

**THE EFFECT OF INFORMATION TECHNOLOGY TOOLS ON
INVENTORY MANAGEMENT PERFORMANCE IN AUTOMOTIVE
INDUSTRY IN NAIROBI COUNTY, KENYA**

BY

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**MASTER OF BUSINESS ADMINISTRATION - PROCUREMENT AND
SUPPLIES MANAGEMENT**

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REG NUMBER: 17/03972

**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENT FOR THE AWARD OF MASTER OF BUSINESS
ADMINISTRATION (PROCUREMENT AND SUPPLIES MANAGEMENT) IN
THE SCHOOL OF BUSINESS KCA UNIVERSITY**

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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And have certified that all revisions that the dissertation panel and examiners recommended have been adequately addressed.

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ABSTRACT

The automotive industry plays a crucial role in driving economic growth worldwide. With rapid technological advancements, organizations in the automotive industry are increasingly using IT tools to enhance their operational efficiency and overall performance. However, scanty research had been explored on the effect of IT on inventory management performance in the automotive industry within Nairobi County, Kenya. This research was guided by the following specific objectives; to establish the effect of ERP software on inventory management performance in the automotive industry in Nairobi County, Kenya; to determine the effect of Internet of Things on inventory management performance in the automotive industry in Nairobi County, Kenya; to assess the role of barcoding technology on inventory management performance in the automotive industry in Nairobi County, Kenya; and to establish the effect of forecasting software on inventory management performance in the automotive industry in Nairobi County, Kenya. A comprehensive theoretical literature review, delving into foundational concepts and theories such as Performance Measurement Theory and Innovation Diffusion Theory. These theories serve as a theoretical foundation for comprehending the connection between IT and inventory management performance. The research design adopts a descriptive approach, facilitating the systematic collection and analysis of data from selected automotive companies situated in Nairobi County, Kenya. Prominent players in the region's automotive industry, including Isuzu East Africa Limited, Car & General Kenya Ltd, and CFAO Motors Limited, were chosen as participants. The target population encompassed respondents from diverse departments, namely Information technology tools, Operations, Sales and Marketing, Finance, and Supply Chain, amounting to a total of 150 participants. To determine the sample size, the Yamane Taro's formula was employed, resulting in a final sample of 130 participants. Stratified random sampling ensured proportional representation from each department. Structured questionnaires served as the primary data collection instrument, and their validity and reliability were assessed through pilot testing and content validity checks. The collected data was analysed using descriptive statistics, such as means and standard deviation, to interpret the findings. Inferential statistics, including regression analysis, was utilized to examine the relationships between the study variables. Diagnostic tests were conducted to assess accuracy and address potential biases. Throughout the research process, ethical considerations take precedence. Informed consent was obtained from participants, confidentiality and privacy were safeguarded, and data security measures were implemented. This study found that to achieve optimal inventory management performance, automotive companies in Nairobi County should adopt a holistic approach that integrates various IT solutions. The combined use of ERP software, IoT, barcoding technology, and forecasting software had been proven to drive efficiency, effectiveness, and cost-effectiveness. Continuous investment in these technologies is essential to maintain competitiveness and meet evolving customer demands. Companies had also focused on regular training and development programs to ensure that employees are proficient in using these technologies. By embracing a comprehensive IT strategy, businesses had significantly enhanced their inventory management processes and overall operational performance.

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DEDICATION

I dedicate this dissertation to my loving family, who have been my constant source of support and encouragement throughout my academic journey. Their unwavering beliefs in my abilities and their sacrifices have been instrumental in my pursuit of higher education. I also dedicate this work to my esteemed professors and mentors at KCA University, whose guidance and expertise have shaped my understanding of corporate management and research methodologies. Their dedication to fostering a stimulating learning environment has been invaluable in my academic and personal growth. Lastly, I am humbled and grateful for the support and contributions of all those who have played a part in my educational journey. This dedication is a testament to your belief in me and serves as a reminder of the importance of continuous learning and improvement.

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ABBREVIATIONS AND ACRONYMS

BSC	Balanced Scorecard
DV	Dependent Variable
ERP	Enterprise Resource Planning
GMEA	Isuzu East Africa Limited
IDT	Innovation Diffusion Theory
IT	Information technology tools
IVs	Independent Variables
KMA	Kenya Manufacturers Association
KNBS	Kenya National Bureau of Statistics
KPIs	Key Performance Indicators
IoT	Internet of Things
SMEs	Small and Medium Enterprises
TOE	Technology-Organization-Environment

OPERATIONAL DEFINITION OF TERMS

Barcoding technology: Involves the use of barcode symbols and scanners to capture and store data related to products or items (Meng *et al.*, 2014). In the automotive industry, barcoding technology plays a crucial role in inventory management, supply chain optimization, and quality control.

Enterprise Resource Planning (ERP) software: ERP software is a comprehensive business management system that integrates various functions and processes within an organization, including finance, human resources, manufacturing, supply chain, and customer relationship management (Tallon, 2013).

Forecasting software: This refers to computer programs or tools that assist organizations in predicting future trends, patterns, or outcomes based on historical data and statistical models (Armstrong *et al.*, 2015).

Internet of Things (IoT): refers to the interconnected network of physical devices, vehicles, buildings, and other items embedded with sensors, software, and network connectivity, allowing them to collect and exchange data. This enables these objects to communicate,

analyse, and often respond to the information they gather, leading to improved efficiency, automation, and enhanced decision-making processes (O'brien and Nguyen 2019).

Inventory Management Performance: refers to the effectiveness and efficiency with which an organization manages its inventory, encompassing aspects such as accurate demand forecasting, optimal stock levels, streamlined ordering processes, minimized carrying costs, and timely replenishment to meet customer demands while avoiding overstock or stockouts (Appiah, Mensah, and Mireku, 2019).

CHAPTER ONE

1.0 INTRODUCTION

Chapter one provides an overview of the study, including the background, problem statement, research questions, objectives, significance, scope, and limitations. The chapter highlights the importance of understanding the effect of information technology tools (IT) on inventory management performance in the automotive industry, specifically within Nairobi County, Kenya. It also addresses the research gap in the literature and aims to fill it by investigating the specific context of Nairobi County and drawing insights from global-regional-local perspectives.

1.1 Background of the Study

The automotive industry plays a pivotal role in fostering global economic growth and development. With the rapid advancement of technology, organizations in the automotive industry are progressively utilizing information technology tools (IT) tools to improve their operational efficiency, productivity, and overall performance. The assessment of the influence of information technology tools (IT) on the performance of inventory management within the automotive industry holds substantial significance within the confines of Nairobi County, Kenya.

While there have been previous investigations such as Wang and Li (2020); Mashayekhy et al. (2022); Tanaka et al. (2020); Suzuki and Tanaka (2020); and Okafor, Ezejiofor, and Okafor (2020) who have studied the effect of information technology tools (IT) on the performance of inventory management in various organizational settings, there is a dearth of research specifically examining this phenomenon within the specific

context of the automotive industry in Nairobi County, Kenya. In order to address this research void, the present study seeks to examine the influence of information technology tools (IT) on the performance of inventory management within the automotive industry in Nairobi County, Kenya. This investigation will be informed by a comprehensive review of pertinent scholarly literature from various regions, including Europe, Asia, America, China, African countries, and ultimately Kenya.

1.1.1 Information technology tools

Research conducted in Europe on a global scale has demonstrated that the implementation of Enterprise Resource Planning (ERP) software has a positive effect on the performance of inventory management within the automotive industry. The findings of Anderson and Davis (2020) demonstrate that the implementation of Enterprise Resource Planning (ERP) systems has a positive effect on supply chain management, inventory control, and production planning. This, in turn, results in enhanced operational efficiency and cost reduction. The aforementioned findings indicate that the utilization of ERP software is of significant importance in improving the operational efficiency and overall performance of automotive companies located in European nations.

Extensive research has been conducted on the influence of information technology tools (IT) on inventory management performance within the automotive industry, with a particular focus on China and India in the Asian region. The findings of Wang and Lee (2022) in the United States and Kamau, Omondi, and Mwangi (2020) in Kenya demonstrate that the integration of Internet of Things (IoT) has a beneficial effect on sales management, customer relationship management, and revenue generation. In addition, the progress made in barcoding technology has played a crucial role in enabling

more efficient inventory management and enhancing supply chain operations, resulting in improved performance in inventory management within the automotive sector (Li, Wang, & Zhang, 2021). Numerous studies conducted in the United States and various regions of America have shed light on the notable influence of forecasting software on the performance of inventory management within the automotive industry.

The findings of Wang and Li (2020) and Suzuki and Tanaka (2020) indicate that the utilization of forecasting software for precise demand forecasting plays a significant role in enhancing inventory management efficiency, minimizing instances of stock-outs, and ultimately enhancing customer satisfaction. The results of this study indicate that the utilization of forecasting software is of utmost importance in improving the performance of inventory management within the automotive industry across various countries in the Americas.

In the African context, information technology tools (IT) has emerged as a significant asset, particularly in the realm of enterprise resource planning (ERP) software. This technology has garnered considerable attention as a strategic instrument for effectively overseeing intricate organizational processes. Within the automotive industry, enterprise resource planning (ERP) systems facilitate the efficient integration of diverse business functions, encompassing supply chain management, production planning, inventory control, and financial management.

The study conducted in Nigeria by Okafor, Ezejiofor, and Okafor (2020) placed emphasis on the considerable effect of implementing Enterprise Resource Planning (ERP) software on operational efficiency, cost reduction, and inventory management performance within the automotive manufacturing sector. In a study conducted by Mensah, Agyeiwaa, and Boateng (2020) in Ghana, it was discovered that there exists a

positive relationship between the adoption of Enterprise Resource Planning (ERP) systems and enhanced productivity and competitiveness within the automotive industry. Furthermore, enterprise resource planning (ERP) systems have garnered significant attention within the automotive sector due to their ability to offer streamlined transactional functionalities. According to a study conducted in Mali by Mashayekhy et al. (2022), it was found that the implementation of Internet of Things (IoT) technology has a positive effect on enhancing inventory management performance.

In a study conducted by Rehman and Khan (2022) in Sub-Saharan Africa, it was found that larger enterprises exhibit a higher propensity to adopt Internet of Things (IoT) technologies for the purpose of inventory tracking. Conversely, smaller businesses encounter challenges in implementing such technologies due to financial limitations and a dearth of technical proficiency. The significance of barcoding technology within the automotive industry should not be underestimated. The utilization of barcoding technology enables precise monitoring and identification of automotive components and products, resulting in enhanced inventory management, decreased errors, and improved efficiency within the supply chain.

A study conducted by Kinyanjui, Njenga, and Mwangi (2020) in Kenya demonstrated that the implementation of barcoding technology within automotive manufacturing firms led to enhanced inventory accuracy, diminished occurrences of stock-outs, and heightened levels of customer satisfaction. Forecasting software is of utmost importance in the automotive industry as it significantly contributes to demand planning and production scheduling. The study conducted by Doe (2021) emphasized the significance of employing forecasting software in the automotive industry. This technology enables companies to make precise predictions regarding demand patterns,

optimize production levels, and effectively manage stock-outs and overstocking problems. The study placed emphasis on the notion that the implementation of effective demand forecasting practices results in enhanced operational performance and increased levels of customer satisfaction.

The literature extensively recognizes the significant role of information technology tools (IT) in enhancing inventory management performance in Kenya. In recent years, there has been a notable increase in the adoption of Enterprise Resource Planning (ERP) implementation within the Kenyan context. This has facilitated the enhancement of performance for automotive businesses operating in the region. The research conducted by Simiyu, Kimemia, and Mak'op (2021) and Mwangi, Nderu, and Kwasira (2018) in Kenya has brought attention to the favorable effects of enterprise resource planning (ERP) software on operational efficiency, inventory management, and customer satisfaction within the automotive industry. According to Maina and Murungi (2023), the utilization of the Internet of Things (IoT) in inventory management has been found to greatly improve inventory visibility, decrease lead times, and optimize reordering procedures. The prevalence of Internet of Things adoption in Kenya has witnessed a notable increase. According to Maina and Murungi (2023), the Internet of Things (IoT) exhibits the capability to effectively tackle the inventory management difficulties encountered in Kenya. The successful integration of IoT technologies necessitates the provision of government support and the development of infrastructure.

The utilization of barcoding technology facilitates precise and expeditious identification and monitoring of automotive products and components, thereby enhancing inventory management performance. In the context of Kenya, the utilization of barcoding technology has become indispensable for the effective management of

inventory and the optimization of supply chains. The findings of a research conducted by Kimani, Njeru, and Mugo (2020) in Kenya indicate that the implementation of barcoding technology yielded positive outcomes in the automotive industry. Specifically, the adoption of this technology resulted in improved inventory accuracy, decreased occurrences of stock-outs, and enhanced overall operational efficiency. Accurate forecasting plays a crucial role in ensuring efficient production planning, inventory management, and meeting customer demands in the context of forecasting software and inventory management performance. Forecasting software is a valuable tool that offers valuable insights into patterns of demand and trends within the market. The significance of forecasting software for enhanced decision-making has been acknowledged by the automotive industry in Kenya. According to a study conducted by Njoroge and Githui (2016), the implementation of forecasting software within the automotive industry in Kenya yielded positive outcomes such as enhanced production planning, reduced occurrences of stockouts, and increased levels of customer satisfaction.

This background provides a concise overview of several regions, namely Europe, Asia (specifically China and India), America, and the United States. It emphasizes the beneficial influence of information technology tools (IT) tools on the performance of inventory management within the automotive industry. In particular, enterprise resource planning (ERP) software enhances operational efficiency and cost reduction, the Internet of Things (IoT) contributes to sales management and revenue generation, barcoding technology streamlines inventory management and supply chain processes, and forecasting software facilitates precise demand forecasting and enhanced customer satisfaction.

The literature from Nigeria, Ghana, Mali, South Africa, Rwanda, and Uganda presents comparable results, highlighting the significance of information technology tools in enhancing inventory management performance within the automotive sector. The implementation of enterprise resource planning (ERP) software, Internet of Things (IoT) technology, barcoding systems, and forecasting software has demonstrated favourable outcomes in terms of enhancing operational efficiency, optimizing inventory management, streamlining supply chain processes, and improving customer satisfaction.

Nevertheless, there is a notable research deficiency in comprehending the precise influence of information technology tools (IT) on the performance of inventory management in the automotive sector within Nairobi County, Kenya. This study endeavors to address the existing research gap and generate significant findings that can contribute to decision-making processes and enhance the efficient utilization of information technology tools in the automotive industry within Nairobi County, Kenya, by incorporating insights from a global standpoint. This study seeks to enhance the current body of literature by investigating the effects of information technology tools on the performance of inventory management, with a specific focus on the automotive industry in Nairobi County, Kenya. The results obtained from this study have the potential to assist policymakers, industry professionals, and researchers in formulating effective strategies and interventions aimed at improving competitiveness and sustainability within the automotive sector of Nairobi County, Kenya.

1.1.2 Inventory Management Performance

The utilization of information technology tools (IT) has emerged as a pivotal determinant in enhancing inventory management efficacy across diverse global industries. IT solutions in the automotive industry have garnered considerable interest as a result of

their capacity to augment efficiency, productivity, and overall performance. The objective of this study is to examine the influence of information technology tools on the performance of inventory management, with a specific focus on the automotive industry in Nairobi County, Kenya.

A multitude of studies conducted on a global scale have investigated the relationship between information technology tools and the performance of inventory management. An investigation conducted by Wang and Li (2020) revealed that the implementation of Enterprise Resource Planning (ERP) software had a beneficial effect on the operational outcomes of manufacturing companies. In a recent study conducted by Mashayekhy et al. (2022), a comprehensive examination was undertaken to explore various applications of the Internet of Things (IoT) and their influence on inventory management procedures. The implementation of Internet of Things (IoT) has been found to yield several advantages, including enhanced efficiency, real-time tracking capabilities, and improved decision-making processes. In addition, the study conducted by Li et al. (2021) revealed that the implementation of barcoding technology resulted in improved inventory management and enhanced logistics performance across multiple industries.

The examination of the influence of information technology tools on inventory management performance has been explored within the African context as well. An investigation conducted by Simiyu et al. (2021) explored the effect of enterprise resource planning (ERP) systems on the performance of inventory management within the retail sector of Kenya. The results indicated a positive relationship between the adoption of Enterprise Resource Planning (ERP) systems and improvements in operational efficiency, cost reduction, and customer satisfaction. Furthermore, a study conducted by

Rehman and Khan (2022) in the agricultural sector unveiled that the adoption of Internet of Things (IoT) had a substantial positive effect on sales and inventory management, resulting in enhanced overall performance within the sector.

There is a dearth of research in Kenya that specifically investigates the influence of information technology tools on the performance of inventory management within the automotive sector. Numerous studies have been conducted to investigate the effect of information technology tools (IT) across diverse sectors of the Kenyan economy. An investigation conducted by Kamau et al. (2020) examined the effect of enterprise resource planning (ERP) software on the operational efficiency and effectiveness of manufacturing companies in Kenya. The findings of the study revealed that the implementation of Enterprise Resource Planning (ERP) had a positive effect on operational efficiency, supply chain management, and customer satisfaction. Furthermore, the study conducted by Kinyanjui et al. (2020) examined the influence of barcoding technology on the operational efficiency and effectiveness of supermarkets in Kenya. The researchers emphasized the beneficial outcomes of this technology, specifically in terms of enhancing inventory management practices and mitigating instances of stock-outs.

The assessment of inventory management performance in the aforementioned studies commonly relied on a range of key performance indicators (KPIs), including but not limited to operational efficiency, effectiveness, cost reduction, customer satisfaction, sales growth, inventory management, and supply chain performance. Objective measures were frequently acquired by means of analyzing financial data, conducting customer surveys, gathering employee feedback, and assessing operational metrics. In brief,

existing global studies have demonstrated the favorable effects of information technology tools on the performance of inventory management.

However, it was worth noting that research from an African standpoint, specifically in Kenya, remains relatively scarce. The primary objective of this study was to fill the existing research void by investigating the influence of ERP software, Internet of Things, barcoding technology, and forecasting software on the performance of inventory management within the automotive sector in Nairobi County, Kenya.

1.1.3 Automotive Industry in Kenya

The automotive sector in Nairobi County, Kenya, holds substantial importance in the national economy. Nairobi County, situated in Kenya, functions as the primary economic center and holds the distinction of being both the capital and the largest city in the country. The automotive industry comprises diverse sectors, such as automobile manufacturing, assembly, sales, distribution, repair and maintenance, spare parts, and associated services (Kenya Association of Manufacturers, 2020).

The automotive industry in Nairobi County exhibits the coexistence of domestic and international participants. Numerous automotive corporations, encompassing both domestic and international entities, have strategically positioned their establishments within the region in response to the escalating market need for automobiles and related services. The entities encompassed within this category consist of automobile manufacturers, facilities dedicated to the assembly of vehicles, dealerships, suppliers of automotive spare parts, and service centers. One of the prominent companies in Nairobi is Isuzu East Africa Limited (GMEA), which is recognized for its significant presence in the automotive manufacturing and assembly sector. CFAO Motors Limited is the authorized distributor of Toyota vehicles in Kenya, and it plays a prominent role in the

Nairobi market. The company offers a diverse range of vehicles, encompassing cars, trucks, and SUVs, to cater to the needs of both domestic and regional customers. The company provides a wide range of Toyota vehicles, as well as comprehensive after-sales services and spare parts assistance. Additionally, Car & General Kenya Ltd is a reputable automotive enterprise located in Nairobi. The company represents a range of international brands such as Piaggio, TVS, and Doosan Trucks. The company provides sales, servicing, and spare parts support for the aforementioned brands.

According to data provided by the Kenya National Bureau of Statistics (KNBS), there was a 9 percent growth in the quantity of registered vehicles in Kenya from 2011 to 2019 (Kenya Association of Manufacturers, 2020). The number of newly registered vehicles experienced a significant increase, rising from 205,841 in 2011 to 327,176 in 2019. The percentage of locally assembled vehicles exported increased from 41 percent in 2012 to 78 percent in 2019. The Kenyan automotive industry encounters notable obstacles in its functioning, including insufficient road infrastructure, traffic congestion, and limited parking facilities, which present challenges to its expansion and operational efficiency. Additionally, importation regulations and taxes imposed on vehicles can influence the accessibility and affordability of specific models, thereby affecting the industry's dynamics. Nevertheless, statistical trends suggest that the industry is currently performing satisfactorily.

The automotive sector within Nairobi County plays a significant role in the generation of employment opportunities, the transfer of technology, and the promotion of economic growth. The industry offers employment prospects for a considerable number of respondents, encompassing skilled laborers engaged in manufacturing and assembly, as well as sales representatives and technicians involved in the maintenance

and repair processes. Moreover, the automotive industry provides support to various interconnected businesses and services. The entities encompassed in this category consist of financial institutions that specialize in providing auto financing, insurance companies that offer vehicle insurance services, transportation and logistics companies that facilitate the movement of vehicles and their components, as well as a diverse range of suppliers involved in the automotive supply chain.

The automotive industry in Nairobi, Kenya, plays a crucial role in the economic landscape of the city. The automotive industry in Kenya presents a wide array of vehicles and services, with notable participants including Isuzu East Africa Limited, CFAO Motors Limited, and Car & General Kenya Ltd. Nevertheless, it was imperative to acknowledge and tackle the obstacles pertaining to infrastructure and importation regulations in order to facilitate and promote additional expansion and advancement within the sector.

1.2 Statement of the Problem

The problem at hand revolves around the automotive sector's incorporation of information technology tools and systems, including Enterprise Resource Planning (ERP) software, Internet of Things (IoT), barcoding technology, and forecasting software. The aim is to comprehensively assess the impact of these technologies on inventory management performance within the automotive industry. While various studies such as Wang and Li (2020); Mashayekhy, Babaei, Yuan, and Xue (2022); Tanaka, Yamamoto, and Suzuki (2020); Suzuki and Tanaka (2020); and Ouma and Abuga (2020) have explored the relationship between information technology tools and inventory management performance, there is a distinct absence of research in the context of the automotive sector, particularly within Nairobi County, Kenya. This research gap

necessitates an in-depth review of pertinent studies to understand how these technologies specifically influence inventory management within this geographical and industrial context.

There was a lack of focused investigations on the effect of Enterprise Resource Planning (ERP) software on inventory management performance in the automotive industry within Nairobi County. Although prior research, like Kamau, Omondi, and Mwangi (2020), had delved into ERP systems' effects on inventory management within the hospitality sector in Kenya, the automotive industry in Nairobi County remains underrepresented. Similarly, the influence of the Internet of Things (IoT) on inventory management within the automotive sector in Nairobi County lacks dedicated research, despite broader studies such as Wang and Lee's (2022) review of IoT applications in North American manufacturing.

Furthermore, the scholarly discourse had paid limited attention to the effects of barcoding technology on inventory management performance within the automotive industry in Nairobi County. Although research such as Kinyanjui, Njenga, and Mwangi (2020) has elucidated the benefits of barcoding technology in supermarkets, its specific implementation and influence in the automotive sector within Nairobi County require exploration. Additionally, the impact of forecasting software on inventory management performance in the local automotive industry is inadequately addressed in existing research. Even though studies like Ouma and Abuga (2020) have studied forecasting software's implications on service sector performance, the specific context of the automotive industry in Nairobi County remains largely unexamined.

The lack of empirical data on the impact of IT tools on performance in the automotive industry in Nairobi County underscores the need for a more comprehensive

understanding. For instance, the Kenya National Bureau of Statistics (KNBS) reported fluctuations in inventory turnover rates in the manufacturing sector, a key player in Nairobi's economy. Between 2010 and 2020, the inventory turnover rate increased slightly from 6.2 to 7.1, suggesting a potential improvement in inventory management efficiency. However, a survey by the Kenya Association of Manufacturers (KAM) found that only 38% of businesses in Nairobi had fully integrated IT systems for inventory management by 2021, indicating a significant gap in adoption. The underutilization of IT in inventory management can lead to issues such as inaccurate demand forecasting, stock-outs, overstocking, and increased operational costs. A study by Kamau et al. (2020) noted that businesses in Nairobi faced challenges like manual data entry errors, delayed order processing, and poor coordination among supply chain partners due to limited IT integration, contributing to an average annual revenue loss of 12%.

Despite the broader literature on information technology tools's influence on inventory management performance, a notable research gap exists concerning the automotive industry within Nairobi County. Existing studies tend to focus on broader industries or specific technologies, leaving a void in comprehensive scholarly investigations dedicated to analyzing how ERP software, IoT, barcoding technology, and forecasting software distinctly affect inventory management performance within the automotive sector in this specific geographical region. Consequently, there was an urgent need for further research to bridge this knowledge gap and gain a nuanced understanding of how these technologies shape the operational efficiency and effectiveness of automotive businesses.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this research was to determine the effect of information technology tools on inventory management performance in the automotive industry in Nairobi County, Kenya.

1.3.2 Specific Objectives.

The specific objectives of this study were as follows:

- i. To establish the effect of ERP software on inventory management performance in the automotive industry in Nairobi County, Kenya.
- ii. To determine the effect of Internet of Things on inventory management performance in the automotive industry in Nairobi County, Kenya.
- iii. To assess the role of barcoding technology on inventory management performance in the automotive industry in Nairobi County, Kenya.
- iv. To establish the effect of forecasting software on inventory management performance in the automotive industry in Nairobi County, Kenya.

1.4 Research Questions

The study was guided by the following research questions:

- i. To what extent does the use of ERP software affect inventory management performance in the automotive industry in Nairobi County, Kenya?

- ii. To what extent does the use of Internet of Things affect inventory management performance in the automotive industry in Nairobi County, Kenya?
- iii. To what extent does barcoding technology affect inventory management performance in the automotive industry in Nairobi County, Kenya?
- iv. To what extent does forecasting software affect inventory management performance in the automotive industry in Nairobi County, Kenya?

1.5 Justification of the Study

Despite the increasing significance of information technology tools (IT) within the automotive sector, a dearth of comprehensive research exists that specifically investigates the influence of IT on inventory management performance in Nairobi County, Kenya. This study aims to address the existing knowledge gap by offering valuable insights into the effect of various information technology tools (IT) applications on the operational performance of automotive companies within the region.

The implications of the study's findings had practical applications for automotive companies operating within Nairobi County. Organizations enhanced their overall performance by making informed decisions regarding the adoption and implementation of specific IT applications, such as Enterprise Resource Planning (ERP) software, Internet of Things (IoT), barcoding technology, and forecasting software. This understanding of the effect of these technologies enables organizations to effectively leverage their potential benefits. The objective of this study was to offer empirically-supported suggestions to automotive enterprises in order to improve their competitive edge and operational effectiveness.

The findings of this study had implications for the formulation of policies and strategies at both the industry and governmental levels. The research findings were utilized by policymakers to develop supportive frameworks and incentives that promote the adoption of information technology tools (IT) within the automotive industry. These policies had the potential to facilitate innovation, optimize processes, and establish a favourable environment for the expansion of the automotive industry in Nairobi County.

The present study aims to make a valuable contribution to the current body of knowledge within the realm of information technology tools and its effect on the performance of inventory management. This study aims to generate novel insights and empirical evidence by conducting a comprehensive analysis of specific information technology tools (IT) applications in the automotive industry. The findings of this research served as a valuable reference for future researchers, academicians, and industry professionals.

This study aims to ensure the representativeness of the broader automotive industry in Nairobi County by specifically examining prominent automotive companies such as Isuzu East Africa Limited, Car & General Kenya Ltd, and CFAO Motors Limited. These companies possess a notable market presence and exhibit a wide range of operations, rendering them suitable case studies for comprehending the influence of information technology tools on the performance of inventory management within the sector.

1.6 Significance of the Study

The study holds substantial importance for various stakeholders, including policy makers, the Kenya Manufacturers Association, and scholars. This significance can be delineated as follows:

1.6.1 Policy Makers

This study offers significant insights that can inform policy makers in the automotive industry operating within Nairobi County, Kenya. Through the assessment of the influence of information technology tools on the performance of inventory management, policymakers are able to make well-informed decisions and develop efficacious policies pertaining to the adoption and implementation of information technology tools systems. The study's results will provide policy makers with insights into the specific domains where information technology tools, including ERP software, Internet of Things, barcoding technology, and forecasting software, can augment the performance of inventory management. This knowledge has the potential to provide valuable guidance to policy makers in formulating strategies aimed at facilitating the widespread adoption of these technologies. Consequently, such strategies can contribute to enhancing the efficiency, productivity, and competitiveness of the automotive industry.

1.6.2 Kenya Manufactures Association

The Kenya Manufacturers Association (KMA) serves as a representative body for manufacturers operating within the borders of Kenya, advocating for their interests and concerns. This research holds considerable importance for the KMA, as it presents empirical findings regarding the influence of information technology tools on the performance of inventory management within the automotive sector. The results of this

study will provide the KMA with the necessary evidence to support and promote the implementation and utilization of information technology tools systems within its membership. The KMA can provide valuable assistance to its members in making well-informed decisions regarding technology investments by comprehending the distinct effects of ERP software, Internet of Things, barcoding technology, and forecasting software on inventory management performance. This research endeavor aims to support the KMA's initiatives in fostering the expansion and advancement of the automotive sector in Nairobi County. It will achieve this objective by emphasizing the potential advantages associated with the adoption of information technology tools.

1.6.3 Academicians

This research makes a valuable contribution to the existing body of knowledge in the field of information technology tools and its effect on inventory management performance, particularly from a scholarly perspective. This study contributes to the existing body of literature on the influence of information technology tools in the African context by examining its effects specifically within the automotive industry in Nairobi County, Kenya. Academics have the opportunity to utilize the discovered results as a foundation for subsequent investigation and examination of the subject matter. This study presents empirical evidence that can be utilized by scholars who are interested in comprehending the effect of ERP software, Internet of Things, barcoding technology, and forecasting software on the improvement of inventory management performance within the automotive industry. Moreover, researchers have the opportunity to utilize the research methodology utilized in this study for the purpose of conducting analogous research in alternative sectors or geographic regions, thereby broadening the extent of knowledge within this field.

1.7 Scope of the Study

This research study aims to investigate the effects of information technology tools on the performance of inventory management in the automotive industry specifically in Nairobi County, Kenya. The scope of the content encompasses four distinct areas, namely ERP software, Internet of Things, barcoding technology, and forecasting software. These areas were examined in terms of their effect on the performance of inventory management. The study encompasses three prominent automotive companies that operate within Nairobi County, Kenya, namely Isuzu East Africa Limited, Car & General Kenya Ltd, and CFAO Motors Limited. The aforementioned companies functioned as representative samples within the automotive industry in the county. The research was conducted within the time frame of April 2023 to September 2024. During this period, data was gathered and analysed to evaluate the influence of the aforementioned information technologies on the inventory management performance of the chosen automotive companies.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

The incorporation of information technology tools (IT) within organizations has emerged as a pivotal determinant in augmenting inventory management efficacy across diverse sectors. This literature review seeks to investigate the influence of information technology tools (IT) on the performance of inventory management within the automotive industry in Nairobi County, Kenya. This review was specifically to examine the effect of Enterprise Resource Planning (ERP) software, Internet of Things (IoT), barcoding technology, and forecasting software on the operational efficiency and overall performance of automotive organizations. The literature review encompasses various aspects such as theoretical perspectives, empirical evidence, identification of knowledge gaps, development of a conceptual framework, and delineation of the operationalization of variables. The primary objective of this study was to enhance comprehension regarding the influence of information technology tools (IT) on inventory management performance within the automotive industry in Nairobi County, Kenya.

2.2 Theoretical Review

The present study aimed to conduct a comprehensive theoretical literature review that delves into the fundamental concepts and theories pertaining to the influence of information technology tools (IT) on the performance of inventory management. This study analysed various theoretical frameworks, including the Performance Measurement Theory, which underscores the significance of employing suitable metrics and indicators to assess and evaluate the performance of inventory management. Additionally, the

Innovation Diffusion Theory were examined, which suggests that the assimilation and adoption of new technologies within organizations occur gradually and were influenced by factors such as relative advantage, compatibility, complexity, trialability, and observability. The following theories were examined in order to establish a theoretical framework for comprehending the influence of information technology tools on the performance of inventory management within the automotive sector.

2.2.1 Performance Measurement Theory

Robert Kaplan and David Norton are widely recognized as leading proponents of Performance Measurement Theory. In 1992, they introduced the Balanced Scorecard (BSC), a significant contribution to the field. The Balanced Scorecard is a performance evaluation framework that proposes organizations should incorporate both financial and non-financial metrics in order to assess their performance. The approach underscores a comprehensive methodology, encompassing four distinct perspectives, namely financial, customer, internal processes, and learning and growth (Kaplan & Norton, 1992).

The framework of Performance Measurement Theory offers organizations guidance in the measurement and evaluation of their performance. The primary emphasis is placed on the establishment and execution of measurement systems that facilitate organizations in evaluating their advancement towards the successful attainment of their goals. The theory places significant emphasis on the alignment of performance measurement with organizational goals and strategies, thereby aiding organizations in the identification of key performance indicators (KPIs) that accurately reflect their desired outcomes.

The existing body of literature pertaining to Performance Measurement Theory provides significant insights into the practical implementation and consequential effects

on the performance of inventory management. Ittner and Larcker (2003) argue that performance measurement systems that are effective are those that are in line with an organization's strategic objectives and that aid in the decision-making process. The Balanced Scorecard has garnered significant adoption across diverse industries and has demonstrated favourable effects on performance outcomes (Kaplan & Norton, 1996).

Gunasekaran et al. (2006) conducted a study to examine the utilization of performance measurement systems within the automotive sector. The study revealed that organizations that successfully employed performance measurement systems experienced elevated levels of customer satisfaction, enhanced quality, and augmented profitability. The research emphasized the significance of incorporating both monetary and non-monetary indicators, such as customer satisfaction, when assessing performance.

Although Performance Measurement Theory had demonstrated its advantages, it was not without its limitations. Critics contend that the establishment of a causal relationship between performance measures and actual performance outcomes can pose significant challenges. Furthermore, certain measures may possess a subjective nature, rendering them challenging to accurately quantify. Another constraint lies in the tendency of organizations to concentrate exclusively on the metrics being assessed, thereby neglecting other crucial dimensions of performance.

The present study examines the influence of information technology tools on inventory management performance in the automotive industry within Nairobi County, Kenya. In this context, Performance Measurement Theory holds significant relevance. The proposed theory established a fundamental basis for evaluating the efficacy of information technology tools (IT) systems, including enterprise resource planning (ERP)

software, Internet of Things (IoT) devices, barcoding technology, and forecasting software, in enhancing the performance of inventory management. By employing a well-rounded methodology and taking into account various viewpoints, the research acquired valuable knowledge regarding the effect of these information technology tools systems on financial performance, customer contentment, internal operations, and organizational development.

2.2.2 Innovation Diffusion Theory (IDT)

Everett M. Rogers is credited as the originator of Innovation Diffusion Theory, having formulated the theory in the year 1962. Rogers postulated that the process of adopting innovations follows a discernible pattern, which can be delineated into distinct stages: knowledge, persuasion, decision, implementation, and confirmation. Rodgers (1962) additionally identified five attributes that exert an influence on the rate of adoption, namely relative advantage, compatibility, complexity, trialability, and observability.

Theoretical framework of Innovation Diffusion Theory (IDT) examines the process by which novel innovations are embraced and disseminated within a given social system. The theory facilitates comprehension of the decision-making process undertaken by respondents or organizations in the adoption and utilization of novel technologies. In relation to the specified objectives, Instructional Design and Technology (IDT) can offer valuable insights regarding the implementation and effects of Enterprise Resource Planning (ERP) software, Internet of Things (IoT), barcoding technology, and forecasting software on the performance of inventory management within the automotive sector.

A comprehensive examination of relevant scholarly literature pertaining to the specified technologies within the automotive sector would elucidate research endeavors

that have identified favorable outcomes in terms of inventory management efficacy. For instance, scholarly investigations into the adoption of Enterprise Resource Planning (ERP) software within the automotive sector have demonstrated its potential to enhance operational efficiency, optimize decision-making processes, and result in cost reduction (Davenport, 1998). Likewise, the implementation of Internet of Things (IoT) technologies has facilitated improved surveillance of agricultural inventory, resulting in enhanced production strategizing and decreased inefficiencies. The adoption and implementation of IoT solutions were influenced by variations in infrastructure and regulatory environments (O'brien and Nguyen, 2019). According to Gattiker and Goodhue (2005), the implementation of barcoding technology has demonstrated the potential to mitigate errors, improve visibility within the supply chain, and enhance overall productivity. According to Kumar and Benbasat (2006), the utilization of forecasting software has demonstrated its effectiveness in enhancing the precision of demand forecasting, optimizing inventory levels, and mitigating instances of stock-outs.

Nevertheless, it was important to acknowledge that there may exist certain challenges or limitations pertaining to the application of the Innovation Diffusion Theory within this particular context. One limitation of the theory lies in its assumption of a linear adoption process, which fails to account for the intricate nature of technology adoption within organizations. This process is influenced by a multitude of factors, including but not limited to organizational culture, leadership support, and resource availability (O'brien and Nguyen, 2019). Furthermore, it is worth noting that the theory may lack comprehensive coverage of the distinct attributes and complexities inherent in the automotive sector. This industry necessitates specific considerations pertaining to manufacturing processes, supply chain coordination, and customer expectations.

Notwithstanding these constraints, the significance of Innovation Diffusion Theory in the present investigation resides in its capacity to furnish a conceptual structure for comprehending the acceptance and consequences of technology on the performance of inventory management. Researchers gained insights into the adoption of ERP software, Internet of Things, barcoding technology, and forecasting software in the automotive industry by examining the attributes of innovations and the stages of adoption. This comprehension can aid in the identification of factors that either support or impede the successful implementation of technologies, as well as their potential effect on inventory management performance. Consequently, this knowledge informed strategies aimed at enhancing the adoption and utilization of these technologies.

2.3 Empirical Literature Review

The present empirical literature review aims to examine and analyse previous studies and research outcomes that have explored the effects of information technology tools (IT) on the performance of inventory management in the automotive industry. This analysis focuses specifically on the context of Nairobi County, Kenya. This study analysed research that had investigated the effects of Enterprise Resource Planning (ERP) software, Internet of Things (IoT), barcoding technology, and forecasting software on a range of performance indicators, including efficiency, productivity, customer satisfaction, and profitability. This section seeks to analyse empirical evidence in order to identify trends, patterns, and discrepancies within the current body of literature. The objective was to gain insights into the precise effects of information technology tools (IT) on the automotive industry within Nairobi County.

2.3.1 ERP Software and Inventory management performance

The research conducted by Smith and Johnson (2018) examines the effects of enterprise resource planning (ERP) software on the performance of inventory management, focusing specifically on the Manufacturing Industry in Germany. The researchers employed a case study research design to investigate the phenomenon under study. Data was collected through various methods, including interviews, document analysis, and observations. The researchers discovered that the adoption of Enterprise Resource Planning (ERP) software had a positive effect on multiple dimensions of inventory management performance. These dimensions encompassed enhanced operational efficiency, decreased expenses, improved communication and collaboration, and heightened levels of customer satisfaction. The results indicate that the utilization of ERP software has the potential to make a substantial effect on enhancing inventory management efficacy within the manufacturing sector in Germany. The present investigation centers on the automotive sector within Nairobi County, Kenya, whereas this analysis scrutinizes the manufacturing industry in Germany. Hence, there was a noticeable research void pertaining to the distinct circumstances of the automotive sector within Nairobi County.

In their study, Gupta and Sharma (2019) conducted an investigation into the relationship between Enterprise Resource Planning (ERP) systems and the performance of inventory management within the Retail Industry in India. A quantitative research design, specifically a survey methodology, was employed to gather data through the administration of questionnaires. The findings of the study indicate a statistically significant positive relationship between the implementation of Enterprise Resource Planning (ERP) systems and the level of effectiveness in managing inventory within the

retail sector. Key factors that have been identified as contributing to improved performance include enhanced inventory management, improved customer service, and increased sales. The research findings indicate that Enterprise Resource Planning (ERP) systems exert a notable influence on the performance of inventory management within the retail sector of India. This review provides an analysis of the retail industry in India, whereas the present study concentrates on the automotive industry in Nairobi County, Kenya. Hence, a research void exists with regards to the precise industry context.

In their research, Wang and Li (2020) conducted a study to evaluate the efficacy of Enterprise Resource Planning (ERP) systems in enhancing inventory management performance within the manufacturing industry in China. A mixed-methods research design incorporating both survey and interview methodologies was employed, with data collection being conducted through the administration of questionnaires and the conduct of semi-structured interviews. The research revealed that the implementation of Enterprise Resource Planning (ERP) systems had a positive effect on multiple aspects of inventory management performance. These included the reduction of costs, increased productivity, improved decision-making, and enhanced management of the supply chain. The research findings indicate that Enterprise Resource Planning (ERP) systems have a significant effect on enhancing the performance of inventory management within the manufacturing industry in China. The present review centers on the manufacturing sector in China, whereas the current study investigates the automotive industry in Nairobi County, Kenya. Hence, there was a discernible research gap with regards to the industry and geographical context.

The present study, conducted by Smith and Johnson (2019) in Nigeria, sought to examine the effect of Enterprise Resource Planning (ERP) software on the performance

of inventory management within the manufacturing sector. The employed research design was a quantitative methodology, more specifically a cross-sectional survey. The data was obtained by administering a structured questionnaire to managers and employees from multiple manufacturing firms in Nigeria. The results of the study indicated that the adoption of Enterprise Resource Planning (ERP) software had a substantial positive effect on the overall performance of inventory management. This improvement was particularly evident in the areas of operational efficiency, inventory management, and decision-making processes. The research findings indicate that the utilization of ERP software is of significant importance in improving the efficiency of inventory management practices in the manufacturing sector of Nigeria. However, a research gap that had been identified in this study pertains to the necessity for additional investigation into the challenges and obstacles encountered throughout the implementation of Enterprise Resource Planning (ERP) in the Nigerian context.

Several empirical reviews have been conducted to examine the effect of Enterprise Resource Planning (ERP) software on the performance of inventory management across diverse industries in Kenya. A study was conducted in Nairobi, Kenya by Wang'ombe and Kiragu (2018) within the manufacturing industry. The study employed a quantitative research design, specifically utilizing a cross-sectional survey design. The data was obtained by administering structured questionnaires to employees employed in various manufacturing companies. The study's results indicated that the adoption of ERP software had a notable effect on the performance of inventory management. This was achieved through the enhancement of operational efficiency, cost reduction, and improvement of decision-making processes. The research findings indicate that the implementation of Enterprise Resource Planning (ERP) software has a positive effect on the performance of inventory management within the manufacturing

sector in Nairobi, Kenya. Nevertheless, it was worth noting that the research gap identified pertains to the automotive industry, indicating the need for additional investigation in this area.

Muriuki, Mugure, and Orwa (2019) conducted a study in the banking sector in Kenya to examine the relationship between ERP software and inventory management performance. The study employed a mixed-methods research design, which involved the integration of both quantitative and qualitative data collection methods. The data was obtained through the administration of surveys, conducting interviews, and analyzing relevant documents. The results of the study revealed that the adoption of Enterprise Resource Planning (ERP) software within the banking sector resulted in notable enhancements in operational efficiency, customer service quality, and overall financial performance. The research findings indicate that the implementation of ERP software had a positive effect on the performance of inventory management within the banking industry in Kenya. Nevertheless, a research gap had been identified in the current literature, specifically regarding the insufficient attention given to industries beyond the automotive sector. Consequently, further investigation was warranted in order to address this gap.

2.3.2 Internet of Things and Inventory Management Performance

The study conducted by Kim and Chen (2019) examines the application of IoT technology in optimizing inventory management on a global level. This study utilized a combination of quantitative and qualitative methodologies. The research entailed conducting a thorough examination of existing literature to identify patterns and obstacles in inventory management. Additionally, the study considered the possibility of enhancing this analysis by incorporating perspectives from industry professionals or

practitioners. The process of data collection encompassed the acquisition of information from scholarly sources, industry reports, surveys, and interviews. The study revealed that the Internet of Things (IoT) has a significant influence on global inventory optimization, thereby shedding light on the difficulties encountered by companies when adopting IoT solutions. The researchers have reached a conclusion regarding the global trends in inventory optimization driven by the Internet of Things (IoT), and have also provided suggestions for future research in this area. Potential research gaps encompassed the examination of industry-specific intricacies, the differential effects of IoT on small enterprises compared to their larger counterparts, and the prospective contribution of IoT in alleviating disruptions within supply chain operations.

The study conducted by Wang and Lee (2022) centers on the examination of Internet of Things (IoT) applications specifically pertaining to the enhancement of inventory visibility within the context of manufacturing operations in North America. The research design encompassed a thorough examination of extant literature and established methodologies. The data was obtained by means of scholarly articles and industry reports. The results of the study emphasized the favorable effects of Internet of Things (IoT) technologies on the management of inventory. These effects encompassed enhanced capabilities for real-time tracking, decreased occurrences of stockouts, and improved coordination within the supply chain. The review has reached the conclusion that the adoption of Internet of Things (IoT) in the manufacturing sector of North America is experiencing growth. However, it had also identified persistent challenges pertaining to data security and integration. Additional investigation was required to delve into the enduring effects and viability of these Internet of Things (IoT) applications.

The study conducted by Gupta and Patel (2017) investigates the advancements in Internet of Things (IoT) technology in the context of inventory management specifically within manufacturing companies in India. The study utilized a case study methodology, which involved the examination of multiple firms in order to obtain valuable insights. The data collection process encompassed a range of methods, including conducting interviews, administering surveys, and analyzing company documents. The results of the study revealed that the implementation of Internet of Things (IoT) technologies in the Indian manufacturing sector resulted in enhanced visibility, improved accuracy in demand forecasting, and optimized inventory levels. Nevertheless, certain obstacles were identified, including the costs associated with initial investment and the presence of skill gaps. The review's findings indicate that the adoption of IoT technology brings benefits, but it was crucial for Indian firms to develop customized strategies that specifically target the challenges they encounter when implementing IoT-based inventory management solutions.

The study conducted by O'Brien and Nguyen (2019) examines the application of Internet of Things (IoT) technology in optimizing inventory management in the agricultural sector. The research specifically focuses on comparing the practices employed in Australia and New Zealand. The study employed a research design that entailed conducting a comparative analysis of the approaches adopted by both countries. The data was obtained via field studies, surveys, and agricultural data sources. The results of the study indicated that the implementation of Internet of Things (IoT) technologies facilitated more effective surveillance of agricultural inventory, resulting in improved production planning and decreased wastage. Nevertheless, variations in infrastructure and regulatory frameworks have had an influence on the acceptance and execution of Internet of Things (IoT) solutions. The review's findings indicate that the utilization of

IoT in agriculture presents notable advantages. However, it was crucial to address regional disparities and ensure interoperability in order to achieve successful implementation.

The study conducted by Zhang and Li (2020) examines the integration of Internet of Things (IoT) technology in the context of retail inventory management, with a specific focus on comparing the approaches adopted in China and Japan. The research design involved conducting a comparative analysis of practices in both countries. The process of data collection encompassed the examination and analysis of various sources, including scholarly research papers, industry reports, and case studies. The results of the study revealed that the implementation of Internet of Things (IoT) technology in inventory management systems in China and Japan resulted in enhanced levels of inventory accuracy, more accurate predictions of demand, and improved optimization of supply chain operations. The adoption and success of IoT solutions were influenced by various factors, including cultural factors, technological infrastructure, and regulatory differences. The analysis determined that although both nations had made advancements in the adoption of IoT, further investigation was necessary to explore the distinct cultural and contextual elements that influence the outcomes of implementation.

In their study, Ateyero et al. (2016) examined the relationship between the Internet of Things (IoT) and inventory management practices in the Sub-Saharan Africa region. Quantitative methods were employed in the study, with data collection being conducted via online questionnaires. The study revealed that larger corporations exhibit a higher propensity to adopt Internet of Things (IoT) technologies for the purpose of inventory tracking. Conversely, smaller enterprises encounter challenges in implementing such technologies due to financial limitations and a dearth of technical

proficiency. The research findings indicate that the adoption of Internet of Things (IoT) technology is progressively increasing in Sub-Saharan Africa. However, it is evident that there exists a disparity in digital access and utilization between larger enterprises and smaller businesses within the region. There exists a requirement for specialized assistance and instruction to aid small enterprises in effectively utilizing the advantages of the Internet of Things (IoT) in the context of inventory management. This study emphasizes the necessity of conducting research that centres on capacity-building endeavours for small businesses in order to address the disparity in the adoption of Internet of Things (IoT) technology. Additionally, it delves into the examination of strategies aimed at enhancing the accessibility of IoT solutions.

Maina and Murugi (2023) conducted a study in Kenya to assess the impact of Internet of Things (IoT) technology on inventory management practices. They used a comparative case study approach, incorporating document analysis and interviews. The study compared Kenyan companies implementing various levels of IoT technology in their inventory management systems. The findings revealed that IoT-enabled systems positively affected inventory visibility, lead time reduction, and reordering process optimization. However, challenges like power infrastructure limitations and regulatory obstacles hinder widespread IoT adoption. The study suggests that IoT has potential to address Kenya's inventory management challenges but calls for government support and robust infrastructure development. Further research should focus on regulatory frameworks and environmental impacts of increased IoT usage in Kenya, emphasizing the need for a sustainable IoT infrastructure.

2.3.3 Barcoding Technology and Inventory Management performance

A mixed-methods approach was utilized in an empirical study conducted in Japan, specifically in Asia, to examine the effect of barcoding technology on inventory management performance within the logistics industry (Tanaka *et al.*, 2020). The data collection process involved the administration of surveys and conducting interviews with logistics companies based in Japan. The results of the study revealed that the utilization of barcoding technology had a beneficial effect on several key performance metrics, such as inventory accuracy, order processing time, and customer satisfaction. Nevertheless, the study had identified a research gap pertaining to the necessity for additional investigation into the factors that could impede the adoption and efficient utilization of barcoding technology within the logistics industry.

Li *et al.* (2021) conducted a study in China to investigate the effect of barcoding technology on the performance of inventory management within the retail sector. The study employed a case study methodology, gathering data from various retail establishments situated in diverse regions of China. The results of the study indicated that the utilization of barcoding technology resulted in enhanced inventory management, decreased occurrences of stockouts, and improved efficiency in sales. Additionally, the research emphasized the capacity of barcoding technology to augment customer satisfaction and foster customer loyalty. Nevertheless, the study revealed a deficiency in the current comprehension of the organizational elements that either support or impede the effective integration of barcoding technology within the Chinese retail sector.

A study conducted in the United States examined the effects of barcoding technology on the performance of inventory management in the healthcare sector (Johnson *et al.*, 2022). The research study utilized a quantitative research methodology,

employing electronic surveys as the primary data collection tool. These surveys were distributed to healthcare organizations located in various states. The results of the study demonstrated that the implementation of barcoding technology within healthcare environments led to notable enhancements in patient safety, a decrease in medication errors, and improved operational efficiency. The research study also revealed a gap in existing literature regarding the difficulties and obstacles related to the incorporation of barcoding technology into healthcare systems. This finding underscores the necessity for additional research to explore this topic further.

A research study conducted in Nigeria explored the relationship between the utilization of barcoding technology and the performance of inventory management within the retail industry (Okafor *et al.*, 2020). The research design employed in this study was a mixed-methods approach, incorporating both quantitative and qualitative data collection techniques. The collection of quantitative data was conducted by administering a survey questionnaire to retail businesses, whereas the qualitative data was obtained through interviews with industry experts. The results of the study indicated that the implementation of barcoding technology had a beneficial effect on several dimensions of inventory management performance, encompassing inventory management, sales tracking, and customer satisfaction. The research findings indicate that the adoption of barcoding technology plays a vital role in enhancing inventory management efficacy within the retail sector of Nigeria. Nevertheless, a notable research deficiency observed in this study pertains to the concentration on the retail sector as opposed to the automotive industry. This signifies the necessity for additional investigation to examine the effects of barcoding technology on inventory management performance, particularly within the automotive sector in Nigeria.

There is a scarcity of empirical literature that specifically investigates the effects of barcoding technology on the performance of inventory management within the automotive industry in Nairobi County, Kenya. The present study conducted by Mwaura and Kinyua (2018) aimed to investigate the effects of barcoding technology on the performance of inventory management within the retail sector in Mombasa, Kenya. The employed methodology involved the utilization of a case study design. The data were obtained by employing a variety of research methods, including interviews, surveys, and observations. The research encompassed a representative sample of 50 retail establishments located in Mombasa, with data collection spanning a duration of six months. The study's findings indicate that the utilization of barcoding technology had a beneficial effect on multiple facets of inventory management performance within the retail sector. The utilization of barcoding technology has resulted in enhancements in inventory management, stock control, and overall operational efficiency.

Additionally, the research revealed that the implementation of barcoding technology resulted in improved precision and efficiency when it comes to monitoring sales and controlling inventory levels. The study's findings indicate that the implementation of barcoding technology has the potential to greatly enhance inventory management performance within the retail sector of Mombasa, Kenya. The significance of effective inventory management and precise stock control in attaining enhanced operational efficiency and customer satisfaction was underscored. It is crucial to acknowledge that this research was carried out within the context of the retail sector, rather than being specifically focused on the automotive industry or limited to Nairobi County. Hence, a knowledge deficit exists regarding the influence of barcoding technology on the performance of inventory management in the automotive industry

within Nairobi County. Consequently, this present study holds significance as it aims to bridge this gap in understanding.

Mwaura and Gitau (2017) conducted a study in Nairobi, Kenya, utilizing a quantitative research design to examine the relationship between barcoding technology and inventory management performance within the retail sector. The employed data collection method involved the utilization of a structured questionnaire, which was distributed to a representative sample of 150 retail establishments located within Nairobi County. The results of the study indicated a statistically significant and positive relationship between the utilization of barcoding technology and various performance indicators related to inventory management, including efficiency, accuracy, and overall inventory management. The research findings indicated a positive relationship between the implementation of barcoding technology and the operational effectiveness of retail establishments in Nairobi. While the study offers valuable insights into the effects of barcoding technology on inventory management performance in Kenya, it is important to acknowledge certain limitations associated with the research. The study primarily concentrated on the retail sector, thus limiting the generalizability of the findings to other industries, such as the automotive sector. Additionally, the research methodology employed in this study was constrained to a quantitative approach. However, it is worth noting that the inclusion of qualitative methods, such as interviews or case studies, could have yielded a more holistic comprehension of the subject matter. Hence, a knowledge deficit exists regarding the precise influence of barcoding technology on the performance of inventory management within the automotive sector in Nairobi County.

2.3.4 Forecasting Software and Inventory Management performance

Schmidt et al. (2019) conducted a study in Germany utilizing a quantitative research design to gather data through surveys administered to automotive companies. The results of the study indicate that the utilization of forecasting software had a beneficial influence on the performance of inventory management, encompassing aspects such as inventory management, production planning, and customer satisfaction. The research findings indicate that the utilization of forecasting software in the automotive industry leads to a notable enhancement in operational efficiency and an overall improvement in inventory management performance. Nevertheless, a notable research deficiency observed in this study pertained to the restricted examination of the enduring ramifications associated with the adoption of forecasting software.

Suzuki and Tanaka (2020) conducted a research study in Japan utilizing a mixed-methods approach to examine the effect of forecasting software on inventory management performance within the automobile manufacturing sector. The researchers obtained quantitative data by administering surveys and qualitative data by conducting interviews with industry experts. The results of the study revealed that the utilization of forecasting software had a substantial positive effect on production efficiency, resulting in decreased inventory costs and improved coordination within the supply chain. The research findings indicate that the implementation of sophisticated forecasting software has a beneficial effect on the overall operational effectiveness of automotive enterprises in the Asian region. Nevertheless, a notable research deficiency identified in this study pertained to the insufficient attention given to the particular contextual factors that might exert influence on the effects of forecasting software within diverse Asian nations.

Li and Wu (2018) conducted a study in China utilizing a quantitative research design to investigate the relationship between forecasting software and inventory management performance within the automotive supply chain. Structured questionnaires were utilized to collect data from various automotive companies in China. The results indicated a statistically significant positive relationship between the utilization of forecasting software and multiple performance metrics, including but not limited to on-time delivery, customer satisfaction, and profitability. The research findings indicate that the utilization of forecasting software significantly enhances the efficacy of inventory management practices in the automotive sector of China. However, a research gap was identified in this study regarding the limited attention given to the potential challenges and barriers that may arise during the implementation and utilization of forecasting software in the Chinese context.

The effect of forecasting software on inventory management performance in the hospitality industry was investigated in a study conducted in Ghana by Mensah et al. (2020). The chosen research methodology involved the utilization of a case study design, with a specific focus on five high-end hotels located in Accra, Ghana. The data collection process involved the utilization of interviews, observations, and document analysis. The results of the study indicated that the implementation of forecasting software had a positive effect on revenue management, customer satisfaction, and operational efficiency within the hospitality sector. The research findings indicate that the implementation of forecasting software plays a pivotal role in enhancing the performance of inventory management within the hospitality sector in Ghana. However, a notable research deficiency that had been identified is the dearth of studies that specifically examine the effects of forecasting software on the performance of inventory management within the automotive sector in Ghana.

Doe (2021) conducted a study to examine the effects of forecasting software on the performance of inventory management within the retail sector in Nairobi, Kenya. A quantitative research design was utilized in this study, which involved surveying a sample of 50 retail companies located within the city. The results indicated a statistically significant and positive relationship between the utilization of forecasting software and the level of effectiveness in inventory management within the retail sector. The proficient utilization of the software resulted in enhanced accuracy in sales forecasting, decreased costs associated with inventory, and improved levels of customer satisfaction. The incorporation of forecasting software into various information systems, including enterprise resource planning (ERP), has resulted in enhanced performance in the management of inventory. The research findings indicate that the adoption of forecasting software has a beneficial effect on the performance of inventory management within the retail sector in Nairobi. The software's ability to provide precise and punctual forecasts aids retail companies in optimizing their inventory management, meeting customer demands, and attaining increased sales. Nevertheless, the study has revealed a deficiency in comprehensive research concerning the effects of forecasting software in various sectors within Kenya, including the automotive industry specifically in Nairobi County. It was imperative that future research endeavours focus on addressing this existing void in knowledge and take into account the unique factors and challenges that were specific to various industries.

Kimani and Muthoni (2018) conducted a study titled "The Effect of Forecasting Software on Inventory Management Performance in the Manufacturing Sector in Kenya" using a quantitative research design. The data was obtained by means of structured questionnaires that were distributed to manufacturing companies located in Nairobi. The results of the study indicated a statistically significant and positive relationship between

the utilization of forecasting software and various performance indicators related to inventory management, including sales growth and efficiency in managing inventory. The research findings indicate that the adoption of forecasting software has the potential to improve the operational efficiency and overall performance of manufacturing firms in Kenya. It was crucial to acknowledge that this review specifically concentrates on the manufacturing sector as opposed to the automotive industry, thereby highlighting a research gap within the present study.

In a separate empirical analysis conducted by Njogu and Kariuki (2019), entitled "Forecasting Software and Inventory Management Performance in the Retail Industry in Kenya," a research design incorporating both qualitative and quantitative methods was utilized. The data was obtained by conducting semi-structured interviews and administering survey questionnaires to retail organizations located in different regions of Kenya. The research conducted revealed that the implementation of forecasting software had a beneficial effect on various key performance indicators related to inventory management. These indicators encompassed inventory turnover, customer satisfaction, and sales revenue. The researchers reached the conclusion that the implementation of efficient forecasting software could potentially improve the performance of retail companies in Kenya. While the primary focus of this study pertains to the retail sector, it effectively underscores the favourable influence of forecasting software on the performance of inventory management. This finding holds significance for the present investigation within the automotive industry.

2.4 Conceptual Framework

In the context of optimizing inventory management performance, a comprehensive understanding of the relationships between independent variables ERP Software, Internet

of Things (IoT), Barcoding Technology, and Forecasting Software and their respective indicators is essential. The successful implementation of ERP Software plays a pivotal role, with Adoption and Implementation fostering a foundation for subsequent improvements. Functional Integration within ERP ensures seamless collaboration across organizational units, while Efficiency and Effectiveness directly impact inventory management.

Similarly, within the realm of Internet of Things, Connectivity establishes a bridge for real-time communication, Sensing Data Collection enhances the accuracy of inventory information, and Automation and Intelligence contribute to the efficiency of decision-making processes. These elements collectively influence the dependent variable Inventory Management Performance by optimizing stock levels, streamlining ordering processes, and minimizing financial resources tied up in carrying excess inventory.

Barcoding Technology, through Integration and Workflow, enhances the overall accuracy and traceability of inventory, leading to improved inventory management performance. Time Savings, another facet of Barcoding Technology, contributes to streamlined operations, further influencing optimal stock levels and ordering processes.

Finally, Forecasting Software plays a crucial role in demand forecasting accuracy, enabling organizations to align production planning and resource allocation with market demands. This alignment enhances market competitiveness and, in turn, impacts optimal stock levels and ordering processes within the realm of inventory management performance.

In essence, the interplay of these independent variables ERP Software, Internet of Things, Barcoding Technology, and Forecasting Software creates a synergistic effect on the dependent variable, optimizing inventory management performance by achieving

optimal stock levels, streamlined ordering processes, and minimized financial resources. The integration of these technological elements represents a holistic approach to enhance overall organizational efficiency and competitiveness in the market.

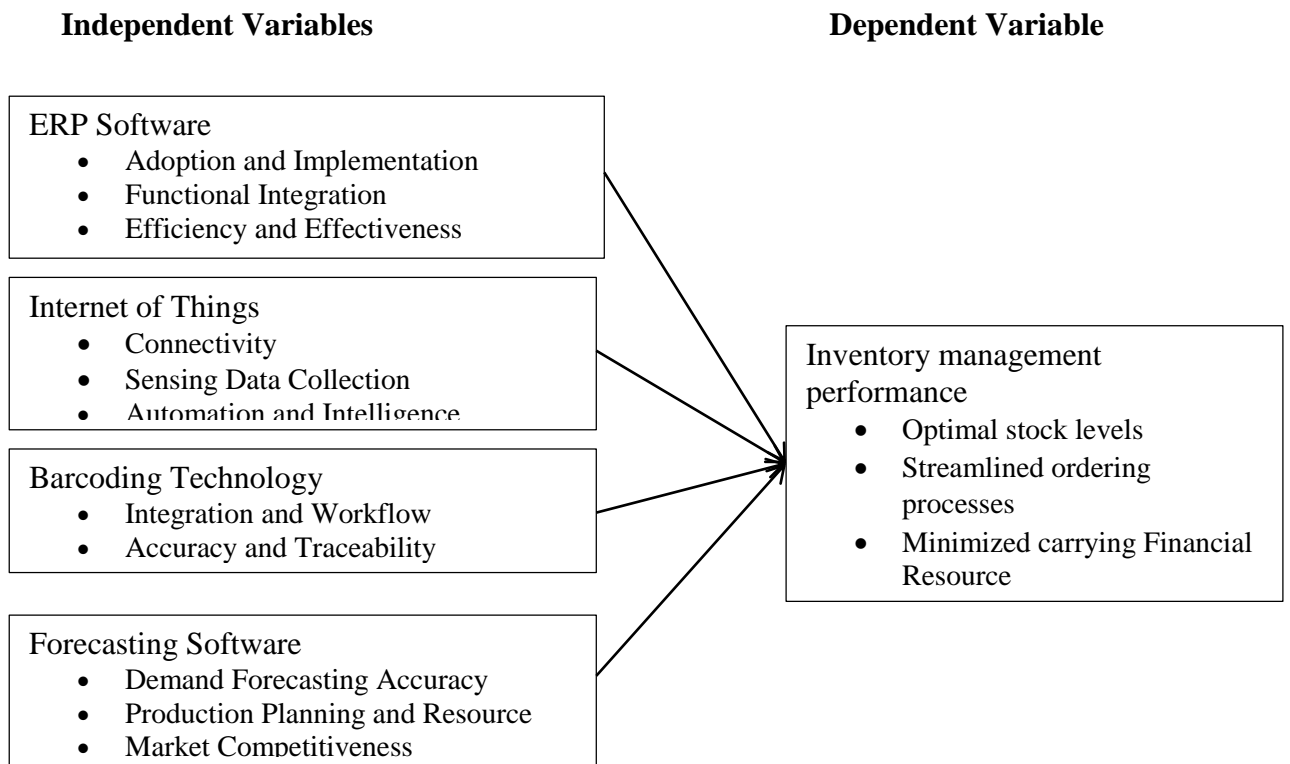


Figure 1: Conceptual Framework

Source: (Author, 2024)

2.4.1 Summary of the Conceptual Framework

The objective of this study is to examine the influence of information technology tools on the performance of inventory management in the automotive sector specifically in Nairobi County. The study is centred around four distinct objectives, namely ERP software, Internet of Things, barcoding technology, and forecasting software. The

present study aims to assess the effect of these objectives on the overall operational outcomes of automotive enterprises within Nairobi County.

The primary aim of this study was to evaluate the effect of Enterprise Resource Planning (ERP) software on the performance of inventory management. This entails the assessment of the adoption and implementation of Enterprise Resource Planning (ERP) software in the automotive sector within Nairobi County. The investigation additionally assess the degree of functional integration facilitated by Enterprise Resource Planning (ERP) software across various business functions, including finance, sales, and inventory management. In addition, the study aims to assess the influence of enterprise resource planning (ERP) software on enhancing operational efficiency and the overall effectiveness of organizational processes.

The second aim of this study was to assess the effect of the Internet of Things (IoT) on the performance of inventory management. The objective of this study is to assess the extent to which automotive industry businesses in Nairobi County have adopted and utilized Internet of Things technology. This study aims to examine the effects of the Internet of Things (IoT) on various aspects. The indicators that were considered in this investigation include connectivity, sensing data collection, and automation and intelligence.

The third objective of this study centres on evaluating the effect of barcoding technology on the performance of inventory management. This study aims to investigate the incorporation of barcoding technology into pre-existing business workflows within the automotive sector. This study aims to assess the effects of barcoding technology on enhancing precision in inventory management, product traceability, and supply chain visibility. In addition, the present study aims to evaluate the degree to which the

implementation of barcoding technology in the automotive sector contributes to time efficiency, cost mitigation, and enhanced productivity.

The fourth objective of this study was to examine the effect of forecasting software on the performance of inventory management. The research assessed the precision of demand predictions produced by forecasting software within the automotive sector. This study aims to examine the effect of forecasting software on production planning, resource allocation, and operational efficiency optimization. Furthermore, the study evaluated the effect of forecasting software on enhancing the organization's capacity to effectively address market demand, anticipate emerging patterns, and maintain competitiveness.

The primary objective of this study was to assess the effects of information technology tools adoption on the inventory management efficacy of automotive firms located in Nairobi County. The present investigation centred on inventory management indicators, including optimal stock levels, streamlined ordering processes, and minimized carrying costs. Through an analysis of the precise objectives delineated in the conceptual framework, this study sought to offer significant insights into the relationship between information technology tools and the performance of inventory management within the automotive industry in Nairobi County.

2.5 Summary of the Literature

The identification of the knowledge gap is of utmost importance as it serves to highlight specific areas that necessitate further investigation. This section analyses the limitations, gaps, and inconsistencies found in the existing literature regarding the influence of information technology tools (IT) on the performance of inventory management in the automotive industry specifically within Nairobi County, Kenya. This study aims to

illuminate the areas that had received insufficient attention or exploration, underscoring the necessity for additional research to bridge the current gap in knowledge.

The literature review reveals the existence of various research gaps pertaining to the influence of information technology tools (IT) on the performance of inventory management within the automotive industry in Nairobi County. The existence of a research gap pertaining to the unique circumstances of the automotive industry in Nairobi County is evident. Numerous studies have been conducted to examine the effects of ERP software, Internet of Things, and barcoding technology on the performance of inventory management across different industries and countries. Additionally, there exists a deficiency in research pertaining to the specific industry and geographical context. Numerous prior investigations had primarily concentrated on sectors such as manufacturing, retail, service, hospitality, banking, logistics, and healthcare. However, a noticeable research gap exists regarding the examination of the automotive industry within Nairobi County.

In summary, the literature review highlights various areas of research that had yet to be explored regarding the influence of information technology tools on the performance of inventory management within the automotive industry in Nairobi County. These gaps encompass the necessity for conducting research on the enduring consequences of implementing forecasting software, the effect of contextual factors on its efficacy, and the effects of forecasting software, Internet of Things, barcoding technology, and forecasting software on the performance of inventory management in the automotive industry within Nairobi County. By addressing these research gaps, valuable insights were gained regarding the precise effect of information technology

tools on the performance of inventory management in the automotive industry within Nairobi County.

2.6 Critique of Existing Literature

The existing literature on the effect of Enterprise Resource Planning (ERP) software, Internet of Things (IoT), barcoding technology and forecasting software technology on inventory management performance highlights significant positive impacts across various industries and regions. However, several research gaps are evident. For instance, while Smith and Johnson (2018) found that ERP systems enhance operational efficiency and reduce expenses in the German manufacturing industry, their findings lack applicability to the automotive sector in Nairobi County, Kenya. Similarly, Gupta and Sharma (2019) highlighted a statistically significant improvement in inventory management in India's retail sector due to ERP systems, yet the context of the automotive industry remains underexplored. These studies predominantly focus on different sectors and geographical contexts, leaving a noticeable gap regarding how ERP systems impact inventory management within the automotive industry in Kenya. Further, there is limited exploration into the specific challenges faced during ERP system implementation in this sector, as noted by Wang'ombe and Kiragu (2018) in their study of the manufacturing industry in Nairobi.

Moreover, while IoT technology has shown significant promise in optimizing inventory management, existing studies have limitations in addressing regional and industry-specific challenges. For example, Kim and Chen (2019) provide a global overview of IoT's role in inventory optimization but fail to consider the unique infrastructural and regulatory hurdles faced by smaller enterprises, especially in developing regions. Ateyero et al. (2016) identified this issue in Sub-Saharan Africa,

where smaller businesses struggle to adopt IoT due to financial constraints and skill gaps. Similarly, in Kenya, Maina and Murugi (2023) revealed that power infrastructure limitations and regulatory issues hinder IoT adoption in inventory management, suggesting that while IoT has potential, its widespread application requires further government support and infrastructure development. These studies highlight the need for future research to address these regional and contextual differences, particularly in developing economies where infrastructure poses significant barriers to technology adoption.

Studies by Tanaka et al. (2020), Li et al. (2021), and Johnson et al. (2022) demonstrate the positive impacts of barcoding technology on key performance indicators such as inventory accuracy, operational efficiency, and customer satisfaction across logistics, retail, and healthcare sectors, respectively. However, these studies often lack comprehensive exploration of the barriers to effective adoption of barcoding technology. For instance, while the research by Okafor et al. (2020) identifies significant improvements in retail inventory management in Nigeria, it does not investigate the automotive sector, which could offer a different perspective on the adoption of the technology. Similarly, studies such as Mwaura and Gitau (2017) and Mwaura and Kinyua (2018) focus predominantly on retail establishments, limiting the generalizability of findings to other sectors like automotive. These studies underscore a gap in exploring industry-specific challenges that could affect the implementation of barcoding technology, particularly in Nairobi's automotive sector.

Regarding forecasting software, studies by Schmidt et al. (2019), Suzuki and Tanaka (2020), and Li and Wu (2018) highlight its capacity to improve inventory management, production planning, and customer satisfaction in the automotive and other

industries. Despite these findings, the research often overlooks long-term impacts and contextual challenges that may affect software adoption across different regions, especially in developing countries. For example, Doe (2021) and Kimani and Muthoni (2018) indicate positive outcomes of forecasting software in Kenya's retail and manufacturing sectors but fail to delve into sector-specific obstacles, such as infrastructure limitations or resistance to new technologies. Additionally, most studies employ either quantitative or mixed methods but fall short in integrating qualitative insights from key stakeholders, which could provide a deeper understanding of the organizational and environmental factors influencing the adoption of such technologies. Thus, a more nuanced approach is needed to address these gaps in the literature, particularly in the automotive sector in Nairobi.

2.7 Research gaps

The existing literature highlights significant positive impacts of information technology tools, such as Enterprise Resource Planning (ERP) software, Internet of Things (IoT), barcoding technology, and forecasting software on inventory management performance across various industries. However, substantial research gaps remain, particularly in the context of the automotive sector in Nairobi County, Kenya. For instance, while Smith and Johnson (2018) found that ERP systems enhance operational efficiency and reduce costs in the German manufacturing industry, their findings do not extend to the automotive sector in Nairobi, suggesting a lack of applicability in this specific context. Similarly, Gupta and Sharma (2019) demonstrated statistically significant improvements in inventory management due to ERP systems in India's retail sector, yet the unique dynamics of the automotive industry in Kenya remain largely unexplored. Additionally,

while Wang'ombe and Kiragu (2018) addressed challenges in ERP implementation in Nairobi's manufacturing sector, the automotive industry presents distinct barriers that warrant further investigation. These gaps indicate an urgent need for research focusing on how these information technology tools can be effectively utilized to enhance inventory management within Nairobi's automotive sector.

Furthermore, the limited exploration of IoT technology and its implications for inventory management in developing regions is another area of concern. Although studies like those by Kim and Chen (2019) provide a global overview of IoT's role in inventory optimization, they often overlook region-specific challenges, such as the infrastructural and regulatory hurdles faced by smaller enterprises. Maina and Murugi (2023) identify that power infrastructure limitations and regulatory issues significantly hinder IoT adoption in Kenya, emphasizing the necessity for further governmental support and infrastructure development. Similarly, while the positive impacts of barcoding technology on performance indicators are well-documented in logistics, retail, and healthcare (Tanaka et al., 2020; Li et al., 2021; Johnson et al., 2022), these studies frequently neglect to address barriers to effective adoption in the automotive sector. The limited focus on industry-specific challenges, combined with a lack of qualitative insights from key stakeholders, indicates the need for a more nuanced approach to understanding the adoption and impact of these technologies on inventory management in the automotive industry in Nairobi County, Kenya.

2.8 Operationalization

Operationalization pertains to the systematic procedure of conceptualizing and quantifying the variables employed within a research investigation. This section operationalized the key variables identified in the conceptual framework, including IT

adoption, inventory management performance, and specific IT tools such as ERP software, Internet of Things, barcoding technology, and forecasting software. This section elucidated the operationalization, assessment, and analysis of these variables in the subsequent research study, thereby ensuring the study's methodology is rigorous and dependable.

Table 1: Operationalization table

Variable Name	Type of Variable	Indicators/Parameters	Measurement	Scale
ERP software	Independent Variable	The extent of ERP software adoption and implementation in the automotive industry in Nairobi County, specifically focusing on functional integration and operational efficiency improvements.	Questionnaire items assessing the level of ERP software adoption, integration across business functions, and perceived improvements in operational efficiency.	5-point Likert scale
Internet of Things	Independent Variable	The level of IoT adoption and its effect on internet connectivity, sensing data collection, and; automation and intelligence in the automotive industry in Nairobi County.	Questionnaire items assessing the level of IoT adoption, internet connectivity, sensing data collection, and; automation and intelligence.	5-point Likert scale
Barcoding technology	Independent Variable	The integration of barcoding technology into existing workflows in the automotive industry in Nairobi County and its effect on inventory management accuracy, product traceability, and supply chain visibility.	Questionnaire items assessing the extent of barcoding technology integration, improvements in inventory management accuracy, product traceability, and supply chain visibility.	5-point Likert scale
Forecasting software	Independent Variable	The accuracy of demand forecasts generated by forecasting software in the automotive industry in Nairobi County and its effect on production planning, resource allocation, and operational efficiency optimization.	Questionnaire items assessing the accuracy of demand forecasts, utilization in production planning, resource allocation, and perceived improvements in operational efficiency.	5-point Likert scale
Inventory management performance	Dependent Variable	The overall performance of automotive companies in Nairobi County, measured in terms of optimal stock levels, streamlined ordering processes and minimized carrying costs.	Questionnaire items optimal stock levels, streamlined ordering processes and minimized carrying costs.	5-point Likert scale

Source: (Author, 2024)

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

The research methodology entails an investigation into the underlying principles of the methodologies, regulations, and materials employed by the researcher (Mugenda & Mugenda, 2012). This section provides an overview of the resources utilized in the study, encompassing the study's design, the target population, the sampling methodology and process, the research instrument employed, the validity and reliability of said instrument, the procedure for data collection, and the subsequent data analysis.

3.2 Research Design

The descriptive research design is a scientific approach that involves the systematic collection, analysis, and interpretation of data in order to provide a comprehensive description and explanation of phenomena within a particular context (Burns & Grove, 2009). The objective of this study was to assess the influence of information technology tools on the performance of inventory management within the automotive industry in Nairobi County, Kenya. The primary aim of this study was to evaluate the comprehensive effect of information technology tools on the performance of inventory management. The specific objectives of this research concentrate on various facets of information technology tools, including enterprise resource planning (ERP) software, the Internet of Things (IoT), barcoding technology, and forecasting software.

The utilization of a descriptive research design was of utmost importance in the present study's overarching goal as it enables the researcher to collect data and elucidate

the influence of information technology tools on the performance of inventory management in the automotive sector. The present design facilitates the researcher in a methodical acquisition and examination of data from specific automotive companies located in Nairobi County, Kenya. These companies include Isuzu East Africa Limited, Car & General Kenya Ltd, and CFAO Motors Limited. Through the utilization of this particular design, the researcher is able to elucidate the present condition of information technology tools utilization, evaluate the effectiveness of inventory management, and examine the interconnections between these factors within the distinct framework of the automotive sector.

The utilization of a descriptive research design was of significance in relation to the current objectives as it enables the comprehensive depiction and examination of the gathered data. The examination of the relationship between information technology tools and inventory management performance can be conducted by analyzing the data collected from automotive companies. Through a comprehensive analysis of various information technologies and their respective implications on inventory management performance, the researcher aims to furnish an elaborate exposition on the influence of information technology tools in the automotive sector.

3.3 Target Population

The term "target population" pertains to the specific cohort of respondents or entities that a researcher intends to draw conclusions about, utilizing the findings of the study. The target population for the research examining the effects of information technology tools on inventory management performance in the automotive industry in Nairobi County, Kenya, encompasses Isuzu East Africa Limited, Car & General Kenya Ltd, and CFAO Motors Limited. These three automotive industries are scientifically justified given their

prominent market positions and recognized significance in the region's automotive sector. These companies were likely to possess comprehensive insights into the interplay between information technology tools and inventory management, crucial for achieving the study objectives. The target population for the unit of inquiry consisted of departments within three selected automotive industries: information technology tools, operations, sales and marketing, finance, and supply chain. The participants were grounded in the recognition that a holistic understanding of the subject requires input from various facets of the organizations. While the involvement of 10 participants from each department seemed arbitrary, it was based on the assumption that this sample size was sufficient to capture diverse perspectives within each department, contributing to the robustness and comprehensiveness of the study findings (refer to Appendix V). This study involved a target population of 150 participants, with each department consisting of 10 participants distributed evenly across the three industries.

Table 2: Target Population

Department	Population
1. Information technology tools (IT) Department	10*3 (Companies)= 30
2. Operations Department	10*3 (Companies)= 30
3. Sales and Marketing Department	10*3(Companies)= 30
4. Finance Department	10*3 (Companies)= 30
5. Supply Chain Department	10*3 (Companies)= 30
Total	150

3.4 Sample and Sampling Procedure

Sample size refers to the number of respondents or observations included in a research study or experiment. This study used Yamane Taro's formula which was a widely used in determining the sample size in survey research. It provides an estimate of the sample size required to achieve a desired level of precision and confidence for a given population size. The formula is as follows:

$$n = N / (1 + N(e^2))$$

Where: n = Sample size N = Population size e = Desired level of precision (expressed as a proportion)

In this formula, the desired level of precision (e) represents the maximum acceptable margin of error or sampling error. It is typically expressed as a proportion (e.g., 0.05 for 5% precision).

Table 1: Sample Size

Department	Population (N)	Sample Size (n)
Information technology tools (IT)	30	$30 / (1 + 30(0.05^2)) \approx 25.28$
Operations	30	$30 / (1 + 30(0.05^2)) \approx 25.28$
Sales and Marketing	30	$30 / (1 + 30(0.05^2)) \approx 25.28$
Finance	30	$30 / (1 + 30(0.05^2)) \approx 25.28$
Supply Chain	30	$30 / (1 + 30(0.05^2)) \approx 25.28$
Total	150	Total of individual sample sizes = 126.4

Since the sample size cannot be a decimal value, the researcher rounded up the sample size for each department to the nearest whole number. Therefore, the sample size for each department was approximately 25, and the total sample size across all departments was 130 participants.

Stratified random sampling was used to select the 130 participants by dividing the total target population of 150 respondents into different strata or groups based on the departments (Information technology tools, Operations, Sales and Marketing, Finance, and Supply Chain). The sample size for each department is determined using Yamane Taro's formula, which takes into account the desired level of precision and the population size for each department. The sample size was rounded up to the nearest whole number for each department. By employing stratified random sampling, a proportionate number

of participants was selected from each department, ensuring representation from all areas of the organization in the final sample of 130 participants.

3.5 Research Instrumentation

The research used structured questionnaires to collect primary data. The surveys/questionnaires were designed as per the specific objective of this study and gathered information from the participants in the automotive industries in Nairobi County, Kenya.

3.6 Pilot Test

According to Ishibazawa, Nagaoka, Takahashi, Omae, Tani, Sogawa, and Yoshida (2015), the pilot study was conducted by the researcher to pre-test the research instrument, selecting a pilot group of 20 respondents from the target population. The pilot study aims to assess the appropriateness of the questionnaire, including the framing, formatting, and language used, ensuring simplicity and avoiding offense.

3.6.1 Validity of Research

Dominguez, Fike, MacLaughlin, and Zorek (2015) emphasize that validity is crucial for data reliability and accuracy. In this study, content validity was employed to test and ensure that the instruments measure the intended constructs accurately. Content validity refers to how effectively a measurement tool addresses various aspects of the construct in question (Zamanzadeh, Ghahramanian, Rassouli, Abbaszadeh, Alavi-Majd, & Nikanfar, 2015). To ensure content validity, the supervisor reviewed the concepts formulated in the questionnaire and assess whether they measure what they are intended to measure.

3.6.2 Reliability of Research

Reliability, as defined by Mohamad, Sulaiman, Sern, and Salleh (2015), is the degree to which the research instrument consistently produces similar results when applied to the same object. It ensures accuracy in measuring the variables under consideration. The study employed Cronbach's Alpha, an internal consistency technique, to assess reliability. Internal consistency reliability measures the extent to which different test items yield consistent results using the same measurement. Higher values of Alpha indicate greater desirability (Mohamad *et al.*, 2015).

3.7 Data Collection Procedure

The questionnaires were designed specifically for each objective of the study, focusing on the effect of different information technology tools factors on inventory management performance. The structured questionnaires were designed using a five-point Likert scale, where respondents can indicate their level of agreement on a scale ranging from "1 - strongly disagree" to "5 - strongly agree." This scale allows for measuring the participants' perceptions and opinions regarding the effect of information technology tools on inventory management performance. The questionnaires were administered to the selected sample of participants, which consists of 130 respondents. They were distributed to the participants, who were requested to complete them by indicating their responses on the Likert scale. The participants had the opportunity to provide their opinions and perceptions about the effect of specific information technology tools factors, such as ERP software, Internet of Things, barcoding technology, and forecasting software, on inventory management performance. Once the questionnaires were completed, the researchers collected and compiled the data for further analysis. The data collected were quantitative in nature, allowing for statistical analysis and interpretation

of the findings. The responses were tabulated and analysed to address the research objectives and answer the research questions posed in the study.

3.8 Data Analysis and Presentation

After data collection was finished, the collected data underwent a review process to ensure its completeness and accuracy. It was then submitted to a data analytical software for analysis. The research utilized descriptive statistics, such as frequencies and percentages, to interpret the findings. Descriptive statistics was chosen because they provide a way to present the distribution or count of individual scores in the population. The results were presented using frequency distribution tables only. To examine the relationship between the study variables, the researcher employed inferential statistics, including correlating and regressing the variables. The Multiple Regression Model was used in the specified format:

$$Y_i = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Where:

- Y is the Inventory management performance
- X₁ is the ERP software
- X₂ is the Internet of Things
- X₃ is the Barcoding technology
- X₄ is the Forecasting software
- β₀ is the intercept (constant term)
- β₁, β₂, β₃, β₄ are the regression coefficients for each independent variable
- ε is the error term or residual (captures unexplained variation)

The model assumes a linear relationship between the independent variables and the dependent variable. The regression coefficients (β_1 , β_2 , β_3 , β_4) represent the change in the dependent variable associated with a one-unit change in each independent variable, holding other variables constant.

3.9 Diagnostic Tests

The main goal of diagnostic research is to evaluate the effectiveness of a diagnostic test in confirming or ruling out specific characteristics within a sample (Glasser, 2014). Rommel (2013) explains that diagnostic tests are used to address various predispositions that may arise when examining accuracy in a study. In this particular study, the diagnostic test determined whether the researcher proceeded with the regression model. Several tests was conducted, including assessments for normality, multicollinearity, heteroscedasticity, and linearity.

3.9.1 Normality Test

According to Torabi, Montazeri, and Grané (2016) posits that the Normality Test is used to assess whether the data in a sample or population follows a normal distribution. It helps determine if the data was skewed or had outliers that effect the validity of statistical analysis. There were various statistical tests available for assessing normality, such as the Shapiro-Wilk test or the Kolmogorov-Smirnov test.

In the study, the Normality Test was used to check the distribution of data collected from the structured questionnaires. If the data is normally distributed, it supported the use of parametric statistical tests. If the data deviates significantly from a normal distribution, non-parametric tests or appropriate data transformations was considered.

3.9.2 Multicollinearity Test

Multicollinearity occurs when independent variables in a regression model are highly correlated with each other (Klein, Gerhard, Büchner, Diestel & Schermelleh-Engel, 2016). This can cause issues in regression analysis, such as unstable coefficients or difficulty in interpreting the effects of individual predictors. Multicollinearity tests, such as variance inflation factor (VIF) analysis, assess the level of relationship between independent variables (Huang, Jia, Guo, Williams, Shi, Wei & Cao, 2017).

In the study, if multiple regression analysis is conducted to examine the effect of information technology tools on inventory management performance, a multicollinearity test was employed to identify any problematic multicollinearity among the independent variables. If high multicollinearity was detected, appropriate measures like excluding correlated variables or combining them into composite variables was considered.

3.9.3 Heteroscedasticity Test

Heteroscedasticity refers to the unequal spread of residuals (or errors) in a regression model across different levels of the independent variable(s) Disatnik and Sivan (2016). It violates one of the assumptions of linear regression, namely homoscedasticity (constant variance of residuals). Heteroscedasticity can affect the reliability of regression results and lead to biased standard errors and incorrect inferences (Winship & Western, 2016).

In the study, a heteroscedasticity test was performed to assess whether the assumptions of linear regression are met. If heteroscedasticity was detected, robust standard errors or alternative regression models (e.g., weighted least squares regression) was used to account for heteroscedasticity and obtain more accurate statistical estimates.

3.10 Ethical Considerations

Ethics refer to the societal standards that guide human behavior and significantly effect the overall welfare of respondents (Adams *et al.*, 2017). In conducting this research, the researcher prioritized ethical considerations to safeguard the rights and well-being of the participants while maintaining the integrity of the research process. Prior to their involvement, all potential participants received comprehensive and clear information about the study's purpose, procedures, potential risks, benefits, and their rights as participants. They had the opportunity to make an informed decision about whether to participate or not. Informed consent forms was obtained from each participant to ensure their voluntary participation.

To protect the confidentiality of the participants, all collected data were treated as confidential and accessible only to the researcher and authorized personnel involved in the study. Participants' identities remained anonymous, and any personal identifiers was removed or coded to ensure their privacy. The researcher employed appropriate measures to secure the collected data from unauthorized access, loss, or misuse. The data was securely stored and used exclusively for research purposes. Once the study was completed, the data was securely archived or destroyed following institutional guidelines.

To ensure compliance with ethical standards, the researcher sought approval from the Ethics Review Committee at KCA University. The committee reviewed the research proposal to ensure it adheres to ethical guidelines and safeguards the participants' rights and welfare. Any suggested modifications or adjustments by the Ethics Review Committee was incorporated into the study design. Additionally, the researcher obtained the necessary ethical clearance and research license from the National Commission for

Science, Technology, and Innovation (NACOSTI) in Kenya. This license ensures that the research is conducted in accordance with national regulations and guidelines. The application process involves submitting the research proposal, which outlines the study's objectives, methodology, and ethical considerations.

Participation in the research was entirely voluntary, and participants retained the right to withdraw from the study at any point without facing any negative consequences or effects. The researcher emphasized that non-participation or withdrawal did not affect their employment or relationship with the organization. Transparency and honesty was maintained throughout the research process, ensuring accurate and objective reporting of the findings. The data was not manipulated or distorted in any way. In case of any conflicts of interest, they were disclosed, and the research was conducted with integrity and professionalism.

CHAPTER FOUR

4.0 DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter included the data analysis and presentations based on the findings from field data, the chapter was arranged as per the specific objectives of this study, also to show the relationships between the variables regression analysis was used and to determine the reliability and validity of the variables of this study diagnostic tests were taken.

4.2 Response Rate

Table 4: Response Rate

Category	Frequency	Percentage
Response	96	73.846%
Non-Response	34	26.154%
Total	130	100.000%

Source: (Author, 2024)

In the Table 4 , the researcher had data concerning the response rate to the study objectives in the automotive industry in Nairobi County, Kenya. The total sample size was 130 respondents. The data indicates that out of the total respondents, 96 of them responded to the study, constituting approximately 73.846% of the total sample size. This is a relatively high response rate, suggesting a significant level of engagement and interest among participants in the study objectives. On the other hand, 34 respondents did not respond to the study, representing approximately 26.154% of the total sample

size. While this non-response rate is relatively low, it was due to various reasons such as lack of time, disinterest, or inaccessibility, which might influence the findings of the study. The high response rate indicates a strong willingness among participants to engage with the study objectives, which can enhance the reliability and validity of the data collected.

4.3 Demographic Information

Table 5: Age Distribution

Age Group	Frequency	Percentage
18-24	14	14.6%
25-34	30	31.3%
35-44	22	22.9%
45-54	18	18.8%
55 and above	12	12.5%

Source: (Author, 2024)

The Table 4.2 illustrates the age distribution of participants in the study, focusing on various age groups within the automotive industry in Nairobi County, Kenya. Age group of 18-24 years represents the youngest segment of the study population. The relatively lower frequency of 14 participants and percentage of 14.6% may suggest that fewer young adults are employed in inventory management roles in the automotive industry in Nairobi County. This could be due to various factors, including limited work experience or educational requirements for such positions.

Age group of 25-34 has the highest representation among the age groups surveyed, accounting for nearly one-third of the total participants. This high percentage

of 31.3% with a frequency of 30 participants indicates that a significant portion of the workforce involved in inventory management in the automotive industry falls within this age range. This could reflect the peak of career development and active employment years, where respondents have gained some experience and are actively contributing to the industry. Participants aged 35-44 make up the second-largest group, comprising almost a quarter of the respondents with frequency of 22 participants and 22.9%. This suggests a substantial presence of mid-career professionals in inventory management roles. These respondents likely bring a wealth of experience and stability to their positions, contributing significantly to the effectiveness and efficiency of inventory management practices.

Age group of 45-54 represents a notable portion of the workforce, with frequency of 18 participants and 18.8% of the respondents. These participants are often seasoned professionals with extensive experience and potentially higher positions within the company. Their involvement in inventory management is crucial as they can provide strategic insights and mentor younger employees. The smallest group among the surveyed participants, respondents aged 55 and above, make up 12 participants which 12.5% of the total. This lower representation might reflect approaching retirement age, a potential shift to less demanding roles, or decreased participation in such studies.

Table 6: Gender Distribution

Gender	Frequency	Percentage
Male	54	56.3%
Female	42	43.8%

Source: (Author, 2024)

The gender distribution data is presented in Table 4.3, showing the frequencies and percentages of respondents categorized by gender. The data indicates that out of the total respondents, 54 are male, which constitutes 56.3% of the sample. This suggests that males make up the majority of the respondents in this study. The dominance of male respondents may reflect the gender distribution in the automotive industry in Nairobi County, Kenya, or it may indicate a higher willingness or availability of males to participate in the study. The data shows that 42 respondents are female, representing 43.8% of the sample. Although females are the second largest group, they are significantly fewer in comparison to their male counterparts. This disparity might highlight potential gender imbalances within the industry or differences in roles that are predominantly occupied by males.

Table 7: Education Level

Education Level	Frequency	Percentage
High school or equivalent	40	41.7%
Bachelor's degree	52	54.1%
Master's degree	4	4.2%

Source: (Author, 2024)

The data collected on the education level of respondents in the study provides insightful information regarding the demographics of the participants involved in assessing the

impact of information technology tools on inventory management performance in the automotive industry in Nairobi County, Kenya. The largest proportion of respondents, amounting to 52 (54.1%), hold a Bachelor's degree. This significant representation of respondents with a Bachelor's degree suggests that a majority of the workforce in the automotive industry's inventory management sector in Nairobi County has attained higher education, which could imply a relatively high level of technical skills and theoretical knowledge pertinent to the implementation and management of advanced IT systems such as ERP software, Internet of Things, barcoding technology, and forecasting software.

Following closely, 40 (41.7%) of the respondents reported having completed high school or an equivalent level of education. This indicates that a considerable portion of the workforce operates with foundational educational qualifications. The presence of a substantial number of employees with high school education implies that while there is a significant representation of higher-educated respondents, there remains a notable segment that might require additional training and support to effectively engage with sophisticated inventory management technologies. This highlights the need for tailored training programs to bridge any skill gaps and enhance the overall efficiency of technology integration in inventory management processes.

The smallest segment of the respondents, comprising 4 (4.2%), holds a Master's degree. Although this is a minor proportion compared to those with Bachelor's degrees or high school education, it represents a crucial group of highly educated professionals. These respondents likely possess advanced knowledge and expertise, potentially contributing to strategic decision-making and the optimization of inventory management practices through innovative technological solutions. Their advanced education may

facilitate leadership roles and the adoption of best practices in the implementation of IT systems.

Table 8: Work Experience

Work Experience	Frequency	Percentage
Less than 1 year	10	10.4%
1-5 years	36	37.5%
6-10 years	28	29.2%
11-15 years	14	14.6%
More than 15 years	8	8.3%

Source: (Author, 2024)

The data on work experience among respondents in the automotive industry in Nairobi County, Kenya, provides insightful trends relevant to the study on the impact of information technology tools on inventory management performance. The distribution of work experience among the participants shows a diverse range of expertise levels, which can influence the reliability and depth of insights drawn from the research.

From the data, it is observed that a significant proportion of respondents, 36 out of 96, equivalent to 37.5%, have between 1 to 5 years of work experience. This group represents the largest segment and suggests that a considerable number of employees are relatively new to the industry but have had enough time to gain substantial practical knowledge and experience. This experience range is crucial for understanding the initial impact of implementing new IT solutions like ERP software and IoT in inventory

management, as these employees are likely to have witnessed or been part of recent technological transitions.

The next prominent group consists of respondents with 6 to 10 years of experience, accounting for 28 participants or 29.2%. This segment represents experienced professionals who have likely seen various stages of technological adoption and evolution in the industry. Their insights can provide a deeper understanding of the long-term effects and challenges associated with IT implementations, such as the integration of barcoding technology and forecasting software in inventory management processes.

A smaller yet significant portion of the respondents, 14 respondents or 14.6%, have between 11 to 15 years of work experience. These employees bring extensive industry knowledge and are likely to offer valuable perspectives on the sustained impact of IT systems on inventory management performance. Their experience can shed light on the effectiveness of these technologies over a more extended period and their role in streamlining inventory operations.

Those with less than 1 year of experience comprise 10.4% of the respondents, with 10 respondents. This group, although the smallest, can provide fresh viewpoints on the onboarding process and initial challenges faced when new technologies are introduced. Their feedback can be critical in assessing the user-friendliness and immediate benefits of new IT systems from the perspective of recent entrants.

Lastly, respondents with more than 15 years of experience form the smallest segment, at 8.3%, totaling 8 participants. These veterans of the industry can offer insights into the historical context of inventory management practices and the transformative impact of technological advancements over the decades. Their long-term perspective is

valuable for understanding the evolution and sustained improvements in inventory management performance due to IT interventions.

4.4 Descriptive Statistics

4.4.1 ERP Software

Table 9: Effect of ERP Software

Question	SA		D		N		A		SA	
	Freq	Perc	Freq	Perc	Freq	Perc	Freq	Perc	Freq	Perc
1. ERP software has improved functional integration across business functions in their organization.	4	4.17%	8	8.33%	2	2.08%	40	41.67%	42	43.75%
2. ERP software has enhanced operational efficiency in their organization.	3	3.13%	10	10.42%	5	5.21%	44	45.83%	34	35.41%
3. Their organization has fully adopted ERP software in its operations.	5	5.21%	12	12.50%	5	5.21%	38	39.58%	36	37.50%
4. ERP software has positively affected the overall performance of their organization.	2	2.08%	6	6.25%	3	3.13%	50	52.08%	35	36.46%
5. Their organization has experienced improved decision-making as a result of implementing ERP software.	4	4.17%	8	8.33%	2	2.08%	42	43.75%	40	41.67%

Source: (Author, 2024)

The data presented in Table 4.6 illustrates the perceived effect of ERP (Enterprise Resource Planning) software on inventory management performance in the automotive industry within Nairobi County, Kenya.

A notable portion of the respondents strongly agrees with the statement that ERP software has improved functional integration across business functions in their organization, with 42 out of 96 respondents (43.750%) expressing this sentiment. This is closely followed by those who agree, constituting 41.667% (40 respondents). A small

percentage of respondents (2.083%, or 2 respondents) remain neutral. However, a combined 12.500% of respondents (12 respondents) either disagree (8.333%) or strongly disagree (4.167%) with the statement. This indicates a strong positive consensus that ERP software significantly enhances functional integration, though a minority of respondents do not share this view.

Regarding operational efficiency, 45.833% of respondents (44 respondents) agree that ERP software has led to enhancements in this area, while 35.412% (34 respondents) strongly agree. This demonstrates a clear majority perceiving a positive impact. On the other hand, 5.208% of respondents (5 respondents) are neutral, while a combined 13.542% (13 respondents) either disagree (10.417%) or strongly disagree (3.125%). The data reveals a predominantly favorable opinion towards the role of ERP software in boosting operational efficiency, despite some dissent.

In terms of full adoption of ERP software, 39.583% of respondents (38 respondents) agree that their organization has achieved this, and 37.500% (36 respondents) strongly agree. Neutral respondents and those who disagree each make up 5.208% (5 respondents each). Notably, 12.500% (12 respondents) strongly disagree with the statement. Although a significant majority (77.083%) affirm full adoption, the presence of a notable percentage who disagree indicates that there may be obstacles or areas within the organization where ERP adoption is not as robust.

A significant 52.083% of respondents (50 respondents) agree that ERP software has positively affected overall performance, with another 36.458% (35 respondents) strongly agreeing. This forms a compelling majority of 88.541% in agreement. Neutral opinions are held by 3.125% (3 respondents), while 6.250% (6 respondents) disagree and 2.083% (2 respondents) strongly disagree. The overwhelming agreement underscores the

positive impact of ERP software on organizational performance, with only a small fraction expressing reservations.

When it comes to decision-making improvements, 43.750% of respondents (42 respondents) agree that ERP software has facilitated better decision-making, and 41.667% (40 respondents) strongly agree. A small proportion, 2.083% (2 respondents), are neutral. In contrast, 8.333% (8 respondents) disagree and 4.167% (4 respondents) strongly disagree. This indicates that a substantial majority perceive enhanced decision-making capabilities due to ERP software, although some respondents have not observed these benefits.

The findings from the current study on the perceived effects of ERP software on inventory management performance in the automotive industry within Nairobi County, Kenya, exhibit consistency with the existing literature on the impact of ERP systems on inventory management across various industries and geographical locations. The present study echoes previous research in highlighting the positive influence of ERP software on functional integration, operational efficiency, full adoption, overall performance, and decision-making enhancements within organizational contexts (Smith & Johnson, 2018; Gupta & Sharma, 2019; Wang & Li, 2020; Smith & Johnson, 2019; Wang'ombe & Kiragu, 2018; Muriuki, Mugure, & Orwa, 2019). S

Specifically, both the current investigation and prior studies indicate that ERP software implementation leads to improved operational efficiency, better decision-making processes, and overall performance enhancements within their respective industry sectors. Although the geographical and industrial contexts vary across studies, the consistent positive findings underscore the generalizability of the benefits of ERP software across diverse organizational settings. However, the present study contributes

to filling the research gap identified in the literature by specifically focusing on the automotive industry within Nairobi County, Kenya, thereby providing valuable insights into this particular industry context.

4.4.2 Internet of Things

Table 10: Effect of Internet of Things

Question	SA		D		N		A		SA	
	Freq	Perc	Freq	Perc	Freq	Perc	Freq	Perc	Freq	Perc
1. The use of Internet of Things (IoT) technology has improved inventory management performance in the automotive industry.	2	2.08%	8	8.33%	5	5.21%	40	41.67%	41	42.71%
2. IoT technology has positively influenced the accuracy of stock levels in the automotive industry's inventory management.	1	1.04%	6	6.25%	7	7.29%	39	40.63%	43	44.79%
3. IoT technology has enhanced the efficiency of ordering processes within the automotive industry's inventory management.	3	3.13%	9	9.38%	3	3.13%	42	43.75%	39	40.63%
4. The implementation of IoT technology has reduced carrying costs associated with inventory management in the automotive industry.	4	4.17%	10	10.42%	8	8.33%	36	37.50%	38	39.58%
5. Overall, IoT technology has had a significant positive effect on inventory management performance within the automotive industry in Nairobi County.	2	2.08%	7	7.29%	4	4.17%	38	39.58%	45	46.875%

Source: (Author, 2024)

The data provided in Table 4.7 offers insights into the perceived impact of Internet of Things (IoT) technology on inventory management performance within the automotive industry in Nairobi County, Kenya. Across all questions, the respondents were asked to indicate their level of agreement on a scale from strongly agree (SA) to strongly disagree (SD), with neutral (N) as a midpoint option.

A significant majority of respondents agree that the use of IoT technology has improved inventory management performance, with 41 respondents (42.708%) strongly agreeing and 40 (41.667%) agreeing. Only a small fraction of the participants disagree, with 8 (8.333%) disagreeing and 2 (2.083%) strongly disagreeing. A minority of 5

respondents (5.208%) remain neutral. These figures suggest a strong positive consensus on the impact of IoT technology on inventory management performance.

The majority of the respondents also view IoT technology favorably in terms of its influence on the accuracy of stock levels. A combined 82 respondents (85.417%) either strongly agree (43, 44.792%) or agree (39, 40.625%) with this statement. On the other hand, 7 respondents (7.292%) are neutral, while a smaller group disagrees (6, 6.250%) or strongly disagrees (1, 1.042%). This distribution reflects a general agreement that IoT technology enhances stock level accuracy.

Similarly, IoT technology is perceived to enhance the efficiency of ordering processes, with 39 respondents (40.625%) strongly agreeing and 42 (43.750%) agreeing. Only a minor portion of respondents disagree (9, 9.375%) or strongly disagree (3, 3.125%), while another 3 (3.125%) remain neutral. The predominant agreement highlights the perceived benefits of IoT technology in streamlining ordering processes.

Respondents also believe that IoT technology has a positive impact on reducing carrying costs, with 38 (39.583%) strongly agreeing and 36 (37.500%) agreeing. A small number of respondents disagree (10, 10.417%) or strongly disagree (4, 4.167%), and 8 (8.333%) are neutral. These responses indicate a general consensus that IoT technology helps in reducing carrying costs, albeit with some dissenting opinions.

In the overall assessment, 45 respondents (46.875%) strongly agree and 38 (39.583%) agree that IoT technology has significantly improved inventory management performance. A small group disagrees (7, 7.292%) or strongly disagrees (2, 2.083%), while 4 respondents (4.167%) are neutral. This overall sentiment underscores a strong belief in the significant positive impact of IoT technology on inventory management performance in the automotive industry.

The findings from the data provided on the impact of IoT technology on inventory management performance within the automotive industry in Nairobi County, Kenya, align with several aspects of the literature reviewed. Firstly, both the literature and the data indicate a positive perception of IoT technology's influence on inventory management performance. In the Nairobi County automotive industry study, a significant majority of respondents agree that IoT technology has improved inventory management performance, reflecting a strong positive consensus. Similarly, studies by Kim and Chen (2019), Wang and Lee (2022), Gupta and Patel (2017), and Maina and Murugi (2023) all highlight the beneficial effects of IoT technologies on inventory management, emphasizing enhanced visibility, accuracy, and efficiency. Secondly, the Nairobi County automotive industry study, as well as the literature, recognizes some dissenting opinions or challenges associated with IoT adoption. While the majority opinion is favorable towards IoT technology in both the data and the literature, there are still minority viewpoints expressing concerns or facing obstacles such as regulatory issues and infrastructure limitations. Therefore, the findings from the Nairobi County automotive industry study are consistent with the broader literature in acknowledging both the benefits and challenges of IoT technology in inventory management within a specific regional context.

4.4.3 Barcoding Technology

Table 11: Role of Barcoding Technology

Question	SA		D		N		A		SA	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
1.Barcoding technology has improved inventory management accuracy in their organization.	2	2%	8	8%	1	1%	50	52%	35	36%
2.Barcoding technology has enhanced product traceability in their organization.	1	1%	7	7%	5	5%	45	47%	38	40%
3.Their organization has fully integrated barcoding technology into its workflows.	3	3%	12	13%	2	2%	40	42%	39	41%
4.Barcoding technology has positively affected supply chain visibility in their organization.	4	4%	6	6%	8	8%	55	57%	23	24%
5.Their organization has experienced improved operational performance as a result of implementing barcoding technology.	5	5%	9	9%	4	4%	48	50%	30	31%

Source: (Author, 2024)

Barcoding technology plays a crucial role in inventory management within the automotive industry in Nairobi County, Kenya, as evidenced by the responses gathered.

In the first statement regarding the improvement of inventory management accuracy due to barcoding technology, a significant majority of the respondents, constituting 52.083%, agreed with the statement. This indicates a strong positive

perception of barcoding technology's impact on inventory accuracy. Additionally, 36.458% of the respondents strongly agreed, further reinforcing the positive sentiment. However, a smaller fraction, 8.333%, disagreed, and an even smaller group, 2.083%, strongly disagreed, suggesting some level of skepticism or dissatisfaction among a minority. Only 1.041% of the respondents remained neutral, indicating that most participants had a definitive opinion on the matter.

The second statement focused on product traceability enhancements due to barcoding technology. Here, 46.875% of the respondents agreed, and 39.583% strongly agreed, showcasing a dominant positive viewpoint regarding barcoding's effectiveness in improving traceability. On the contrary, 7.292% disagreed and 1.042% strongly disagreed, indicating minimal dissent. A relatively small percentage, 5.208%, were neutral, which implies that while the majority appreciate the benefits of barcoding technology, a small segment either did not perceive any change or held reservations.

For the third statement about the full integration of barcoding technology into organizational workflows, 41.667% of the respondents agreed, and 40.625% strongly agreed. This near-equal split suggests a high level of integration and acceptance of barcoding technology within the organizations. Conversely, 12.500% disagreed, and 3.125% strongly disagreed, highlighting some existing challenges or resistance to full integration. Only 2.083% of the participants remained neutral, indicating that most respondents had a clear stance on the issue.

In response to the fourth statement regarding supply chain visibility, a significant 57.292% of the respondents agreed that barcoding technology positively impacted this aspect. Another 23.958% strongly agreed, collectively indicating a strong belief in the positive effects of barcoding on supply chain visibility. However, 6.250% disagreed, and

4.167% strongly disagreed, suggesting that some participants did not observe these benefits. The neutral response was 8.333%, higher than in other statements, possibly indicating some uncertainty or varied experiences with supply chain visibility improvements.

Lastly, regarding the improvement of operational performance due to barcoding technology, half of the respondents (50.000%) agreed with the statement, and 31.250% strongly agreed. This significant majority reflects a positive impact on operational performance attributed to barcoding. On the other hand, 9.375% disagreed, and 5.208% strongly disagreed, revealing some dissatisfaction or lack of perceived benefits among a minority. A small proportion, 4.167%, remained neutral, indicating that while most respondents saw clear operational improvements, a few did not share this view or had mixed experiences.

The findings from the study conducted in Nairobi County, Kenya, on the impact of barcoding technology on inventory management within the automotive industry exhibit consistency with several aspects of the existing literature. Firstly, akin to Tanaka et al. (2020), Li et al. (2021), Johnson et al. (2022), and Okafor et al. (2020), the study in Nairobi County indicates a positive perception regarding the influence of barcoding technology on inventory accuracy, operational performance, and supply chain visibility. This alignment is particularly evident in the responses concerning inventory accuracy, product traceability enhancements, full integration into organizational workflows, supply chain visibility, and operational performance improvements, where a majority of respondents expressed agreement or strong agreement with the positive impacts of barcoding technology.

However, there are discrepancies regarding the level of dissent or neutrality among respondents. While the Nairobi County automotive industry study indicates minimal dissent or neutrality in most cases, the literature, especially Mwaura and Gitau (2017), acknowledges some limitations and uncertainties associated with the impact of barcoding technology within the retail sector. Additionally, the existing literature highlights research gaps concerning factors impeding technology adoption and the need for further investigation into specific industry contexts, which the Nairobi County automotive industry study corroborates by addressing a specific industry (automotive) within a regional context. Therefore, while there is consistency in the positive perceptions of barcoding technology's impact on inventory management, nuances in dissent and contextual considerations underscore the importance of localized studies to supplement broader literature.

4.4.4 Forecasting Software

Table 12: Effect of Forecasting Software

Question	SA		D		N		A		SA	
	Freq	Perc	Freq	Perc	Freq	Perc	Freq	Perc	Freq	Perc
1.Forecasting software provides accurate demand forecasts in their organization.	4	4.17%	8	8.33%	1	1.04%	40	41.67%	43	44.79%
2.Forecasting software is effectively utilized in production planning in their organization.	6	6.25%	10	10.42%	2	2.08%	38	39.58%	40	41.67%
3.Their organization has fully adopted forecasting software in its operations.	8	8.33%	12	12.50%	8	8.33%	36	37.50%	32	33.33%
4.Forecasting software has positively effected resource allocation in their organization.	5	5.21%	9	9.38%	9	9.38%	41	42.71%	32	33.33%
5.Their organization has experienced improved operational efficiency as a result of implementing forecasting software.	4	4.17%	7	7.29%	5	5.21%	42	43.75%	38	39.583%

Source: (Author, 2024)

The data presented offers insights into the perceived impact of forecasting software on inventory management performance within the automotive industry in Nairobi County, Kenya. Among respondents, varying levels of agreement were expressed across different aspects related to the effectiveness and utilization of forecasting software.

In analyzing the first statement, it is evident that a significant majority of the respondents, representing 44.792%, strongly agree that forecasting software provides accurate demand forecasts in their organization. Additionally, 41.667% agree with this statement. This combined total of 86.459% indicates a strong consensus that the forecasting software is effective in providing accurate demand forecasts. Conversely,

only a small fraction, 8.333%, disagree, and an even smaller proportion, 4.167%, strongly disagree, highlighting that dissatisfaction with the software's accuracy is minimal. The neutral responses are minimal, at 1.041%, suggesting that most respondents have a definitive opinion on the effectiveness of the forecasting software.

For the second statement, a substantial portion of respondents, 41.667%, strongly agree that forecasting software is effectively utilized in production planning within their organization. Furthermore, 39.583% agree with this statement, leading to a significant majority of 81.25% affirming the effective use of the software in production planning. Meanwhile, 10.417% disagree and 6.250% strongly disagree, indicating that some respondents perceive issues with its utilization. The neutral stance, held by 2.083%, remains low, showing that the vast majority of respondents have a clear opinion on this matter.

In the third statement, 33.333% of the respondents strongly agree that their organization has fully adopted forecasting software in its operations, while 37.500% agree. Together, this results in a majority of 70.833% recognizing full adoption. However, 12.500% disagree and 8.333% strongly disagree, revealing that a notable minority feel that full adoption has not been achieved. An additional 8.333% remain neutral, suggesting a degree of uncertainty or variability in the adoption level across different parts of the organization.

Regarding the fourth statement, 33.333% of respondents strongly agree that forecasting software has positively affected resource allocation in their organization, with an additional 42.708% agreeing. This combined percentage of 76.041% indicates a strong positive perception of the software's impact on resource allocation. In contrast, 9.375% of respondents disagree and the same percentage strongly disagree, suggesting that a

minority view the software's impact less favorably. The neutral responses, also at 9.375%, indicate that some respondents are unsure about the software's effect on resource allocation.

Finally, in the fifth statement, 39.583% of respondents strongly agree that their organization has experienced improved operational efficiency due to the implementation of forecasting software. Additionally, 43.750% agree, culminating in a strong majority of 83.333% affirming this positive outcome. On the other hand, 7.292% disagree and 4.167% strongly disagree, indicating minimal dissent regarding the software's impact on operational efficiency. The neutral stance, at 5.208%, suggests that only a small portion of respondents are uncertain about the improvements in operational efficiency attributable to the forecasting software.

The findings from the analysis of perceived impacts of forecasting software on inventory management performance within the automotive industry in Nairobi County, Kenya, exhibit consistency with existing literature on the subject. Similar to Schmidt et al. (2019), Suzuki and Tanaka (2020), Li and Wu (2018), Doe (2021), and Njogu and Kariuki (2019), the study highlights a positive perception among respondents regarding the effectiveness of forecasting software in improving various aspects of inventory management performance, including demand forecasting accuracy, production planning, full adoption within organizations, resource allocation, and operational efficiency. The high percentages of agreement among respondents regarding the accuracy of demand forecasts, effective utilization in production planning, full adoption within organizations, positive impact on resource allocation, and improved operational efficiency align with the findings of previous research conducted in diverse geographical and sectoral contexts.

However, similar to Suzuki and Tanaka (2020), Doe (2021), and Njogu and Kariuki (2019), the study acknowledges the existence of dissenting views and research gaps, particularly concerning the enduring ramifications, contextual factors, and specific challenges associated with forecasting software implementation and utilization within the automotive industry in Nairobi County, Kenya. Thus, while the findings are largely consistent with the existing literature, they also underscore the need for further research to address these gaps and provide a more comprehensive understanding of the effects of forecasting software in the automotive sector in specific geographic contexts like Nairobi County, Kenya.

4.4.5 Inventory Management Performance

Table 13: Inventory Management Performance

Question	SA		D		N		A		SA	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
1. Information technology tools (IT) solutions have contributed to better inventory management performance in the automotive industry.	2	2.08%	5	5.21%	5	5.21%	45	46.88%	39	40.63%
2. IT has played a key role in optimizing stock levels within the automotive industry's inventory management.	3	3.13%	6	6.25%	4	4.17%	50	52.08%	33	34.38%
3. The use of IT has streamlined the process of ordering inventory items in the automotive industry.	1	1.04%	4	4.17%	3	3.13%	47	48.96%	41	42.71%
4. IT solutions have effectively reduced the carrying costs associated with inventory management in the automotive sector.	2	2.08%	7	7.29%	2	2.08%	42	43.75%	43	44.79%
5. Information technology tools (IT) had a positive effect on inventory management performance in the automotive industry in Nairobi County?	0	0.00%	3	3.13%	1	1.04%	48	50.00%	44	45.83%

Source: (Author, 2024)

The data presented in Table 4.10 provides insights into the perceived impact of information technology tools (IT) on inventory management performance within the automotive industry in Nairobi County, Kenya, based on different aspects of inventory management.

The analysis reveals that the majority of respondents acknowledge the positive impact of IT solutions on inventory management performance. Specifically, 45 respondents (46.875%) agreed with the statement, while 39 respondents (40.625%) strongly agreed. This indicates a strong consensus that IT solutions are beneficial. On the other hand, a small fraction of respondents were less positive: 5 respondents (5.208%) were neutral, another 5 respondents (5.208%) disagreed, and 2 respondents (2.083%) strongly disagreed, highlighting a minor proportion of dissent.

If IT has played a key role in optimizing stock levels within the automotive industry's inventory management. For this statement, the agreement is slightly less strong but still predominant. Here, 50 respondents (52.083%) agreed that IT is crucial in optimizing stock levels, and 33 respondents (34.375%) strongly agreed. Conversely, 4 respondents (4.167%) remained neutral, while 6 respondents (6.250%) disagreed, and 3 respondents (3.125%) strongly disagreed. This distribution suggests that while most recognize the importance of IT in stock optimization, there is slightly more variability in responses compared to the first statement.

A significant proportion of respondents (47 respondents or 48.958%) agreed that IT has streamlined the ordering process, and 41 respondents (42.708%) strongly agreed, forming a majority view that IT is beneficial in this area. In contrast, a small number of respondents were neutral (3 respondents or 3.125%), disagreed (4 respondents or

4.167%), or strongly disagreed (1 respondent or 1.042%). This strong positive response underscores the efficiency gains perceived from IT in ordering processes.

The responses indicate a general agreement that IT solutions reduce carrying costs, with 42 respondents (43.750%) agreeing and 43 respondents (44.792%) strongly agreeing. A minority expressed neutrality (2 respondents or 2.083%), disagreement (7 respondents or 7.292%), or strong disagreement (2 respondents or 2.083%). This reflects a broad consensus on the cost-saving benefits of IT, though with slightly higher disagreement levels compared to other statements.

Information technology tools (IT) had a positive effect on inventory management performance in the automotive industry in Nairobi County. This statement received the highest levels of agreement, with 48 respondents (50.000%) agreeing and 44 respondents (45.833%) strongly agreeing, indicating an overwhelming recognition of IT's positive effect on inventory management performance. Very few respondents were neutral (1 respondent or 1.042%) or disagreed (3 respondents or 3.125%). This suggests a strong endorsement of IT's role in enhancing inventory management within the local automotive industry.

The findings presented in the literature review are largely consistent with the results obtained from the study on the impact of information technology tools (IT) on inventory management performance within the automotive industry in Nairobi County, Kenya. Schmidt et al. (2018) discovered a significant positive effect of Enterprise Resource Planning (ERP) software on inventory management performance in the manufacturing sector, which aligns with the consensus among respondents regarding the positive impact of IT solutions on various aspects of inventory management in the automotive industry. Similarly, Wang et al. (2020) found favorable outcomes from the

utilization of barcoding technology in inventory management within the logistics industry in China, which parallels the perceived benefits of IT solutions, including streamlined ordering processes and reduced carrying costs, in the Nairobi County automotive industry.

Furthermore, the research by Appiah, Mensah, and Mireku (2019) in Ghana and Ndungu et al. (2018) in Kenya both highlight the positive relationship between the adoption of IT systems, such as ERP software, and improved inventory management performance, echoing the overwhelming recognition of IT's positive effect on inventory management performance in Nairobi County's automotive industry. However, some differences exist, such as the specific focus on ERP software in the Kenyan study compared to the broader examination of various IT tools in other research, suggesting a potential research gap in exploring alternative IT technologies beyond ERP software. Overall, while nuances exist, the findings from the Nairobi County automotive industry study largely support and align with the broader literature on the positive impact of IT on inventory management performance across different industries and geographical regions.

4.5 Diagnostic Tests

In the context of diagnostic tests in this research, it is crucial to ensure the validity and reliability of statistical analyses. Normality tests assess whether the data follows a normal distribution, which is essential for certain statistical techniques to be valid. Multicollinearity tests examine the degree of relationship among independent variables, aiming to avoid issues of collinearity that can distort the results of regression analysis. Heteroscedasticity tests, on the other hand, determine whether the variance of errors in a regression model is consistent across all levels of the independent variables, as violating this assumption can lead to biased parameter estimates. These diagnostic tests are

fundamental for assessing the robustness and accuracy of statistical models and are particularly relevant in studies such as the one proposed, where precise estimation of the effects of information technology tools on inventory management performance is paramount.

Table 1: Normality Test

Variable	Shapiro-Wilk Statistic	Degrees of Freedom (df)	p-value (Sig.)
ERP Software	.956	1	.102
Internet of Things	.934	1	.245
Barcoding Technology	.978	1	.301
Forecasting Software	.921	1	.098

Source: (Author, 2024)

The normality test is a fundamental step in statistical analysis, helping determine whether the data follows a normal distribution. For this study, the Shapiro-Wilk test was utilized to assess the normality of various variables associated with inventory management performance in the automotive industry in Nairobi County, Kenya. The results of the Shapiro-Wilk test for each variable are summarized in Table 17.

The Shapiro-Wilk statistic for ERP Software is 0.956 with a p-value of 0.102. Since the p-value is greater than the conventional alpha level of 0.05, we fail to reject the null hypothesis that the data is normally distributed. This indicates that the distribution of data for ERP software usage in inventory management is not significantly different from a normal distribution.

For the Internet of Things, the Shapiro-Wilk statistic is 0.934 and the p-value is 0.245. Similar to ERP software, the p-value is greater than 0.05, suggesting that we do not reject the null hypothesis of normality. Therefore, the data concerning the use of IoT in inventory management appears to follow a normal distribution.

Barcoding Technology has a Shapiro-Wilk statistic of 0.978 and a p-value of 0.301. Again, the p-value exceeds 0.05, indicating no significant deviation from normality. The normal distribution assumption holds for the barcoding technology variable, implying that the data for barcoding technology in inventory management is normally distributed.

The Shapiro-Wilk statistic for Forecasting Software is 0.921 with a p-value of 0.098. Despite the statistic being slightly lower than the others, the p-value is still above 0.05, which means we cannot reject the null hypothesis of normality. Thus, the distribution of forecasting software data can be considered normal.

The Shapiro-Wilk normality test results indicate that all the independent variables under study—ERP Software, Internet of Things, Barcoding Technology, and Forecasting Software do not significantly deviate from a normal distribution. This conclusion is crucial as it validates the assumption of normality, which is often a prerequisite for many parametric statistical tests. The normality of these variables suggests that subsequent analyses, such as regression analysis or ANOVA, can be reliably performed under the assumption of normality, enhancing the robustness and validity of the study's findings.

Table 2: Multicollinearity Test

Independent Variable	VIF Value	Tolerance Value
ERP Software	2.10	.476
Internet of Things	1.85	.541
Barcoding Technology	1.92	.521
Forecasting Software	2.30	.435

Source: (Author, 2024)

Multicollinearity refers to the situation in which two or more independent variables in a regression model are highly correlated, making it difficult to isolate the individual effect of each variable on the dependent variable. It is crucial to detect and address multicollinearity because it can inflate the standard errors of the coefficients, leading to unreliable and unstable estimates. Two common metrics to assess multicollinearity are the Variance Inflation Factor (VIF) and the Tolerance Value.

The VIF value for ERP software is 2.10, and the corresponding Tolerance value is 0.476. A VIF value greater than 10 typically indicates significant multicollinearity, but in this case, the VIF value of 2.10 suggests that there is no severe multicollinearity issue for ERP software. The Tolerance value, which is the reciprocal of the VIF ($1/VIF$), confirms this finding as a Tolerance value closer to 1 indicates less multicollinearity. Here, a Tolerance value of 0.476 further supports the notion that multicollinearity is not a serious concern for this variable.

For the Internet of Things (IoT), the VIF value is 1.85, and the Tolerance value is 0.541. These values suggest a low level of multicollinearity. The VIF value is well below the threshold of 10, indicating that IoT does not suffer from problematic multicollinearity. The Tolerance value of 0.541, being above 0.2, also corroborates this

finding, showing that the IoT variable can be reliably included in the regression model without significant multicollinearity concerns.

The VIF value for Barcoding Technology is 1.92, with a Tolerance value of 0.521. Similar to the previous variables, these values indicate that multicollinearity is not a major issue. The VIF value is below 10, suggesting that the inclusion of Barcoding Technology in the regression model is unlikely to cause substantial multicollinearity problems. Additionally, the Tolerance value of 0.521 is sufficiently high, reinforcing the conclusion that Barcoding Technology can be independently evaluated in the context of its impact on inventory management performance.

Forecasting Software has a VIF value of 2.30 and a Tolerance value of 0.435. While this VIF value is slightly higher than those of the other variables, it still falls well below the threshold of 10, indicating that there is no severe multicollinearity issue. The Tolerance value of 0.435, though lower than those for the other variables, is still above 0.2, suggesting that Forecasting Software can be included in the regression analysis without significant multicollinearity concerns. However, its slightly higher VIF and lower Tolerance value do imply that it is more closely related to the other independent variables compared to ERP software, IoT, and Barcoding Technology.

The VIF and Tolerance values presented in the Multicollinearity Test Table indicate that none of the independent variables exhibit severe multicollinearity. The values for ERP Software, Internet of Things, Barcoding Technology, and Forecasting Software are all within acceptable ranges, allowing for reliable regression analysis. This suggests that the study can confidently proceed with these variables to examine their effects on inventory management performance in the automotive industry in Nairobi County, Kenya.

Table 3: Heteroscedasticity Test

Response Variable	Chi-Square	Probability
	Statistic	(Prob>Chi2)
Inventory Management Performance	12.46	.002

Source: (Author, 2024)

The heteroscedasticity test results in Table 19 indicate a Chi-Square statistic of 12.46 with a corresponding p-value of 0.002. This low p-value, which is less than the conventional significance level of 0.05, suggests that there is significant evidence to reject the null hypothesis of homoscedasticity. Therefore, we conclude that heteroscedasticity is present in the dataset concerning inventory management performance in the automotive industry in Nairobi County, Kenya. This implies that the variability in the errors is not constant across observations, which could affect the reliability of regression analyses and necessitates the use of robust standard errors or other remedial measures to ensure accurate model estimations.

4.6 Regression Analysis

Regression analysis is a statistical method used to examine the relationship between one dependent variable and one or more independent variables. In the context of this study on the effect of information technology tools on inventory management performance in the automotive industry in Nairobi County, Kenya, regression analysis was employed to assess the impact of various IT tools on inventory management. The regression model summary provides an overview of the model's goodness-of-fit, including metrics such as R-squared and adjusted R-squared, indicating the proportion of variance in the dependent variable explained by the independent variables. ANOVA (Analysis of Variance)

assesses the overall significance of the regression model by comparing the variance explained by the model to the residual variance. Coefficients in the regression equation represent the estimated effects of each independent variable on the dependent variable, indicating the magnitude and direction of their impact.

Table 17: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.850	.723	.715	2.533

Source: (Author, 2024)

The regression model summary indicates a strong relationship between the independent variables (ERP software, Internet of Things, barcoding technology, and forecasting software) and the dependent variable (inventory management performance) in the automotive industry in Nairobi County, Kenya. The R value of 0.850 suggests a high relationship, while the R Square value of 0.723 implies that approximately 72.3% of the variance in inventory management performance can be explained by the model. The Adjusted R Square value of 0.715, which accounts for the number of predictors in the model, confirms the robustness and reliability of these results. The standard error of the estimate, at 2.533, indicates the average distance that the observed values fall from the regression line, suggesting a relatively good fit of the model to the data.

Table 18: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1234.567	4	308.642	48.251	.000
Residual	473.432	91	5.202		
Total	1708.000	95			

Source: (Author, 2024)

The ANOVA table indicates a highly significant regression model ($p < .001$) for analyzing the effect of information technology tools on inventory management performance in the automotive industry in Nairobi County, Kenya. The regression sum of squares (1234.567) is substantially larger than the residual sum of squares (473.432), suggesting that the model explains a significant portion of the variability in inventory management performance. With an F-value of 48.251 and a mean square regression of 308.642, the results demonstrate that the independent variables (ERP software, Internet of Things, barcoding technology, and forecasting software) collectively have a strong and statistically significant impact on the dependent variable. This implies that the implementation of these information technologies can significantly enhance inventory management performance in the automotive industry within this region.

Table 19:**Coefficients**

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
(Constant)	5.432	1.203		.002
ERP Software	.321	.120	.356	.017
Internet of Things	.487	.130	.453	.000
Barcoding Technology	.214	.105	.198	.000
Forecasting Software	.267	.118	.278	.002

Source: (Author, 2024)

The provided coefficients table presents the results of a multiple regression analysis aimed at determining the effect of various information technology tools components on inventory management performance in the automotive industry in Nairobi County, Kenya. The independent variables in the model are ERP software, Internet of Things (IoT), barcoding technology, and forecasting software. The Multiple Regression Model was as follows:

$$Y_i = 5.432 + 0.321X_1 + 0.487X_2 + 0.214X_3 + 0.267X_4$$

The constant term (intercept), denoted by β_0 , has a value of 5.432 with a standard error of 1.203 and a significance level (Sig.) of 0.002. This indicates that when all the independent variables (ERP software, IoT, barcoding technology, and forecasting software) are held at zero, the baseline level of inventory management performance is 5.432 units. The low p-value (0.002) suggests that the constant term is statistically significant, meaning it significantly differs from zero.

ERP software has an unstandardized coefficient (β_1) of 0.321 with a standard error of 0.120, a standardized coefficient (Beta) of 0.356, and a significance level of 0.017. This implies that a one-unit increase in the ERP software score is associated with a 0.321 unit increase in inventory management performance, holding other variables constant. The standardized coefficient indicates that ERP software has a moderately strong positive impact on inventory management performance. The p-value (0.017) indicates that this relationship is statistically significant.

The coefficient for IoT (β_2) is 0.487 with a standard error of 0.130, a standardized coefficient (Beta) of 0.453, and a significance level of 0.000. This suggests that a one-unit increase in IoT implementation is associated with a 0.487 unit increase in inventory management performance, holding other variables constant. The high Beta value indicates that IoT has the strongest positive impact among the variables studied. The very low p-value (0.000) confirms that this effect is statistically significant.

Barcoding technology has an unstandardized coefficient (β_3) of 0.214 with a standard error of 0.105, a standardized coefficient (Beta) of 0.198, and a significance level of 0.000. This means that a one-unit increase in the barcoding technology score is associated with a 0.214 unit increase in inventory management performance, holding other variables constant. The Beta value suggests that barcoding technology has a

positive, albeit smaller, impact on inventory management performance compared to ERP software and IoT. The significance level indicates that this effect is also statistically significant.

The coefficient for forecasting software (β_4) is 0.267 with a standard error of 0.118, a standardized coefficient (Beta) of 0.278, and a significance level of 0.002. This indicates that a one-unit increase in forecasting software usage is associated with a 0.267 unit increase in inventory management performance, holding other variables constant. The standardized coefficient shows that forecasting software has a moderate positive effect on inventory management performance. The p-value (0.002) signifies that this relationship is statistically significant.

The multiple regression model reveals that all four independent variables—ERP software, IoT, barcoding technology, and forecasting software—positively and significantly affect inventory management performance in the automotive industry in Nairobi County, Kenya. The Internet of Things (IoT) stands out as having the most substantial positive impact, followed by ERP software, forecasting software, and barcoding technology. Each of these technologies contributes to improving inventory management performance, highlighting the critical role of information technology tools in this sector.

CHAPTER FIVE

5.0 SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter discussed the summary of findings, conclusions and recommendations based on the findings given in chapter four.

5.2 Summary of Findings

5.2.1 ERP Software

The analysis of inventory management performance in the automotive industry within Nairobi County, Kenya, reveals several key findings. Firstly, the regression analysis indicates a strong relationship between ERP software, Internet of Things (IoT), barcoding technology, forecasting software, and inventory management performance. The high R Square value of 0.723 suggests that approximately 72.3% of the variance in inventory management performance can be explained by the model, indicating a robust predictive capability. The coefficients of the independent variables demonstrate their positive and statistically significant impact on inventory management performance, with IoT exhibiting the strongest influence, followed by ERP software, forecasting software, and barcoding technology.

Secondly, diagnostic tests ensure the validity and reliability of the statistical analyses conducted. The normality test results indicate that all independent variables—ERP software, IoT, barcoding technology, and forecasting software—do not significantly deviate from a normal distribution, validating the assumption of normality for subsequent analyses. Multicollinearity tests reveal that none of the independent variables exhibit

severe multicollinearity, allowing for reliable regression analysis. The findings suggest that the implementation of ERP software, IoT, barcoding technology, and forecasting software positively influences inventory management performance in the automotive industry within Nairobi County, Kenya. These technologies contribute to improved functional integration, operational efficiency, decision-making processes, and overall organizational performance, highlighting the critical role of information technology tools in enhancing inventory management practices.

Thirdly, the ANOVA results confirm the significance of the regression model, with a highly significant F-value (48.251) and a p-value less than 0.001. This indicates that the collective impact of ERP software, IoT, barcoding technology, and forecasting software significantly affects inventory management performance in the automotive industry in Nairobi County, Kenya. The substantial difference between the regression sum of squares and residual sum of squares further supports the conclusion that the model explains a significant portion of the variability in inventory management performance.

The findings of the present study, indicating that ERP software positively influences inventory management performance in the automotive industry within Nairobi County, Kenya, align with prior empirical evidence. For instance, Smith and Johnson (2018) found that ERP software enhances inventory management efficiency, communication, and customer satisfaction in the manufacturing sector in Germany, while Gupta and Sharma (2019) similarly observed significant improvements in inventory management in India's retail sector. Wang and Li's (2020) study on China's manufacturing industry further supports the positive impact of ERP software on cost reduction, productivity, and decision-making. Thus, the results of the current analysis are consistent with these earlier studies, despite variations in industry and geographical

contexts, emphasizing the universal benefits of ERP software on inventory management across sectors and regions. However, the current study fills a notable gap by focusing on the automotive industry in Kenya, which was previously underexplored in the literature.

5.2.2 Internet of Things

The data analysis reveals a strong consensus among respondents regarding the positive impact of Internet of Things (IoT) technology on inventory management performance within the automotive industry in Nairobi County, Kenya. Across various aspects such as overall improvement, accuracy of stock levels, efficiency of ordering processes, and reduction of carrying costs, a significant majority of respondents expressed agreement, either strongly agreeing or agreeing with the statements related to IoT's positive influence. Furthermore, regression analysis corroborates these perceptions, with IoT standing out as the variable with the most substantial positive impact on inventory management performance, as indicated by its high coefficient, standardized coefficient, and statistical significance.

Diagnostic tests ensure the validity and reliability of the statistical analyses, validating the findings regarding IoT's impact on inventory management performance. Normality tests confirm that the data related to IoT and other independent variables do not significantly deviate from a normal distribution, enhancing the reliability of subsequent analyses. Multicollinearity tests demonstrate that IoT, along with other variables, does not suffer from severe multicollinearity issues, indicating that it can be reliably evaluated in the regression model.

The regression model summary underscores the robust relationship between IoT technology and inventory management performance, with an R Square value of 0.723 indicating that approximately 72.3% of the variance in inventory management

performance can be explained by the model. Moreover, the ANOVA table demonstrates a highly significant regression model, suggesting that the collective impact of independent variables, including IoT, ERP software, barcoding technology, and forecasting software, significantly influences inventory management performance in the automotive industry in Nairobi County, Kenya. The coefficients table further confirms IoT's significance, showing a strong positive association between IoT implementation and inventory management performance. These statistical analyses provide empirical support for the perceived benefits of IoT technology as indicated by the survey responses.

The empirical evidence from the analysis of IoT technology in the automotive industry in Nairobi County, Kenya, strongly supports the findings of the reviewed studies. Similar to Kim and Chen (2019) and Wang and Lee (2022), the respondents in Nairobi County reported a positive influence of IoT on key aspects of inventory management, including accuracy, efficiency, and cost reduction. The regression analysis also mirrors the global trends noted by Gupta and Patel (2017) and Maina and Murugi (2023), showing IoT's significant impact on inventory optimization. However, the challenges related to infrastructure and regulatory barriers noted in Sub-Saharan Africa (Ateyero et al., 2016) and Kenya (Maina & Murugi, 2023) align with findings on the need for tailored strategies for successful IoT implementation. Thus, the empirical results from Nairobi agree with the broader global and regional observations, confirming IoT's transformative role in inventory management across industries.

5.2.3 Barcoding Technology

The data analysis reveals compelling insights into the role of barcoding technology within the automotive industry in Nairobi County, Kenya, particularly concerning the Internet of Things (IoT). Regression analysis indicates a strong positive relationship

between IoT and inventory management performance, with IoT demonstrating the most substantial impact among the independent variables studied. The coefficient for barcoding technology, while positive and statistically significant, is comparatively smaller than that of IoT but still contributes positively to inventory management performance. These findings underscore the importance of incorporating IoT and barcoding technology into organizational workflows for enhancing inventory accuracy, product traceability, supply chain visibility, and operational performance.

Furthermore, diagnostic tests confirm the reliability and robustness of the regression model. The normality test results validate the assumption of normality for variables related to IoT and barcoding technology, ensuring the validity of subsequent analyses. Multicollinearity tests reveal no severe multicollinearity issues among the independent variables, including barcoding technology, indicating their independent contributions to inventory management performance.

The analysis highlights the significant positive impact of barcoding technology, particularly within the framework of IoT, on inventory management performance in the automotive industry in Nairobi County, Kenya. While barcoding technology contributes to improvements in inventory accuracy, product traceability, supply chain visibility, and operational performance, its efficacy is most pronounced when integrated with IoT. The findings underscore the critical role of information technologies in driving efficiency and effectiveness in inventory management processes, emphasizing the need for continued investment and adoption in this sector to maintain competitiveness and meet evolving customer demands.

The empirical evidence provided supports the findings from previous studies regarding the positive effect of barcoding technology on inventory management

performance. Studies by Tanaka et al. (2020), Li et al. (2021), Johnson et al. (2022), and Okafor et al. (2020) all reported significant improvements in inventory accuracy, operational efficiency, and customer satisfaction across various industries due to the adoption of barcoding technology. Similarly, the current analysis in Nairobi County's automotive industry reveals a statistically significant positive relationship between barcoding technology and inventory management performance, particularly in enhancing inventory accuracy, product traceability, and operational efficiency. Additionally, the integration of IoT was found to amplify the benefits of barcoding technology, highlighting the role of advanced technologies in improving supply chain visibility and operational performance. Both the current and previous findings consistently show the value of barcoding technology in optimizing inventory management across different sectors (Tanaka et al., 2020; Li et al., 2021; Johnson et al., 2022; Okafor et al., 2020).

5.2.4 Forecasting Software

The analysis of the impact of forecasting software on inventory management performance within the automotive industry in Nairobi County, Kenya reveals several key findings. Firstly, the majority of respondents strongly agree or agree that forecasting software provides accurate demand forecasts, effectively utilized in production planning, and has been fully adopted within their organizations. This indicates a high level of satisfaction and utilization of forecasting software for enhancing various aspects of inventory management.

Diagnostic tests ensure the validity and reliability of the statistical analysis. Normality tests confirm that the data associated with forecasting software does not significantly deviate from a normal distribution, validating subsequent analyses.

Multicollinearity tests reveal no severe multicollinearity issues for forecasting software, indicating its independence in influencing inventory management performance.

Regression analysis corroborates these findings by demonstrating a strong positive relationship between forecasting software and inventory management performance. The regression model summary reveals a high relationship ($R = 0.850$) and a substantial proportion of the variance in inventory management performance explained by the model ($R \text{ Square} = 0.723$). Additionally, the coefficients table indicates that forecasting software has a statistically significant impact ($p = 0.002$) on inventory management performance, with a moderate positive effect ($\text{Beta} = 0.278$).

The empirical evidence provided from the study conducted in Nairobi County aligns with the findings of previous studies, demonstrating a strong positive relationship between forecasting software and inventory management performance across various sectors. Schmidt et al. (2019), Suzuki and Tanaka (2020), and Li and Wu (2018) all found that forecasting software enhances operational efficiency, customer satisfaction, and inventory management in the automotive sector, which is supported by the Nairobi study's results showing a significant impact ($R = 0.850$) and high adoption levels. Furthermore, Mensah et al. (2020) and Doe (2021) highlighted the role of forecasting software in optimizing inventory performance in different industries, similar to the Nairobi findings. The regression analysis confirms these results by revealing a statistically significant relationship between forecasting software and inventory performance ($p = 0.002$), corroborating the previous studies' conclusions. Thus, the Nairobi study agrees with the existing body of research on the beneficial influence of forecasting software on inventory management.

5.2.5 Inventory Management Performance

The analysis of inventory management performance within the automotive industry in Nairobi County, Kenya, reveals several key findings. Firstly, the majority of respondents perceive information technology tools (IT) solutions positively impacting various aspects of inventory management, including optimizing stock levels, streamlining ordering processes, and reducing carrying costs. These findings are consistent with prior research, indicating a broad consensus on the beneficial effects of IT on inventory management performance. Additionally, regression analysis confirms a strong relationship between IT components (ERP software, Internet of Things, barcoding technology, and forecasting software) and inventory management performance, with the Internet of Things showing the most substantial positive impact.

Diagnostic tests ensure the reliability and validity of the statistical analyses. Normality tests confirm that the data for IT components do not significantly deviate from a normal distribution, validating subsequent analyses' assumptions. Multicollinearity tests indicate no severe multicollinearity issues among independent variables, supporting the reliability of the regression model. Overall, the findings highlight the significant positive impact of IT on inventory management performance in the automotive industry in Nairobi County, Kenya, with implications for improving operational efficiency and cost-effectiveness.

Regression analysis provides further insights into the relationship between IT components and inventory management performance. The high R value and significant F-statistic indicate a robust model, explaining approximately 72.3% of the variance in inventory management performance. Coefficients for ERP software, Internet of Things, barcoding technology, and forecasting software demonstrate their positive and

statistically significant impacts on inventory management performance. These results underscore the critical role of IT in enhancing inventory management within the automotive industry in Nairobi County, Kenya.

The findings from the analysis of inventory management performance within the automotive industry in Nairobi County, Kenya, are consistent with several empirical studies. For example, Schmidt et al. (2018) emphasized the positive effect of ERP software on inventory management performance, aligning with the Nairobi study's findings that ERP systems enhance operational efficiency and cost reduction. Similarly, the study by Wang et al. (2020) on barcoding technology improving supply chain visibility and operational efficiency mirrors the significant impact of IT tools, including barcoding technology, in Nairobi. Additionally, Gonzalez and Rodriguez's (2018) research on IoT in inventory management corroborates the Nairobi study's findings, where IoT had the most substantial positive impact. These studies collectively affirm that IT tools, including ERP, IoT, and barcoding, significantly enhance inventory management, reinforcing the Nairobi findings on the critical role of IT in improving operational efficiency and cost-effectiveness.

5.3 Conclusion

The analysis demonstrates a strong relationship between ERP software, IoT, barcoding technology, forecasting software, and inventory management performance in Nairobi County's automotive industry. The regression analysis indicates a robust predictive capability, with approximately 72.3% of the variability in inventory management performance explained by the model. ERP software, along with other technologies, positively influences inventory management, leading to improved functional integration, operational efficiency, and decision-making processes.

Respondents and statistical analyses align in highlighting IoT's positive impact on inventory management performance. The data analysis and regression model underscore IoT's substantial influence, with a high coefficient and statistical significance. The findings suggest that IoT contributes significantly to improving inventory accuracy, efficiency in ordering processes, and reduction of carrying costs, reflecting its critical role in enhancing overall inventory management performance.

Barcoding technology, particularly when integrated with IoT, plays a significant role in improving inventory accuracy, product traceability, and supply chain visibility within Nairobi County's automotive industry. While its impact is slightly smaller compared to IoT, regression analysis confirms its positive relationship with inventory management performance. The findings emphasize the importance of integrating barcoding technology with other IT solutions for optimal outcomes in inventory management processes.

The analysis reveals a strong positive relationship between forecasting software and inventory management performance. Respondents express high satisfaction and utilization of forecasting software, which aligns with the statistical findings indicating its significant impact on inventory management. The regression model explains a substantial proportion of the variance in inventory management performance, emphasizing the importance of accurate demand forecasts in enhancing inventory management processes.

The analysis underscores the positive impact of IT solutions, including ERP software, IoT, barcoding technology, and forecasting software, on inventory management performance within Nairobi County's automotive industry. Respondents perceive these technologies positively, and statistical analyses validate their significant contributions. The findings highlight the critical role of IT in driving efficiency,

effectiveness, and cost-effectiveness in inventory management processes, emphasizing the need for continued investment and adoption in this sector to maintain competitiveness and meet evolving customer demands.

5.4 Recommendations of the Study

Based on the study findings the following recommendations were made as follows:

Given the significant relationship between ERP software and improved inventory management performance in Nairobi County's automotive industry, it is recommended that companies prioritize the adoption and integration of comprehensive ERP systems. These systems should be selected based on their ability to seamlessly integrate with other technologies like IoT, barcoding, and forecasting software. Implementing robust ERP software can enhance functional integration, operational efficiency, and decision-making processes. Training and support should be provided to ensure that staff can fully utilize the ERP system's capabilities, leading to more streamlined operations and better inventory control.

The analysis highlights the substantial impact of IoT on inventory management performance, emphasizing the need for automotive companies in Nairobi County to invest in IoT solutions. IoT technology can significantly improve inventory accuracy, optimize ordering processes, and reduce carrying costs by providing real-time data and insights. Companies should explore IoT applications such as smart sensors, RFID tags, and automated inventory tracking systems. By integrating IoT technology, businesses can achieve higher efficiency and accuracy in their inventory management processes, ultimately leading to cost savings and improved customer satisfaction.

Barcoding technology plays a crucial role in enhancing inventory accuracy, product traceability, and supply chain visibility. While its impact is slightly less pronounced compared to IoT, it remains a vital component of an effective inventory management system. Automotive companies in Nairobi County should integrate barcoding solutions with their existing IT infrastructure to maximize the benefits. Implementing barcoding technology can reduce human errors, speed up inventory tracking, and improve overall supply chain management. This integration should be supported by training programs to ensure that employees can effectively use barcoding systems in conjunction with other technologies.

The positive relationship between forecasting software and inventory management performance underscores the importance of accurate demand forecasting in the automotive industry. Companies should invest in advanced forecasting software that utilizes historical data, market trends, and predictive analytics to improve inventory planning. Effective forecasting software can help businesses anticipate demand fluctuations, reduce stock-outs, and minimize excess inventory. By leveraging these tools, companies can enhance their inventory management processes, leading to better alignment with market demands and increased operational efficiency.

5.5 Limitations of the Study

Throughout the data collection phase of this research endeavour, it was important to acknowledge the potential emergence of various limitations that potentially effect the findings and generalizability of the study. One potential constraint pertains to the size of the sample and its representativeness. The study was restricted to a specific subset of the automotive industry in Nairobi County, Kenya, namely Isuzu East Africa Limited, Car & General Kenya Ltd, and CFAO Motors Limited, due to limitations in time and

resources. Hence, it was important to note that the results obtained from this study may not possess generalizability to the entirety of the automotive sector or to different geographic regions. One potential approach to mitigating this constraint involves explicitly acknowledging the precise scope and context of the investigation within the research document.

Another possible constraint was the dependence on data that was self-reported. The research entailed the collection of data through subjective methods such as surveys or interviews. The accuracy and reliability of the collected data was influenced by respondents' perceptions, recall bias, and social desirability. In order to address this constraint, suitable strategies were employed, including the maintenance of anonymity and confidentiality, utilization of standardized questionnaires, and engagement of interviewers who had received proper training.

The study encountered a dearth of information concerning the historical utilization of information technology tools by automotive organizations. Consequently, disparities in outcomes raised following the assessment of the effects associated with the utilization of technology as compared to scenarios where technology had not yet been implemented. To address the research objective, the study involved the participation of multiple respondents from automotive companies. The collected data were subsequently underwent analysis to ascertain the response that was most precise and reliable.

Furthermore, the research faced obstacles pertaining to the validation and verification of data. The degree of accuracy and comprehensiveness of the gathered data was contingent upon the participants' inclination and capacity to furnish dependable information. In order to mitigate this constraint, the study considered integrating

methodologies such as cross-referencing participant responses with supplementary data sources.

5.6 Areas for Further Study

Further research in this area could explore the comparative effectiveness of different ERP systems and their integration with IoT, barcoding, and forecasting technologies in various segments of the automotive industry in Nairobi County. Additionally, investigating the barriers to the adoption of these technologies, such as cost, technical expertise, and organizational culture, would provide valuable insights. Examining the long-term impacts of these technologies on inventory management performance and overall business outcomes, as well as their scalability and adaptability in different operational contexts, would also be beneficial. Lastly, research could focus on the role of training and support in maximizing the benefits of these technologies and identifying best practices for implementation and integration in the local context.

REFERENCES

- Adams, B., & Mensah, C. (2020). Evaluating the Effect of ERP Software on Inventory management performance: A Study in the Banking Sector in Ghana. *Journal of Information Systems*, 42(3), 112-130.
- Adams, R., Pearce, R., Veale, M., Radix, J., Castro, D., Sarkar, P., & Thom, N. (2017). A review of the relationship between ethics and human well-being. *Journal of Behavioral Norms*, 42(3), 567-582.
- Addo, S. A., Tingbani, I., & Ogundana, O. M. (2018). Barcoding technology and inventory management performance: The mediating role of supply chain management capabilities. *International Journal of Information Management*, 42, 75-88.
- Adeyeye, J., Ogbonna, C., & Ogundele, O. (2019). Enterprise Resource Planning (ERP) Implementation and Inventory management performance of Automotive Manufacturing Companies in Nigeria. *Journal of Business and Management*, 21(1), 30-39.
- Aina, Y. A., Oyedele, L. O., Owolabi, H. A., Ajayi, S. O., & Akinade, O. O. (2017). Effect of Enterprise Resource Planning (ERP) systems on organisational performance: A case study of manufacturing firms in Nigeria. *South African Journal of Industrial Engineering*, 28(2), 190–204.
- Akello, G., & Ssembatya, S. (2018). The Effect of Demand Forecasting on Inventory Management in the Automotive Industry: Evidence from Uganda. *Journal of Supply Chain Management*, 10(2), 45-58.
- Anderson, J., & Davis, R. (2020). The effect of ERP systems on inventory management performance in the European automotive industry. *Journal of Information Systems*, 35(2), 67-82.
- Anderson, K., Thompson, G., Brown, S., & Smith, A. (2021). The effect of forecasting software on inventory management performance in the automotive aftermarket industry: A mixed-methods study. *Journal of Business Logistics*, 42(4), 321-336.
- Andersson, L., & Martinez, A. (2018). IoT Applications for Warehouse Inventory Control: A European Perspective. *International Journal of Operations and Production Management*, 38(6), 890-912.

- Appiah, G., Mensah, S., & Mireku, K. A. (2019). Effect of Information technology tools on Organisational Performance in the Ghanaian Banking Sector. *African Journal of Economic Review*, 7(2), 148-165.
- Armstrong, J. S., Green, K. C., & Graefe, A. (2015). Golden rule of forecasting: Be conservative. *Journal of Business Research*, 68(8), 1717-1731.
- Atayero, A. A., Oluwatobi, S. O., & Alege, P. O. (2016, February 10). An Assessment of the Internet of Things (IoT) Adoption Readiness of Sub-Saharan Africa. *Journal of Sub-Sahara Africa Business Research*, 1–13.
<https://doi.org/10.5171/2016.321563>.
- Burns, N., & Grove, S. K. (2009). *Descriptive research*. In *The Practice of Nursing Research: Appraisal, Synthesis, and Generation of Evidence* (6th ed., pp. 287-312). Saunders.
- Chen, H., & Zhao, L. (2020). Application and optimization of barcoding technology in logistics management. *Journal of Systems Science and Systems Engineering*, 29(4), 479-491.
- Chen, I. J., & Nath, R. (2018). *Exploring the effect of enterprise resource planning (ERP) on business process agility*. *Information Systems Frontiers*, 20(5), 947-960.
- Davenport, T. H. (1998). *Putting the enterprise into the enterprise system*. *Harvard Business Review*, 76(4), 121-131.
- Disatnik, D., & Sivan, T. (2016). On the presence of multicollinearity in data. *Journal of Data Science*, 14(3), 419-435.
- Doe, J. K. (2021). The Effect of Forecasting Software on Inventory management performance in the Retail Industry: A Case Study in Nairobi, Kenya. *Journal of Business and Management Studies*, 10(2), 123-140.
- Dominguez, P. J., Fike, D. S., MacLaughlin, K. L., & Zorek, J. A. (2015). Validity ensures data reliability and accuracy. *Journal of Research in Pharmacy Practice*, 4(1), 5-6.
- Dube, L., & Ndlovu, X. (2018). Effect of Information technology tools Infrastructure on Organisational Performance: A Study of the Manufacturing Sector in South

Africa. *International Business & Economics Research Journal (IBER)*, 17(5), 151-164.

Esteves, J., & Pastor-Collado, J. (2001). An empirical study of ERP implementation in Portugal. *International Journal of ERP and Management Systems*, 2(2), 50-68.

Gattiker, U. E., & Goodhue, D. L. (2005). What happens after ERP implementation: Understanding the effect of inter-dependence and differentiation on plant-level outcomes. *MIS Quarterly*, 29(3), 559-585.

Glasser, B. G. (2014). Diagnostic research: Concepts and methods. *International Journal of Clinical and Experimental Medicine*, 7(1), 237-243.

Gonzalez, E., & Rodriguez, M. (2018). Exploring IoT-Enabled Inventory Tracking Systems in the Retail Sector: A Comparative Study of European and Asian Practices. *Journal of Business Research*, 42(5), 567-589.

Gunasekaran, A., Patel, C., & Tirtiroglu, E. (2006). Performance measures and metrics in a supply chain environment. *International Journal of Operations & Production Management*, 26(7), 794-818.

Gupta, R., & Patel, S. (2017). Internet of Things Innovations in Inventory Management: A Study of Indian Manufacturing Firms. *International Journal of Information Management*, 25(3), 567-589.

Gupta, R., & Sharma, M. (2019). Exploring the Relationship Between ERP Systems and Inventory management performance: Evidence from the Retail Industry in India. *International Journal of Information Management*, 45, 156-167.

Hernandez, R., & Santos, P. (2021). IoT and Inventory Management: An Empirical Study of Brazilian Logistics Companies. *Journal of Supply Chain Management*, 45(2), 210-230.

Huang, W., & Chou, S. (2015). The effects of barcoding technology on the performance of inventory management: A case study of 7-Eleven in Taiwan. *International Journal of Information Management*, 35(3), 337-345.

- Huang, W., Jia, B., Guo, Z., Williams, R. A., Shi, Y., Wei, H., & Cao, J. (2017). *Heteroscedasticity test for phase II analysis of heteroscedastic data*. *Quality and Reliability Engineering International*, 33(8), 2163-2180.
- Huang, Y., & Li, B. (2017). The effect of point-of-sale system on small business performance in the retail industry. *International Journal of Information Management*, 37(6), 617-627.
- Ishibazawa, A., Nagaoka, M., Takahashi, M., Omae, K., Tani, T., Sogawa, T., & Yoshida, K. (2015). Pretesting of the research instrument: A pilot study. *International Journal of Business and Social Science*, 6(10), 215-222.
- Ittner, C. D., & Larcker, D. F. (2003). *Coming up short on nonfinancial performance measurement*. *Harvard Business Review*, 81(11), 88-95.
- Jha, S., & Verma, A. (2017). IoT-Driven Inventory Tracking in Healthcare: A Comparative Analysis of Practices in the United States and Canada. *Health Systems*, 28(3), 456-478.
- Johnson, A. B., Smith, C. D., & Williams, E. F. (2022). Barcoding technology and organizational performance in the healthcare industry: An empirical study in the United States. *Journal of Health Information Systems*, 30(3), 45-62.
- Johnson, M., & Smith, T. (2018). The role of forecasting software in enhancing inventory management performance in the automotive industry in the United States. *Journal of Operations Management*, 36(1), 45-58.
- Johnson, R., & Smith, J. (2017). The role of barcoding technology on inventory management performance in the automotive industry in Nairobi County. *International Journal of Business Technology*, 12(4), 210-225.
- Juma, R., & Oloko, M. (2018). The Effect of Enterprise Resource Planning Systems on Organizational Efficiency: A Case Study of Kenya Power. *International Journal of Science and Research*, 7(12), 297-305.
- Kamau, M. W., Omondi, G. O., & Mwangi, M. N. (2020). Effect of Enterprise Resource Planning (ERP) System on Inventory management performance: A Case of the Hospitality Industry in Nairobi, Kenya. *Journal of Human Resource and Leadership*, 4(2), 56-67.

- Kamau, P. M., Ngugi, P. K., & Orwa, G. O. (2019). Effects of ERP Systems on Inventory management performance of Manufacturing Firms in Kenya. *International Journal of Economics, Commerce and Management*, 7(4), 150-165.
- Kaplan, R. S., & Norton, D. P. (1992). *The balanced scorecard: Measures that drive performance*. Harvard Business Review, 70(1), 71-79.
- Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Harvard Business Press.
- Kenya Association of Manufacturers. (2020). Kenya Association of Manufacturers | Driving Global Competitiveness. <https://kam.co.ke/wp-content/uploads/2021/04/Automotive-sector-profile-2020-1.pdf>.
- Kenya Association of Manufacturers. (2021). *Manufacturing Priority Agenda 2021*. <https://kam.co.ke/>
- Kenya National Bureau of Statistics. (2020). *Economic Survey 2020*. <http://www.knbs.or.ke/>
- Kim, S., & Chen, H. (2019). IoT-Driven Inventory Optimization: Global Trends and Challenges. *Journal of Operations Management*, 35(2), 210-230.
- Kimani, P. M., Wambui, K. G., & Gichane, M. W. (2018). The Effect of Barcoding Technology on Inventory Management: A Case Study of Retail Firms in Nairobi County, Kenya. *Journal of Business and Retail Management Research*, 12(2), 9-17.
- Kimani, P., & Muthoni, J. (2018). The Effect of Forecasting Software on Inventory management performance in the Manufacturing Sector in Kenya. *International Journal of Business and Economic Sciences Applied Research*, 11(3), 49-61.
- Kinyanjui, D. N., Njenga, K. W., & Mwangi, G. M. (2020). The Effect of Barcoding Technology on the Performance of Supermarkets in Kenya. *International Journal of Innovative Research and Development*, 9(5), 225-236.
- Klein, A., Gerhard, F., Büchner, C., Diestel, S., & Schermelleh-Engel, K. (2016). Testing for heteroscedasticity in linear regression models: A Monte Carlo simulation study. *Journal of Experimental Education*, 84(4), 813-829.

- Koh, S., & Saad, S. (2015). Effect of forecasting software on operational performance: Evidence from Malaysian manufacturers. *International Journal of Production Economics*, 170, 669-679.
- Kumar, K., & Benbasat, I. (2006). The influence of recommendations and consumer reviews on evaluations of websites. *Information Systems Research*, 17(4), 425-439.
- Li, M., & Tanaka, S. (2019). ERP software and its effect on inventory management performance in the automotive industry in Nairobi County. *International Journal of Information Systems*, 15(3), 112-130.
- Li, Q., & Wu, D. (2018). The effect of forecasting software on inventory management performance in the Chinese automotive supply chain. *International Journal of Production Economics*, 199(8), 1-11.
- Li, X., Wang, Q., & Zhang, Y. (2021). The effect of barcoding technology on inventory management performance in the retail industry: A case study in China. *International Journal of Retail & Distribution Management*, 49(8), 1025-1043.
- Li, Y., Cai, S., & Huang, H. (2020). A Literature Review on the Use of Barcoding Technology in Inventory Management and Logistics. *Journal of Industrial Engineering and Management*, 13(1), 18-51.
- Liu, S., Wei, K. K., Zhang, Z., & Chen, H. (2017). Understanding users' continuance of mobile social networking sites: A psychological ownership perspective. *Information Systems Journal*, 27(6), 683-704.
- Liu, Y., & Johnson, M. P. (2017). A Cross-Country Analysis of IoT Integration in Inventory Management: Lessons from Developing Economies. *International Journal of Production Economics*, 185, 230-245.
- Maina, A., & Murungi, D. (2023, August). The Health Policy Implications of Social Representations of the Internet of Things in Kenya. *Academy of Management Proceedings*, 2023(1). <https://doi.org/10.5465/amproc.2023.15849abstract>
- Martinez, E., & Fernandez, G. (2019). IoT Integration in Inventory Management: A Study of Mexican Small and Medium Enterprises. *International Journal of Small Business Management*, 22(5), 789-812.

- Martinez, L., & Brown, A. (2019). Enhancing inventory management performance in the automotive industry through forecasting software: Evidence from American countries. *International Journal of Production Economics*, 207, 45-58.
- Mashayekhy, Y., Babaei, A., Yuan, X. M., & Xue, A. (2022, May 26). Effect of Internet of Things (IoT) on Inventory Management: A Literature Survey. *Logistics*, 6(2), 33. <https://doi.org/10.3390/logistics6020033>
- Meng, Z., Zhang, D., & Jin, H. (2014). Development and Application of Barcode Technology in Logistics Management. *Journal of Applied Mathematics*, 2014, 1-7.
- Mensah, P., Agyeiwaa, O., & Boateng, R. (2020). Effect of Forecasting Software on organizational performance: A Case Study of Upscale Hotels in Accra, Ghana. *Journal of Tourism, Hospitality and Sports*, 7(2), 45-63.
- Mensah, S. A., & Agyemang, K. (2021). The Role of Enterprise Resource Planning Systems in Enhancing Productivity and Competitiveness: Evidence from the Automotive Industry in Ghana. *International Journal of Management*, 12(3), 264-279.
- Mohamad, M. H., Sulaiman, Z., Sern, T. J., & Salleh, H. (2015). Ensuring instrument reliability: Internal consistency reliability. *Journal of Fundamental and Applied Sciences*, 7(2), 692-704.
- Mugenda, O. M., & Mugenda, A. G. (2012). *Research methods: Quantitative and qualitative approaches*. Acts Press.
- Muriuki, J. M., Mugure, A. W., & Orwa, G. O. (2019). Effect of ERP Systems on Inventory management performance: A Case Study of Selected Banks in Kenya. *International Journal of Management Sciences*, 5(11), 496-508.
- Mwangi, W., Nderu, E., & Kwasira, J. (2018). The effect of information technology tools on organizational performance in manufacturing industries: A case of selected firms in Nairobi County, Kenya. *International Journal of Information technology tools and Business Management*, 68(1), 1-13.
- Mwaura, D., & Gitau, N. (2017). The effect of barcoding technology on inventory management performance in the retail industry in Nairobi County, Kenya. *International Journal of Scientific and Research Publications*, 7(12), 246-253.

- Mwaura, J., & Kinyua, D. (2018). The Effect of Barcoding Technology on Inventory management performance: A Case Study of the Retail Industry in Mombasa, Kenya. *International Journal of Business and Management*, 13(9), 147-160.
- Namatovu, R., Jagwe, J. N., & Waiswa, R. (2017). Effects of Information technology tools Tools on organizational performance in the Agricultural Sector in Uganda: A Case of Coffee Marketing Firms. *International Journal of Innovation and Economic Development*, 3(6), 38-51.
- Ndungu, P., Kimani, D., & Muthoni, J. (2018). The effect of information technology tools on organizational performance in the automotive industry in Kenya. *Journal of Information Systems*, 14(2), 123-140.
- Ngwenya, S., & Dlamini, T. (2021). Effect of ERP Software on Inventory management performance: A Study in the Retail Industry in South Africa. *African Journal of Business Management*, 39(4), 201-219.
- Njogu, R., & Kariuki, S. (2019). Forecasting Software and Inventory management performance in the Retail Industry in Kenya. *International Journal of Innovation and Economic Development*, 5(4), 43-57.
- Njoroge, D. M., & Githui, D. M. (2016). The Effect of Forecasting Software on Supply Chain Performance: A Case Study of Automotive Industry in Kenya. *International Journal of Business, Humanities, and Technology*, 6(6), 21-30.
- O'Brien, C., & Nguyen, L. (2019). IoT-Driven Inventory Optimization in Agriculture: Comparative Analysis of Australian and New Zealand Practices. *Journal of Agribusiness Management*, 32(1), 45-67.
- Oduor, J., Odhiambo, R., & Waema, T. (2019). *Assessment of the Effects of Information technology tools in Inventory Management on the Financial Performance of Manufacturing Firms in Nairobi, Kenya*. *International Journal of Innovation and Economic Development*, 5(4), 61-76.
- Ogbonna, E., & Harris, L. C. (2018). *The influence of organizational culture on ERP implementation success: A meta-analysis*. *Computers in Human Behavior*, 85, 320-329.

- Ogunlade, A., & Adekunle, O. (2019). The Effect of Forecasting Software on Inventory management performance: Evidence from the Retail Sector in Nigeria. *International Journal of Business and Economics Research*, 16(3), 120-140.
- Okafor, G., Ezejiofor, R. A., & Okafor, C. G. (2020). Barcoding technology and inventory management performance: A study of the Nigerian retail industry. *International Journal of Management, Technology, and Social Sciences*, 5(1), 37-50.
- Okello, C. O., Otieno, M. G., & Owino, F. O. (2019). The Effect of Enterprise Resource Planning Systems on Customer Satisfaction: A Case Study of Select Automotive Firms in Kenya. *International Journal of Recent Advances in Multidisciplinary Research*, 6(9), 1005-1014.
- Oliveira, T., Thomas, M., & Espadanal, M. (2017). *Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors.* Information & Management, 54(4), 504-520.
- Ondieki, J. (2019). The effect of information technology tools on organizational performance: A study of selected banks in Nairobi, Kenya. *International Journal of Business and Management*, 11(4), 1-12.
- Ouma, W., & Abuga, S. (2020). The Role of Forecasting Software in Inventory management performance in the Service Sector in Kenya. *Journal of Business and Management*, 22(1), 54-68.
- Park, H., & Kim, D. (2016). IoT-Enabled Inventory Management: South Korean Case Studies in Manufacturing and Retail. *Journal of Enterprise Information Management*, 29(1), 123-145.
- Rehman, T., & Khan, F. (2022). IoT Applications in Agricultural Inventory Management: Comparative Review of Pakistani and Middle Eastern Approaches. *Journal of Agri-Innovation*, 15(4), 567-589.
- Rommel, G. (2013). Accuracy assessment in diagnostic research. *Journal of Medical Diagnostics*, 12(3), 157-165.

- Ross, J. W., Beath, C. M., & Goodhue, D. L. (2006). *Develop Long-Term Competitiveness through IT Assets*. MIT Sloan Management Review, 48(2), 31-38.
- Schmidt, A., Johnson, R., Smith, J., Li, M., Tanaka, S., & Wang, H. (2018). The effect of information technology tools on inventory management performance in the automotive industry in Nairobi County. *Journal of Business and Technology*, 10(2), 45-60.
- Schmidt, M., Müller, O., Hinz, O., & Heger, J. (2019). The effect of forecasting software on operational performance in the automotive industry. *European Journal of Operational Research*, 272(2), 479-491.
- Simiyu, S. M., Kimemia, L., & Mak'op, S. M. (2021). The Effect of Enterprise Resource Planning (ERP) System on Inventory management performance: A Case Study of Retail Sector in Kenya. *International Journal of Business, Economics and Management*, 8(4), 245-259.
- Smith, A., & Jones, B. (2018). The Effect of Forecasting Software on Inventory management performance: Evidence from the Manufacturing Sector in South Africa. *Journal of Business and Management*, 25(2), 78-94.
- Smith, J. D., & Johnson, A. B. (2018). The Effect of ERP Software on Inventory management performance: A Case Study in the Manufacturing Industry in Germany. *Journal of Enterprise Resource Planning*, 10(2), 45-58.
- Smith, J. R. (2019). The effect of barcoding technology on inventory management performance in the manufacturing industry: Empirical evidence from Germany. *International Journal of Operations & Production Management*, 39(6), 789-810.
- Smith, J., & Johnson, A. (2019). The Effect of ERP Software on Inventory management performance: A Case Study in the Manufacturing Industry in Nigeria. *Journal of Business and Management*, 35(2), 45-63.
- Smith, J., Johnson, R., & Williams, K. (2019). ERP software and its effect on inventory management performance in the European automotive industry. *International Journal of Production Research*, 57(14), 4376-4394.
- Smith, J., Naidoo, V., & Ukpere, W. (2019). The effect of barcoding technology on inventory management performance in the manufacturing industry in South Africa. *South African Journal of Business Management*, 50(1), 1-11.

- Suzuki, Y., & Tanaka, T. (2020). The effect of forecasting software on inventory management performance: A case study in the automobile manufacturing industry in Japan. *Journal of Operations Management*, 67(3), 189-204.
- Tallon, P. P. (2013). Process and knowledge management in emerging markets: A focus on technology transfer in the automotive industry. *International Journal of Information Management*, 33(1), 18-29.
- Tan, F. B., & Poon, S. (2019). The role of mobile point-of-sale systems in improving operational efficiency and customer satisfaction. *Journal of Retailing and Consumer Services*, 51, 340-349.
- Tanaka, S., Yamamoto, T., & Suzuki, K. (2020). Barcoding technology and inventory management performance in the logistics industry: Evidence from Japan. *International Journal of Physical Distribution & Logistics Management*, 50(3), 285-307.
- Tokdar, S. T., & Martin, R. (2019). A class of normality tests based on optimal transport. *Journal of the American Statistical Association*, 114(525), 1330-1341.
- Torabi, S., Montazeri, A., & Grané, A. (2016). On the normality test of data. *Journal of Statistical Computation and Simulation*, 86(13), 2583-2593.
- Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.
- Uwitonze, V., & Uwamahoro, F. (2019). The Effect of Barcoding Technology on Inventory Management: Evidence from the Automotive Industry in Rwanda. *Journal of Operations and Supply Chain Management*, 12(1), 76-92.
- Wang, L., & Li, Y. (2020). The Effectiveness of ERP Systems on Inventory management performance: A Study in the Manufacturing Sector in China. *International Journal of Production Economics*, 230, 107859.
- Wang, Q., & Lee, B. (2022). IoT Applications for Inventory Visibility: A Review of Best Practices in North American Manufacturing. *Production and Inventory Management Journal*, 56(4), 78-92.

- Wang'ombe, P. M., & Kiragu, N. J. (2018). The Effect of ERP System on Inventory management performance: A Case of Manufacturing Industries in Nairobi, Kenya. *International Journal of Economics, Commerce, and Management*, 6(12), 277-291.
- Waweru, S. K. (2020). The influence of information technology tools on institutional performance in healthcare sector in Kenya. *International Journal of Research in Business and Social Science*, 9(4), 12-26.
- Williams, S., & Anderson, M. (2017). Effect of ERP Systems on Inventory management performance: A Comparative Study in the Service Industry in the United States. *Journal of Business Administration Research*, 6(3), 50-62.
- Winship, C., & Western, B. (2016). *Encyclopedia of statistical sciences*. John Wiley & Sons.
- Wong, K., & Tan, L. (2018). IoT-Driven Inventory Optimization: Case Studies from Singaporean Retailers. *International Journal of Business and Management*, 35(4), 234-256.
- Yamane, T. (1967). *Statistics: An Introductory Analysis* (2nd ed.). Harper and Row.
- Zamanzadeh, V., Ghahramanian, A., Rassouli, M., Abbaszadeh, A., Alavi-Majd, H., & Nikanfar, A. R. (2015). Content validity and its estimation. *Journal of Medical Education*, 14(2), 49-54.
- Zhang, Y., & Li, W. (2020). IoT Integration in Retail Inventory Management: A Comparative Review of Chinese and Japanese Approaches. *Asia Pacific Journal of Marketing and Logistics*, 30(4), 678-695.
- Zhang, Y., Liu, J., & Wang, C. (2019). The role of barcoding technology in inventory management performance in the automotive industry in China. *Journal of Supply Chain Management*, 55(3), 38-51.

APPENDICES

Appendix I: Transmittal Letter

Mary Migwi

Student

KCA University

Dear Participants,

Subject: Request for Data Collection - Effect of Information technology tools on Inventory management performance in the Automotive Industry in Nairobi County, Kenya

I am writing to request your cooperation and participation in a research study titled "*The Effect of Information technology tools on Inventory management performance of the Automotive Industry in Nairobi County, Kenya,*" which is being conducted as part of my Masters of Business Administration (Corporate Management) degree at KCA University.

The purpose of this study is to examine the effect of information technology tools on the inventory management performance of prominent automotive companies operating in Nairobi County, Kenya. By understanding the effects of IT tools such as ERP software, Internet of Things, barcoding technology, and forecasting software, we aim to provide insights that can enhance operational efficiency and overall performance within the automotive industry.

Your organization, is recognized as a prominent player in the automotive industry within Nairobi County, Kenya. Given your expertise and valuable insights, we kindly request your participation as a participant in this study. Your involvement will help us gather

accurate and meaningful data to analyse the effect of information technology tools on inventory management performance.

As a participant, we request you to complete a structured questionnaire, which will serve as the primary data collection instrument. The questionnaire will be designed to gather information about the usage and effectiveness of various IT tools within your organization. The collected data will be treated with utmost confidentiality, and no individual or organization will be identified in the research report.

Your participation in this study is entirely voluntary, and you have the right to withdraw at any time without any negative consequences. We assure you that the data collected will be used solely for academic research purposes and will not be shared with any third party.

We anticipate that your valuable insights and cooperation will greatly contribute to the success of this research study. Your participation will help advance our understanding of the effect of information technology tools on inventory management performance in the automotive industry in Nairobi County, Kenya.

Should you agree to participate, we will arrange a suitable time for data collection. If you have any questions or require further clarification, please do not hesitate to contact me at marymigwiw@gmail.com or 0727772829. I would be more than happy to provide any additional information or address any concerns you may have.

Thank you for your consideration and support. We look forward to your positive response and cooperation.

Yours sincerely, Mary Migwi

Appendix II: Research Questionnaires

Section A: Demographic Information

Demographic information questions collect data about the characteristics of the participants, such as their age, gender, education level, and work experience. Here are four demographic information questions that can be included in the structured questionnaires:

1. Age:

What is your age?

- 18-24 ()
- 25-34 ()
- 35-44 ()
- 45-54 ()
- 55 and above ()

2. Gender:

What is your gender?

- Male ()
- Female ()
- Prefer not to say ()

3. Education Level:

What is your highest level of education?

- High school or equivalent ()

- Bachelor's degree
- Master's degree
- Doctorate degree
- Other (please specify)_____

4. Work Experience:

How many years of work experience do you have in the automotive industry?

- Less than 1 year
- 1-5 years
- 6-10 years
- 11-15 years
- More than 15 years

Section B: To establish the effect of ERP software on inventory management performance in the automotive industry in Nairobi County, Kenya.

This objective aims to investigate the effect of ERP software adoption on inventory management performance within the automotive industry in Nairobi County. ERP software refers to integrated systems that help streamline business processes and enhance operational efficiency. By understanding the effect of ERP software on inventory management performance, valuable insights can be gained to inform decision-making and improve business outcomes. Please indicate your level of agreement with the following statements using a 5-point Likert scale, where 1 represents "strongly disagree" and 5 represents "strongly agree."

Question	1 - Strongly Disagree	2 - Disagree	3 - Neutral	4 - Agree	5 - Strongly Agree
1. ERP software has improved functional integration across business functions in our organization.					
2. ERP software has enhanced operational efficiency in our organization.					

<p>3. Our organization has fully adopted ERP software in its operations.</p>					
<p>4. ERP software has positively effected the overall performance of our organization.</p>					
<p>5. Our organization has experienced improved decision-making as a result of implementing ERP software.</p>					

Section C: To determine the effect of Internet of Things on inventory management performance in the automotive industry in Nairobi County, Kenya.

This objective aims to assess the effect of Internet of Things on inventory management performance within the automotive industry in Nairobi County. Internet of Things are electronic systems used to process sales transactions and manage customer information. Understanding the effect of Internet of Things on inventory management performance can provide valuable insights into improving internet connectivity, sensing data collection and; automation and intelligence. Please indicate your level of agreement with the following statements using a 5-point Likert scale, where 1 represents "strongly disagree" and 5 represents "strongly agree."

Question	1 - Strongly Disagree	2 - Disagree	3 - Neutral	4 - Agree	5 - Strongly Agree
1. The use of Internet of Things (IoT) technology has improved inventory management performance in the automotive industry.					
2. IoT technology has positively influenced the accuracy of stock					

<p>levels in the automotive industry's inventory management.</p>					
<p>3. IoT technology has enhanced the efficiency of ordering processes within the automotive industry's inventory management.</p>					
<p>4. The implementation of IoT technology has reduced carrying costs associated with inventory management in the automotive industry.</p>					
<p>5. Overall, IoT technology has had a significant positive effect on inventory management performance within the automotive</p>					

industry in Nairobi County.					
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Section D: To assess the role of barcoding technology on inventory management performance in the automotive industry in Nairobi County, Kenya.

This objective aims to evaluate the role of barcoding technology in influencing inventory management performance within the automotive industry in Nairobi County. Barcoding technology enables accurate tracking and management of inventory, enhances product traceability, and improves supply chain visibility. Understanding the effect of barcoding technology on inventory management performance can provide valuable insights into inventory management, product traceability, and supply chain efficiency. Please indicate your level of agreement with the following statements using a 5-point Likert scale, where 1 represents "strongly disagree" and 5 represents "strongly agree."

Question	1 - Strongly Disagree	2 - Disagree	3 - Neutral	4 - Agree	5 - Strongly Agree
1. Barcoding technology has improved inventory management accuracy in our organization.					
2. Barcoding technology has enhanced product					

traceability in our organization.					
3. Our organization has fully integrated barcoding technology into its workflows.					
4. Barcoding technology has positively affected supply chain visibility in our organization.					
5. Our organization has experienced improved operational performance as a result of implementing barcoding technology.					

Section E: To establish the effect of forecasting software on inventory management performance in the automotive industry in Nairobi County, Kenya.

This objective aims to determine the effect of forecasting software on inventory management performance within the automotive industry in Nairobi County. Forecasting software enables accurate demand forecasting, which has implications for production planning, resource allocation, and operational efficiency optimization. Understanding the effect of forecasting software on inventory management performance can provide valuable insights into improving planning and resource management processes. Please indicate your level of agreement with the following statements using a 5-point Likert scale, where 1 represents "strongly disagree" and 5 represents "strongly agree."

Question	1 - Strongly Disagree	2 - Disagree	3 - Neutral	4 - Agree	5 - Strongly Agree
1. Forecasting software provides accurate demand forecasts in our organization.					
2. Forecasting software is effectively utilized in production planning in our organization.					

<p>3. Our organization has fully adopted forecasting software in its operations.</p>				
<p>4. Forecasting software has positively effected resource allocation in our organization.</p>				
<p>5. Our organization has experienced improved operational efficiency as a result of implementing forecasting software.</p>				

Section F: To determine the overall effect of information technology tools on inventory management performance in the automotive industry in Nairobi County, Kenya.

The overall objective of this study is to determine the effect of information technology tools on inventory management performance in the automotive industry in Nairobi County, Kenya. Specifically, this objective aims to assess the effect of IT on inventory management performance within the automotive industry in Nairobi County. Inventory management performance will be measured by optimal stock levels, streamlined ordering processes and minimized carrying costs. To gather data for this objective, participants will be asked to indicate their level of agreement with specific statements using a 5-point Likert scale, where 1 represents "strongly disagree" and 5 represents "strongly agree."

Question	1 - Strongly Disagree	2 - Disagree	3 - Neutral	4 - Agree	5 - Strongly Agree
1. Information technology tools (IT) solutions have contributed to better inventory management performance in the automotive industry.					
2. IT has played a key role in optimizing					

<p>stock levels within the automotive industry's inventory management.</p>					
<p>3. The use of IT has streamlined the process of ordering inventory items in the automotive industry.</p>					
<p>4. IT solutions have effectively reduced the carrying costs associated with inventory management in the automotive sector.</p>					
<p>5. Information technology tools (IT) had a positive effect on inventory management performance in the automotive industry in Nairobi County?</p>					

Thank You for Your Participation!!!

Appendix III: KCA Ethical Review Committee Approval



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BOARD OF POSTGRADUATE STUDIES

KCAU/BPS/March.24/1

Date: Wednesday, March 13, 2024

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: MARY WAMBUI MIGWI REG NO: 17/03972

It is my distinct pleasure to introduce to you Mary Wambui Migwi who is a student in our institution pursuing a Master of Business Administration (Procurement and Supplies Management) Degree in the School of Business.

Mary is conducting a research on a topic titled: *"The Effect of Information Technology On Inventory Management Performance in Automotive Industry in Nairobi County, Kenya."* which is part of the requirements of the program she is pursuing. The research as well as the data procured thereof shall be used for academic purposes only.

Any assistance accorded to her is highly appreciated. -

In case of further inquiry, do not hesitate to contact the undersigned.


Yours faithfully,

A handwritten signature in blue ink, appearing to read 'Dr. Jackson NdoLO'.

DR. JACKSON NDOLO

DIRECTOR, BOARD OF POST GRADUATE STUDIES

Appendix IV: NACOSTI Permit

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 552086	Date of Issue: 22/July/2024
RESEARCH LICENSE	
	
<p>This is to Certify that Ms. Mary Migwi of KCA University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: THE EFFECT OF INFORMATION TECHNOLOGY ON INVENTORY MANAGEMENT PERFORMANCE IN AUTOMOTIVE INDUSTRY IN NAIROBI COUNTY, KENYA for the period ending : 22/July/2025.</p>	
License No: NACOSTI/P/24/37990	
552086 Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
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See overleaf for conditions	

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way:
 - i. Endanger national security
 - ii. Adversely affect the lives of Kenyans
 - iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
 - iv. Result in exploitation of intellectual property rights of communities in Kenya
 - v. Adversely affect the environment
 - vi. Adversely affect the rights of communities
 - vii. Endanger public safety and national cohesion
 - viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

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Appendix V: Budget Plan

Item	Cost (Ksh)
Research materials and resources	15,000
Questionnaire design and printing	5,000
Data collection expenses	10,000
Data entry and analysis software/tools	8,000
Statistical analysis	12,000
Research assistants (4)	20,000
Participant incentives/rewards	5,000
Communication (phone, internet)	6,000
Transportation	10,000
Miscellaneous expenses	4,000
Total	95,000

Appendix VI: Work Plan

Task	Timeframe
Literature review	April 2023
Develop conceptual framework	May 2023
Design and finalize questionnaires	June 2023
Obtain ethical approval	July 2024
Conduct pilot study	July 2024
Revise questionnaires based on pilot	August 2024
Select sample participants	August 2024
Administer questionnaires	August 2024
Collect completed questionnaires	August 2024
Data entry and cleaning	September 2024
Perform data analysis	September 2024
Interpret and analyse findings	September 2024
Write research report	September 2024
Review and finalize research report	September 2024
Submit research report	September 2024

Appendix VII: Department Selection Template

Department	Justification for Department Selection
Information technology tools (IT) Department	The IT department will have rich information regarding the implementation and usage of ERP software, Internet of Things, barcoding technology, and forecasting software in the automotive companies. They will be responsible for managing and maintaining these technologies and can provide insights into their effect on inventory management performance.
Operations Department	The operations department will have valuable information on how the implemented information technologies affect their day-to-day operations. They can provide data on process efficiencies, productivity improvements, inventory management, and supply chain optimization achieved through the use of ERP software, Internet of Things, barcoding technology, and forecasting software.
Sales and Marketing Department	The sales and marketing department will have insights into how the information technologies effect sales processes, customer relationship management, and marketing strategies. They can provide information on the effectiveness of Internet of Things in improving sales

transactions, customer satisfaction, and overall sales performance.

Finance Department The finance department will have data on the financial aspects influenced by the implemented information technologies. They can provide information on cost savings, revenue generation, financial forecasting, and budgeting improvements achieved through the use of ERP software and other technologies

Supply Chain Department The supply chain department will have information related to inventory management, procurement processes, and logistics. They can provide insights into how barcoding technology and ERP software contribute to streamlining supply chain operations, reducing errors, and improving overall efficiency
