

**INVENTORY MANAGEMENT PRACTICES AND OPERATIONS
PERFORMANCE OF PLASTICS AND RUBBER MANUFACTURERS IN
KENYA**

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DECLARATION

I, Benson Mbogo Kingori declare that this research project is my original work. No part of this document has been submitted for academic credit in any other Institution of Higher Learning.

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ABBREVIATIONS AND ACRONYMS

ABC - Always Better Control

EAC – East African Community

EALA – East African Legislative Assembly

EOQ - Economic Order Quantity

FMCG – Fast Moving Consumer Goods

ICT – Information Communication Technology

IMP – Inventory Management Practices

JIT – Just in Time

KAM – Kenya Association of Manufacturers

KCSE – Kenya Certificate of Secondary Education

KTDA – Kenya Tea Development Agency

NEMA – National Environment Management Authority

PMCB – Plastic Materials Control Bill

PPEs – Personal Protective Equipment

PVC – Polyvinyl Chloride

RBV – Resource Based Theory

ROCE – Return on Capital Employed

ROE – Return on Equity

ROI – Return on Investment

UNEP – United Nations Environmental Program

VMI – Vendor Managed Inventory

ABSTRACT

The main objective of the study was to establish the effect of Inventory Management Practices on the performance of plastics and rubber manufacturers in Kenya. The specific objectives were to establish the extent to which plastics and rubber manufacturers in Kenya have implemented Inventory Management Practices and find the relationship between of Inventory Management Practices on the operations performance of plastics and rubber Manufacturers in Kenya. The study population was the 70 plastics and rubber manufacturers in Kenya registered with the Kenya Association of Manufacturers from which data was collected using a structured questionnaire. This study employed two research assistants who delivered the questionnaires and picked them up at a later agreed time (Drop and Pick Later method) to ensure that as much data as possible is collected for the study. The collected data was then verified, checked for correctness and fed into a statistical software which analyzed the data using descriptive and inferential statistics. The findings show that there is a high implementation rate of inventory management practices with 85% of the firms in the industry having adopted a modern inventory management model. The Economic Order Quantity (EOQ) model is the most widely applied model in the plastics and rubber value chain because it's an effective, simple and easy to apply inventory management model. The study concluded that the implementation of inventory management practices had a positive effect on the internal efficiency, the timeliness and flexibility of organizations that adopted them. However, these practices did little to improve the quality of service rendered to the customer by the organizations. This study therefore recommends that firms strive to improve the quality of service rendered to their customers through sound customer care and customer satisfaction management strategies aimed at improving the customer experience in the plastics and rubber industry in Kenya.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Over the last decade, inventory management has emerged as a key research area in reference to business performance amongst manufacturers around the world. Musyoka, Ochieng, Wambui and Bellah, (2017) noted that inventory management has emerged as one of the crucial functions in the management of organizations around the world. This is because inventory management and valuation are a key indicator of profitability in organizations. Naliaka and Namusonge (2017) noted that practices put in place by firms to manage inventory directly affects the competitiveness of manufacturers since it focuses on quantity of inventory, working capital and timely delivery of orders to customers are core functions on any firm's operations. According to Li, Ragu, Nathan, & Subba (2006) competitive advantage is achieved by focusing on capabilities that differentiate itself from other firms in the market through efficient management decisions. Managing inventory is critical to a manufacturer because it guarantees the client will get their orders delivered wholly at the right time without experiencing stock outs or delays in deliveries due to inadequate inventory.

This study is anchored on two theories; the resource-based theory and the knowledge-based theory. The resource-based theory views a firm's internal resources as way to improve competitiveness. Resources include technology, personnel, inventory and other capital assets are positively correlated to a firm's measures of performance internally and financially. Inventory is one of the most important resources a firm can utilize to improve its quantitative and qualitative performance (Maalim and Avutswa, (2017). Secondly, the studied applied the Knowledge Based Theory by Grant, (1996) and reviewed by Wiklund and Shepherd (2019) which is an improvement of the Resource Based Theory which insists on taking advantage of the unique knowledge and skills possessed by personnel to gain competitive advantage. Gitau (2018) noted that inventory comprises of many of liquid assets especially in retail and manufacturing and therefore inventory management strikes a delicate balance between deficit and surplus so as to avoid stock outs and holding buffer stock which may go obsolete if demand is uncertain (Gupta, H & Gupta, P 2017). A prudent approach to inventory

management was found to positively affect profitability of an organization by eliminating waste and minimizing excess stock in production process (Eroglu and Hofer, 2017).

The manufacturing sector in Kenya is well developed with new firms emerging in the market in growing sectors. Among the growing sectors in Kenya is plastics manufacturing due to the growing demand of a wide range of plastic products used in almost every aspect of life. According to Lwiki, Ojera, Mugenda and Wachira (2019) inventory management is a key aspect amongst manufacturers as it is critical in the operations efficiency in Manufacturers. According to Brydson (2019) plastics have dominated the building and construction, automotive manufacturing, household appliances, electronics, medical equipment as well as the packaging sectors. This study focused on the effect of managing inventory amongst plastic manufacturers in Kenya.

1.1.1 Inventory Management Practices

Inventory management practices are activities and policies put in place to satisfy customer demand by a coordinated effort of purchasing raw materials, manufacturing finished products and distributing them to the target customers (Miller, 2019). These functions must be coordinated within the organization to ensure they are efficient and sustainable in the short and long run. Inventory management mainly deals with ordering, maintaining and undertaking efficient logistics to ensure customer orders are met on time and within the agreed time schedules. Inventory management involves a coordinated management replenishment of goods, returning of defective goods, managing warehouse space, asset management, inventory handling while observing the desired lead time and avoiding stock outs so that at no time will the organization lack inventory to ship to its customers. This also involves managing the material and inventory handling costs associated with maintaining a certain level of inventory (Ogbo, Onekanma and Wilfred, 2014)

Inventory management practices are recognized as a crucial problem issue that should be solved as a matter of priority (Dimitrios, 2018). Organizations, whether large or small succeed based on how effectively and efficiently it manages its inventory and the supply chain. The issue when managing inventory is striking a balance between the demand and supply of inventory. As a matter of principle, a firm should have enough stocks to meet customer demand as well as ensure that no customer will not be served due to inadequate

stocks. The other headache is to avoid holding too much stocks so as not to incur hefty inventory handling costs. The decision to hold stocks is risky and affects the operations performance of a manufacturing organization. According to Mwangi (2018) managing inventory is very crucial role in the competitiveness of manufacturers. This study therefore sought to find out the effect of Inventory Management Practices (IMPs) on the Operations performance of plastics Manufacturers in Kenya.

1.1.2 Operations Performance

Operations performance involves streamlining internal processes in order to curb internal inefficiencies to achieve optimality and ensure maximum productivity (Mogere, Oloko and Okibo, 2018) The study will measure the degree to which the inventory management practices reduce inventory wastage, reduce material handling cost, eliminate material misappropriation and fraud, enhance end to end inventory tracking, improve staff productivity and result to an overall improve the organizational Operations performance.

The contribution of Inventory Management Practices (IMP)s on the performance of sugar manufacturers and found a strong causal effect between IMPs and the Operations performance of sugar manufacturers. According to Maalim and Avutswa, (2017) sound inventory management practices adopted by a firm should in ideal cases hasten the inventory turnover by ten times and cut costs and wastage by between 10% and 40% respectively. According to Agu, Ozioma & Nnate (2016,) the management of inventory should be applied in all departments in an organization or in different departments in the production as well as the sales department to ensure smooth production and satisfy customer demand. Ideally an organization should have sufficient inventories to satisfy demand but however this should be done with a delicate balancing act such that the firm does not have too much inventory which will increase its inventory holding costs (Agu, Ozioma & Nnate, 2016).

Inventory management practices impacts the operations performance of a manufacturer and found a strong causal effect between the IMPs and the operations performance of an organization (Mwangi, 2018). According to Ogbad (2019), how an organization manages the inventory plays a very significant role towards gaining competitive advantage above its competitors. The inventory management practices adopted determines whether the firm incurs losses due to spoilage more so when the materials or the stock merchandise is

perishable (Ogbad, 2019). The management of inventory is very crucial towards the firm's competitiveness in the market. Inventory management determines the optimal amount of inventory to be maintained so as to optimize on inventory handling cost, avoid deterioration as well as the costs associated to holding stocks like insurance and security (Koin, Cheruiyot and Mwangangi, 2017). This study will measure operations performance using four parameters; internal efficiency in terms of cost, timeliness, quality and flexibility.

1.1.3 Plastics and Rubber Manufacturers in Kenya

The use of plastics has grown over the last few decades. It is widely used in the electrical industry for its excellent insulation, durability and malleability characteristics. Currently over 90% of the packaging materials used across the world are made of plastic. In the household scenario, the uses of plastics is evident. Plastics are currently being used to make chairs, Polyvinyl Chloride (PVC) tiles, tables, stools, cutlery, carpets, armchair body shells, whilst chipboard, foam upholstery, cupboard drawers and decorative laminates. In medicine plastics are used to make a range of body parts such as hip joints and other mobility aids like walking sticks, wheel chairs, knee and wrist supports, heart valves, injection syringes and other single use equipment such as PPEs masks and gloves (Brydson, 2019). The study further noted that an average car is made of at least 75 kg of plastic material. This creates a massive market for plastics manufacturing the world over.

The National Environment Management Authority (NEMA) recommended the ban on the use of single use plastic bags in 2017 after which the Government of Kenya banned the trade in plastic bags through a gazette notice 2334 & 2356. Mukui and Odira (2017) noted that before the use of plastic bags was banned in August, 2017, Supermarkets and retail shops used to use an estimated 24 million plastic bags per annum. Major supermarkets chains operating in Kenya, used over a million plastic bags for packaging per annum. Earlier in 2011, the East African Legislative Assembly (EALA) had passed the Polythene Control Bill which sought to oversee the manufacture and usage of polythene bags within the East African Community (EAC) region. This law is enforced with collaboration with local legislations and local government bylaws to bring sanity to the plastics industry in Kenya.

The Kenya Association of Manufacturers (KAM) noted that the average Kenyan uses 0.03kg of plastics per day per person (KAM, 2016). However, since the ban on plastics in 2017,

currently the usage of plastics for packaging has reduced significantly. The KAM report further notes that plastics manufacturers fall under the plastic and rubber sector which has a membership of 70 and employs 30,000 people directly and 100,000 indirectly. However, following the ban of use of plastic packaging in 2017, the output of the plastic products in the sector decline by 3.7%. The outbreak of the COVID 19 pandemic increased the demand for plastic single use PPEs which has been retrogressive to earlier efforts to curb plastic pollution though statistics are scanty about the environmental impact of the single use personal protection equipment (PPEs) in Kenya and around the world.

Currently, there are 70 bulk plastics manufacturers in Kenya who are registered and regulated by NEMA and KAM. Currently, there is no recommended industry inventory management practice and individual firms therefore decide on which method to apply when managing inventory. Some firms do not have an operational inventory management plan and hence this study intends to add value to the industry by recommending an inventory management practice which can be applied in the plastics and rubber industry in Kenya

1.2 Research Problem

Inventory management is a critical element towards the operations success of an organization (Mandeep & Nita, 2016). This is because the valuation and management of inventory has a one-on-one effect on the profitability of an organization. Chitale and Gupta (2014) argued that inventory management impacts on every organizational aspect particularly operations, marketing, accounting and finance. Padmanava (2017) noted that every organization aims to maintain manageable quantity of inventory as it impacts on liquidity and profitability. According to Mathuva (2018) firms involved in manufacturing in Kenya have problems in maintaining inventory, conducting an accurate demand forecast as well as responding accordingly to changing customer demands which has resulted to a general poor performance. Furthermore, many of these firms have not embraced ICT and hence most of the inventory management practices are manual which causes a lot of inconsistencies and prone to errors (Musyoka *et al.*, 2017).

According to Priniotakis and Argyropoulos (2018) there is a link between holding the right amount of inventory and business performance as it reduces the response time to customer demand which results to higher customer satisfaction. Similarly, firms who have a wide

variety of items in inventory provide a one stop shop for customers increasing customer satisfaction. Oballah, Waiganjo and Wachiuri, (2017) argued that sound inventory management practices help organizations monitor and value inventory accurately as well as track their financial performance. Empirical studies around the world (Kofu, 2020; Achuora & Arasa, 2020; Nyabwanga & Ojera, 2018) linked sound Inventory Management Practices to improved operations performance. Local studies in Kenya (Lwiki et al 2018; Musyoka et al., 2017; Tekalign, 2019) linked excellence in the application inventory management practices on operations effectiveness and profitability.

However, a recent study by Harwin et al., (2021) showed that IMPs did not significantly affect the operations performance of organizations. This is consistent to Edwin and Florence (2017) who found a negative relationship between IMPs and profitability of cement manufacturers. Notably, scanty sector specific research is available on the effect of IMPs on performance of firms specifically focusing on plastics manufacturers, hence necessitating this study. This variance of findings about the contribution of IMPs on the performance of manufacturers therefore necessitated this study. The study therefore sought to answer the question, what is the contribution of IMPs towards the performance of plastics and rubber manufacturers in Kenya?

1.3 Research Objectives

The general objective of the study was to determine the effect of Inventory Management Practices on the performance of plastics and rubber manufacturers in Kenya.

The study sought to achieve the following specific objectives;

- i. To establish the extent to which plastics and rubber manufacturers in Kenya have implemented Inventory Management Practices in Kenya.
- ii. To find out the effect of Inventory Management Practices on the operations performance of plastics and rubber Manufacturers in Kenya.

1.4 Value of the Study

The study is beneficial to plastics manufacturers who can apply the findings, conclusions and recommendations of the study in their day-to-day operations to be able to leverage from the benefits realized by firms who had adopted sound IMPs early enough in their operations. The

study is also valuable to firms struggling to implement best practices in inventory management as it points out challenges faced by similar firms and find solutions to their current problems.

The study empowers regulators and environmentalists who keep a keen eye on the plastics manufacturing sector in Kenya. The study gives insight on the best practices that can be adopted to manage inventory and hence may be the basis for future regulation or review of the current regulatory framework in the plastics sector. The study is valuable to the KAM, as it gives insight on the contribution of sound IMPs on the performance of plastics manufacturers and hence may be the basis on which KAM may recommend that members adopt the best practices in inventory management.

The study is beneficial to scholars as it adds to the body of knowledge on inventory management and provide a valuable source of Research Data (2023) in future. Scholars can refer to the study conclusions and recommendations as a basis for further studies to critique the study findings or support our study depending on their findings in future. This study is valuable for peer review for fellow scholars in future.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a literature review of past literature by past scholars which is relevant to the study. This chapter presents a theoretical review, a review of empirical literature, the study conceptualization of variables as well as the research gap necessitating this study.

2.2 Theoretical Review

This section presents the theoretical framework that guided the study. The study reviewed the tenets of the Resource Based View (RBV) and the Knowledge Based Theory. The knowledge-based theory which is derived from the resource-based view is the main guiding theory because it is the knowledge and application of the Inventory Management Practices that makes an organization gain competitive advantage over other firms in the market.

2.2.1 The Resource Based View

The Resource Based View (RBV) was proposed by Penrose (1959). It views the firm as a set of productive tangible and intangible resources that are optimally combined to provide a competitive advantage to the firm. A resource therefore must be rare, unique and excludable to be able to give a firm competitive advantage. Proponents of the theory point out that each firm has a unique resource(s) that it uses to outperform others. The applicability of the theory found that a firm's resources, capabilities and human resource play a significant role towards its competitive advantage. Resource-based theory capitalizes on the fact that when a firm has a unique skill that increases its internal efficiency and operating costs, it is able to compete favorably with other firms.

The RBV theory is relevant because it brings out the unique knowledge of best practices in modern IMPs to gain competitive advantage and to stand out from others in the industry. Inventory management practices enable a firm to compete favorably in the marketplace by ensuring internal efficiency, reducing waste and misappropriation associated with inventory. According to a recent study, Sambharya and Banerji (2019) supported the view that inventory management creates internal efficiencies that provide firms with a competitive advantage and improve their financial and operations performance. Critics of the theory point out that many

firms find it difficult to identify the specific resource that give them competitive advantage over its competitors since the process of identifying resources is complex and many organizations may lack the technical knowledge to point out what makes them stand out ahead of the competitors (Gupta, 2023)

2.2.2 The Knowledge Based Theory

The knowledge-based theory was proposed by Grant (1996). The Knowledge Based Theory builds on the resource-based theory, which insists on leveraging a firm's competitive advantage on knowledge of the firm's human resources and unique internal processes. Reviews of knowledge-based theory (Barney, 2001; Hoskisson et al., 2009; De Carolis, 2018) show that homogeneous firms operating in a certain industry differ in the level of innovation, dynamism and skills that the firm uses in its operations. The knowledge-based theory is particularly relevant to bring out how the application of IMPs as a key contributor towards the operations performance of an organization. In theory, firms must adopt operations best practices in inventory management that can minimize wastage in the production process, eliminate buffer stocks and save on inventory related costs (Eroglu and Hofer, 2017).

According to Bozarth et al (2019) the calculated application of inventory management best practices is important towards aligning the supply and demand of raw materials in the production process as well as satisfying customer demand. Many organizations in developing countries face many operations problems for not applying best IMPs. Such organizations face frequent stock-outs, delays due supplier red tape and inability to predict customer demand accurately (Chen, Frank, & Wu, 2017). This theory is criticized by recent studies (Hawkins, 2021) which claim that inventory management does not adds value since it does not significantly contribute to better Operations performance in a manufacturing organization.

2.3 Inventory Management Practices

This section will review past literature on the EOQ model, the JIT Model, the VMI Model, ABC Analysis model, the MRP model and the DSI Model.

The EOQ Model is based on a calculated interplay of the total annual demand, the costs involved in inventory handling as well as the costs of making orders which it assumes are constant over considerable length of time to make the model valid. The EOQ model can only

be effective in improving the operations efficiency of a firm if only the correct data is available to predict the demand, the inventory costs and the ordering costs incurred per order. A firm must be able to correctly predict its total annual demand factoring in any seasonal fluctuations in customer demands due to seasons or income variations as well as conduct a regression analysis using past data to predict the inventory handling costs as well as the cost of making orders. The last major aspect is the re-order level where firms applying the model must strictly adhere to the re-order levels and the fixed order quantities (Bowersox, 2002).

The tenets of the JIT model are adopted from a Japanese principle of mass production where an organization maintains a quantity of inventory just enough to satisfy its demand for that time. According to Hutchins (1999), the JIT model automatically adjusts itself to changes in demand as suppliers are able to supply in record time to avoid stock-outs but at the end of the day still clear the inventory as the demand increases. Literally, the organizations hold no buffer stocks. In a manufacturing set up, the material suppliers ideally supply raw materials just when they are needed to produce output. This enables the firm to produce just in time to coincide with customer orders.

The VMI model emphasizes on using past data to be able to predict future demand. In such a scenario, the vendor maintains the customer records and hence able to predict cyclical fluctuations in customer demand for a specific retailer and stock appropriately to match the clients' needs. According to Kazim, (2018) this model enables sharing of information between players in the value chain to ensure information symmetry amongst all players. This means that if one player gives false information there will be a market breakdown as there will be either excess stocks or stock-outs as the demand shocks cannot be filled immediately.

The ABC analysis involves a portfolio of stocks where an organization has to decide the weight of funds out of its total estimated inventory that will be allocated to each volume of product. It applies the principle of pareto efficiency to allocate scarce inventory money and to decide which item carries more weight and at what time. It classifies items of stock as A, B or C depending on the number of items the organization stocks, then decide the proportion of each item of stock it will keep in order to maximize the returns. According to Ogbo et al., (2019) 'A' items are items which comprise of between 70 – 80% of the annual demand, 'B' items comprise of items whose demand does not exceed 30% while 'C' items are those items whose demand is less than 5% of the annual total demand.

The role of MRP model is to keep as little inventory as possible. The MRP achieves it by determining when a component is needed and scheduling it to be available on time. To apply the MRP method effectively, the required inputs are: Master Production Schedule (MPS), Bill of Materials (BOM), inventory records, purchase orders, and Lead Time are known. For instance, supplier deliveries are not always on time (fuzzy lead time), so the safety stock option can be adopted as the included parameter (Santin, 2015). In the case of MRP problem with fuzzy lead times, analysis can use a fuzzy multi-objective integer linear programming (Madronero, 2015). The accuracy of the MRP input is the main factors of MRP system success. Once all inputs are available, the next step is to determine gross demand and net requirement of material. The difference of them lies in the calculation of inventory stocks of the company.

The days sales in inventory shows how fast the company is moving its inventory. In other words, the days sales in inventory ratio shows how many days a company's current stock of inventory will last. Older, more obsolete inventory is always worth less than current, fresh inventory. Shorter days inventory outstanding means the company can convert its inventory into cash sooner. Management wants to make sure its inventory moves as fast as possible to minimize these costs and to increase cash flows. Remember the longer the inventory sits on the shelves, the longer the company's cash can't be used for other operations. Management strives to only buy enough inventories to sell within the next 90 days. If inventory sits longer than that, it can start costing the company extra money. It only makes sense that lower day's inventory outstanding is more favourable than higher ratios (Ying-MeiTu, 2017).

2.4 Empirical Literature Review

This section reviews literature on inventory management practices and operations performance. The study will review literature using the funnel approach in order to have an all-round feel of how the Inventory Management Practices have impacted on the performance of organizations globally

Priniotakis and Argyropoulos (2018) conducted a study about inventory management practices and techniques in Greece. The article discussed basic concepts and techniques for classifying inventory, controlling inventory levels, preventing inventory outages, and increasing customer satisfaction. The study discussed the importance of demand forecasting and uses the Root Mean Square Error as an effective measure of forecast error, which later

becomes a fundamental driver for inventory management. It addressed service level as a performance metric and emphasized the importance of safety stocks. The paper concluded that holding the right amount of inventory can increase business performance by reducing response time to customer demand, leading to higher customer satisfaction. Textile managers and business owners should consider and balance the trade-offs when deciding how much inventory to hold and make strategic decisions based on proven concepts. The findings of study were based on the experience of the textile industry in Greece and hence cannot be generalized across all sectors

Masudin et al (2018) conducted a study on the probable impact of inventory management on a firm's performance in Indonesia. The purpose of the paper was to examine inventory and purchasing management practices and their impact on organizational performance. The performance measures examined in the research are financial performance and customer satisfaction. The study used secondary data collection by gathering information related to inventory management and purchasing practices from various articles, journals and books by various researchers. The study found that automated procurement processes such as e-product increase organizational performance; Implementing world-class procurement practices also increases organizational performance. The study also found that inventory management increases organizational performance.

Mwangi and Nyambura (2017) studied the importance of IMPs amongst food processors in Kenya. Their key concern was how the inventory was managed to ensure operations efficiency and the overall profitability of the firm. The study singled out three practices that worked particularly in the food processing industry namely; loss control, production maintenance and cost reduction as the key drivers to managing inventory costs amongst food processors. The study however did not recommend the best inventory management practice that can be applied by manufacturers. Ngei and Kihara (2017) conducted a study that focused on gas distributors in Kenya and how the implementation of inventory management best practices had impacted on their operations. The study used a structured questionnaire to collect data from the study respondents. The study findings show that Vendor Managed Inventory, e- procurement as well as the application of Enterprise Resource Planning worked well to bring the operations of these firms to a good level of Operations efficiency. The study however did not link inventory management to operations performance

Mogere, Oloko and Okibo (2018) studied the effect of IMPs adopted by Gianchore Tea Factory to manage its inventory on the factory's operations performance. The study was aimed at generalizing and recommending key inventory management practices which could be applied across the KTDA managed tea factories in Kenya. The study found out that management of inventory minimized leakages and improved operations efficiency, gradually saving overall costs. since 2015. The gradual reduction in production costs positively impacted the operations performance of the factory as a unit and therefore recommended that the same practices be applied across all the KTDA managed factories in Kenya. The findings of the study are however limited to the tea processing sector and may not be applied in the manufacturing sector

Lwiki, et al., (2018) studied the effect of IMPs on the financial performance of sugar manufacturers between 2013 and 2017. The study relied on both primary and secondary data. Primary data was collected using questionnaires and analyzed for both descriptive and inferential statistics. The findings show that only 12 firms had adopted inventory management practices, with most of them using electronic JIT, EOQ models to manage their inventory. The findings show that firms that implemented an IMP had better financial performance as well as an inventory audit trail compared to those that did not implement them. The study found a direct correlation between application of IMPs and the return on equity and capital applied. The findings however are limited to application of IMPs in the sugar manufacturing sector which is structurally different from the plastics and rubber industry

Ogbo, Onekanma and Wilfred (2019) studied the organizational performance of seven-piece bottling company since the implementation of a rapid results inventory management system in Enugu, Nigeria with the aim of deriving a correlation between inventory flexibility and a firm's financial performance. The study collected data using a structured questionnaires and analyzed the data using SPSS. The study found out that that the inventory management system enhanced cost saving, end to end material tracking as well as an improved return on investment. The firm recorded a consistent trend of reduced level of operating expenses for three years after which it stabilized, symbolizing the optimal level of operations. The study found a positive correlation between effective IMPs and operations effectiveness and recommended that manufacturing firms should closely monitor their operating costs through

inventory management. The research findings are limited to Nigeria and hence cannot be used to describe the plastics and rubber industry in Kenya.

Onchoke and Wanyoike (2020) conducted a survey of the effect of IMPs on the performance of agrochemical distributors in Nakuru, Kenya. The findings show that the practices used to manage inventory in these firms improved the transparency of the purchasing process by enabling full inventory tracking and facilitating audit. The results of the study showed that inventory audit, adoption of security measures as well as a computerized integrated inventory management system positively affected the financial performance of agrochemical distributors. The findings are similar to Abdullahi (2020) who studied the impact of a firm's IMPs on the customer satisfaction and found a correlation of 0.83 between the EOQ model adopted by the firms and client satisfaction. The findings are limited to the application of IMPs in the Agrochemical Industry which is very different from the plastics and rubber industry in Kenya.

Ajayi, Tunde and Araoye, (2021) sought to find out the contribution of IMPs on the performance of Fast-Moving Consumer Goods (FMCG) firms listed the Stock Exchange in Nigeria for the decade ending 2019. The researchers hypothesized a positive correlation between operations efficiency and financial performance measured using Return on Investment (ROI), Return on Capital Employed (ROCE) and the average annual profits for the ten years under review. The findings show that IMPs contributed significantly towards the improvement of the firms' operations profits which consequently led to a higher ROI, ROCE and an improvement of the level of annual profits by an average of 5 – 8% in the 10 years reviewed. The study identified weaknesses in the inventory management systems which it recommended be improved on to achieve the desired results as well as seal profit leakages. The study findings are limited to profitability and financial performance and not operations performance.

Yankah (2022) sought to establish the influence of IMPs on the performance of manufacturers in Kumasi Metropolis, Ghana. The study anticipated that IMPs contributed significantly to improving the income and balance sheet position of manufacturers in Kumasi. The study relied on primary data collected using a questionnaire and analyzed using descriptive and inferential statistics. The regression results study showed that each unit increase in IMPs led to between 20 – 30% increase in market efficiency, profitability and an

improved cash flow position. This indirectly led to customer satisfaction translating to a higher level of inventory turnover. This showed that IMPs contributed to the improvement of the performance of manufacturers in Kumasi, Ghana and recommended that optimal inventory management may be the key to an improved internal efficiency level in manufacturing firms and should be adopted as an industry best practice.

Chin, Ramiah & Razali (2023) conducted a study which aimed at developing an Inventory Management Systems (IMS) that can provide better control and handling of product stock, customer order, customer service and order delivery that relates to company inventory information. The target user is the owner and employee in Small and Medium Enterprise (SME) retail store that stills manages inventory manually in Malaysia. IMS helps retail store to track down the next arrival of product stocks and record customer order for reservation for the product in the store inventory. Data was collected from managers of ICT companies and small organizations in which the app was implemented. The findings show that use of the inventory management app improved the inventory handling, internal efficiency and enhanced the record keeping for inventory records but did less to increase the level of customer service. Even though the inventory management system has been fully developed by the developer, there were still limitations found and future enhancement that can be made towards the system.

2.5 Literature Review Summary and the Research Gap

A summary of the empirical literature review is provided in the table 2.1 below. The table highlights the authors, the focus of the studies, the methodology applied, key findings, the research gaps and what the study did to fill the research gap found.

Table 2. 1 Literature Review Summary and Research Gaps

Author (s)	Focus of the Study	Methodology	Key Findings	Research Gaps	Filling of Gaps
Edwin and Florence (2017)	The impact of IMPs on financial performance of Cement Manufacturers in Kenya.	A cross sectional study of cement Manufacturers in Athi River township were sampled for the study.	Implementation of IMPS negatively impacted the financial performance of cement manufacturers.	The research was based on the operations of the mining sector which is substantially different in terms of Operations dynamics as compared to the plastics manufacturing sector.	This study sheds light of the scanty literature on the plastics manufacturing sector in Kenya and provide an all-round approach to inventory management and plastics manufacturing
Mogere, Oloko and Okibo	how IMPs affected the performance of	A case study of Gianchore tea	The implementation of IMPs positively influenced	The findings of a case study may not be applicable to other firms	This study involves a census of all plastics Manufacturers in Kenya

(2018)	Gianchore Tea Factory.	factory	performance	in the sector or the entire business scenario	and hence the findings can be reliably used to conclude about the plastics industry
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Author (s)	Focus of the Study	Methodology	Key Findings	Research Gaps	Filling of Gaps
Lwiki, <i>et al.</i>, (2018)	Application of IMPs amongst Sugar Manufacturers.	A purposive sample of 16 sugar firms in Western Kenya.	The findings revealed that IMP had a positive effect on ROI and ROE.	The study made its conclusions on the findings from sugar Manufacturers which has a different dynamic from plastics manufacturing	The study carried-out a comprehensive study on the plastics sector

Ogbo, Onekanma and Wilfred, (2019)	The impact of IMPs on organizational performance	A case study approach was used where the Seven – Price Bottlers of Nigeria was studied	Operations Performance can be achieved by adopting a flexible IMP.	The study was conducted in Enugu, Nigeria and recommended that IMPs should be flexible if it is to meet organizational objective of improving performance	This study was customized to the Kenyan market and make the findings relevant to not only the Kenyan plastics manufacturing sector but also manufacturing in general in Kenya
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Author (s)	Focus of the Study	Methodology	Key Findings	Research Gaps	Filling of Gaps
Kamau and Assumpta	The impact of IMP on	The study sampled 135 staff of Safaricom to	IMP affects the competitiveness an	The study was based on safaricom which operates	The study was not only applicable across the

(2018)	organizational competitiveness.	represent the entire workforce.	organization	in the service sector where the Operations dynamics which differ from plastics manufacturing	manufacturing sector but the economy at large
Onchoke and Wanyoike, (2020)	The influence of IMP used on performance of Agrochemical distributors operating in Nakuru.	The study carried out a survey of agrochemical distributors in Nakuru City	The findings show that inventory management practices adopted by agrichemical distributors improved transparency in the procurement process as it enabled end to end inventory	The study was based on the agrochemicals value chain and hence some of the conclusions made in this study may not be relevant in the plastics manufacturing sector in Kenya.	This study highlights the operations of plastics manufacturers and inventory management in general.

			tracking and ease of audit.		
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Author (s)	Focus of the Study	Methodology	Key Findings	Research Gaps	Filling of Gaps
Ajayi, Tunde and Araoye (2021)	The contribution of IMPs on the performance of Fast-Moving Consumer Goods (FMCG) firms listed the Stock Exchange in Nigeria	The study conducted a correlation analysis between the IMPs and the Return on Investment (ROI), Return on Capital Employed (ROCE) and the average annual profits	The findings show that IMPs contributed significantly towards the improvement of the firms' operations profits which consequently led to a higher ROI, ROCE and an improvement of the level of annual profits by an average of 5 – 8% in the 10	The study findings are limited to profitability and financial performance and not operations performance	This study measured the effect of IMPs on the operations performance of plastics and rubber manufacturers in Kenya

			years reviewed.		
Yanka, (2022)	The influence of IMPs on the performance of manufacturers in Kumasi Metropolis, Ghana.	The study relied on primary data collected using a questionnaire.	The regression results study showed that each unit increase in IMPs led to between 20 – 30% increase in market efficiency, profitability and an improved cash flow position.	The study was based on the context of Kumasi Ghana which is contextually different from Kenya	The study measured the effect of IMPs on the operations performance of Plastics and rubber manufacturers in Kenya

Author (s)	Focus of the Study	Methodology	Key Findings	Research Gaps	Filling of Gaps
Chin, Ramiah & Razali	Developing an Inventory	The researcher adopted a quantitative research	The inventory management system achieved the general	The Inventory management system	This study measured the effect

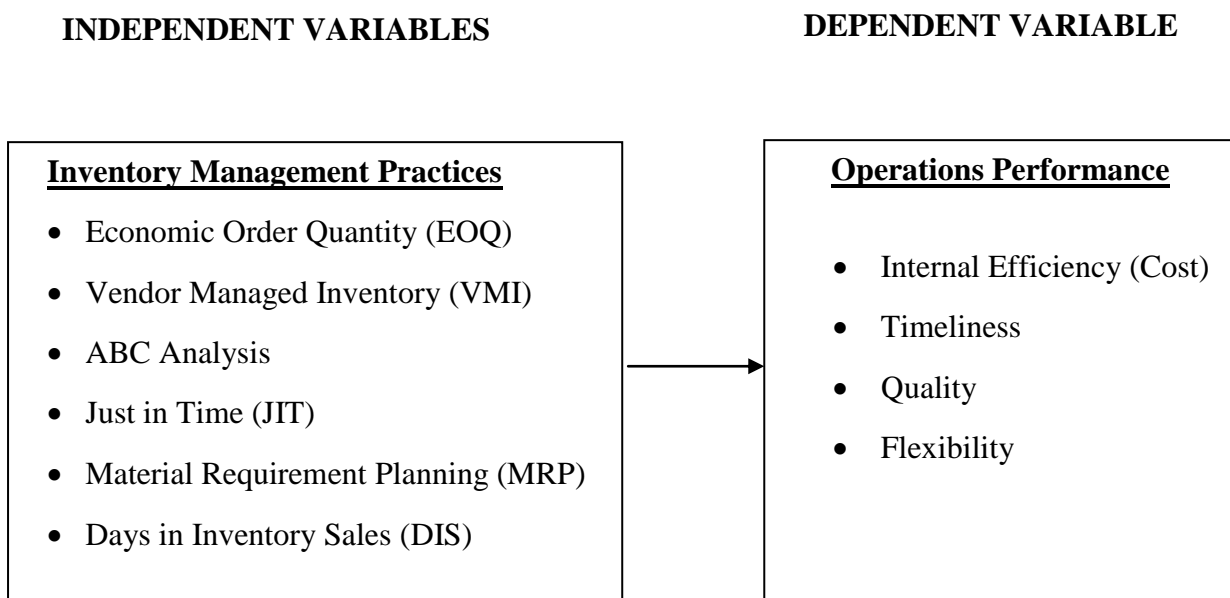
<p>(2023)</p>	<p>Management Systems (IMS) that can provide better control and handling of product stock, customer order, customer service and order delivery that relates to company inventory information</p>	<p>method where the study conducted a survey. Data was collected using a questionnaire which was distributed to IT and persons with knowledge and experience in inventory management.</p>	<p>of inventory management activities but there are more additional features like recording feedbacks and assigning staff for order delivery and many more that can be used by the user if needed</p>	<p>was not benchmarked against world renowned inventory management systems to determine its efficiency in improving operations performance</p>	<p>of six inventory management practices in the plastics and rubber industry in Kenya in order to establish the most widely adopted practice and the most efficient in improving operations performance</p>
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Source: Researcher (2023)

2.6 Conceptual Framework

The study conceptualizes that organizations establish the Inventory Management Practices that are to be followed to effectively manage their Operations inventory (Raw material and Finished output). These practices are meant to enhance performance of the organization. The dependent variable which will be measured in terms of cost saving, timeliness of delivery of customer orders, Quality control and flexibility to demand changes. However, these practices can only be effective if they are implemented fully as shown in Figure 2.1 below;

Figure 2.1 Conceptual Model



Source: Researcher (2023)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section presents the research methods that were used in this study. It details the research design adopted by the study, study's population, the data collection procedure, how data was analyzed as well as how the findings of the study were presented.

3.2 Research Design

A descriptive research design was adopted for this study. Using a descriptive research study improves understanding and provides a clear link between the research variables. Since the researcher cannot control the variables, there is no way the researcher can manipulate the existing variables (Nassaji, 2017).

3.2 Population of the Study

The study population was the 70 plastics and rubber manufacturers in Kenya registered with the Kenya Association of Manufacturers (Appendix III). A census was conducted since the population was small.

3.3 Data Collection

This study's research instrument was a questionnaire which was used to collect primary data. It consisted of closed ended questions on a likert scale. The questionnaire contained three Sections; Section A was designed to capture the background of the respondents; Section B was designed to measure the level of implementation of the inventory management models. Section C measured the effect of inventory management models as implemented in plastics manufacturers in Kenya on various measures of operations efficiency. This study employed two research assistants who delivered the questionnaires and picked them up at a later agreed time (Drop and Pick Later method) to ensure that as much data as possible is collected for the study. The two research assistants were recruited and trained in a pilot study prior to data collection. This helped in establishing the reliability of the questionnaire instrument. The study focused on inventory managers or equivalents in the plastics and rubber as the respondents of the study as they were deemed to have the required knowledge of the policies and procedures adopted by the firms for inventory management.

3.4 Data Analysis

The returned questionnaires were then be numbered, checked for full responses and then entered into the SPSS (V.21) software. The software then generated descriptive statistics to describe the data. The data from Section A and B of the questionnaire was analyzed using descriptive statistics, while in Section C inferential statistics were used, where a regression analysis was used to determine the relationship between the study variables. The regression analysis was guided by the regression model below;

$$Y = \beta_0 + \beta_1(\text{EOQ}) + \beta_2(\text{JIT}) + \beta_3(\text{VMI}) + \beta_4(\text{ABC}) + \beta_5(\text{MRP}) + \beta_6(\text{DSI}) + \varepsilon$$

Where;

Y = (Dependent Variable) Performance of Plastic Manufacturers in Kenya

$\beta_0 - \beta_6$ = Coefficients

ε = error term

Table 3. 1 Data Collection and Analysis Methods

The Objectives	Section	Analysis Method used
Background Data	A	Descriptive Statistics
Degree of implementation of Inventory Management by plastics manufacturers in Kenya.	B	Descriptive Statistics
The effect of IMPs on operations performance of plastics manufacturers in Kenya.	C	Regression Analysis

Source: Researcher (2023)

CHAPTER FOUR

RESULTS AND FINDINGS

4.1 Introduction

This chapter presents the findings of the study in a way of data analysis. The findings are presented in line with the research objectives. The analysis consists of the response rate, the background information, a presentation of descriptive statistics in line with the research objectives and finally a presentation of inferential statistics derived from the Research Data.

4.1.1 Response Rate

The researcher reached out to respondents of the study. The researcher and the research assistants delivered 70 questionnaires to the target respondents. A total of 58 questionnaires were returned but only 55 questionnaires were fully filled. 3 questionnaires were voided for being partially filled. 12 targeted respondents did not respond at all. The frequencies and percentages of the responses are shown in table 4.1 below

Table 4. 1 Response Rate

Action	Count	Percentage
Responded	55	79%
Did not Respond	12	17%
Spoilt	3	4%
Total	70	100%

Source: Research Data (2023)

This response rate was considered excellent and was enabled by the proactiveness of the research assistants who dropped the questionnaires and followed up on the respondents to

ensure the questionnaires were returned. This response was considered adequate for the study and statistically sound to make conclusions and inferences about the study population.

4.2 Background Information

The study sought to establish the background of respondents in terms of gender, age, level of education and the experience in the plastics and rubber value chain. The findings are presented below.

4.2.1 Gender

Table 4. 2 Gender of Respondents

Gender	Count	Percentage
Male	36	65%
Female	19	35%
Total	55	100%

Source: Research Data (2023)

The findings presented in table 4.2 above show that 36 respondents (65%) in the study were male while 19 respondents (35%) were female. This shows that both genders were well represented in the study and considered a fair representation of the gender composition of managers in the plastics and rubber industry in Kenya.

4.2.2 Age of Respondents

Table 4. 3 Age of Respondents

Age of Respondents	Count	Percentage
Below 25 years	10	18%
Between 26 – 36 years	18	33%
Between 37 – 45 years	13	24%
Between 46 – 60 years	11	20%
Above 60 years	3	5%
TOTAL	55	100%

Source: Research Data (2023)

The findings presented in table 4.3 above show that 18% of the respondents were below 25 years of age, 33% were aged between 26 and 36 years, 24% were aged between 37 and 45 years, 20% were aged between 46 and 60 years while only 5% were aged above 60 years. This shows that the study sample was representative of all the age groups and hence the findings of the study cannot be said to be biased to the views of a specific age group.

4.2.3 Level of Education

Table 4. 4 Level of Education

Level of Education	Count	Percentage
KCSE	7	13%
Certificate	9	17%
Higher Diploma	16	29%
Undergraduate Degree	14	25%
Others (Specify)	9	17%
TOTAL	55	100%

Source: Research Data (2023)

The findings presented in table 4.4 above show that 13% only had the KCSE certificate, 17% had an artisan certificate, 29% had a diploma, 25% had a degree and 17% indicated that they had other qualifications above the undergraduate degree. This shows that the study respondents could understand the questionnaire and provide valuable information which the researcher relied on to make conclusions about the study population.

4.2.4 Experience in the Plastics and Rubber Industry

The study sought to establish the years of experience a respondent has had in the plastics and rubber value chain and the findings are presented in tale 4.2 below;

Table 4. 5: Experience in the Plastics and Rubber Sector

Experience	Count	Percentage
1 - 2 years	10	18%
3 - 6 years	12	22%
7 - 10 Years	18	33%
Over 10 years	15	27%
TOTAL	55	100%

Source: Research Data (2023)

The findings presented in table 4.2 below show that 18% of the respondents had worked in the industry for less than 2 years, 22% have worked in the industry for between 3 – 6 years, 33% had worked in the sector for between 7 – 10 years while 27% had worked in the sector for over 10 years. These findings show that the research sample was representative of all the possible classes of employees in the organization as the respondents had vast experience in the plastics and rubber industry and could objectively understand the operations of firms in the industry.

4.2.5 Position in the Organogram

The study sought to find the position of the respondent in the organogram. This was intended to measure the level of understanding a respondent has regarding the research area and the findings are presented in table 4.3 below;

Table 4. 6 Position in the Organogram

Position	Count	Percentage
Director	22	40%
Partner	0	0%
Manager	18	33%
Employee	15	27%
TOTAL	55	100%

Source: Research Data (2023)

The findings presented in table 4.3 above show that 40% of the respondents were directors in their organizations, 33% were managers while 27% were ordinary employees in their organizations. None of the respondents indicated being a partner in their organizations as the institutions sampled were registered companies. This calibre of respondents were deemed knowledgeable enough to objectively understand the operations of firms in the industry and hence their feedback could be relied upon to make inferences about the industry.

4.3 Level of Implementation of Inventory Management Practices

The first objective of the study was to establish the degree to which inventory management practices have been implemented in the sampled organizations. The study looked at the possible implementation for six common inventory management models; The Economic Order Quantity Model, the Just In time Method, the Vendor Managed Inventory method, the ABC analysis, the Material Requirement Planning model and the Days Inventory in Sales method. The table below shows the organizations which have adopted the various inventory management practices.

Table 4. 7 Adoption of Inventory Management Practices

Inventory Management Practice	Count	Percentage
Economic Order Quantity	33	60%
Just In Time	5	9%
Vendor Managed Inventory	1	2%
ABC Analysis	0	0%
Material Requirement Planning	1	2%
Days Inventory in Sales	0	0%
None	15	27%
TOTAL	55	100%

Source: Research Data (2023)

The findings presented in table 4.4 above show that 60% of the organizations had adopted the Economic Order Quantity (EOQ) model as the preferred inventory management practice of choice. 5 organizations (9%) had implemented the just in time approach, the Vendor Managed Inventory and Material Requirement Planning models were adopted in one organization each while 15 organizations did not have a specific inventory management model. None of the organizations studied had adopted the ABC analysis or the Days Inventory in Sales models. This shows that majority of the organizations in the sector preferred to use the principles of the EOQ model as they were simple to apply and could easily be computerized and also integrated into their core business systems.

4.4 The Effect of Inventory Management Practices on Operations Performance

The second objective of the study was to determine the effect of the various inventory management practices had impacted on various aspects of operations performance in the

organizations in which they were implemented in. Respondents were requested to indicate on a scale of 1 – 5 (where 1 represented a very little extent and 5 represented a very great extent) the degree to which the various operations aspects had improved due to the successful implementation of the inventory management models and the findings are presented in table 4.8 below.

Table 4. 8 The Effect of Inventory Management Practices on the Measures of Operations Performance

Measures of Operations Performance	Mean	Std Deviation
1 Internal Efficiency (Cost)		
Reduced Inventory Wastage	4.6	0,124
Reduced Material Handling Costs	4.8	0,132
Reduced inventory misappropriation and Fraud	4.3	0,215
Overall Mean	4,57	
2 Timeliness (Speed)		
Has avoided stock-out by timeliness of delivery	4.5	0,225
Increased Staff productivity	4.2	0,321
Has enabled Flexibility to changes in demand	4.1	1,122
Overall Mean	4,27	
3 Quality		
Hastened the Quality Control	3.2	1,956
Enabled better service to customers	3.5	1,596
Reduced Customer Complaints	2.9	2,312
Overall mean	3,20	

4 Flexibility

The firm is able to meet customer demand	4.2	0,852
The Firm is able to take Special Orders	3.8	1,263
The firm is able to manage supplier alternatives	4.1	0,682
Overall Mean	4,03	

Source: Research Data (2023)

The findings presented in table 4.8 above show that that the implementation of inventory management practices had a great effect on the internal efficiency of the organization in terms of cost with an overall mean of 4.57 by reducing inventory wastage (Mean 4.6) reduced material handling costs (Mean 4.8) and reducing inventory fraud (4.3). this shows that the inventory management practices helped reduce the inefficiencies associated with inventory management which had a great effect on operations performance of organizations.

Secondly, the implementation of Inventory Management Practices greatly improved the timeliness with which inventory related transactions were concluded with an overall mean of 4.27. This study can therefore deduce that the implementation of the inventory management practices improved the timeliness with which major organizational transactions involving sales and movement of inventory were concluded.

The findings also show that the respondents were neutral regarding how the implementation of Inventory management practices improved the quality control process with a mean of 3.2. The respondents also did not believe the inventory management practices did much to better the services rendered to customers with a mean of 3.5. This trend also seemed consistent as many respondents did not think the implementation of Inventory Management practices

reduced the number of complaints from customers with a mean of 2.9. the study findings show that in general, the implementation of inventory management practices did not significantly improve quality control in the plastics and rubber sector.

However, the respondents were positive that the organizations that implemented inventory management practices were able to meet customer demand with a mean of 4.2 and the firms could easily manage supplier alternatives with a mean of 4.1 since they could easily measure the efficiency with which suppliers were able to meet the demand when called upon to supply. The respondents however did not think the inventory management practices did much to enable firms take special orders with a mean of 3.8. In total, the implementation of the inventory management practices was able to improve a firm's flexibility to a great extent as indicated by a mean of 4.01. This study can therefore deduce from these findings that the implementation of the Economic Order Quantity (EOQ) and Just in Time (JIT) significantly improved the internal efficiency, the timeliness and flexibility of organizations that adopted them. However, these practices did little to improve the quality of service rendered to the customer by the organizations.

4.5 Regression Results

The study ran a regression model on the between operations performance and its indicators (The Economic Order Quantity model, The Just in Time Model, the Vendor Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory) with the intention of developing a linear model that can be used to predict the effect of IMPs on operations performance. The regression analysis was carried out in two levels. First, the study carried out an analysis to establish the relationship between the IMPs and the individual measures of operations performance namely Internal efficiency (Cost), Timeliness, Quality

and Flexibility. The second level involved the overall regression model that measured the relationship between the IMPs and operations performance using a composite measure of the four indicators of operations performance. Overall, five regression models will be run and analysed.

4.5.1 Inventory Management Practices and Internal Efficiency (Cost)

The study run a regression analysis between IMPs and internal efficiency (cost) and the findings are presented in table 4.9, 4.10 and 4.11.

Table 4. 9 Regression Coefficients for Internal Efficiency (Cost)

Model	Un-standardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.751	.018		4.321	.023
Economic Order Quantity	9.253	.036	9.113	9.521	.028
Just in Time	1.562	.022	2.396	3.125	.058
Vendor Managed Inventory	.725	.032	.675	1.222	.031
ABC analysis	.000	.000	.000	.000	.000
Material Requirement Planning	.725	.031	.675	.881	.028
Days in Inventory Model	.000	.000	.000	.000	.000

a) Dependent variable: Internal Efficiency (Cost)

Source: Research Data (2023)

The equation for linear regression for internal efficiency is:

$$Y = 2.751 + 9.253\beta_1 + 1.562\beta_2 + 0.725\beta_3 + 0.000\beta_4 + 0.725\beta_5 + 0.000\beta_6 + e$$

Where:

Y = Internal Efficiency (Cost)

β_1 – Economic Order Quantity

β_2 – Just in Time

β_3 – Vendor Managed Inventory

β_4 – ABC Analysis

β_5 – Material Requirement Planning

β_6 – Days in Sales

From table 4.9; Inventory Management Practices (EOQ ($t=9.521$, $P<0.05$), JIT ($t=3.125$, $P<0.05$) had a significant effect on the internal efficiency of firms in the plastics and rubber industry in Kenya because their $P < 5\%$ and their $t > 1.96$. However, Vendor Managed Inventory ($t=1.222$, $p<0.05$) and Material Requirement Planning ($t=.881$, $p<0.05$) showed t values below 1.96 rendering them to be insignificant as they did not have a significant effect on internal efficiency of firms in the plastics and rubber industry in Kenya. Lastly, the regression results show us that when all the variables were maintained at zero, the level of internal efficiency in terms of cost would be a constant value of 2.751.

Table 4. 10 Model Summary for Operations Performance

Model	R	R Square	Adjusted R Square	Std Error of the Estimate	Change Statistics			
					F Change	df1	df2	Sig. F Change
1	.812 ^a	.659	.649	.212	22.251	6	48	.000

a) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

Source: Research Data (2023)

From table 4.10, R^2 of 65% denotes that 65% of the variations in internal efficiency can be attributed to inventory management practices. This outcome is considered fairly good as 35% of variations in internal efficiency in terms of cost remains unexplained. This means that the

model is fairly good in measuring operations performance of firms in the plastics and rubber industry in Kenya. The Analysis of Variance (ANOVA) is outlined in table 4.11.

Table 4. 11 Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	62.48	6	10.413	4.448	0.05(a)
Residual	112.38	48	2.341		
Total	174.86	54			

a) Dependent variable: Internal Efficiency

b) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

The findings presented in table 4.11 shows that at 5% significance level at degrees of freedom (6, 48) the F value is 4.448 which is bigger than the F critical value 2.295 meaning the model is adequate to predict internal efficiency.

4.5.2 Inventory Management Practices and Timeliness

The study run a regression analysis between IMPs and Timeliness and the findings are presented in table 4.12, 4.13 and 4.14.

Table 4. 12 Regression Coefficients of Timeliness

Model	Un-standardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	5.623	.018		4.256	.015
Economic Order Quantity	8.256	.012	8.152	12.623	.046
Just in Time	3.215	.004	3.110	2.125	.012
Vendor Managed Inventory	.733	.028	.688	2.421	.021
ABC analysis	.000	.000	.000	.000	.000
Material Requirement Planning	.733	.028	.688	3.513	.013

Days in Inventory Model	.000	.000	.000	.000	.000
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b) Dependent variable: Timeliness

Source: Research Data (2023)

The equation for linear regression of timeliness is:

$$Y = 5.623 + 8.256\beta_1 + 3.215\beta_2 + 0.733\beta_3 + 0.000\beta_4 + 0.733\beta_5 + 0.000\beta_6 + e$$

Where:

Y = Timeliness

β_1 – Economic Order Quantity

β_2 – Just in Time

β_3 – Vendor Managed Inventory

β_4 – ABC Analysis

β_5 – Material Requirement Planning

β_6 – Days in Sales

From table 4.12; Inventory Management Practices (Economic Order Quantity (t=12.623, P<0.05), Just in Time (t=2.125, P<0.05), Vendor Managed Inventory (t=2.421, p<0.05), Material Requirement Planning (t=3.513, p<0.05), had a significant effect on the timeliness of firms in the plastics and rubber industry in Kenya because their P values are less than 5% and their T values were above 1.96. Lastly, the regression results show the holding all other factors constant at zero, the level of timeliness would be 5.623.

Table 4. 13 Model Summary for Timeliness

Model	R	R Square	Adjusted R Square	Std Error of the Estimate	Change Statistics			
					F Change	df1	df2	Sig. F Change

1	.868	.753	.741	.658	28.124	6	48	.000
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b) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

Source: Research Data (2023)

From table 4.13, R^2 of 74% denotes that 74% of the variations in timeliness can be attributed to inventory management practices. This outcome is considered excellent as only 26% of variations in timeliness remains unexplained. The Analysis of Variance (ANOVA) is outlined in table 4.14.

Table 4. 14 Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	75.42	6	12.57	3.861	0.05(a)
Residual	156.28	48	3.256		
Total	231.70	54			

c) Dependent variable: Timeliness

d) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

The findings presented in table 4.14 shows that at 5% significance level at degrees of freedom (6, 48) the F value is 3.861 which is bigger than the critical value 2.295 meaning the model is adequate to predict timeliness.

4.5.3 Inventory Management Practices and Quality

The study sought to find out the linear relationship between the IMPs and Quality and the findings are presented in table 4.15, 4.16 and 4.17 below.

Table 4. 15 Regression Coefficients of Quality

Model	Un-standardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.785	.021		1.856	.028
Economic Order Quantity	1.112	.028	1.101	2.365	.022
Just in Time	.235	.012	.213	2.146	.008
Vendor Managed Inventory	.001	.008	.001	.124	.021
ABC analysis	.000	.000	.000	.000	.000
Material Requirement Planning	.001	.008	.001	.451	.021
Days in Inventory Model	.000	.000	.000	.000	.000

a) Dependent variable: Quality

Source: Research Data (2023)

The equation for linear regression of quality is:

$$Y = .785 + 1.112\beta_1 + .235\beta_2 + 0.001\beta_3 + 0.000\beta_4 + 0.001\beta_5 + 0.000\beta_6 + e$$

Where:

Y = Quality

β_1 – Economic Order Quantity

β_2 – Just in Time

β_3 – Vendor Managed Inventory

β_4 – ABC Analysis

β_5 – Material Requirement Planning

β_6 – Days in Sales

From table 4.15; Inventory Management Practices (Economic Order Quantity ($t=2.365$, $P<0.05$), Just in Time ($t=2.146$, $P<0.05$), had a significant effect on the quality of firms in the plastics and rubber industry in Kenya. This is because their P values are less than 5% and their T values were above 1.96. However, Vendor Managed Inventory ($t=.124$, $p<0.05$), Material Requirement Planning ($t=.451$, $p<0.05$) showed t values below 1.96 rendering them to be statistically insignificant. Lastly, the regression results show us that when all the variables were maintained at zero, the level of quality value would be .785.

Table 4. 16 Model Summary for Quality

Model	R	R Square	Adjusted R Square	Std Error of the Estimate	Change Statistics			
					F Change	df1	df2	Sig. F Change
1	.781 ^a	.610	.605	.416	32.135	6	48	.000

a) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

Source: Research Data (2023)

Table 4.16 shows that R^2 of 61% means that 61% of the variations in quality can be attributed to inventory management practices. 39% of variations in quality remains unexplained. The Analysis of Variance (ANOVA) is outlined in table 4.11.

Table 4. 17 Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	63.52	6	10.59	3.390	0.05(a)
Residual	154.28	48	3.214		
Total	217.80	54			

a) Dependent variable: Quality

b) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

The findings presented in table 4.17 shows that the F value is 3.39 which is bigger than the critical value 2.295 (at 5% significance level and (6, 48) degrees of freedom. This shows that the model is adequate to predict quality as a measure of operations performance.

4.5.4 Inventory management Practices and Flexibility

The study run a regression analysis between IMPs and flexibility as a measure of flexibility and the findings are presented in table 4.18, 4.19 and 4.20 below.

Table 4. 18 Regression Coefficients of Flexibility

Model	Un-standardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	3.562	.022		2.651	.031
Economic Order Quantity	2.135	.028	6.538	8.254	.025
Just in Time	1.188	.018	2.416	4.265	.021
Vendor Managed Inventory	.712	.026	.681	2.134	.081
ABC analysis	.000	.000	.000	.000	.000
Material Requirement Planning	.712	.026	.681	1.983	.022
Days in Inventory Model	.000	.000	.000	.000	.000

b) Dependent variable: Flexibility

Source: Research Data (2023)

The equation for linear regression of flexibility is:

$$Y = 3.562 + 2.135\beta_1 + 1.188\beta_2 + 0.712\beta_3 + 0.000\beta_4 + 0.712\beta_5 + 0.000\beta_6 + e$$

Where:

Y = Flexibility

β_1 – Economic Order Quantity

β_2 – Just in Time

β_3 – Vendor Managed Inventory

β_4 – ABC Analysis

β_5 – Material Requirement Planning

β_6 – Days in Sales

From table 4.18; Inventory Management Practices (Economic Order Quantity ($t=8.254$, $P<0.05$), Just in Time ($t=4.265$, $P<0.05$), Vendor Managed Inventory ($t=2.134$, $p<0.05$), Material Requirement Planning ($t=1.983$, $p<0.05$), had a significant effect on the flexibility of firms in the plastics and rubber industry in Kenya. This is because their P values are less than 5% and their T values were above 1.96. Lastly, holding all other factors constant at zero, the level of flexibility would be 3.562.

Table 4. 19 Model Summary for Flexibility

Model	R	R Square	Adjusted R Square	Std Error of the Estimate	Change Statistics			
					F Change	df1	df2	Sig. F Change
1	.799 ^a	.638	.635	.386	22.875	6	48	.000

b) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

Source: Research Data (2023)

From table 4.19, R^2 of 64% shows that 64% of the variations in flexibility can be attributed to inventory management practices. 36% of variations in flexibility remains unexplained. The Analysis of Variance (ANOVA) is outlined in table 4.11.

Table 4. 20 Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	46.53	6	7.755	2.543	0.05(a)
Residual	146.33	48	3.049		

Total	192.86	54			
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c) Dependent variable: Flexibility

d) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

The findings presented in table 4.20 shows that at 5% significance level at degrees of freedom (6, 48) the F value is 3.277 which is bigger than the critical value 2.295 meaning the model is adequate to predict flexibility.

4.5.5 Inventory Management Practices and Operations Performance

The study sought to find out the overall relationship between IMPs and operations performance so as to find out the composite measure of operations performance. This analysis was carried out independently so as to determine the overall effect of IMPs on operations performance. The regression findings are presented in 4.20, 4.21 and 4.22 below;

Table 4. 21 Regression Coefficients of Operations Performance

Model	Un-standardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.856	.013		4.321	.036
Economic Order Quantity	6.562	.032	6.538	9.521	.025
Just in Time	2.502	.021	2.416	3.125	.031
Vendor Managed Inventory	.003	.032	.002	1.861	.032
ABC analysis	.000	.000	.000	.000	.000
Material Requirement Planning	.003	.032	.002	1.243	.018
Days in Inventory Model	.000	.000	.000	.000	.000

c) Dependent variable: Operations Performance

Source: Research Data (2023)

The equation for linear regression of operations performance is:

$$Y = 1.856 + 6.562\beta_1 + 2.502\beta_2 + 0.003\beta_3 + 0.000\beta_4 + 0.003\beta_5 + 0.000\beta_6 + e$$

Where:

Y = Operations Performance

β_1 – Economic Order Quantity

β_2 – Just in Time

β_3 – Vendor Managed Inventory

β_4 – ABC Analysis

β_5 – Material Requirement Planning

β_6 – Days in Sales

From table 4.20; Inventory Management Practices (Economic Order Quantity (t=9.521, P<0.05), Just in Time (t=3.125, P<0.05), had a significant effect on the operations performance of firms in the plastics and rubber industry in Kenya. This is because their P values are less than 5% and their T values were above 1.96. However, Vendor Managed Inventory (t=1.861, p<0.05), ABC Analysis (t=.000, p<0.00), Material Requirement Planning (t=1.243, p<0.05), Days in Sales Inventory (t=0.00, p<0.00). showed t values below 1.96 rendering them to be insignificant as they did not have a significant effect on operations performance of firms in the plastics and rubber industry in Kenya. Lastly, the regression results show us that when all the variables were maintained at zero, the level of operations performance value would be 1.856.

Table 4. 22 Model Summary for Operations Performance

Model	R	R Square	Adjusted R Square	Std Error of the Estimate	Change Statistics			
					F Change	df1	df2	Sig. F Change

1	.785 ^a	.616	.601	.416	32.135	6	48	.000
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c) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

Source: Research Data (2023)

From table 4.22, R^2 of 60% denotes that 60% of the variations in operations performance can be attributed to inventory management practices. This outcome is considered fairly good as 40% of variations in operations performance remains unexplained. This means that the model is fairly good in measuring operations performance of firms in the plastics and rubber industry in Kenya. The Analysis of Variance (ANOVA) is outlined in table 4.11.

Table 4. 23 Analysis of Variance (ANOVA)

	Model	Sum of Squares	Df	Mean Square	F	Sig.
	Regression	52.71	6	8.785	3.277	0.05(a)
1	Residual	128.69	48	2.681		
	Total	181.40	54			

e) Dependent variable: Operations Performance

f) Predictors: (Constant), (Economic Order Quantity, Just in Time, Vender Managed Inventory, ABC Analysis, Material Requirement Planning, Days in Sales Inventory)

The findings presented in table 4.23 shows that at 5% significance level at degrees of freedom (6, 48) the F value is 3.277 which is bigger than the critical value 2.295 meaning the model is adequate to predict operations performance.

4.6 Discussions of the Findings

The study sought to achieve two objectives. The first objective was to establish the extent to which plastics and rubber manufacturers in Kenya have implemented Inventory Management Practices in Kenya and secondly to find out the effect of Inventory Management Practices on the operations performance of plastics and rubber Manufacturers in Kenya. The study was pegged on the tenets of the resource-based theory and the Knowledge based theory where the study viewed the implementation of inventory management practices as a unique knowledge

that was expected to give an organization competitive advantage over their competitors. Based on the first study objective, the findings of the study show 60% of the organizations studied in this study had implemented the Economic Order Quantity (EOQ) model of inventory management, 9% use the Just in Time (JIT), 2% had implemented the Vendor Managed Inventory (VMI) and Material Requirement Planning (MRP) respectively and a significant 15% of the firms studied had not applied a specific inventory management practice.

These findings show that the industry had an 85% implementation rate of inventory management practices which is impressive. Thus the study therefore can infer that there is a high implementation rate of modern inventory management practices among firms in the plastics and rubber industry in Kenya. These findings are similar to the findings of Ngei and Kihara, (2017) which found out that Vendor Managed Inventory, e- procurement as well as the application of Enterprise Resource Planning worked well to bring the operations of these firms to a good level of Operations efficiency. The findings also compare favorably to the findings of a similar study in Nigeria where it was found out that there was a positive correlation between effective IMPs and operations effectiveness and recommended that manufacturing firms should closely monitor their operating costs through inventory management (Ogbo, Onokanma & Winfred, 2019)

In line with the second study objective, the study found out that the implementation of the inventory management practices had a significant effect on the internal efficiency of a firm in terms of cost with an overall mean of 4.57, timeliness at an overall mean of 4.27 and flexibility with an overall mean of 4.08. However, the implementation of the inventory management practices did not have a significant effect on the quality as the findings show an overall mean of 3.2. This study therefore can infer that that the implementation of the

inventory management practices had a significant effect on the internal efficiency, timeliness and flexibility but have no effect on the quality of service rendered to the clients. These findings are similar to the findings by Chin, Ramiah & Razali (2023), who concluded that the use of the inventory management app improved the inventory handling, internal efficiency and enhanced the record keeping for inventory records but did less to increase the level of customer service

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS AND CONCLUSIONS

5.1 Introduction

This chapter presents a summary of findings, discussions of findings, conclusions, recommendations and suggestions for further research.

5.2 Summary of Findings

The main objective of the study was to determine the effect of Inventory Management Practices on the performance of plastics and rubber manufacturers in Kenya. Two specific objectives guided the study. The first objective of the study was to establish the extent to which plastics and rubber manufacturers in Kenya have implemented Inventory Management Practices in Kenya. While the second research objective was to find out the effect of Inventory Management Practices on the operations performance of plastics and rubber Manufacturers in Kenya. The study collected data from the target respondents using a structured questionnaire which was divided into three parts, the background information, the level of implementation of inventory Management practices and the impact of inventory management practices on the operations performance of firms in the plastics and rubber value chain. Out of the targeted 70 respondents of the study, 55 returned their questionnaires fully filled which represented a 79% response rate which was deemed statistically valid to make conclusions and inferences from.

In line with objective one of the study, the findings show that out of the 55 respondents, that 60% of the organizations had adopted the Economic Order Quantity (EOQ) model as the preferred inventory management practice of choice. 5 organizations (9%) had implemented the just in time approach. The Vendor Managed Inventory and Material Requirement Planning models were adopted in one organization each while 15 organizations did not have a

specific inventory management model. None of the organizations studied had adopted the ABC analysis or the Days Inventory in Sales models. This study therefore can infer that 85% of the industry players had implemented modern inventory management practices with the Economic Order Quantity model and the JIT models being the most popular.

In line with the second study objective, the study found out that the implementation of the inventory management practices had a significant effect on the internal efficiency of a firm in terms of cost with an overall mean of 4.57, timeliness at an overall mean of 4.27 and flexibility with an overall mean of 4.08. However, the implementation of the inventory management practices did not have a significant effect on the quality as the findings show an overall mean of 3.2. The study can therefore infer that the implementation of the Economic Order Quantity (EOQ) and Just in Time (JIT) significantly improved the internal efficiency, the timeliness and flexibility of organizations that adopted them. However, these practices did little to improve the quality of service rendered to the customer by the organizations.

5.3 Conclusions

In line with the first study objective, the study can conclude for the research findings that 73% of firms in the plastics and rubber sector had implemented at least one inventory management practice in their operations. The study found out that the Economic Order Quantity (EOQ) model is the most widely applied model in the plastics and rubber value chain because it's an effective, simple and easy to apply inventory management model. This study therefore can conclude that majority of the firms in the plastics and value chain had adopted the EOQ model due to its ease of application and compatibility with existing operations.

In line with the second study objective, the study found out that there was a positive relationship between of Inventory Management Practices on the operations performance of plastics and rubber Manufacturers in Kenya. The study regression model shows that $r^2 = .710$ showing that the regression model could account for 71% of the changes in the organizational performance which shows the model is adequate to predict organizational performance. This study can therefore conclude that the implementation of inventory management practices in firms operating in the plastics and rubber industry had a very significant effect on the operations performance of the firms.

5.4 Recommendations of the Study

The study noted that 27% of the firms sampled had not implemented any of the five inventory management practices in the study model. This is a significantly large proportion which has not experienced the perceived benefits that come with the implementation of inventory management practices. Some of the organizations used the First in First out (FIFO) method, Last in First out (LIFO) and the Weighted Average Method (WAM) which were not part of the research model. This means that these organizations have an idea that inventory should be managed and therefore this study recommends that these organizations should adopt a modern inventory management model to enjoy the operations performance benefits

The study concluded that the implementation of inventory management practices had a positive effect on the internal efficiency, the timeliness and flexibility of organizations that adopted them. However, these practices did little to improve the quality of service rendered to the customer by the organizations. This study therefore recommends that firms strive to improve the quality of service rendered to their customers through sound customer care and

customer satisfaction management strategies aimed at improving the customer experience in the plastics and rubber industry in Kenya.

5.5 Limitations of the Study

The study faced some challenges. First, not all the firms sampled had implemented an inventory management practice as anticipated by the researcher. No firm had implemented the ABC analysis and Days in Sales Inventory management models as they were deemed too complicated to be implemented in the sector. Secondly, the study noted that some of the firms had adopted ancient inventory management practices like LIFO or FIFO which limited the study scope as the study expected that the adoption of inventory management practices would have hit the 90% implementation mark in the year 2023.

5.6 Suggestions for Further Research

The study noted that despite the positive impact of inventory management practices on the operations performance of an organization, 27% of the organizations sampled had not implemented any formal inventory management model. This is a significant number because if the statistic was escalated to the sector, it would mean that more than a quarter of the players in the sector had not implemented inventory management practices. This could be due to the low adoption of ICT in the sector because most of these inventory management models are usually automated. This study therefore suggests a further study on how ICT influences the implementation of inventory management practices among firms in the plastics and rubber value chain.

REFERENCES

- Abdullahi, Z. M. (2020). Strategic Inventory Control and Operations Performance of Manufacturers in Mogadishu, Somalia. Doctoral Dissertation, University of Nairobi.
- Agu, O. A., Ozioma, O. H., and Nnate, E. C., (2016) Effect of Inventory Management on the Organizational Performance of The Selected Manufacturers. *Singaporean Journal of Business economics, and management Studies (SJBEM)* VOL. 5, NO. 4, 2016
- Ajayi, E.O. Tunde, O.O, and Araoye, F. E. (2021) Effective Inventory Management Practice and Firms Performance: Evidence from Nigerian Consumable Goods Firms. *American International Journal of Business Management (AIJBM)* Volume 04, Issue 05, 2021
- Anichebe, N.A And Agu, O.A (2018) Effect of Inventory Management on Organizational Effectiveness, Information and Knowledge Management. *European journal of business management research* 3,(8)
- Blackburn. J. (2019) “*Fundamentals of Purchasing and Inventory Control for Certified Pharmacy Technicians*” Texas Tech University, Health Sciences Center, School Of Pharmacy. Available at <http://www.jdeducation.com>
- Bowersox, D. J. (2002). *Supply chain – Logistics management. International edition*. USA: M C Graw Hill
- Bozarth, C. C., Handfield, R. B., & Weiss, H. J. (2018). *Introduction to operations and supply chain management*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Brydson, J. A. (2019). *Plastics Materials*. Oxford: Butterworth-Heinemann
- Burns, N. & Groves, S. K., (2004). *The Practice of Nursing Research*. 5 ed. Churchill, Livingstone: Elsevier Health Services.
- Chen, H., Frank, M. Z., & Wu, Q. W. (2017). What actual happened to the inventories of American companies between 1981 and 2000? *Management sciences*, 51, 1051- 1031

- Coleman, B. (2000),” Determining the Correct Service Level Target”. *Production and Inventory Management Journal*, 41(1):169-176
- Connecticut plastics. (2018, May 17). *connecticut plastics*. Retrieved May 17, 2018, from a connecticut plastics website: <http://www.connecticutplastics.com>
- Cooper, D. R., & Schindler, P. S. (2006). *Business Research Methods* (9th edition). USA: McGraw-Hill.
- Cronbach, L. J. (1971a). *Essentials of psychological testing* (3th ed.). New York: Harper & Row
- Daniel A., & Assefa B. (2018) The impact of inventory management practice on firms’ competitiveness and organizational performance: Empirical evidence from micro and small enterprises in Ethiopia, *Cogent Business & Management*, 5:1, DOI: [10.1080/23311975.2018.1503219](https://doi.org/10.1080/23311975.2018.1503219)
- Dimitrios, P. (2018). The effect of inventory management on firm performance. *International Journal of Productivity and Performance Management*, 57(5), 355–369
- Dun, S and Bradstreet, M. (2023) *Plastics and Rubber Products Manufacturing Companies In Kenya*. Retrieved from: [Find Plastics and Rubber Products Manufacturing Companies in Nairobi - Dun & Bradstreet \(dnb.com\)](https://www.dnb.com)
- Edwin S and Florence M (2017) The Effect Of Inventory Management On Profitability Of Cement Manufacturing Companies In Kenya: A Case Study Of Listed Cement Manufacturing Companies In Kenya, *International Journal Of Management And Commerce Innovations* 3(2) 111-119
- Eroglu, C., & Hofer, C. (2017). Lean, leaner, too lean? The inventory-performance link revisited. *Journal of Operations Management*, (29), 356–369
- Green, K.W. Jr & Inman, R.A. (2019), “Using a just-in-time selling strategy to strengthen supply chain linkages”, *International Journal of Production Research*, 43(16). 3437-3453.
- Hermanth, C. P. (2019). Study on Inventory Management conducted at Reid and Taylor Limited India.

Hutchins, D. (1999). *Just in time*. UK: Gower Publishing, Limited.

Kamau L W and Assumpta W. K (2017) Influence Of Inventory Management Practices On Organizational Competitiveness: A Case of Safaricom Kenya Limited, *International Academic Journal Of Procurement And Supply Chain Management*,1(5) 72-98

Kaplan R., & Norton, D. (1992). The balanced scorecard measures that drive performance, *Harvard Business Review*, January-February, pp. 71-79

Kazim, S. (2018). Inventory inaccuracy and performance of collaborative supply chain practices. *Industrial Management and Data Systems*, 108, 495–509. doi:10.1108/02635570810868353

Kenya Association of Manufacturers (KAM), (2019), Kenya Plastic Action Plan, Accelerating a Circular Economy in Kenya. Available online, [KPAP Document-pages.pdf](https://www.kam.co.ke/KPAP_Document-pages.pdf) (kam.co.ke)

Kimaiyo, K. K. & Ochiri, G (2014). Role of Inventory Management on Performance of Manufacturers in Kenya – A case of new Kenya Cooperative Creameries. *European Journal of Business Management*, 2 (1), 336-341

Kitheka, S.S., & Ondiek, G.O. (2014). Inventory Management Automation and the Performance of Supermarkets in Western Kenya. *International Journal of Research in Management & Business Studies*, 1(4.), 9-18.

Koin V. R, Cheruiyot G. K and Mwangangi P (2014) Effect Of Inventory Management On The Supply Chain Effectiveness In The Manufacturing Industry In Kenya: A Case Study Of Tata Chemicals Magadi, *International Journal Of Social Sciences Management And Entrepreneurship* 1(2):189-202,

Kros, J. F., Falasca, M. & Nadler, S. S. (2006). Impact of just-in-time inventory systems on OEM suppliers, *Industrial Management and Data systems*, 106(2),224-241.

Li, S. R., Ragu-Nathan, B., Ragu-Nathan, T. S., & Subba Rao, S. (2006). The impact of supply chain management practices on competitive advantage and organizational performance. *Omega*, 34(2), 107–124. doi:10.1016/j.omega.2004.08.002

- Lwiki, T., Ojera, P., Galo, N., & Kirigo, V. (2018). The impact of inventory management practices on financial performance of sugar Manufacturers in Kenya. *International journal of business, humanities and technology* , 75-85.
- Maalim, M. R., and Avutswa, N. (2017) Effects of Inventory Management on performance of Business Outlets. A case study of Mander County, Kenya. Available on; Effects of Effective Inventory Management on Performance of Business Outlets (a Case Study of Mander County, Kenya) (uonbi.ac.ke)
- Mathuva, N. (2018). Determinants of corporate inventory holding: Evidence from a developing country. *The International Journal of Applied Economic and Finance*,7, 1-22.
- Mogere, K., Oloko, M. & Okibo, W. (2018). Effect of Inventory management practices on Operations Performance of Tea Processing Firms: A Case Study of Gianchore Tea Factory, Nyamira County, Kenya. *The International Journal of Business & Management*, 1 (5), 12-27.
- Mugenda O. M. and Mugenda, A. G., (2003), *Quantitative and Qualitative Approaches*. Kenya: Acts Press
- Mukopi, C.M., & Iravo, A.M. (2017). An Analysis of the Effects of Inventory Management on the Performance of the Procurement Function of Sugar Manufacturing Companies in the Western Kenya Sugar Belt. *International Journal of Scientific and Research Publications*, 5(5), 2-14.
- Mukui, N.M., & Odira, P. M (2017) Mass Balance of Plastics: A Case Study of Nairobi City. Retrieved from; Mass balance of plastics: case study for Nairobi city (uonbi.ac.ke)
- Munyaka B., Jean, C., & Yadavalli, S. (2022). Inventory management concepts and implementations: a systematic review. *South African Journal of Industrial Engineering*. Vol 33, No 2. 15-36. 10.7166/33-2-2527
- Musyoka, R., Ocheing, V., Wambui, M., & Bellah, C. (2017). Role of inventory management on performance of production deprtaments a case of Manufacturers. *International journal of Economics, commerce and management* , 1625-1656.

- Mwangi, A.G. (2018). *Inventory Management and Supply Chain Performance of Non-Governmental Organizations in the Agricultural Sector, Kenya*. Unpublished Master's Thesis Presented to University of Nairobi.
- Mwangi, W., & Nyambura, M.T. (2017). The role of inventory management on performance of food processing companies: a case study of Crown Foods Limited Kenya. *European Journal of Business and Social Sciences*, 4(04), 64-78.
- Naliaka, V. W., & Namusonge, G. S. (2017). Role of inventory management on competitive advantage among Manufacturers in Kenya: A case study of Unga Group Limited. *International Journal of Academic Research in Business and Social Sciences*, 5(5), 87–104
- NEMA. (2018). State of Environment (SoE) Report For Kenya. Nairobi: UNEP.
- Ngei, N.M., & Kihara, A. (2017). Influence of Inventory Management Systems on Performance of Gas Manufacturers in Kenya City County, Kenya. *International Journal of Business & Law Research*, 5(2), 21-39
- Nyabwanga, R. N., & Ojera, p. (2018). Inventory management practices and business performance for small scale enterprises in Kenya. *KCA journal of business management* , 11-28.
- Oballah, D., Waiganjo, E., & Wachiuri, E. (2017). Effect of inventory management practices on organizational performance in public health institutions:A case study of Kenyatta national hospital. *International journal of Education and research* , 703-714.
- Ogbad, E. E. (2009). Profitability Through Effective Management of Material. *Journal Of Economics and International Finance*, 1(4), 099-105
- Ogbo, A. I., Onekanma I. V and Wilfred I. U (2019) The Impact of Effective Inventory Control Management on Organisational Performance: A Study of 7up Bottling Company Nile Mile Enugu, Nigeria, *Mediterranean Journal of Social Sciences*, Vol 5 No 10

- Ogbo, A.I. (2011) *Production and Operations Management*". Enugu: De-verge Agencies Limited
- Omondi, I., and M. Asari. 2021. "A Study on Consumer Consciousness and Behavior to the Plastic Bag Ban in Kenya." *Journal of Material Cycles and Waste Management* 23(2): 425–435. <https://doi.org/10.1007/s10163-020-01142-y>
- Onchoke, B. N., & Wanyoike, D. M. (2020). Influence of Inventory Control Practices on Procurement Performance of Agrochemicals Distributors in Nakuru Central Sub-County, Kenya. *International Journal of Economics, Finance and Management Sciences*,4 (3), 117- 126
- Ondiek, G. (2018). Assesment of materials management in Kenyan Manufacturers. *Journal of business studies quarterly* , 41-49.
- Tekalign, N. (2019). Assessing the inventory management,A case of Manufacturers in Hawassa City Ethiopia. *International journal of current research*
- Toomey, W.J. (2008). *MRP II: Planning for Manufacturing Excellence*. Massachusetts. Chapman and hall
- UNEP. (2019). Selection, Design and Implementation of Economic Instruments in the Solid Waste Management Sector in Kenya -The Case of Plastic Bags. Nairobi: United Nations Environment Program
- Wangari, K.L., Kagiri, A.W. (2017). Influence of Inventory Management Practices on Organizational Competitiveness: A Case of Safaricom Kenya Limited. *International Academic Journal of Procurement and Supply Chain Management*, 1(5), 72-98.
- Yankah, R., Osei, F., Owusu-Mensah, S., & Agyapong, P. J. (2022). Inventory Management and the Performance of Listed Manufacturers in Ghana. *Open Journal of Business and Management*, 10, 2650-2667.

APPENDIX I:

INTRODUCTION LETTER

Dear Respondent,

My name is Benson Mbogo Kingori, a graduate student at UoN currently doing my MBA. I am working on a research study entitled: “The Inventory Management Practices and Operations Performance of Plastics Manufacturers in Kenya.” You were selected as a resourceful person for the study. This questionnaire is structured to obtain basic and expert information to support the analysis and report for this study. Your response to the questions presented in this questionnaire will be highly appreciated. Kindly take time to fill this questionnaire to the best of your ability. The findings of the study will be confidential and your identity will not be revealed without your consent. Thank you.

Yours Sincerely,

Benson Mbogo Kingori

APPENDIX II:
QUESTIONNAIRE

Introduction

My name is Benson Mbogo Kingori, a graduate student at UoN currently doing my MBA. I am working on a research study entitled: “The Inventory Management Practices and Operations Performance of Plastics Manufacturers in Kenya. This questionnaire should take you 5 to 10 minutes to fill in. Your responses will remain anonymous. Please do not indicate your name or any other identification details on the questionnaire. Thank you for agreeing to fill this questionnaire.

SECTION A: Biodata

1. Kindly indicate your gender?

Female

Male

Other

2. Kindly indicate your age group?

18 – 25 Years

26 – 36 Years

37 – 45 Years

46 - 60 Years

Above 60 years

3. which of the following describes your level of education?

KCSE

Certificate

Higher Diploma

Undergraduate degree

Other (Specify)

4. For how long have you worked in the plastics value chain?

1 – 2 yrs

3 – 6 yrs

7 – 10 yrs

Over 10 yrs

5. Which is your position in the management structure?

Director

Partner

Manager

Employee

SECTION B: Level of Implementation of Inventory Management Practices

6. Using scale of 1 to 5 (Where 1 represents a very little extent and 5 represents a great little extent) What is the level of implementation of the following aspects of inventory Management Practices in your firm?

Statement	Not at all	VLE	LE	N	GE	VGE
1. Economic Order Quantity Model (EOQ)						
The firm orders a fixed quantity of Inventory from its suppliers each time it places an order						
The re order levels are strictly observed						
The inventory costs have been decreasing						

Statement	Not at all	VLE	LE	N	GE	VGE
2. Just in Time (JIT)						
The suppliers always supply on time						
The demand rarely exceeds the supply						
The inventory never goes stale						
Customer orders are processed on time						

3. Vendor Managed Inventory (VMI)	Not at all	VLE	LE	N	GE	VGE
The inventory is always adequate to satisfy demand						
Customers rarely complain about stock outs						
The inventory costs are decreasing						

4. ABC Analysis	Not at all	VLE	LE	N	GE	VGE
The forecasted demand is always adequate						
Suppliers are able to deliver on time to replenish inventory						
Customer orders are processed quickly						

5. MRP	Not at all	VLE	LE	N	GE	VGE
The suppliers lead time is predictable						
The organization maintains a safety stock						
The predicted lead time determines the order size						

6. DSI Model	Not at all	VLE	LE	N	GE	VGE
The organization orders stock as per the predicted sales level						
The organization's average inventory holding period is less than 90 days						
Fast moving stocks are replenished just before they are finished						

SECTION C: Inventory Management models and Operations Performance of Plastics Manufacturers in Kenya

7. On a likert scale of 1 – 5 (Where 1 represents a very little extent, and 5 represents a very great extent) Kindly rate the degree to which the following Practices have improved the following Operations aspects in your organization

	Measures of Operations Performance	VGE	GE	N	LE	VLE
1	Internal Efficiency (Cost)					
	Reduced Inventory Wastage					
	Reduced Material Handling Costs					
	Reduced inventory misappropriation and Fraud					
2	Timeliness (Speed)					
	Has avoided stock-out by timeliness of delivery					
	Increased Staff productivity					
	Has enabled Flexibility to changes in demand					
3	Quality					
	Hastened the Quality Control					
	Enabled better service to customers					
	Reduced Customer Complaints					
4	Flexibility					
	The firm is able to meet customer demand					
	The Firm is able to take Special Orders o					
	The firm is able to manage supplier alternatives					

THE END

THANK YOU

APPENDIX III

PLASTICS AND RUBBER MANUFACTURERS IN KENYA

1. A Plus PVC Technology Company Limited
2. Acme Containers Ltd
3. Adix Plastics Ltd
4. Advance Plastics Ltd
5. Afri Piping Systems Kenya Limited
6. Apex Piping Systems Limited
7. Aquaplast Limited
8. Ashut Engineers Limited
9. Ashut Plastics Limited
10. Autopak International Ltd
11. Betatrad Kenya Ltd
12. Blowplast Limited
13. Budget Shoes Limited
14. Coastal Bottlers Ltd
15. Comcraft Kenya Ltd
16. Complast Industries Limited
17. Coninx Industries Ltd
18. Crown Industries Limited
19. Dune Packaging Limited
20. Equator Bottlers Limited
21. Foam Mattress Limited
22. Friendship Container Manufacturers Limited
23. G.N. & Co. Polythene Ltd
24. Galaxy Plastics Limited
25. General Industries Limited
26. General Plastics Limited
27. Halar Industries Limited
28. Hope Plastics Limited
29. Kenpoly Manufacturers Limited

30. Kenstar Plastic Industries Limited
31. Kenya Adhesive Products Limited
32. Kenya Suitcase Manufacturers Limited
33. King Plastic Industries Ltd
34. Krona Plastics Limited
35. Malplast Industries Limited
36. Metal Crowns Limited
37. Moldplast Kenya Limited
38. Mplastico Industries Limited
39. Mr & R Plastics Limited
40. Nairobi Plastics Ltd
41. Nampak Kenya Limited
42. Neopack Limited
43. Pacific Diagnostics Limited
44. Packaging Industries Limited
45. Plastic Products Co Ltd
46. Polyflex Industries Limited
47. Polysynthetics Eastern Africa Limited
48. Polythene Industries Limited
49. Precision Plastics Limited
50. Premier Industries Limited
51. Printpak
52. Proplast Limited
53. Pyramid Packaging Limited
54. Quality Plast Limited
55. Roto Moulders Limited
56. Royal Group Industries Kenya Ltd
57. Safepak Limited
58. Sanpac Africa Limited
59. Shrink Pack Limited
60. Silafrica Kenya Limited
61. Silverspread Hardware Ltd

62. Solvochem East Africa Ltd
63. Synresins Limited
64. Techpak Industries Limited
65. Texplast Industries Limited
66. Thermopak Limited
67. Top Pipe Ltd
68. Torrent East Africa Ltd
69. Umoja Rubber Products Limited
70. Zaverchand Punja Limited

Source: Dun & Bradstreet (2023)