International Journal of Management and Business Research

IJMBR

Volume 6, Issue 1, pg. 906-924, 2024

ISSN 29769-91723

WAREHOUSE LAYOUT AND PERFORMANCE OF DISTRIBUTION FIRMS IN KENYA

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ABSTRACT

This study sought to establish the effect of warehouse layout on performance of distribution firms in Kenya. This study was anchored on the theory of Constraints (TOC) and theory of the firm. This study used both descriptive and explanatory research designs. In addition, this study employed a positivist research philosophy. The target population was based on the total of 1061 registered distribution firms in Kenya spread all over the country. The overall sample size for this study was determined using a formula by Yamane formula. Therefore, using the Yamane formula, the sample size for the study was 290 distribution firms. This study also used questionnaire to collect data relevant to this study. Quantitative data collected was analyzed using descriptive statistical techniques which are frequencies, mean, standard deviation. Inferential statistics which include Pearson correlation and the Regression Analysis Model were used to test the relationship between study variables. To test moderating effect the study used hierarchical regression model. The significance of the model was tested at 5% level of significance. Data was analysed using Statistical Package for Social Sciences (SPSS) software. The study results were presented through use of tables and figures. The returned questionnaires for the pilot test were 15 (100%). From the validity findings, construct validity and content validity were met an indication that the data collection tool was valid and was suitable to be used for further data collection as is; no item was excluded/altered. Also, All the variables were found to have Cronbach alpha value greater than 0.70. This suggested that all the variables were reliable. Therefore, the questionnaire was valid and reliable and was used to collect data for the actual study. From the descriptive analysis, the study found that respondents agreed on average that warehouse layout affects performance of distribution firms in Kenya. From the regression findings, a unit increase in warehouse layout would result in a 0.732 (p=0.000) increase in performance of distribution firms in Kenya. Finally, the study found that introduction of firm size as moderating variable has positive influence on performance of distribution firms in Kenya; it led to .093 change in R Square. The study therefore recommends that distribution firms should give priority to warehouse layout (distribution Center Layout, fulfilment Center Layout and cross-Docking Facility Layout).

Key Words: Warehouse Layout, Firm Size, Distribution Firms, Theory of Constraints

Background of the Study

Warehouses are a key aspect of modern supply chains and play a vital role in the success, or failure, of Distribution Firms (Hompel & Schmidt, 2017). Warehousing operations optimization has been considered an effective and powerful approach to improve the performance or design more efficient warehouse. Therefore, management of warehouse operations is one of the important steps in global supply chain and the impact of the improvement of warehouse operations' yield is crucial for cost reduction and increase of productivity in a supply chain company (Chrisopher, 2021). Optimizing a warehouse creates conditions in which high-demand items in-demand are always stocked, leading to timely order fulfilment. Warehouse Layout is key to the efficient operation of warehouses of all sizes. A disciplined process, Warehouse Layout includes automation and a determination of how to save time, space, and resources while reducing errors and improving flexibility, communication, management, and customer satisfaction. Other Warehouse Layout considerations include warehouse flow, product placement, storage, and retrieval systems. Warehouse Layout is vital to lean warehouses and agile supply chains. According to the Lai and Cheng (2019) the activities of the warehousing optimization can be divided into three groups. First, the basic technical structure of warehouse; second, the operational and organizational framework, to which a special attention is paid in this work; and third, the coordinating and controlling systems for warehouse operations. The main contribution of this paper is to show the current state-of-the-art in optimization in mentioned three groups of interest, and to help researchers with orientation in logistic Warehouse Layout problems to improve performance of their firm (Wayongah, 2019).

In the United States of America, according to the Aberdeen (2019), research on the improvement of warehouse and distribution center performance deduced that for many companies, improved warehouse and distribution center productivity remains a goal, not a reality. Although companies' top focus in warehouse improvement is cutting logistics costs, six out of ten respondents report that they have not been able to lower costs in the last two years. A majority of companies have also been unable to reduce customer order cycle times. However, a segment of companies have been able to reduce both costs and cycle times. These top performers are leveraging more technology, have better data visibility, and work harder at cross-training their staffs. Across the board, companies that are above average warehouse performers in their industry classified as Best in Class companies have been much more likely than their peers to have significantly lowered their warehousing costs in the last twenty four months.

In Nigeria, the size of industry, small, medium, and large scale, has a significant effect on both the numerical strength of staff and level of involvement in stock control of both raw material and the finished product. The type of inventory system in practice in any organization depends on many factors among which are economic stability of the place, infrastructural facilities available, transportation network and many more which are called constraints. For many companies the root cause of underproduction stoppages and high production cost could be easily traced to unscientific method of arriving at a general inventory policies and crucial inventory decisions. The situation is more acute in a developing country like Nigeria, where the practical application of operation research techniques in industry and business enterprise is in its infancy. Moreover, the bulk of raw material inventory and the finish goods inventory used by companies in developing countries have to be imported from the industrial nations of Europe, America and Asia, which gave rise to higher cost of procurement and higher uncertainty in the availability of such basic raw materials (Ogbo & Ann, 2018).

In Kenya, Warehouse management have been impacted by many business organizations spend a lot of resources installing warehouse management systems with the aim of minimizing their total operating costs, and enhance service delivery to customers. Many Institutions within East African Community have trouble resulting from operating losses and cash flow problems. Quite often, piles of obsolete stock are seen within the premises of these institutions, resulting in huge write offs eating into the bottom line of these institutions. Many a times, stock outs are also experienced resulting in high customer turnover and therefore low sales and poor service delivery to customers. Stock control normally becomes reportable issues (condition) and is always raised in the

management letters to many institutions where very little attention is given in the management of inventories as

Statement of the Problem

The optimization of warehouse operations significantly impacts the performance and competitiveness of distribution firms in Kenya. However, empirical evidence suggests that many such firms face formidable challenges in achieving efficient warehouse management practices. According to a recent industry report by Frost and Sullivan ("Logistics Market in East Africa, Forecast to 2025"), approximately 65% of distribution firms surveyed in Kenya reported difficulties in optimizing their warehouse operations effectively (Frost & Sullivan, 2021). These challenges manifest in various forms, including inadequate inventory management leading to excess stock levels or stockouts, inefficient space utilization, suboptimal picking and packing processes, and limited visibility into inventory movement. Furthermore, research indicates that distribution firms in Kenya with poorly optimized warehouses experience, on average, 20% higher logistics costs compared to those with efficient warehouse management systems (Olalere et al., 2020). These elevated costs not only reduce revenue growth but also hinder the ability of firms to invest in innovation, technology adoption, and market expansion efforts. Moreover, studies show that distribution firms in Kenya with inefficient warehouse operations experience a 15% increase in order fulfillment lead times, resulting in diminished customer satisfaction and retention rates (Ndirangu & Karanja, 2019).

Therefore, performance of distribution logistics plays a crucial role in the overall success of an organization, as it directly impacts customer satisfaction and loyalty, which are vital assets for any business (Paulraj & Chen, 2017). In the context of logistical supply chains, the speed of operations, particularly from order picking to delivery, is essential for ensuring high-quality customer service and satisfaction (Miheso, 2019). However, the integration of information technology in logistics management remains a challenge for a significant number of firms in Kenya (Mitullah & Odek, 2019). Additionally, suboptimal warehouse design and layout result in underutilized assets, with up to 75% of warehouses in Kenya operating at less than 40% capacity (Wathe, 2019). This inefficiency leads to substantial financial losses for distribution firms, impacting their ability to provide competitive pricing and maintain customer service levels.

Labor costs constitute a substantial portion of warehouse operating expenses, particularly for third-party logistics providers (3PLs), where it can account for up to 50% of total operating costs (Wathe, 2019). Such high labor costs, combined with difficulties in inventory tracking and picking inaccuracies, result in shipping and delivery delays, further affecting customer satisfaction (Baker, 2021). Moreover, transportation and delivery expenses can represent a significant portion of the total cost of goods, reaching up to 15% or even 50%. Therefore, optimizing the transport system can lead to substantial cost savings, potentially as high as 30% (Kumar, 2018). Inaccurate physical inventory management, frequently caused by poor implementation of warehouse systems and automation processes, leads to backorders, customer dissatisfaction, and increased overall costs (Gurría, 2018).

While previous studies have explored various aspects of warehouse management and supply chain performance, there is a notable gap in research regarding the impact of Warehouse Layout on the performance of distribution firms in Kenya, and how firm size may moderate this relationship. For instance; Wacuka (2017) investigated the relationship between warehouse management control and supply chain performance of FMCG, Wambui (2018) focused on the relationship between lean management practices and SC performance of FMCG as well as Onyango (2017) focused on the relationship between warehouse management practices and performance of manufacturing firms in Nairobi County. However, none of these studies showed the effect of Warehouse Layout on performance of distribution firms in Kenya. Further, the studies did not show how firm size moderates the relationship between Warehouse Layout and performance of distribution firms in Kenya. It is against this background that the current study sought to establish the influence of warehouse layout on performance of distribution firms in Kenya. In addition, the study sought to assess the

moderating effect of firm size on the relationship between warehouse layout and performance of distribution firms in Kenya.

Objectives of the study

i. The main objective of this study was to establish the effect of warehouse layout on performance of distribution firms in Kenya.
ii. To assess the moderating effect of firm size on the relationship between Warehouse Layout and performance of distribution firms in Kenya.

Research Hypothesis

The study sought to test the following research hypotheses;

H_{01} Warehouse layout has no significant effect on performance of distribution firms in Kenya.

H_{02} Firm size has no significant moderating effect on the relationship between warehouse layout and performance of distribution firms in Kenya

Theoretical framework

The Theory of Constraints

Theory of constraints is an approach to the management of operations and it was developed by Goldratt (1984). It provides a management theory of how organizations should be run especially the when handling scarce financial resources. The concept was extended to theory of constraints (TOC) with a publication which views any manageable system as being limited in achieving more of its objectives by a very small number of constraints.

There is always one constraint and the TOC uses a focusing process to identify the constraint and restructure the resources around it (Kotabe & Murray, 2018) TOC emphasizes on the optimization of performance within a defined set of constraints of the existing process and it provides an action framework which combines the activities of the managers and the visible system elements (Hansen, Schaumburg-Muller & Pottenger, 2017).

TOC views project financial resources as systems consisting of resources, which are linked by the processes they perform. The goal of project financial resources serves as the primary judge of success. Within that system, a constraint is defined as anything that limits the project financial resources from achieving higher performance relative to its purpose (Tummala, Phillips & Johnson, 2016). The pervasiveness of interdependencies within the organization makes the analogy of a chain, or network of chains, very descriptive of a system's processes. Just as the strength of a chain is governed by its single weakest link, the TOC perspective is that the ability of any project to achieve its goal is governed by a single, or at most very few, constraints (European Commission, 2017).

However, there are also some criticisms of TOC. One limitation is that the theory assumes that constraints are static and unchanging. In reality, constraints can be dynamic and can shift over time as the system evolves. This can make it difficult to identify and address the most important constraints, and can limit the effectiveness of the TOC approach (Jinxiang, Goetschalckx & Mcginnis, 2019). Another limitation of TOC is that it focuses primarily on optimizing performance at the bottleneck, without considering the broader system implications of these optimizations (Saifudin, Zainuddin & Azwardi, 2017). Additionally, TOC has been criticized for its reliance on quantitative data and its limited consideration of human factors in organizational performance. The theory does not account for the complex interactions between people and technology in organizational performance, which can limit its effectiveness in certain contexts (Buzu, 2021).

The theory of constraints defines a set of tools that project managers can use to manage constraints, thereby increasing performance. Most projects can be viewed as a linked set of processes that transform inputs into outputs. TOC conceptually models this system as a chain, and advocates the familiar adage that a chain is only as strong as its weakest link (Busi & McIvor, 2018). This theory incorporates the idea that the goal or mission of an organization exists, and organizations can be measured and controlled by variations on three measures sufficiency of funds, funds disbursement timeline and reliability of funding. The Theory of Constraints is used to find out the effect of

warehouse layout on performance of distribution firms in Kenya.

Theory of the firm

Theory of the firm was developed by Jensen and Meckling, (1976). The theory is a microeconomic approach devised in neoclassical economics that every firm operates in order to make profits. According to Jensen and Meckling, (1976) companies ascertain the price and demand of the product in the market, and make optimum allocation of resources for increasing their net profits. The theory of the firm consists of a number of economic theories that explain and predict the nature of the firm, company, or corporation, including its existence, behaviour, structure, and relationship to the market. Firms are key drivers in economics, providing goods and services in return for monetary payments and rewards. Organizational structure, incentives, employee productivity, and information all influence the successful operation of a firm in the economy and within itself (Ahmad, & Mahmood, 2020).

According to Barak, Richman and Jeffrey (2008), the behavioural approach places emphasis on explaining how decisions are taken within the firm, and goes well beyond neoclassical economics. “people possess limited cognitive ability and so can exercise only ‘bounded rationality’ when making decisions in complex, uncertain situations”. Thus individuals and groups tend to "satisfice"—that is, to attempt to attain realistic goals, rather than maximize a utility or profit function. The firm cannot be regarded as a monolith, because different individuals and groups within it have their own aspirations and conflicting interests, and that firm behaviour is the weighted outcome of these conflicts. Organizational mechanisms (such as "satisficing" and sequential decision-taking) exist to maintain conflict at levels that are not unacceptably detrimental. Compared to ideal state of productive efficiency, there is organizational slack (Kantarelis, & Demetri, 2017).

The firm emerges because extra output is provided by team production, but the success of this depends on being able to manage the team so that metering problems (it is costly to measure the marginal outputs of the co-operating inputs for reward purposes) and attendant shirking (the moral hazard problem) can be overcome, by estimating marginal productivity by observing or specifying input behaviour (Oliver & Williamson, 2018). Such monitoring as is therefore necessary, however, can only be encouraged effectively if the monitor is the recipient of the activity's residual income (otherwise the monitor herself would have to be monitored, ad infinitum). The firm, therefore, is an entity that brings together a team that is more productive working together than at arm's length through the market, because of informational problems associated with monitoring of effort. In effect, therefore, this is a "principal-agent" theory, since it is asymmetric information within the firm which must be overcome. The firm emerges as a means of centralizing monitoring and thereby avoiding costly redundancy in that function (since in a firm the responsibility for monitoring can be centralized in a way that it cannot if production is organized as a group of workers each acting as a firm) (Spulber, & Daniel, 2019).

The existence of firms derives from ‘asset specificity’ in production, where assets are specific to each other such that their value is much less in a second-best use. This causes problems if the assets are owned by different firms (such as purchaser and supplier), because it will lead to protracted bargaining concerning the gains from trade, because both agents are likely to become locked into a position where they are no longer competing with a (possibly large) number of agents in the entire market, and the incentives are no longer there to represent their positions honestly: large-numbers bargaining is transformed into small-number bargaining (Williamson, & Oliver, 2018). Theory of the firm was used to assess the moderating effect of firm size on the relationship between Warehouse Layout and performance of distribution firms in Kenya.

Conceptual Framework

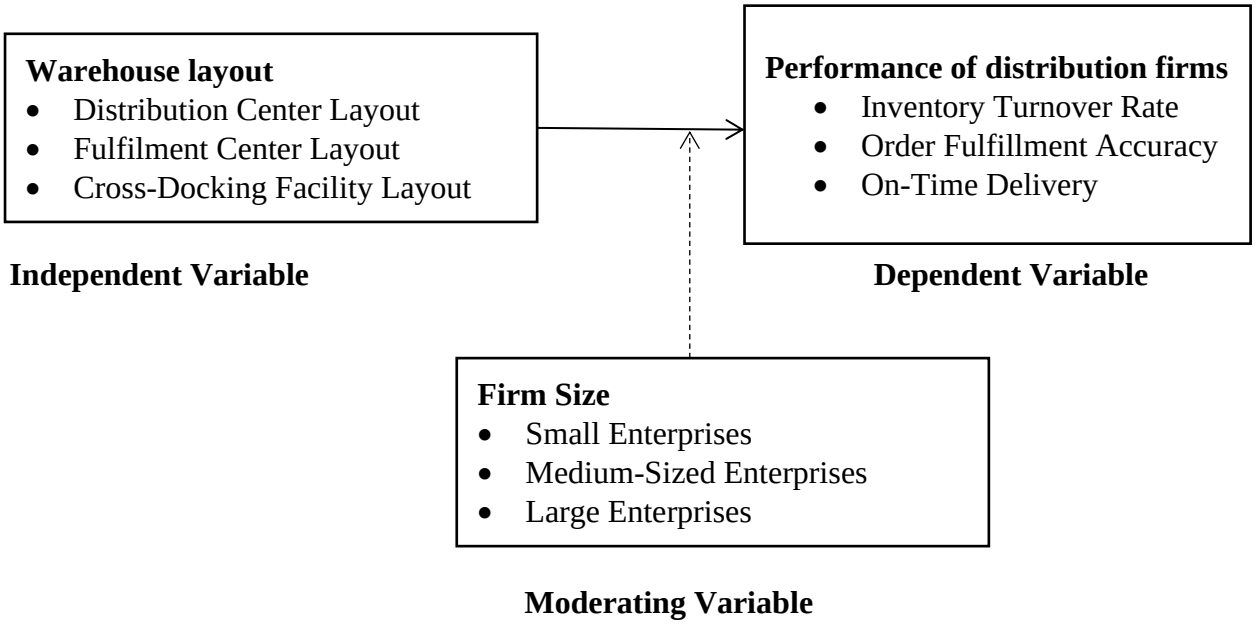

Figure 1: Conceptual Framework

Warehouse Layout

A warehouse layout is the planned design of a warehouse to streamline overall operations. The right layout should help to improve the flow of production and distribution. A good warehouse layout should improve the flow of the facility. But there are many more things a warehouse layout can do to enhance the way you operate. These objectives contribute to the main purpose of keeping costs down and productivity up. The most significant objective of a warehouse layout is to optimize the way warehouse space is used. Using warehouse space effectively allows companies to reduce the time it takes to produce a product and get it out the door, gain visibility into what is and isn't working in the warehouse, and organize inventory to streamline the process at every stage (Jinxiang, Goetschalckx & Mcginnis, 2019).

In supply chain management, the warehouse layout serves as a cornerstone in the optimization of operational efficiency and the facilitation of seamless workflow processes. It encompasses the planned design of a warehouse facility, aimed at maximizing space utilization, enhancing productivity, and minimizing operational costs (Jinxiang, Goetschalckx & Mcginnis, 2019). The warehouse layout varies depending on the specific functions and requirements of the facility, with distinct layouts tailored to different types of warehouses, such as distribution centers, fulfillment centers, and cross-docking facilities.

Distribution center layout design is particularly focused on efficiently managing the flow of goods through the facility, from receiving to storage and ultimately to outbound shipping. These layouts are strategically organized to accommodate high volumes of goods and support rapid order fulfillment to meet customer demand (Saifudin, Zainuddin & Azwardi, 2017). The arrangement of storage areas, picking zones, loading docks, and receiving areas is optimized to facilitate efficient inbound and outbound logistics, ensuring timely delivery of products to customers.

Similarly, fulfillment center layout design is tailored to the specific needs of e-commerce fulfillment operations. These warehouses are optimized for the picking, packing, and shipping of individual customer orders with speed and accuracy (Buzu, 2021). Fulfillment center layouts often incorporate automated storage and retrieval systems, conveyor belts, and robotic technologies to maximize order processing efficiency and handle a large number of SKUs with minimal human intervention.

On the other hand, cross-docking facility layout design focuses on the rapid transfer of goods from inbound to outbound vehicles with minimal storage time. These layouts are designed to facilitate seamless cross-docking operations, minimizing inventory holding costs, handling expenses, and transit times (Jinxiang, Goetschalckx & Mcginnis, 2019). The layout

includes designated receiving and shipping areas, staging zones, and efficient material flow paths to expedite the transfer of goods and optimize supply chain efficiency.

In all these types of warehouse layouts, common objectives such as optimizing space utilization, streamlining workflow processes, and ensuring accessibility and ergonomics remain paramount. By carefully designing the layout to align with the specific functions and requirements of the facility, companies can achieve significant improvements in warehouse performance and enhance their competitive advantage in the marketplace. Therefore, investing in strategic warehouse layout design is essential for maximizing operational efficiency and achieving organizational success in today's dynamic business environment.

Firm Size

Firm size, as a construct for firm characteristics, is one of the most acknowledged determinants of a financial performance (Beard & Dess, 2016). Indeed, firms with the greatest market share and assets report relatively better performance. The market power and access to capital markets of large firms may give them access to investment opportunities that are not available to smaller ones. Firm size has become such a routine to use as a control variable in empirical corporate finance studies that it receives little to no discussion in most research papers even though not uncommonly it is among the most significant variables. Firms of different size distinguish themselves along different observable and unobservable dimensions. Therefore, there are many different ways of defining a firm's size category

Discussions of the role of firm size in explaining firm performance have been ongoing in the fields of business organization and industrial economics. Early research, notably by Jelic *et al* (2016) and Kakani *et al* (2016) emphasizes the importance of scale economies and other efficiencies in larger firms. On the other hand, the structure-conductperformance paradigm highlights the importance of market concentration and conduct in explaining profitability. In particular, Baumol (2017) argues that the advantages of larger firms stem from their market power and greater access to capital markets. Caves and Porter (2019) also attribute variations in profitability to group strategic behavior in different industries. With a few exceptions, notably Hagedoorn and Cloodt (2018), there is considerable evidence in early empirical studies (Merikas *et al,* 2016) to support a positive relationship between firm size and profitability. However, as Prasetyantoko and Parmono (2018) point out, many of these studies neglect the possible effects of other factors, such as market structure, entry barriers and firm strategies. More recent studies have attempted to control for these market and firm-specific characteristics and found more equivocal support for a relationship between firm size and profitability. For instance, Tarawneh (2016) find a firm's market share instead of its size plays a significant role in explaining its relative performance. Amato and Amato (2019) find evidence in US retailing industries to support Porter's (2018) conjecture that both small and large firms can effectively capture niche markets, while middle-sized firms are 'stuck in the middle' in the sense that they are less competitive than their counterparts in either end of the firm size distribution

Firm size is a critical variable in business analysis and policymaking, with enterprises typically categorized into small, medium-sized, and large categories based on various criteria such as employee count, revenue, or assets (European Commission, 2020). Firm size serves as a crucial moderating variable in the relationship between Warehouse Layoutand the performance of distribution firms (Chen et al., 2019). Within the context of distribution logistics, small, medium-sized, and large enterprises exhibit distinct operational dynamics that influence how Warehouse Layoutstrategies translate into performance outcomes. The classification of firms by size provides insights into the varying degrees of resource availability, organizational capabilities, and market reach, thereby shaping the effectiveness of Warehouse Layoutefforts.

Small distribution firms, characterized by limited resources and localized operations, may face challenges in implementing comprehensive Warehouse Layoutstrategies (Ayyagari et al., 2017). Their smaller scale and narrower market presence may restrict their ability to invest in advanced technology or infrastructure upgrades. However, innovative approaches tailored to their specific needs, such as lean inventory management or agile picking processes, can enhance operational efficiency and responsiveness.

Empirical Review

Warehouse Layout and Performance of Distribution firms

Jinxiang, Goetschalckx and Mcginnis (2019) conducted a study on Research on warehouse design and performance evaluation. This paper presents a detailed survey of the research on warehouse design, performance evaluation, practical case studies, and computational support tools. This and an earlier survey on warehouse operation provide a comprehensive review of existing academic research results in the framework of a systematic classification. Each research area within this framework is discussed, including the identification of the limits of previous research and of potential future research directions.

Saifudin, Zainuddin and Azwardi (2017) conducted a study on warehouse layout efficiency in small and medium enterprises (SMEs). This paper focus on the warehouse efficiencies in relation with the warehouse layout among SMEs manufacturing firms and its mediating effect with Management Information System (MIS). Overall 187 SMEs were involved in this study. Questionnaires (42 questions) were given to owners, factory managers or warehouse managers or warehouse section heads. All the SMEs involved came from various sectors such as food & beverages, metal & metal products, wood & wood products, paper and printing publication, machinery & engineering, plastics products, electrical & electronics, non-metallic mineral product, petro chemical and chemical, transport equipment, rubber & rubber products, and leather. Findings shows that the Warehouse Efficiency (AWE) correlates significantly with the Warehousing Layout variables above 0.7 while Warehousing MIS (AMIS) above 0.5. As for multiple regression test, variables AL and AMIS, the effects were significance with the R2 = 0.758 or 75.8 percent to explained in model AWE. In this test, it is found that there are significance value of variables AL (0.623) and AMIS (0.03). This reflects of the significance role of AL and AMIS in maintaining the warehouse efficiency. The results indicate the important of warehouse efficiency in the manufacturing firms

Buzu, (2021) conducted a study on the effect of warehousing management on warehouse performance. Both primary (questionnaires and interviews) and secondary sources of data were used. To achieve the objectives of this study, an explanatory and descriptive research design was used, and this study also applies a mixed research approach. Stratified simple random sampling was used to select the respondents for the study and, accordingly, one hundred one (101) sample sizes were taken for the study. The descriptive and inferential statistical tools such as; mean, standard deviation, percentage, correlation and multiple regressions were used to analyze collected data with the aid of IBM SPSS statistics version 20. The descriptive analysis shows that there is lack of space for loading and unloading items, lack of shelves, pallets and racks; poor well established put away process for received items, poor tight control the storage areas, high warehousing cost, and high inventory cost. The multiple regression analyses reveals that receiving, storage, put away, order picking and shipping significantly influence warehouse performance of the organization. Hence, organizations are expected to enhance their warehousing management so as to gain better warehouse performance.

Firm Size and Performance of Distribution firms

Meiryani *et al* (2020) conducted a study on the effect of firm's size on corporate performance. The purpose of this study is to determine the effect of capital structure on firm's financial performance that is conducted on 55 manufacturing sector listed companies in Indonesia Stock Exchange. The data analysis is conducted using R Studio software. Study is used data panel analysis with random effect model. The result of this study are (1) firm's size has no effect on firm's financial performance which is proxied by return-on-assets; (2) firm's size has no effect on firm's financial performance which is proxied by market-to-book-value

Pervan and Josipa (2018) conducted a study on influence of firm size on its business success. A firm may use different methods and diverse (non)financial analysis/indicators in order to evaluate its business success. However, one of the most widely applied methods refers to financial analyses that use profitability ratios as the key measures of firm's overall efficiency and performance. In this research we focused our attention on firm size and evaluated its influence on firm profitability. Other than by the size of a firm, a firm performance is affected by a variety of internal and external variables. Therefore, apart from mere investigating the relationship between

firm size and performance, we also explored the impact of some other variables crucial in determining firm profitability. The analysis was conducted for the 2002-2010 period and the results revealed that firm size has a significant positive (although weak) influence on firm profitability. Additionally, results showed that assets turnover and debt ratio also statistically significantly influence firms' performance while current ratio didn't prove to be an important explanatory variable of firms' profitability

Kioko (2018) conducted a study on the relationship between firm size and financial performance of commercial banks in Kenya. This research was carried out using a correlational design. The target population of this study was all the 43 commercial banks in Kenya as at 31st December 2012. The panel data to be used was data from 1998 to 2012. This study used secondary data which was collected from Central Bank of Kenya and bank themselves. Firm size was measured using net assets , total loans , total deposits (measured in Kenya shillings) and number of employees. Financial performance was measured using Return on Assets (ROA). Data which was collected was analyzed using correlation and regression statistics. Analyzed data was presented in tables. Study findings indicate that there is moderate correlation between three of the studied factors of bank size which include total deposits, total loans and total assets. The relationship between three of the independent variables, namely, total loans, total deposits, and total assets and the dependent variable (financial performance- ROA) of commercial banks were all found to be statistically significant. Total deposits and total loans had relatively stronger effects on financial performance compared to total assets. There was no significant relationship between number of employees and financial performance for commercial banks in Kenya

Ali (2018) conducted a study on the moderating effect of firm size on the relationship between management participation and firm performance. The study used descriptive survey approach. A structured and semi structured questionnaire was administered to 176 manufacturing firms comprising twelve sub sectors firms in Nairobi and surrounding areas. Out of which , 111 usable questionnaires were returned, giving a response rate of 63% which is adequate for analysis. While, Pearson's product moment correlation coefficient to indicate direction of relationship between the independent, dependent and moderator variables, multiple regression analysis was used to explain the nature of relationship between the variables. F-statistic was also used to decide the validity of the model while R-squared was used to help determine the model goodness-of -fit. The findings revealed that performance of manufacturing firms was significantly related to the nature and extent of management participation in strategic planning. The study thus concluded that management participation in strategic planning had significant effect on both the financial and non- financial performance indicators of the manufacturing firms. Hence management participation in strategic planning is a significant factor among firm level practices that enhance overall firm performance.

Wayongah (2019) conducted a study on firm size and firm financial performance: panel evidence from nonfinancial firms in Nairobi securities exchange, Kenya. Therefore, the purpose of this study was to analyze firm size and financial performance of non-financial firms listed in NSE, Kenya. The study was anchored on Economic, trade-off and Signaling theories. Population consisted of all the forty nonfinancial firms listed at NSE where purposive sampling was used. The study was based on correlational research design. Secondary data from 2010 - 2016 was obtained from financial reports using data collection sheet. The data was subjected to unit root test to check on stationarity. The data was analyzed using panel correlation and fixed effects multiple regression analysis by pooling the data of 28 firms over 7 years period to get 196 data points. The findings revealed that firm size accounted for insignificant variance of 2.65% in BPCI and with positive coefficient of .057844. Findings form this study may be helpful to shareholders in making prudent investment decisions; Management in formulation of policies; and academia as a basis of further research in finance and capital structure decisions

RESEARCH METHODOLOGY

Research Design

The study used cross-sectional survey design to establish the effect of Warehouse Layout on performance of distribution firms in Kenya. A cross-sectional survey research design enables collection of data about a given phenomenon within a limited time horizon which can help describe incidences of events or provide an

explanation of factors related to an organization or industry (Saunders, 2019; Theuri 2019).

Research Philosophy

The system of assumptions and beliefs that control the way the research interprets the world is referred to as research philosophy. It is a knowledge foundation, and the nature of that foundation involves crucial assumptions about the researcher's worldview (Saunders et al.,2019). Positivism, realism, or pragmatism could be the research philosophies. These ideologies share a set of assumptions in common, and these assumptions explain why they are used as examples of bigger philosophies. To uncover the causes that influence outcomes, this study employed a positivist research philosophy. The study was also founded on theoretical foundations from which hypotheses were developed, and logic and evidence were tested using quantitative methodologies.

The positivist method is quantitative and focused on rational, truthful, and valid values. Positivism asserts that reality is stable and can be measured objectively by claiming that events can be isolated and observations can be replicated. This entails manipulating reality using changes in independent variables in order to detect regularities and build links between the social world's constituent elements (Erickson & Kovalainen, 2018).

Target Population

In this study, the target population was distribution firms. From data obtained from Kenya International Freight and Warehousing Association (KIFWA), there are a total of 1061 distribution firms. The distribution firms formed the unit of analysis while warehouse managers formed the unit of observation. Warehouse managers were selected because they were directly involved with all Warehouse Layout related activities in the distribution firms and are therefore in a position to provide the needed information on the effect of Warehouse Layout on performance of distribution firms in Kenya. The sample frame for this study was compiled from list of 1061 distribution firms in Kenya.

Sample Size and Sampling Procedures

Sample Size

The Yamane formula was adopted to calculate the study sample size as follows;

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

Where n is the sample size, and N is the population size, e- acceptable sampling error (0.05)

$$= \frac{1061}{1+1061(0.05^2)}$$

$$= \frac{1061}{3.65} = 290.48$$

$$n \approx 290$$

Therefore, the study sample size was 290 respondents.

Data Collection Instruments

This study used both closed-ended questions and open-ended questions to collect the data. Closed-ended questions were used where respondents were restricted to direct their answers without further explanation while the open-ended questions sought respondent's views on variables being studied. The use of a semi structured questionnaire has also been adopted by Gitahi (2017), Sialala (2016) and Hassan (2017) in their studies.

Pilot Study

According to Singpurwalla (2013), a pilot study sample size should ideally be 1-10% of the study sample. Therefore, for the purpose of this study, the pilot study was conducted by purposively selecting 15 firms from the sample size representing 5%. These firms will not be part of the actual data collection. In choosing the respondents for pilot testing, the researcher based on the accessibility of the location as it was in rainy season. The questions that have errors, omissions, ambiguous and irrelevant were re-defined and the questionnaire content, structure, and sequence was structured restructured to enhance the content validity and reliability. These improvements made the data collection instruments precise.

Data Analysis and Presentation

The researcher collected questionnaires, code them, and enter them into the Software Package for Social Sciences (SPSS version 26) for analysis. The sort function was used to perform the initial screening. The data was based on the study's objectives and research hypothesis. The descriptive statistical techniques of frequency, mean, and standard deviation were used to analyze the quantitative data acquired. The results were displayed using frequency distribution tables, which kept track of how many times a score or

response appears. Qualitative data collected was analysed using content analysis and presented in prose form.

Inferential statistics including regression and correlation analysis were used in the study. Moderator is a variable that affects the direction and the strength of the relationship between an independent or predictor variable and a dependent criterion variable (Baron & Kenny, 2016). The moderating variable in the study is the firm size on the independent variable and the outcome variable. Hierarchical multiple regression was utilized to evaluate the moderating influence of firm size on the relationship between Warehouse Layout and performance of distribution firms in Kenya. This helped to decide whether to accept or reject hypotheses.

RESEARCH FINDINGS AND DISCUSSION

Descriptive Analysis of Study Variables

In this section the study presents findings on Likert scale questions where respondents were asked to indicate their level of agreement with various statements that relate with the effect of Warehouse Layout on performance of distribution firms in Kenya. They used a 5-point Likert scale where 1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree. The means and standard deviations were used to interpret the findings where a mean value of 1-1.4 was strongly disagree, 1.5-2.4 disagree, 2.5-3.4 neutral, 3.5-4.4 agree and 4.5-5 strongly agree. Also, respondents were asked open ended questions at the end of the Likert questions that helped capture information that was not captured by the Likert questions. The information was analysed using content analysis and presented in prose form.

Warehouse Layout

The first objective of the study was to find out the effect of warehouse layout on performance of distribution firms in Kenya. Respondents were requested to indicate their level of agreement with the statements on warehouse layout which was measured in terms of type of layout that is distribution center layout, fulfilment center layout, and cross-docking facility layout. Table 1 presents summary of the findings obtained.

Regarding distribution center layout, the findings showed that the respondents agreed that the layout of their distribution center: effectively optimizes space utilization and facilitates efficient movement of goods (M= 3.848, SD= 0.947); that it is conducive to streamlined inventory management processes, minimizing congestion and enhancing workflow efficiency (M= 3.837, SD= 0.891); and that it supports easy accessibility to inventory, enabling quick retrieval and loading of goods for outbound shipments (M= 3.743, SD= 0.734). On fulfilment center layout, respondents agreed that the layout of their fulfillment center: contributes significantly to the accuracy and timeliness of order fulfillment processes (M= 3.794, SD= 0.882); that it is designed to minimize order processing errors and enhance overall customer satisfaction (M= 3.727, SD= 0.764); and that it enables efficient picking, packing, and shipping of orders, leading to improved operational performance (M= 3.603, SD= 0.799). Finally on cross-docking facility layout, they agreed that their cross-docking facility layout: supports swift and seamless transfer of goods between inbound and outbound shipments (M= 3.818, SD= 0.947); that it enhances operational agility and responsiveness to changing customer demands (M= 3.732, SD= 0.778); and that it is optimized to minimize handling and storage times, resulting in improved efficiency and cost-effectiveness (M= 3.600, SD= 0.934).

The findings above show that space utilization, volume of goods stored, and labour productivity affect performance of distribution firms in Kenya. This also means that warehouse layout affects performance of distribution firms in Kenya. This is supported by an aggregate mean of 3.745 (SD= 0.853). These findings resonate with study conducted by Jinxiang, Goetschalckx, and Mcginnis (2019) that underscored the paramount importance of optimizing warehouse space usage. They emphasize that an efficient warehouse layout contributes to streamlining processes, reducing production times, and gaining better visibility into operational challenges. Additionally, Saifudin, Zainuddin, and Azwardi (2017) explored the correlation between warehouse efficiency and layout, underlining that a well-thought-out layout positively affects operational efficiency. This is particularly relevant to our finding that warehouse layout affects distribution firm performance. Moreover, Buzu's study in 2021 focused on the impact of warehousing management on warehouse performance. It investigated various factors, including space utilization, storage, put away processes, and order picking – all of which are interconnected aspects of warehouse management.

The study findings reveal that these processes significantly influence overall warehouse performance. This aligns perfectly with our findings that space utilization, volume of goods stored, and labor productivity collectively affect distribution firm performance.

Table 1: Descriptive Statistics on Warehouse Layout

	1 %	2 %	3 %	4 %	5 %	Mean	Std. Dev
Distribution Center Layout							
The layout of our distribution center effectively optimizes space utilization and facilitates efficient movement of goods	3.0	7.6	11.1	58.1	20.2	3.743	0.734
The distribution center layout is conducive to streamlined inventory management processes, minimizing congestion and enhancing workflow efficiency	1.0	6.4	18.7	55.7	18.2	3.837	0.891
Our distribution center layout supports easy accessibility to inventory, enabling quick retrieval and loading of goods for outbound shipments	1.1	11.8	19.8	46.5	20.9	3.848	0.947
Fulfilment Center Layout							
The layout of our fulfillment center contributes significantly to the accuracy and timeliness of order fulfillment processes	4.8	15.3	11.6	51.3	16.9	3.794	0.882
Our fulfillment center layout is designed to minimize order processing errors and enhance overall customer satisfaction	0.5	13.4	18.0	49.0	19.1	3.727	0.764
The layout of our fulfillment center enables efficient picking, packing, and shipping of orders, leading to improved operational performance	1.1	10.3	14.9	55.4	18.3	3.603	0.799
Cross-Docking Facility Layout							
Our cross-docking facility layout supports swift and seamless transfer of goods between inbound and outbound shipments	2.7	13.0	15.7	58.9	9.7	3.818	0.947
The layout of our cross-docking facility enhances operational agility and responsiveness to changing customer demands	3.3	9.8	17.5	49.2	20.2	3.732	0.778
Our cross-docking facility layout is optimized to minimize handling and storage times, resulting in improved efficiency and cost-effectiveness	4.0	5.1	14.2	58.5	18.2	3.600	0.934
Aggregate Score						**3.745**	**0.853**

Firm Size

The final objective of the study was to assess the moderating effect of firm size on the relationship between Warehouse Layoutand performance of distribution firms in Kenya. Respondents were therefore asked to indicate their level of agreement with statements on firm size and performance of distribution firms in Kenya. Measures of firm size were the different firm categories that is small, mid-size and large enterprises. Table 2 presents summary of the findings obtained.

Regarding small enterprises, the respondents agreed that small enterprises: demonstrate agility and adaptability in responding to market changes due to their streamlined organizational structure (M= 3.701, SD= 1.022); that they often face resource constraints, limiting their ability to invest in advanced technologies and infrastructure compared to larger counterparts. (M= 3.639, SD= 0.645); and that the size of enterprise allows for direct and personalized communication channels, fostering stronger relationships with customers and suppliers. (M= 3.515, SD= 0.636). Regarding

medium-sized enterprises, respondents agreed that medium-sized enterprises: often possess sufficient resources to invest in technology upgrades and process improvements, contributing to their competitiveness in the market (M= 3.766, SD= 0.737); that the organizational structure of medium-sized enterprises enables effective collaboration and coordination among departments, enhancing overall operational performance (M= 3.724, SD= 1.109); and that they strike a balance between flexibility and stability, allowing for innovation while maintaining operational efficiency (M= 3.714, SD= 0.889). On large enterprises, the respondents agreed that large enterprises benefit from economies of scale, allowing them to negotiate better terms with suppliers and achieve cost efficiencies in operations (M= 3.764, SD= 0.845); that the size and scope of large enterprises enable significant investments in research and development, driving innovation and market leadership (M= 3.763, SD= 0.796); and that they have the capacity to implement comprehensive quality control measures and standardized processes, ensuring consistent product/service delivery (M= 3.703, SD= 1.001).

As supported by an aggregate mean of 3.699 (SD= 0.853), it is evident that firm size affects performance of distribution firms in Kenya. Meiryani et al. (2020) conducted research on the effect of firm size on corporate performance and found that firm size, as one of the most recognized determinants of financial performance, had a significant impact. Our study's focus on the size-related factors of warehouse capacity, packing area, and employee count aligns with their findings and supports the notion that firm size plays a crucial role in determining performance. Furthermore, Pervan and Josipa (2018) explored the influence of firm size on profitability and identified a significant positive influence of firm size on firm profitability. This aligns with our findings that firm size, when measured in terms of warehouse capacity, packing area, and the number of employees, affects the performance of distribution firms. Additionally, Kioko (2018) investigated the relationship between firm size and financial performance in the context of commercial banks in Kenya. Although our study focuses on distribution firms, the insight that both total assets and the number of employees significantly affect performance is consistent with our findings. This reinforces the idea that firm size, particularly when evaluated through various parameters, plays a vital role in influencing organizational performance.

Table 2: Descriptive Statistics on Firm Size

	1 %	2 %	3 %	4 %	5 %	Mean	Std. Dev
Small Enterprises							
Small enterprises demonstrate agility and adaptability in responding to market changes due to their streamlined organizational structure	4.0	6.9	14.9	63.2	10.9	3.701	1.022
Small enterprises often face resource constraints, limiting their ability to invest in advanced technologies and infrastructure compared to larger counterparts.	4.1	15.8	21.1	42.7	16.4	3.515	0.636
The size of enterprise allows for direct and personalized communication channels, fostering stronger relationships with customers and suppliers.	5.0	10.0	22.8	40.6	21.7	3.639	0.645
Medium-Sized Enterprises							
Medium-sized enterprises strike a balance between flexibility and stability, allowing for innovation while maintaining operational efficiency	3.6	10.2	13.8	56.1	16.3	3.714	0.889
Medium-sized enterprises often possess sufficient resources to invest in technology upgrades and process improvements, contributing to their competitiveness in the market	4.1	4.7	24.0	45.0	22.2	3.766	0.737
The organizational structure of medium-sized enterprises enables effective collaboration and coordination among departments, enhancing overall operational performance	1.8	9.4	12.4	67.6	8.8	3.724	1.109
Large Enterprises							
Large enterprises benefit from economies of scale, allowing them to negotiate better terms with suppliers and achieve cost efficiencies in operations	0.6	6.9	23.6	53.4	15.5	3.764	0.845
The size and scope of large enterprises enable significant investments in research and development, driving innovation and market leadership	5.3	8.9	13.6	48.5	23.7	3.763	0.796
Large enterprises have the capacity to implement comprehensive quality control measures and standardized processes, ensuring consistent product/service delivery	2.7	12.4	9.7	62.2	13.0	3.703	1.001
Aggregate Score						**3.699**	**0.853**

Hypotheses One

The first objective of the study was to find out the effect of warehouse layout on performance of distribution firms in Kenya. The corresponding null hypothesis tested was H_{04} Warehouse layout does not significantly affect performance of distribution firms in Kenya. The study conducted a simple regression analysis to examine the warehouse layout relationship between performance of distribution firms in Kenya and warehouse layout.

The R-Squared was used to test the variation in the dependent variable as a result of changes in the independent variable. As indicated in Table 3, the R-squared for the relationship between warehouse layout and performance of distribution firms in Kenya was 0.567; this is an indication that at 95% confidence interval, 56.7% of variation in performance of distribution firms in Kenya can be attributed to changes in warehouse layout. In essence, this finding suggests that warehouse layout is a significant factor contributing to the performance of distribution firms in Kenya, explaining 56.7% of the observed variations. This

aligns with the work by Jinxiang, Goetschalckx, and McGinnis (2019) on warehouse design and performance evaluation that emphasized the importance of optimizing warehouse space and layout to improve the efficiency and flow of operations within a facility. This finding reinforces the notion that an efficient and well-designed warehouse layout can significantly impact the performance of distribution firms.

Table 3: Model Summary for Warehouse Layout on Organization Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.753[a]	.567	.566	.41261

a. Predictors: (Constant), Warehouse layout

To test the significance of the model, analysis of variance was used. Significance was tested at 95% confidence interval. From the findings in Table 4, the p-value was 0.000 which is less than the selected level of significance (0.05) and indication that the model as fitted was significant. Also, the F-calculated value (321.262) was greater than the F-critical Value (3.880) from the f-distributions table. This supports the significance of the model. Therefore, the model as fitted is significant in predicting performance of distribution firms in Kenya.

Table 4: ANOVA for Warehouse Layout on Organization Performance

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	54.694	1	54.694	321.262.000[b]	
1Residual	41.710	245	.170		
Total	96.404	246			

a. Dependent Variable: Performance of Distribution firms
b. Predictors: (Constant), Warehouse layout

From the results in Table 4, the following regression model was fitted.

$$Y = 0.244 + 0.732\ X_4$$

(X_1 is Warehouse layout)

The coefficient results showed that the constant had a coefficient of 0.244 suggesting that if warehouse layout was held constant at zero, performance of distribution firms in Kenya would be at .244 units. In addition, results showed that warehouse layout coefficient was 0.732 indicating that a unit increase in warehouse layout would result in a 0.732 increase in performance of distribution firms in Kenya. It was also noted that the P-value for warehouse layout coefficient was 0.000 which is less than the set 0.05 significance level indicating that warehouse layout was significant. Based on these results, the study rejected the null hypothesis H_{01} (warehouse layout has no significant effect on performance of distribution firms in Kenya) and accepted the alternative that warehouse layout has positive significant effect on performance of distribution firms in Kenya. The finding aligns with the study conducted by Buzu (2021) that emphasized the importance of efficient warehousing management, including aspects like layout, to improve warehouse performance. The positive significant effect observed in the study corresponds to Buzu's findings, underlining the vital role that warehouse layout plays in enhancing the performance of distribution firms, as supported by the cited literature.

Table 5: Coefficients for Warehouse Layout on Organization Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.244	.065		3.754	.019
	Warehouse layout	.732	.041	.753	17.924	.000

a. Dependent Variable: Performance of Distribution firms

Hypotheses Two

The second objective of the study was to assess the moderating effect of firm size on the relationship between Warehouse Layout and performance of distribution firms in Kenya. Moderation happens when the relationship between the dependent variable and the independent variables is dependent on a third variable (moderating variable). The effect that this variable has is termed as interaction as it affects the direction or strength of the relationship between the dependent and independent variable. To achieve the fifth research objective, the study computed hierarchical regression analysis; this also guided the study in testing the fifth research hypothesis H_{02} Firm size has no significant moderating effect on the relationship between Warehouse Layout and performance of distribution firms in Kenya. Firm size (M) was introduced as the moderating variable.

From the model summary findings in Table 6, the first model which is the regression for Warehouse Layout (X) alone, the value of R-squared was 0.610 which suggests that 61% change in performance of distribution firms in Kenya can be explained by changes in warehouse layout. The p-value for the first model (0.000) was less than the selected level of significance (0.05) suggesting that the model was significant. The findings in the second model which constituted warehouse layout, firm size and interaction term (X*M) as predictors, the r-squared was 0.704. This implies that the introduction of firm size in the second model led a 0.092 increase in r-squared, showing that firm size positively moderates the relationship between Warehouse Layout and performance of distribution firms in Kenya.

The finding is in line with research by Kioko (2018) on the relationship between firm size and financial performance of commercial banks in Kenya. Kioko's research highlights how firm size can influence a firm's performance. In this context, the positive moderation effect of firm size on the relationship between Warehouse Layout and performance indicates that larger firms, often associated with greater resources and capabilities, can leverage Warehouse Layout strategies more effectively to enhance their performance, supporting the alignment with the provided literature.

Table 6: Model Summary for Moderation Effect

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df 1	df2	Sig. F Change
1	.781[a]	.610	.609	.39150	.610	383.982	1	245	.000
2	.839[b]	.704	.700	.34282	.093	38.258	2	243	.000

a. Predictors: (Constant), Warehouse Layout
b. Predictors: (Constant), Warehouse Layout, Firm size, X*M

From the model summary findings in Table 7, the F-calculated for the first model, was 383.982and for the second model was 192.428. Since the F-calculated for the two models were more than the F-critical, 3.880 (first model) and 2.642 (second model), the two models were good fit for the data and hence they could be used in predicting the moderating effect of firm size on the relationship between warehouse layout and performance of distribution firms in Kenya.

Table 7: ANOVA for Moderation Effect

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.853	1	58.853	383.982	.000[b]
	Residual	37.551	245	.153		
	Total	96.404	246			
2	Regression	67.846	3	22.615	192.428	.000[c]
	Residual	28.559	243	.118		
	Total	96.404	246			

a. Dependent Variable: Performance of Distribution firms
b. Predictors: (Constant), Warehouse Layout
c. Predictors: (Constant), Warehouse Layout, Firm size, X*M

Further, by substituting the beta values as well as the constant term from the coefficient's findings for the first step regression modelling, the following regression model will be fitted:

$$Y = 0.423 + 0.884\ X$$

(X is Warehouse Layout)

The findings show that when Warehouse Layout is held to a constant zero, performance of distribution firms in Kenya will be at a constant value of 0.423. The findings also show that Warehouse Layout has a statistically significant effect on performance of distribution firms in Kenya as shown by a regression coefficient of 0.884 (p-value= .000).

By substituting the beta values as well as the constant term from model 2 emanating from the second step in regression modelling the following regression model was fitted:

$$Y= 1.600 + 0.849\ X + 1.136\ M + 0.\ 924\ X*M$$

Where X is Warehouse Layout; M is Firm size and X*M is the interaction term between Warehouse Layout and firm size.

The findings show that Warehouse Layout, firm size, and interaction term (X*M) are held to a constant zero, performance of distribution firms in Kenya will be at a constant value of 1.600. The model also indicated that Warehouse Layout had a positive and statistically significant effect on

performance of distribution firms in Kenya as shown by a regression coefficient of 0.849 (p-value= 0.000). It is also seen that firm size had a positive and significant effect on performance of distribution firms in Kenya as shown by a regression coefficient 1.136 (P=0.000<0.05). On the other hand, interaction of Warehouse Layout and firm size (X*M) also had a positive and significant effect on performance of distribution firms in Kenya as shown by a regression coefficient of 0.924 (p-value= 0.000).

It is therefore seen that Warehouse Layout on its own has 0.849 effect on performance of distribution firms in Kenya. However, when interacted with firm size, it has an effect of 0.924. This is a clear indication that introduction of firm size as moderating variable has positive influence on performance of distribution firms in Kenya. The study therefore rejects the null hypothesis and accepts the alternative that firm size has positive significant moderating effect on the relationship between Warehouse Layout and performance of distribution firms in Kenya.

Table 8: Beta Coefficients for Moderation Effect

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.423	.171		2.479	.014
	Warehouse Layout	.884	.045	.781	19.595	.000
2	(Constant)	1.600	.288		5.556	.000
	Warehouse Layout	.849	.097	.779	8.753	.000
	Firm size	1.136	.136	.923	8.353	.000
	X*M	.924	.352	1.468	6.079	.000

a. Dependent Variable: Performance of Distribution firms

Conclusions

The first null hypothesis assessed whether warehouse layout significantly influenced the performance of distribution firms in Kenya. The research outcomes indicated that warehouse layout is statistically significant in explaining the performance of distribution firms in Kenya. This significance was linked to a positive effect, suggesting that improvements in warehouse layout positively impact the performance of distribution firms. Consequently, the study concludes that warehouse layout does have a significant and positive effect on the performance of distribution firms in Kenya.

The second null hypothesis investigated whether firm size had a significant moderating effect on the relationship between Warehouse Layout and the performance of distribution firms in Kenya. The research results showed that firm size indeed has a significant moderating effect on this relationship. In particular, the introduction of firm size as a moderating variable positively influenced the relationship between Warehouse Layout and the performance of distribution firms. Therefore, based on these findings, the study concludes that firm size does have a significant moderating effect, enhancing the relationship between Warehouse Layoutand the performance of distribution firms in Kenya.

Recommendations

Regularly reviewing and updating warehouse layouts to accommodate changing business needs and optimize operations is essential. Seeking expert advice in designing layouts that minimize travel distances and maximize space utilization is highly recommended. Prioritizing safety and ergonomics in warehouse layout planning is crucial for employee well-being and productivity. A well-designed layout can reduce workplace accidents and enhance overall operational efficiency.

For smaller distribution firms, strategic partnerships and collaborations with larger organizations can be advantageous. These partnerships enable smaller firms to leverage the resources and bargaining power of larger counterparts, leading to cost savings and improved performance. Additionally, smaller firms should invest in technology solutions that level the playing field with larger competitors. This includes adopting modern inventory management systems, e-commerce platforms, and customer relationship management tools. Regardless of size, all distribution firms should prioritize a customer-centric approach. Building strong customer relationships, providing exceptional service, and focusing on customer satisfaction can be a competitive advantage for firms of any size.

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