampling helps researchers get around obstacles to studying the entire population, like a lack of time and money for the study. The chief pathologist (1) and the Sub-county pharmacists (17) were purposively sampled, while the other cadre of staff was selected by use of simple random sampling. The research made utilization of Stattrek's (2015) methodology, which shrinks a given population to a sample size with a defined degree of confidence.

$$n = \frac{N}{1 + N(e)^2}$$

The formula is explained as follow;

N = The total poipulation of 180

e = The level of precision which is 90% confidence level

n = Sample Size

$$n = \frac{180}{1 + 180(0.05)^2} = 124$$

Table 3.2: Sampling Frame

Cadre	**Total number**	**Sample**
County pharmacist	1	1
Sub-county pharmacists	17	17
Pharmacist In charges	81	53
Hospital administrators	81	53
Total	**180**	**124**

Source (Field Data, 2023)

3.5 Instrument of Data Collection

In the course of this inquiry, a questionnaire was used to collect the primary data that was necessary. A questionnaire is a collection of questions that is used to collect information from respondents on a certain subject (Lyon, 2007). The major information for the study came from questionnaires that were only partially organized. In order to glean as much information as possible from the respondents, the questionnaire contained a mix of open-ended and closed-ended questions. Part A provides background information about the respondents, while Parts B and C delve further into more particular aspects of the survey.

3.6 Validity and Reliability of Data Collection Instrument

Determined by the accuracy and importance of any conclusions as Mugenda & Mugenda (2013) assert in light of research findings. In other words, validity is the magnitude to which data analysis findings accurately depict the phenomenon being examined. In this study, the concept, predictive, and content validity was all examined. The degree to which a test or scale result predicts results on a criterion measure is known as predictive validity (Chen, 2015). The researcher conducted thorough literature analysis a wide range of consultations to increase content validity.

A set of measurement items' consistency can be defined as their reliability. Measurement consistency every time it is utilized with the same conditions and individuals, is known as

reliability. If a person receives a similar score on the same test when it is administered again, the measure is deemed dependable (Sekaran and Bougie, 2010). In other words, dependability is the level to which a study tool used repeatedly produces consistent outcomes. The split-half correlation value was of special relevance to the researcher as an indicator of the study instrument's internal consistency and dependability. To determine the instrument's level of internal consistency, the researcher relied on the SPSS Cronbach's Alpha Reliability Test. Cronbach's alpha is a measurement of internal consistency that was developed as a result of pretest that was conducted in the county next door, Kiambu County. If the coefficient is more than 0.7, then it is likely that the reliability standards were met. Table 3.3 displays the results of the reliability test, hence R for Reliable.

Table 3.3: Results of Reliability Tests

Variable	**Alpha Value**	**Remark**
VMI	0.782	R
Lean IMS	0.811	R
EIMS	0.77	R
Activity based costing system	0.821	R
Performance	0.802	R
Aggregate score	**0.797**	R

Source: Pretest (2023)

Cronbach's alpha values for all five variables are over 0.7, and the total score for all five is 0.797, as given in Table 3.3. According to Davis (2015), the trustworthiness of a research tool can be determined by ensuring that its Cronbach alpha value falls within the range of 0.70 and 0.90.

3.7 The Data Collection Procedures

The researcher submitted an application to the KU graduate school seeking permission to conduct data collection. With the assistance of the data collection authorization letter, they were able to successfully obtain a data collection permit from the National Commission for Science, Technology, and Innovation (NACOSTI). Following the receipt

of both approval letters, the researcher proceeded to gather data in the field. Subsequently, the researcher collected the dropped questionnaires at a later point in time.

3.8 Analysis

A thorough data cleaning procedure was undertaken as recommended by Mugenda & Mugenda (2013), is to seek out and rectify mistakes in a data set. After determining the purpose of the research, the data sets were sorted accordingly.

Quantitative data was analyzed using both descriptive and inferential statistics in this study. Standard deviations and means were used to describe the data. While SPSS was used for the statistical analysis of the data, inferential statistics included things like regression and correlation. The examination of qualitative data made utilization of content analysis. To identify particular words, subjects, or ideas in the data that could be utilized in providing generalizations to a larger population, the researcher performed content analysis. The supplied analysis data took the form of tables, charts, and frequency tables. The regression model to be utilized in the study was as follows.

$$\mathbf{P = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$$

Whereby,

$P = \text{Performance of Health Institutions}$

$X_1 = \text{Vendor} - \text{Managed Inventory}$

$X_2 = \text{Lean Inventory Management System}$

$X_3 = \text{Electronic} - \text{Inventory Management System}$

$X_4 = \text{Activity Based Costing System}$

$\varepsilon = \text{Error Term}$

$\beta_0 = \text{Constant Term}$

$\beta_1, \beta_2, \beta_3, \beta_4 = \text{Coefficients}$

3.9 Study Ethical Considerations

Kothari (2011) assert that research Ethics are the steps required guaranteeing that the research was done in a manner that protects the anonymity, secretiveness, and rights of others. The NACOSTI, the Ministry of Education, and KU provided the researcher with research permits. The researcher made certain that the study was carried out only for scholarly purposes and that the respondents' identity and confidentially are maintained.

CHAPTER FOUR

STUDY FINDINGS ANALYSIS, PRESENTATION AND DISCUSSION

4.1 Chapter Overview

This chapter serves as the culmination of the research effort, offering a comprehensive presentation of the outcomes derived from the analysis of the collected field data. It begins by divulging essential details such as the response rate, shedding light on the level of engagement achieved with the survey or data collection process. Subsequently, it delves into the respondent demographics and background information, providing context and insight into the characteristics of the study's participants. Moreover, the chapter employs descriptive statistics to offer a clear and concise summary of key data points, enabling readers to grasp the essential trends and patterns. Additionally, it harnesses inferential statistics, including correlation and regression analyses, to unveil deeper insights and relationships within the dataset, enriching the study's findings with empirical evidence and quantitative rigor.

4.2 The Rate of Response

A total of 124 respondents were given the questionnaires to fill out, and the percentage of those who responded is presented in Table 4.1.

Table 4.1: Response Rate

Group	**Frequency**	**Percentage**
Non-responsive	4	3.2
Responsive	120	96.8
Total	**124**	**100**

Source: Investigator, 2023

The findings presented in Table 4.1 indicate a robust response rate of 96.8% among the 124 surveyed individuals, as 120 of them provided responses. This high response rate is crucial for ensuring the reliability and credibility of the research. 80% and beyond response rate is considered appropriate for data analysis in survey-based research (Baruch & Holtom, 2014). In this case, surpassing this threshold with a 96.8% response rate not

only meets but significantly exceeds the recommended benchmark. This achievement is noteworthy as it minimizes the risk of non-response bias and ensures that the data collected is representative of the target population.

The exceptional response rate of 96.8% not only supports the credibility of the research but also strengthens the validity of its conclusions. A high response rate implies that a vast majority of the surveyed individuals engaged with the study, reducing the likelihood of selection bias and increasing the likelihood that the findings accurately reflect the views and opinions of the entire target population. Therefore, the research can be considered reliable and dependable, as the results are based on a comprehensive dataset that includes the vast majority of eligible participants. In summary, the exceptionally high response rate in this study not only meets established standards but also enhances the research's credibility and ensures the robustness of its conclusions.

4.3 Demographic Characteristics

The purpose of the study was to determine the respondents' demographic information, including their gender, greatest degree of education, age range, and the year in which they first began working for the hospital. The results are summarized in the following table.

4.3.1 Gender

Figure 4.1 illustrates the gender breakdown of those who participated in the research.

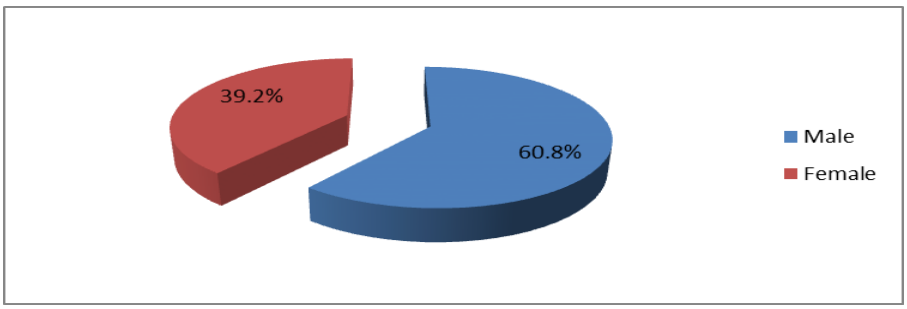

Figure 4.1: Gender

Source: Investigator, 2023

The data presented in Figure 2.1 clearly shows that among the respondents, a majority, comprising 60.8%, identified as male, whereas 39.2% identified as female. These statistics are important as they highlight the gender distribution within the survey sample. Accurate representation of both genders is a crucial aspect of ensuring the survey's validity and generalizability of findings. By including a diverse sample that encompasses both men and women, the study becomes more robust, as it can capture a wider range of perspectives and experiences. This gender breakdown not only demonstrates the inclusivity of the survey but also acknowledges the importance of considering gender-related factors in the analysis and interpretation of the research results.

4.3.2 Education Level of Respondents

Table 4.2: Education Level

Education Level	**Rate**	**%**
Diploma level	45	37.5
Degree level	32	26.7
Post graduate level	18	15.0
Other	25	20.8
Total	**120**	**100**

Source: Investigator, 2023

Table 4.2 displays important information about the respondents' educational backgrounds. A large percentage, 37.5%, clearly had a diploma, whereas a little smaller percentage, 26.7%, had a degree. In addition, 20.8% had completed postsecondary certificate programs, and 15% had completed graduate degree programs. For many reasons, including but not limited to staff training and job satisfaction, knowing the respondents' educational backgrounds is crucial. As the results indicate, it is essential to gauge the efficacy of training programs and comprehend their effect on employee morale and job satisfaction to include staff members from a wide range of educational backgrounds in the survey. Tailoring training programs to fit the requirements and preferences of employees with varied levels of education can increase job satisfaction and productivity.

In addition, there is solid evidence supporting the claim that educational attainment and contentment in the workplace are linked. Employees who are provided with sufficient opportunity for professional development report higher levels of job satisfaction. Employees are more likely to be invested in their work and motivated when they believe their company cares about their professional growth and development. As a result, employees may be more motivated to work more and provide better service to customers, both of which are essential to the organization's bottom line. As a result, learning about respondents' educational backgrounds helps provide light on how training and education programs may affect happiness and productivity on the job.

4.3.3 Age Bracket

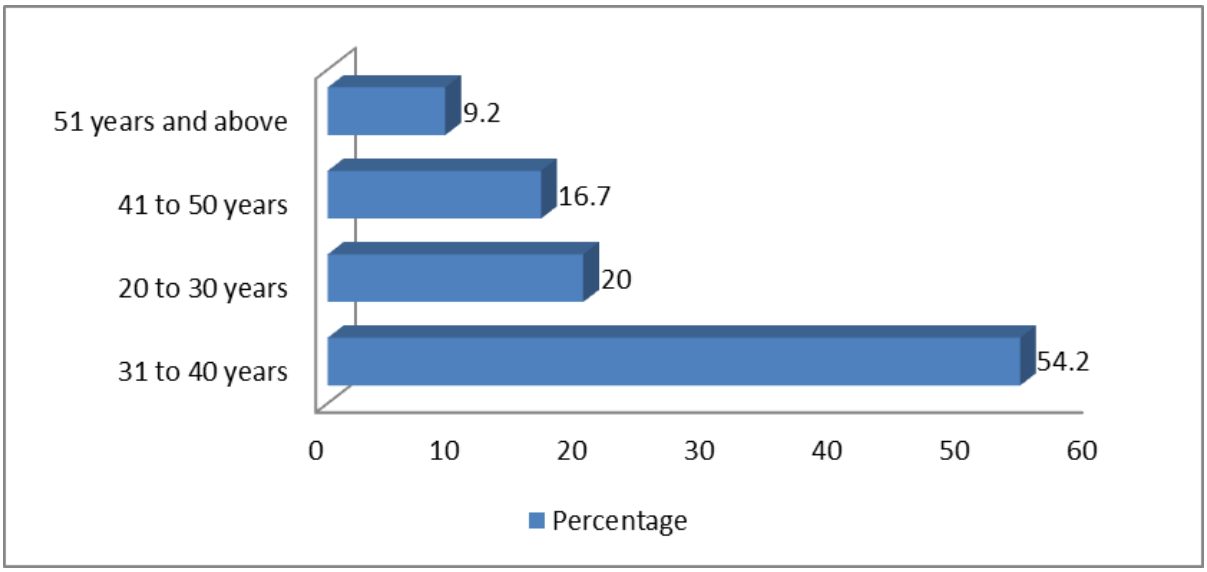

Figure 4.2: Age Bracket

Source: Investigator, 2023

Figure 4.2 presents the results of calculating the median age of the survey's respondents. Among those who participated, those between the ages of 31 and 40 represented the greatest demographic. In addition, 20.0% of respondents were in their twenties, 16.7% were in their forties, and 9.2% were in their fifties. Having a wide range of ages represented among respondents is essential to the survey's reliability and validity. Having people of varying ages contributes to a more complete understanding of the issue at hand.

The statement presented emphasizes the significance of having respondents of diverse ages. Employing younger workers can be beneficial since they bring new ideas, views, and a technologically aware attitude to the table, all of which are essential in today's competitive business climate. On the other side, elder workers can be invaluable to a firm because of the wisdom and leadership they bring as well as the depth of experience and industry expertise they bring to the table. The research not only recognizes the value of generational diversity but also sets itself up to reap the benefits that could result from the distinct qualities and perspectives of individuals of varying ages because they were all invited to participate. This strategy exemplifies the company's dedication to getting the most out of its multicultural staff.

4.3.4 Length of Work with the Hospital

Table 4.3: Length of Work with the Hospital

Years	Frequency	Percentage
5 years and below	12	10.0
6 to 10 years	37	30.8
11 to 15 years	41	34.2
Above 15 years	30	25.0
Total	**120**	**100**

Source: Investigator, 2023

Table 4.3 summarizes information about hospital staff members' lengths of service, revealing a wide range of professional backgrounds among survey respondents. There were a significant number of long-serving personnel, as 34.2% of respondents had been with the hospital for 11-15 years. In addition, 30.8% of those surveyed had worked at the hospital for 6-10 years, 25% had been there for 15 or more years, and 10.0% had been there for 5 years or less. This skewed distribution of years of service shows that feedback from employees at all levels of the organization's career ladder was collected. Such a wide range of work experience is beneficial since it shows that respondents have a thorough familiarity with the hospital's work environment, expectations, and methods for learning new skills and enhancing existing ones. This range of experiences and

viewpoints is representative of the real-world challenges of leading a staff that spans multiple generations.

The importance of a workforce with a wide range of tenures is also highlighted. Employees who have been there for a while have a wealth of institutional knowledge, a solid grasp of the company culture, and the experience to guide and advise their younger colleagues. However, new hires may bring exciting new perspectives, boundless energy, and cutting-edge expertise to the table. Employees with varying levels of expertise work together to provide a fertile atmosphere for the exchange of ideas and the development of new skills. Because of this, the workforce is better able to adjust to new circumstances, and the business as a whole benefits from having access to a constant stream of ideas and skills that are in line with its developing requirements. As a whole, the study's acknowledgment of the respondents' varied work experiences demonstrates the need of tapping into the talents of a broad and experienced healthcare staff across generations.

4.4 Results of Descriptive Statistics

It is usual practice to summarize and report quantitative study findings using descriptive statistics like Standard Deviation (SD) and Mean (M). The Mean (M) is a key statistic for analyzing data since it indicates the typical worth of a given variable. Researchers and readers can use it to get a sense of what is usual or central in a given dataset. Conversely, the Standard Deviation (SD) provides information about the dispersion of data points from the mean. A smaller SD indicates that the data points are closely grouped around the mean, while a larger SD suggests that the data points are more widely scattered.

It will be crucial to provide a clear explanation of the M and SD values in the context of the research in the future section when these descriptive statistics will be reviewed. Explaining the significance of a certain figure, such as M representing the average job satisfaction score of hospital staff, and how it relates to the research objectives is crucial. Equally helpful in revealing whether or not there is consistency or fluctuation in employee perceptions is the interpretation of the SD, which shows the extent to which job satisfaction levels vary. Overall, the use of these statistics improves the clarity and

precision of the quantitative study, helping readers to understand the most salient patterns and qualities of the data.

It's also important to think about how to portray these numbers so that they may be easily understood. The mean and standard deviation can be displayed graphically in tables, charts, and graphs to help a wider audience understand the results. In addition to ensuring the accuracy of the research findings, providing clear explanations alongside these visual aids makes them accessible to both specialists and laypeople in the field. This method ensures that the quantitative findings are conveyed clearly and add substantively to the study's broader understanding of the topic.

4.4.1 Vendor-managed Inventory

This research set out to determine how much of an impact vendor-managed inventory (VMI) has on service quality in NCC's publicly funded health care facilities. Table 4.4 is an essential part of the study since it provides a tabular representation of the findings from the descriptive analysis. Insights into the efficacy of this inventory management strategy within the context of public health facilities can be gained from these results, which are likely to include key figures and measures that throw light on various elements of the influence of VMI on service levels. Evidence-based decision making and prospective improvements in healthcare delivery can be aided by this data presentation, which is essential for researchers and stakeholders to grasp the practical consequences of VMI on service quality.

Table 4.4: Vendor-managed Inventory

Statements	M	SD
The hospital employs systems for vender-managed inventory.	4.08	0.92
The hospital partners with its vendors to modernize its systems.	4.05	0.95
The hospital makes use of automated stock monitoring	4.30	0.70
The hospital makes sure there are enough stock levels to save expenses associated with stock outs.	4.55	0.45
The stock management system in the hospital minimizes the total holding cost	4.15	0.85
The hospital makes certain there is a functional stock management system to shorten lead cycles for efficient waste reduction.	4.56	0.44
The hospital practices vender managed inventory systems.	4.01	0.99

Source: Investigator, 2023

Table 4.4 provides valuable insight into the respondents' perceptions of various aspects of hospital inventory management. Notably, respondents agreed significantly with a number of key statements. First, they firmly agreed that the hospital ensures the presence of a functional stock management system to shorten lead cycles for effective waste reduction, as indicated by a mean (M) score of 4.56 and a relatively low standard deviation (SD) of 0.30. In addition, respondents firmly agreed that the hospital maintains adequate stock levels to avoid stockout-related expenses, indicating a high level of confidence in the hospital's inventory management practices. These findings are significant because they emphasize the positive attitudes of respondents toward the hospital's inventory management efforts, which can result in cost savings and waste reduction.

In addition, the results of the study indicate that respondents generally agreed with other statements regarding inventory management practices, such as the use of automated stock monitoring, the employment of vendor-managed inventory systems, the partnership with vendors to modernize systems, and the implementation of vendor-managed inventory systems. Although these agreement scores are slightly lower than those of the preceding statements, they still reflect a positive perception of these inventory management

approaches among respondents. The congruence between the research findings and previous studies, such as the one conducted by Atnafu, Balda, and Liu (2018), bolsters the research's credibility. This convergence of findings from diverse research contexts highlights the importance of vendor-managed inventory practices for enhancing organizational performance and competitiveness.

Table 4.4 indicates that respondents have a positive opinion of the hospital's inventory management procedures. Strong agreement with statements concerning efficient stock management, cost reductions, and modernization efforts demonstrates the hospital's dedication to effective inventory management. In addition, the consistency between these findings and those of Agu, Ozioma, and Nnate (2016) and Atnafu, Balda, and Liu (2018) highlights the broader relevance and impact of vendor-managed inventory practices on organizational performance and competitiveness, thereby enhancing the credibility and value of the current study's conclusions.

4.4.2 Lean Inventory Management

The purpose of this study was to investigate whether or not public health facilities in NCC, benefit from implementing lean IMS. Table 4.5 displays the descriptive results that were obtained.

Table 4.5: Lean Inventory Management

Statements	M	SD
Reduced inventory holding costs are achieved by ordering both medical and non-medical products from vendors only when they are required.	4.50	0.50
To save inventory holding costs, the healthcare center has agreements with suppliers to provide specific medical and non-medical items only when they are required.	4.63	1.77
In health institution stores, organizing, standardizing, and preserving medical and non-medical products minimizes time, effort, and expiration waste	3.94	1.06
The healthcare facility has dependable vendors that can provide medical products as soon as they are required.	4.84	0.16
Waste is reduced when customers and suppliers are involved in the purchase of medical and non-medical items.	4.04	0.96
There is accurate prediction of supplier delivery dates	4.35	0.65
There are agreements with supplier for short cycle deliveries	3.98	1.02
JIT method leads to efficient resource management	4.51	0.89

Source: Investigator, 2023

Table 4.5 shows widespread consensus among respondents on several areas of inventory management in the hospital setting. Particularly noteworthy is the responders' unanimous agreement that the institution has reliable vendors able to provide medical items promptly when needed. They also noted that a strong commitment to JIT inventory management procedures was demonstrated by the existence of agreements with suppliers to offer certain medical and non-medical commodities only when required. These results are in line with the goals of lean inventory management, which center on minimizing overhead and maximizing output. Consistent with previous studies conducted by Anichebe & Agu (2013), our results highlight the need of effective inventory management in healthcare

settings, particularly with regards to guaranteeing a dependable supply chain and reducing inventory-related issues.

The necessity of good communication and collaboration within the supply chain is further emphasized by the respondents' agreement with statements regarding accurate forecast of supplier delivery dates and the benefits of involving both customers and suppliers in the buying process. These methods help cut down on waste, which in turn can save money and boost productivity. Respondents also emphasized the necessity for effective inventory management techniques, highlighting the need of arranging, standardizing, and maintaining medical and non-medical products at health institution stores. This confirms the findings of Mohamad, Suraidi, Rahman, and Suhaimi (2016), who found that IMS have a major effect on company performance, highlighting the importance of lean inventory management principles in a wide range of sectors, including healthcare.

According to Table 4.5 healthcare providers and administrators alike appreciate the benefits of lean and just-in-time IMS. The dedication to effective management of resources and reduction of costs is reflected in the extent to which one agrees with statements pertaining to reliable vendors, JIT procedures, and agreements with suppliers. Furthermore, the need of excellent communication and coordination is highlighted by the recognition of the significance of accurate projection of supplier delivery dates and collaboration in the supply chain. This confirms the usefulness of lean inventory management strategies in healthcare settings and is consistent with previous studies showing its beneficial effects on organizational efficiency and cost savings.

4.4.3 Electronic-Inventory Management System

The study evaluated how an EIMS in NCC affected the efficiency of public health facilities there. The study collected and evaluated relevant data to reach this conclusion, and Table 4.6 provides a thorough description of the analysis's findings. Considerable insight into the adoption of the computerized inventory management system and its impact on the performance indicators of public health facilities can be gleaned from this table. Vital for making educated decisions and enhancing the overall performance and

efficiency of healthcare facilities, these descriptive findings are crucial in shining light on the practical consequences and efficacy of implementing EIMS in healthcare.

Table 4.6: Electronic-Inventory Management System

Statements	**M**	**SD**
Supplier categorization is done electronically	4.75	0.25
Prequalification of suppliers is electronically done	4.05	0.95
The application of IT lowers inventory loss in our healthcare center.	4.28	0.72
Bar-coding is implemented in the inventory management at our hospital.	4.65	0.35
Our medical facility has a technological system that allows us to electronically exchange business papers with our vendors.	3.58	1.42
The use of computer based system reduces supply chains cost	4.55	0.45
In our medical facility, tags affixed to specific medicinal inventory are automatically identified and tracked through electromagnetic fields.	4.52	0.48
The hospital's computers are connected in real time with those of its suppliers.	3.99	1.01
The hospital utilizes Electronic Data Interchange Technology (EDI)	4.57	0.43

Source: Investigator, 2023

Table 4.6, supplier categorization is done electronically (M=4.75, SD=0.25), Bar-coding is implemented in the inventory management at our hospital (M=4.75, SD=0.25), the use of computer based system reduces supply chains cost (M=4.55, SD=0.45), in their medical facility, tags affixed to specific medicinal inventory are automatically identified and tracked through electromagnetic fields (M=4.52, SD=0.48) and that the hospital utilizes Electronic Data Interchange Technology (EDI) (M=4.57, SD=0.43). This finding agrees with Momanyi and Lelei (2014) who conducted research on Kenyan manufacturing companies' organizational performance and their utilization of the EIMS and established a positive significant relationship.

Respondents agreed that; the application of IT lowers inventory loss in our healthcare center (M=4.28, SD=0.72), prequalification of suppliers is electronically done (M=4.05, SD=0.95), The hospital's computers are connected in real time with those of its suppliers (M=3.99, SD=1.01) and that their medical facility has a technological system that allows them to electronically exchange business papers with their vendors (M=3.58, SD=1.42). This finding is in line with Workalemahu (2018) who conducted a research on the variables impacting the EIMS at the Mugger Cement Factory in Addis Abeba Ethiopia and found that the most significant factors influencing distribution performance are, in order, monetary ability, information system, and logistics outsourcing.

4.4.4 Activity Based Costing System

The primary goal of this study was to examine how an ABC system will affect the efficiency of public health facilities in NCC. To accomplish this objective, the study gathered and analyzed pertinent data, and the descriptive findings are presented in Table 4.7 for convenient reference. Many questions about the ABC costing scheme and its impact on public health institution performance indicators can be answered by examining the data in this table. These illustrative results are critical because they provide a more complete picture of how ABC costing practices may contribute to improved performance and operational efficiency within the context of healthcare facilities, which is important for decision-makers and stakeholders seeking to maximize resource allocation and raise the bar on public health institutions' overall performance.

Table 4.7: Activity Based Costing System

Statements	M	SD
Using ABC method leads to efficient resource management	4.52	0.48
Using ABC method reduces on holding costs	4.63	0.37
Using ABC eliminates wastes associated with obsolescence and expiry of supplies	3.87	1.13
Using ABC leads to increased number of clients served	3.43	1.57
The hospital classifies products based on their stock value through ABC analysis.	4.44	0.56
The hospital lowers stock holding costs through the application of ABC Analysis.	4.51	0.49
Applying ABC analysis, you may rate things based on how much money was spent on them.	3.01	1.99

Source: Investigator, 2023

Table 4.7 displays the results of our survey asking how much respondents agreed with statements that the activity-based costing (ABC) system had an effect on the hospital's bottom line. Respondents overwhelmingly agreed with multiple statements, including that the ABC technique improves resource management, reduces stock holding costs, and reduces holding costs through ABC analysis. These unanimous opinions show that respondents have a great deal of faith in the ABC system's ability to effectively cut costs and maximize available resources. The findings are consistent with those of Onchoke and Wanyoike (2016), who examined the use of ABC costing in the context of pesticide distribution and likewise discovered a correlation between its implementation and enhanced performance.

In addition, respondents agreed that ABC analysis is used to categorize products in the hospital based on their stock value, and that doing so reduces waste caused by obsolescence and the expiration of supplies. These comments support the use of ABC costing concepts and highlight the significance of effective inventory management procedures. The results are in line with those found by Lwaki (2013), who investigated the impact of ABC costing on the bottom lines of sugar firms and stressed the importance of stocking up when needed.

A moderate level of agreement was shown by respondents in regards to claims about improved customer service and ranking items based on cost using ABC analysis. The fact that there is only moderate agreement between the two groups implies that the ABC system may have positive effects on cost control and resource allocation, but its effect on customer service and ratings based on expenditures may differ. Kithae and Achuora (2017) found that when ABC costing was used in private commercial banks, the banks' performance increased. These differences indicate the context-dependency of the effects of ABC costing on several elements of organizational performance.

Table 4.7 shows that respondents have a favorable impression of the ABC costing system's effect on cutting costs and optimizing hospital resources. These views are consistent with previous research in a variety of settings, demonstrating the importance of ABC costing principles in achieving optimal inventory management and financial results. The moderate level of agreement on some points, however, implies that the influence of ABC costing may vary in different areas of organizational performance, stressing the need for a nuanced approach when applying this costing system in healthcare settings.

4.4.5 Health Institutions Performance

The primary purpose of this research was to evaluate the effectiveness of NCC-based public health institutions. The research aimed to accomplish this by collecting useful data and performing an in-depth examination of KPIs. Table 4.8 neatly organizes these descriptive findings, which presumably give a comprehensive assessment of numerous variables of performance within these public health institutions. Stakeholders and decision-makers should be able to use this table to better understand the institutions' strengths and shortcomings in terms of, for example, service quality, operational efficiency, patient happiness, and financial sustainability. Overall, these descriptive findings are a crucial building block for well-informed decision-making and prospective actions to enhance the efficiency and efficacy of NCC's public health institutions.

Table 4.8: Performance of Health Institutions

Statement	M	SD
There have been no shortages of medicines in this facility in the last quarter	4.08	0.92
There have been no expiries of medicines in this facility in the last quarter	4.27	0.73
There is timely supply of medicines	3.64	1.36
We are able to reduce cost of holding stocks	4.72	0.28
The order lead time for medicines is reasonable	4.53	0.47
Our suppliers are reliable	4.59	0.41
We are able to reduce wastages	4.11	0.89

Source: Investigator, 2023

The findings, which are summarized in Table 4.8, respondents were in strongly agreement with the assertions that they are able to lower the cost of storing inventories (M = 4.72, SD = 0.28), that their suppliers are reliable (M = 4.59, SD = 0.41), and that the order lead time for medicines is reasonable (M = 4.53, SD = 0.47). This finding is consistent with the argument made by Barasa, Simiyu, and Iravo (2015), who contend that performance is the capacity of an organization to fulfill its objectives by making effective and efficient use of its own resources.

Respondents agreed that; there have been no expiries of medicines in this facility in the last quarter (M=4.27, SD=0.73), they are able to reduce wastages (M=4.11, SD=0.89), there have been no shortages of medicines in this facility in the last quarter (M=4.08, SD=0.92) and that there is timely supply of medicines (M=3.64, SD=1.36). The finding agree with Randeree and Al Youha (2009) who observe that the organizational performance of any particular corporate company determines its likelihood of success, which depends on its capacity to successfully implement strategies that are connected to the achievement of institutional goals.

4.5 Results of Inferential the Statistics

The conclusions drawn from inferential statistics were founded on correlation and regression analyses. These results indicated;

Table 4.9: Correlation Analysis

		VMI	Lean IM	Electronic IM	Activity based costing system	Performance
Vendor-managed inventory	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	120	120			
Lean inventory management	Pearson Correlation	.159	1			
	Sig. (2-tailed)	.392		.000		
	N	120	120	120		
Electronic inventory mechanism	Pearson Correlation	-.004	.593**	1		
	Sig. (2-tailed)	.983	.000			
	N	120	120	120		
	Sig. (2-tailed)	.357	.001	.004		
Activity based costing system	Pearson Correlation	.171	.551**	.506**	1	
	N	120	120	120	120	
Performance	Pearson Correlation	.643	.896	.743**	.707	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	120	120	120	120	120

Source: Investigator, 2023

The results in Table 4.9 provide valuable insights into the relationships between various IMS and the overall performance of the public health institutions. The values of the Pearson r correlation coefficient for each of these systems and performance are notably positive, ranging from .643 to .896, indicating a strong positive linear correlation. Furthermore, the statistical significance of these correlation coefficients at the 0.01 level suggests that these relationships are not due to chance but hold strong implications for the institutions' performance.

The presence of a positive correlation between practices and performance in these inventory management suggests that as the adoption and utilization of these systems increase, there is a corresponding enhancement in the overall public health institutions

performance. This finding underscores the importance of effective inventory management in enhancing organizational effectiveness, resource utilization, and potentially patient outcomes in healthcare settings. It also suggests that investments in these IMS can yield tangible benefits for public health institutions by optimizing their operational efficiency and ultimately contributing to their ability to provide better care and services.

It is a powerful statistical tool for analyzing the relationships between variables. Tables 4.10, 4.11, and 4.12 display the analyzed data in a clear and organized format. Regression coefficients, p-values, and R-squared values can be found in these tables, and they are crucial for interpreting the strength and direction of the associations as well as their statistical significance. Because it allows for a more in-depth investigation of how each independent factor influences the dependent variable, regression analysis is useful because it reveals which factors have the greatest impact and provides a quantitative foundation for making predictions and well-informed decisions within the research context.

Table 4.10: Summary of the Model

Model	R	R Square	Adjusted R Square	Estimate of the Std. Error
1	.836[a]	.805	.801	.454

Source: Investigator, 2023

Table 4.10 presents an adjusted R-squared value of 0.801, indicating an 80.1% coefficient of determination. This suggests that the adoption of lean inventory management practices such as electronic inventory mechanisms, vendor-managed inventory, and activity-based costing systems accounts for roughly 80.1% of the variability in the efficiency of healthcare institutions. In other words, the overall impact of these inventory management procedures on hospital productivity is substantial. This demonstrates the complexity of hospital performance, which may be influenced by a wide range of additional factors beyond inventory management, as the remaining 19.9% accounts for unanalyzed variables or other factors not included in the model.

The means of the four variables can be compared using analysis of variance (ANOVA), as shown in Table 4.11. By using ANOVA, we may learn whether or not these factors have a significant effect on hospital productivity, and if so, what role each plays in efficiency. This analysis sheds light on which inventory management strategies have the most impact on hospital efficiency and where further development may be possible. Collectively, these data results shed light on the myriad of factors that impact hospital efficiency and provide direction for improving healthcare delivery.

Table 4.11: Variance Analysis

Model		Squares Sum	df	M Square	F	Sig.
1	Regression	118.003	4	29.501	67.707	.001
	Residual	50.107	115	.207		
	Total	168.110	119			

Source: Investigator, 2023

Table 4.12: Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.683	.127		5.378	.000
	Vendor managed inventory	0.830	.231	0.066	3.593	.001
	Lean inventory management	0.778	.116	0.118	6.707	.001
	Electronic-inventory management system	0.696	.315	0.145	2.209	.000
	Activity based costing system	0.790	.248	0.093	3.185	.001

Source: Investigator, 2023

Table 4.12 shows that there are significant correlations between vendor-managed inventory, lean inventory management, electronic inventory mechanism, and activity-based costing, and the performance of public health institutions in NCC (the dependent

variable). When other factors are held constant, the amount by which the dependent variable shifts is represented by the regression coefficient associated with each independent variable. If the regression coefficient for vendor-managed inventory is 0.830, then the performance of public hospitals changes by 0.830 points for every one point change in the quantity of vendor-managed inventory. Just as the lean inventory management, electronic inventory mechanism, and activity-based costing coefficients describe the effects of various inventory management methods on hospital efficiency, so do the activity costing coefficient and the total cost of care coefficient.

This information can help decision-makers understand the relative importance of each inventory management method in affecting hospital efficiency by quantifying the correlations between the independent variables and performance using regression coefficients. The positive coefficients point to the benefits of investing in and optimizing these practices within the healthcare environment, as they are linked to an increase in the usage of IMS, which in turn is linked to better hospital performance. These numbers provide hard evidence for assessing the effectiveness of these measures, allowing NCC's public health authorities to make educated choices that will improve their efficiency.

The established regression equation was as follows;
Performance = 0.683 + 0.830 (vendor-managed inventory) + 0.778 (lean inventory management) + 0.696 (EIMS) + 0.790 (activity based costing system).

As shown by the t-value (t = 3.593, p 0.05), the research conducted on public health facilities in NCC, found that having a vendor manage their inventory had a beneficial and statistically significant impact on the institutions' overall levels of performance. This finding is corroborated by Atnafu, Balda, and Liu (2018), who studied on vendor-managed inventory and companies' competitiveness coupled with the organization performance of SMEs in Ethiopia. They concluded that firm competitiveness is strengthened by greater levels of inventory management.
Statistical analysis of the effects of lean inventory management, EIMS, and activity-based costing on the overall performance of public health facilities in NCC shows that all three have a positive and statistically significant effect. These findings are consistent with those of other studies that have shown the positive impact of inventory management

methods on organizational performance, such those by Mohamad, Suraidi, Rahman, and Suhaimi (2016) and Momanyi and Lelei (2014). There is evidence that public health organizations perform better after adopting lean inventory management, which emphasizes eliminating waste and increasing efficiency. This squares with the results from a different field found by Mohamad et al. (2016). Similarly, Momanyi and Lelei's (2014) research in Kenyan manufacturing organizations confirms that the deployment of EIMS, which automate and streamline inventory procedures, improves performance. Also, consistent with the findings of Onchoke and Wanyoike (2016) in the context of agrochemical distributors, activity-based costing is shown to be linked to enhanced performance. This method assigns costs based on activities and resources.

All of these results point to the need for better inventory management and cost allocation strategies in healthcare facilities, where they can have the most impact on improving efficiency and productivity. These practices are relevant and have the ability to enhance the efficiency and effectiveness of public health institutions in NCC because of the statistically significant links between them and performance. It is important to recognize that the benefits of these practices are in line with the broader principles of organizational efficiency, waste reduction, and cost control, which are especially important in the healthcare sector to guarantee the delivery of high-quality patient care while efficiently managing resources. These findings have important implications for healthcare policymakers and practitioners who are interested in optimizing the efficiency of public healthcare facilities through measures like better inventory management and more equitable spending.

CHAPTER FIVE

STUDY SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Chapter Overview

In this chapter, a comprehensive overview of the research findings is provided, encapsulating the key discoveries and insights gained throughout the study. The chapter also contains the study's concluding remarks, which draw together the implications of the findings and their significance in the broader context of the research area. Furthermore, practical recommendations stemming from the study's outcomes are presented, offering guidance for stakeholders and policymakers on how to improve inventory management practices in the context of public health institutions. Lastly, the chapter offers valuable directions for future research endeavors, highlighting areas where additional investigation and exploration are warranted to deepen our understanding of this critical subject. Together, these components serve to provide a holistic and informative conclusion to the study.

5.2 The Summary of the Findings

This study aimed to assess the impact of various inventory management techniques on the performance of public health facilities in NCC. Three primary inventory management approaches were investigated: vendor-managed inventory, lean inventory management, electronic inventory management, and activity-based costing. Data collection involved questionnaire surveys, and both descriptive and inferential statistical analyses were employed to interpret the data. The findings of the study can be summarized as follows:

On VMI, public health institutions in NCC that outsourced their inventory management to third-party vendors demonstrated superior performance compared to those that did not. These institutions ensured efficient stock management systems to reduce lead times and minimize waste. They also maintained adequate stock levels to avoid the costs associated with stockouts, ultimately enhancing their service delivery.

On Lean Inventory Management, the implementation of lean IMS had a significant positive impact on the public health institutions overall performance in NCC. It was

associated with efficient resource management, reduced inventory holding costs, and a just-in-time (JIT) approach to inventory management. This approach contributed to improved operational efficiency and cost savings.

The use of EIMS was found to have a substantial and beneficial relationship with the functionality achieved by public health organizations in NCC. These systems utilized technology such as RFID tagging, electronic data interchange, and barcoding to streamline inventory management processes. They helped reduce supply chain costs and enhance inventory control.

On ABC, the adoption of activity-based costing methods exerted a considerable and favorable impact on the overall performance of public health institutions in NCC. ABC was associated with reduced holding costs, efficient resource management, and product categorization based on stock value. This approach helped optimize cost allocation and enhance inventory management efficiency.

5.3 Conclusion

The study concludes that vendor managed inventory goal is to reduce inventory-related costs for both parties. When suppliers manage inventory, stock is replenished only when necessary, which reduces overstock and costs for the retailer. It also streamlines operations for the vendor by creating a more predictable business pattern. Vendor managed inventory works by building a strong communication system between the seller and the buyer. The first step is for both parties to set metrics for success and agree on terms and conditions for the partnership. Next, the vendor begins shipping products to the retailer. Throughout the process, the retailer provides current inventory data to the vendor so they can monitor stock levels and purchasing trends.

The research came to the conclusion that effective management of lean inventory can reduce holding costs, eliminate losses due to obsolescence, spoiling, and dead stock, and minimize out-of-stocks, which can alienate customers and cost the business future sales. Lean inventory management is a method that tries to cut waste, optimize flow, and boost customer value by maintaining only the minimum amount of inventory needed to meet demand. These goals can be accomplished by maintaining only the least amount of

inventory needed to meet demand. Lean inventory management enhances customer service and loyalty, increasing operational efficiency and productivity, and fostering a culture of continuous improvement and innovation.

According to the findings of the study, using an EIMS not only makes the process of transferring inventory costs and assets across programs more seamless but also minimizes the necessity for additional bookkeeping expenditures. In order to generate the forecasting and strategic planning reports that are required, a data collection system is utilized. Whether or not an item is in stock can be communicated to employees and customers in a matter of seconds thanks to computerized inventory. This makes it easier to identify reordering needs and gives clients better service overall. When the available stock falls below a certain threshold, fresh orders are placed with the relevant suppliers and tracked so that clients are informed of when the replacement goods will become available.

Based on the study's results, managers obtain more precise production cost information when employing activity-based costing. This can aid organizations in making more informed choices regarding what to produce or in identifying more cost-efficient manufacturing methods. In addition to this, it might be useful for determining prices for certain products. The activity-based costing methodology provides a more accurate method for calculating product profit margins, identifies the procedures that incur unneeded and wasteful expenditures, and provides a more complete comprehension and justification of the costs associated with manufacturing overhead.

5.4 Recommendation

According to the findings of the study, hospitals should be more forthcoming with information to be shared with their suppliers in order to increase their level of confidence in the supplier's ability to meet the requirements of each and every order that is placed. Make sure to keep your vendors informed about seasonality so that they can get ready to deal with the increased demand, and make sure that you never run out of stock on any stock keeping unit. Notify suppliers of any sudden shifts in demand by informing them if there is a change in the demand in the other way. It is sound business practice to negotiate fees up front, and the process of working with a supplier is no exception to this rule.

Establish concrete goals for the hospitals, which will give you a better idea of what the hospitals consider to be a successful relationship with their suppliers and will also assist you in determining whether or not the vendor is living up to their half of the bargain.

The study recommends that the hospitals should maintain a minimal amount of inventory by ordering goods or materials only when they are needed in the production process. By reducing excess stock and improving supply chain efficiency, companies can save costs and minimize waste. The inventory should only be acquired when the job demands it since lean inventory management is based on a demand-based pull. Continually improve by increasing responsiveness and adaptability by being reliable data on job usage and the right technology. Make the value-creating steps occur in tight sequence so the product will flow smoothly towards the job, eliminating waste in the process.

The study recommends that the hospitals should make use of artificial intelligence to improve their inventory management by providing insights, predictions, and recommendations based on their inventory data. Mobile devices, such as smartphones or tablets, can be powerful tools for inventory management. By leveraging mobile devices, you can access and update your inventory information on the go, using apps or web browsers.

The study recommends that the hospitals should first identify the activities that consume overhead costs in your business process, such as ordering materials or setting up machines. Assign costs to each activity based on the resources they use and identify the cost drivers for each activity. Then, calculate the activity rate for each activity and assign the activity costs to each product based on the amount of cost driver they use. Finally, add the activity costs to the direct costs of each product to get the total cost of each product.

5.5 Suggestion for Further Research

The focus on different inventory management techniques should be further explored in future studies to address the gap of 19.1% that account for other variables not studied. The study also looked at public health facilities' performance in NCC. Therefore, a gap in

context can be bridged by conducting a study that focuses on private health facilities within the NCC.

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APPENDICES

Appendix I: Letter of Introduction

Dear participant,

RE: Research Project

I am a MBA student at Kenyatta University researching on the **Influence of Inventory Management Practices on Performance of Public Health Institutions in NCC**

I politely appeal for your assistance in order to enable me to successfully complete the study. Please be truthful in your responses to the attached questionnaire.

Your information will be kept private and the survey results will be utilized solely for educational and research use. Your identity won't be disclosed given that the questionnaire doesn't ask for any personal information.

I appreciate your cooperation.

Yours honestly,

JUSTUS MWITI

Appendix II: The Questionnaire

Section A: Demographic Information

Please indicate with a checkmark [√]which response is accurate and, if necessary, provide further detail.

1. gender

   Male [ ]

   Female [ ]

2. Your highest education level

   Diploma level [ ]

   Degree level [ ]

   Postgraduate [ ]

   Other……..

3. Your age bracket

   20-30 [ ] 31-40 [ ]

   41-50 [ ] 51 and above [ ]

4. When did you start working at the hospital?

   5 years and below [ ] 6 to 10 years [ ]

   11 to 15 years [ ] Above 10 years [ ]

Section B: Inventory Management Practices

I) Vendor-Managed Inventory

What is your agreement level when it comes to the below claims that relate to the Vendor-Managed Inventory?

$5 = \text{Strongly Agree}, 4 = \text{Agree}, 3 = \text{Not Sure}, 2 = \text{Disagree}, 1 = \text{Strongly Disagree}$

		1	2	3	4	5
	The hospital employs systems for vender-managed inventory.					

	The hospital partners with its vendors to modernize its systems.					
	The hospital makes use of automated stock monitoring					
	The hospital makes sure there are enough stock levels to save expenses associated with stock outs.					
	The stock management system in the hospital minimizes the total holding cost					
	The hospital makes certain there is a functional stock management system to shorten lead cycles for efficient waste reduction.					
	The hospital practices vender managed inventory systems.					

II) Lean IMS

What is your agreement level when it comes to the below claims that relate to the lean IMS?

$5 = \text{Strongly Agree}, 4 = \text{Agree}, 3 = \text{Not Sure}, 2 = \text{Disagree}, 1 = \text{Strongly Disagree}$

		1	**2**	**3**	**4**	**5**
	Reduced inventory holding costs are achieved by ordering both medical and non-medical products from vendors only when they are required.					
	To save inventory holding costs, the healthcare center has agreements with suppliers to provide specific medical and non-medical items only when they are required.					

	In health institution stores, organizing, standardizing, and preserving medical and non-medical products minimizes time, effort, and expiration waste.					
	The healthcare facility has dependable vendors that can provide medical products as soon as they are required.					
	Waste is reduced when customers and suppliers are involved in the purchase of medical and non-medical items.					
	There is accurate prediction of supplier delivery dates					
	There are agreements with supplier for short cycle deliveries					
	JIT method leads to efficient resource management					

III) Electronic-Inventory Management System

What is your agreement level when it comes to the below claims that relate to the electronic-inventory management system?

$5 = \text{Strongly Agree}, 4 = \text{Agree}, 3 = \text{Not Sure}, 2 = \text{Disagree}, 1 = \text{Strongly Disagree}$

		1	**2**	**3**	**4**	**5**
	Supplier categorization is done electronically					
	Prequalification of suppliers is electronically done					
	The application of IT lowers inventory loss in our healthcare center.					
	Bar-coding is implemented in the inventory management at our hospital.					

	Our medical facility has a technological system that allows us to electronically exchange business papers with our vendors.					
	The use of computer based system reduces supply chains cost					
	In our medical facility, tags affixed to specific medicinal inventory are automatically identified and tracked through electromagnetic fields.					
	The hospital's computers are connected in real time with those of its suppliers.					
	The hospital utilizes Electronic Data Interchange Technology (EDI)					

IV) Activity Based Costing System

What is your agreement level when it comes to the below statements that relate to the activity based costing system?

$5 = \text{Strongly Agree}, 4 = \text{Agree}, 3 = \text{Not Sure}, 2 = \text{Disagree}, 1 = \text{Strongly Disagree}$

		1	**2**	**3**	**4**	**5**
	Using ABC method leads to efficient resource management					
	Using ABC method reduces on holding costs					
	Using ABC eliminates wastes associated with obsolescence and expiry of supplies					
	Using ABC leads to increased number of clients served					
	The hospital classifies products based on their stock					

	value through ABC analysis.					
	The hospital lowers stock holding costs through the application of ABC Analysis.					
	Applying ABC analysis, you may rate things based on how much money was spent on them.					

V) Performance of health institutions

How much do you agree with the following assertions that are related to the Performance of health institutions?

$5 = \text{Strongly Agree}, 4 = \text{Agree}, 3 = \text{Not Sure}, 2 = \text{Disagree}, 1 = \text{Strongly Disagree}$

Performance of Health Institutions		**1**	**2**	**3**	**4**	**5**
	There have been no shortages of medicines in this facility in the last quarter					
	There have been no expiries of medicines in this facility in the last quarter					
	There is timely supply of medicines					
	We are able to reduce cost of holding stocks					
	The order lead time for medicines is reasonable					
	Our suppliers are reliable					
	We are able to reduce wastages					