Logistics Optimization Management and Performance of Manufacturing Firms in Uasingishu County, Kenya

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Purpose: The purpose of the study was to determine the relationship between logistics optimization management and performance of manufacturing firms in Uasin Gishu County, Kenya. The specific objective were: warehouse and materials handling, packaging management, inventory control management and transport management respectively. This outcome was acceptable from this study findings.

Keywords: Warehouse and Materials Handling, Packaging Management, Inventory Control Management and Transport Management

1.1 Introduction

Supply chain management is a process used by companies to ensure that their supply chain is efficient and cost-effective. A supply chain is the collection of steps that a company takes to transform raw materials into a final product Muttimos (2014). The five basic components of supply chain management are discussed below: The initial stage of the supply chain process is the planning stage (Humphreys, 2013). We need to develop a plan or strategy in order to address how the products and services will satisfy the demands and necessities of the customers. In this stage, the planning should mainly focus on designing a strategy that yields maximum profit. For managing all the resources required for designing products and providing services, a strategy has to be designed by the companies. Supply chain management mainly focuses on planning and developing a set of metrics. After planning, the next step involves developing or sourcing. In this stage, we mainly concentrate on building a strong relationship with suppliers of the raw materials required for production (Kabergey & Richu, 2015).

1.1.1 Resource-Based View Theory

The theory of Resource Allocation Mechanisms (RAMs) theory suggests that organizations that can effectively integrate and share information will be able to allocate resources more efficiently and thus improve their performance (Mendelow, 1991). According to the theory, information integration is critical for effective procurement management, and can have a significant impact on the performance of organizations. Resource Allocation Mechanisms derives the general welfare properties of systems in which individuals are motivated by self-interest. Satisfactory outcomes will emerge only if individual incentives are harnessed by means of a communication and payoff process, or mechanism, involving every agent (Hamali et al 2020).The Resource-Based View (RBV) theory states that the resources and capabilities of an organization determine its performance (Barney, 1991). The theory posits that organizations that have the ability to effectively manage their resources, including their supply chains, will have a competitive advantage and perform better than organizations that do not have this ability. The theory suggests that order fulfillment, as a key aspect of agile procurement, can have a significant impact on the performance of organizations. This theory will be used to establish the influence of information integration on performance of manufacturing firms in Uasin Gishu, Kenya.

1.1.2 Inventory Theory

“Sorry, we’re out of that item.” How often have you heard that during shopping trips? In many of these cases, what you have encountered are stores that aren’t doing a very good job of managing their inventories (stocks of goods being held for future use or sale). They aren’t placing orders to replenish inventories soon enough to avoid shortages (Nahmias,1982). These stores could benefit from the kinds of techniques of scientific inventory management that are described in this chapter. It isn’t just retail stores that must manage inventories. In fact, inventories pervade the business world. Maintaining inventories is necessary for any company dealing with physical products, including manufacturers, wholesalers, and retailers. For example, manufacturers need inventories of the materials required to make their products. They also need inventories of the finished products awaiting shipment. Similarly, both

wholesalers and retailers need to maintain inventories of goods to be available for purchase by customers (Nahmias,1982). The most common inventory situation faced by manufacturers, retailers, and wholesalers is that stock levels are depleted over time and then are replenished by the arrival of a batch of new units. A simple model representing this situation is the following economic order quantity model or, for short, the EOQ model. (It sometimes is also referred to as the economic lot-size model.)The costs associated with storing ("carrying") inventory are also very large, perhaps a quarter of the value of the inventory..

1.1.3 Theory of Constraints

The theory of constraints was developed by (Goldratt, 1990). This theory talks about a series of processes that are put in place to remove constraints in an organization that are preventing the achievement of organizational goals. Theory of constraints is applied to identify the factors that hinder an organization from achieving its goals, finding a solution to these factors and getting individuals to implement the required changes (Nahmias,1982). This theory will therefore be used to assess the influence of order fulfilment on performance of manufacturing firms in Uasin Gishu, Kenya. This theory will be used to assess the influence of lead-time on the performance of manufacturing firms in Uasin Gishu, Kenya.

2.1 Warehousing and Materials Handling

Warehousing forms an integral part of logistics and supply chain operations. Basically, a warehouse connotes an organization's planned space used for storage and material handling purposes (Ongeri & Osoro, 2021). A typical look at the supply chain from the upstream through the focal firm to the downstream indicates that, storage takes place at the various tiers from production to distribution. Warehouse management is therefore essential in ensuring a balance between production and demand. Examining warehousing from the logistics viewpoint indicates that they are facilities used to store or hold raw materials, semi-finished goods, or finished goods for varying periods. Essentially, warehouses minimize the effects of supply chain inefficiencies, improve logistics accuracy and inventory management, and allow product accumulation, consolidation, and customization (Adams, Muir & Hoque, 2014).

The cost of warehousing should be commensurate with the contribution of warehousing to the overall logistics performance. Although many organizations have examined the possibilities of practicing the Just-in-Time philosophy, and others looking at how effective cross-docking techniques could invalidate the significance of warehousing (Ongeri & Osoro, 2021). The extant literature has shown that it would be very expensive, if not impossible to completely do away with warehouses. Worthy to note is the fact that, warehousing and material handling operations work hand-in-hand. The objective of material handling is to ensure efficient products and material movement, protection, storage and control in the warehouse. The concept of material handling has become important with the advent of technology integration into warehouse operations. Subsequently, some organizations operate warehouses with advanced material handling equipment. These material handling equipment increase productivity and accuracy, compared to the completely manual operations. Warehousing and material handling operations has seen massive integration of technology into their operations, however, not all jurisdictions have benefitted from these technological outlays or injections. In Ghana, as in most emerging economies, practitioners mostly use the manual approach in executing the tasks of warehousing and material handling (Adams et al., 2014).

This does not suggest that there have not been some levels of technological integration into warehousing and material handling in Ghana (Ongeri & Osoro, 2021). It is however intriguing to note that, despite the provision of some basic mechanical material handling equipment for MMDAs in Ghana, tradition and culture has rendered most of the equipment redundant as practitioners invariably prefer to stick to the 'status quo', thus extensively using the traditional manual approach in executing their tasks. Significantly, research outputs in the areas of warehousing and material handling are quite substantial. It is also a fact that warehousing and material handling operations have improved across countries, including emerging economies over the past decades. These developments notwithstanding, research has shown that there is a gap in knowledge on the effect of culture and tradition on technological integration in warehousing and material handling operations in Ghana. Indeed, there is no known empirical investigation into how the tale of tradition, culture and modernity impact on warehousing and material handling operations in the MMDAs of Ghana (Adams et al., 2014). The objective of the research therefore is to investigate these variables and their impact on practitioners' performance in a study area known for its paucity of information

2.1.1 Packaging Management

Packaging logistics is a relatively new discipline that in recent years has been developed and has gained increasing attention in terms of the strategic role of logistics in delivering competitive advantage by the industrial and scientific community. Industry and science attribute different maturity levels to the subject depending on country and culture. According to Adams et al. (2014), the concept of packaging logistics focuses on the synergies achieved by integrating packaging and logistics systems with the potential of increased supply chain efficiency and effectiveness, through the improvement of both packaging and logistics related activities. A more recent definition of packaging logistics is attributed to Chan et al.2003, who describe packaging logistics as the interaction and relationship between logistics and packaging systems that improve add-on values on the whole supply chain, from raw material producers to end users, and the disposal of the empty package, by re- use, material recycling, incineration or landfill. Both the definitions focus on the

importance of the packaging logistics system, mainly in order to improve the efficiency of the whole supply chain (Ongeri & Osoro, 2021).

In the market function, things like design, layout, communication, ergonomic aspects that create value for the product and the brand are important features for the packaging system. The purpose of the market function is to satisfy customers and to increase product sales (Ongeri & Osoro, 2021). During recent decades the link between packaging and marketing is analyzed in depth by several authors, and packaging has been studied as a marketing instrument that can influence some specific aspects, such as product positioning, consumer attention, categorization and evaluation, usage behavior, intention to purchase or brand communication. The aspect is significant since the package plays the role of an important interface between the brand owner and the consumer. The initial impression of product quality by the consumers is often judged by the impression of the package. In the current operational environment, planning innovations must take into account not only marketing and logistics functions, but also a factor that is emerging as increasingly important: the environmental aspect. It aims to reduce the negative effects of the packaging system on the environment. Issues like the use of fewer inputs for the same outputs and the re- use of materials, facilitate the recycling of packaging (Adams et al., 2014).

Adams et al. (2014), suggest that an increasing number of companies are choosing approaches that take care of the environmental aspects. It is further established that the design of the packaging system heavily influences the environmental aspect of activities in the supply chain. With regard to packaging logistics, the use of an appropriate packaging system (in terms of functions, materials, size and shape) can improve the management of operations: Facilitate goods handling. This function considers the following aspects: Volume efficiency: this is a function of packaging design and product shape. In order to optimize the volume efficiency of a package, this function can be split into two parts, internal and external filling degree. The first regards how well the space within a package is utilized. When using standardized packages with fixed sizes, the internal filling degree might not always be optimal. The external filling degree concerns the fitting of the primary packages with secondary and of secondary with tertiary. Packages that perfectly fill each other can eliminate unnecessary handling and the risk of damage, but it is important not to be too ambitious (Ongeri & Osoro, 2021).

Too much packaging may be too expensive, and there is a point where it is less costly to allow some damage than to pack for zero damage; Consumption adaptation: the quantity of packages must be adapted to the consumption in order to keep costs low and not to tie unnecessary capital (Ongeri & Osoro, 2021). Moreover it is desirable to have flexible packages and a high turnover of the packaging stock. 4. Weight efficiency: the package must have the lowest possible weight, because volume and weight limit the possible amount to transport. The weight is even more important when packages are handled manually. Handleability: the packaging must be easy to handle for people and automatic systems working in the supply chain, and final customers. According to Adams et al. (2014) the handle ability is considered the most critical packaging quality attribute by Italian companies and users; identify the product. The need to trace the position of goods during transport to the final destination can be achieved in different ways, for example by installing RFID tags in packages. Thanks to this new technology, it is possible to identify the position of both packages and products in real time (Ongeri & Osoro, 2021). This system leads to a reduction in thefts, increase in security, mapping of the path of products and control of the work in progress; protect the product. The protection of the product is one of the basic functions of packaging for both companies and users. An unprotected product could cause product waste, which is negative from both the environmental and the economic point of view. Packages must protect products during manufacturing and assembly (within the factory), storage and picking within the warehouse and transport within the vehicle from surrounding conditions, against loss, theft and manipulation of goods Packaging defined the words package and packaging's have different meanings, intended to convey different images (Adams et al., 2014).

The package is the physical entity that actually contains the product. Packaging is the integration of the physical elements through technology to generate the package (Ongeri & Osoro, 2021). Packaging can be defined as "those activities in the product decision which pertain to the design, manufacturing and filling of the container or wrapper with the product item, in such a way that the product item can be protected, stored, handled, transported and identified effectively and marketed successfully". He, packaging is the material in which a product or a group of products are wrapped and consists of the containment, protection, apportionment and unitization of goods. It adds to the convenience of customers and provides them with the necessary information regarding the packed goods. Packaging further enhances the handling and appearance of goods, which leads to an improvement in the flow of goods through the logistics channel. Packaging categories in this study, packaging includes all packaged items represented to the customer primary packaging of a product is the first and main line of protection the material which is in direct contact with the product. It represents the barrier between the product and the „hazards" of the external environment. Secondary packaging may or may not also be part of the product which is sold to the customer and there may be more than one layer of secondary packaging each carrying out a specific function in the distribution chain (Adams et al., 2014).

Secondary packaging unitizes the primary packaging providing both the retailer and consumer with a more convenient means of handling the product. It can also help to protect the primary packages from another, and thus protect the product (Ongeri & Osoro, 2021). Tertiary packaging (distribution packaging) ensures the safe and efficient delivery of products from their point of manufacture to the next point in their distribution chain which may be a warehouse, distribution centre, the retailer or even the customer. The first

two categories include mainly consumer packaging, on which this study focuses. An effective package must have the ability to meet the physical demands of the distribution and end user (Adams et al., 2014).

2.1.2 Inventory Control Management

Packaging plays a significant role in the supply chain and it is an integral part both of the product process and the product supply chain (Ongeri & Osoro, 2021). Product packaging facilitates easier distribution. It protects product from environmental conditions, such as light, oxygen, moisture, microbes, mechanical stresses and dust. Other basic tasks include adequate labelling to provide information to the consumer, and ensure convenience to the consumer, e.g. easy opening, re-closable lids and a suitable closing mechanism. Basic requirements are good marketing properties, reasonable price, technical feasibility such as suitability for automatic packaging machines, seal- ability suitability for contact, low environmental stress and suitability for recycling or refilling. Adams et al. (2014), further points out that a package has to satisfy all the above requirements effectively and economically. He states that some requirements and demands are contradictory to each other; for these reasons a modern product package should be optimised and integrated with the product supply chain.

Adams et al. (2014), supplies included office and plant cleaning materials (soap, brooms etc. oil, fuel, light bulbs and the likes). These materials do not directly enter into the production process, but are necessary for production process. Inventory constitutes the most significant part of current assets of a large majority of companies in India. For example, on an average inventories are more than 57 per cent of current assets in public limited companies and about 60.5per cent in government companies in India. Therefore it is absolutely imperative to manage inventories efficiently and effectively in order to avoid unnecessary investment in them. An undertaking neglecting the management of inventories will be jeopardizing its long run profitability and may fail ultimately. It is possible for a company to reduce its level of inventories to a considerable degree e.g. 10 to 20 per cent without any adverse effect on production and sales (Ongeri & Osoro, 2021).

Adams et al. (2014), inventories consist of raw materials, stores, spares, packing materials, coal, petroleum products, works-in-progress and finished products in stock either at the factory or deposits. It is most important component of current assets in the cement industry and was 42 per cent of total current assets for sample companies as on March 31, 2004. In other industries too it is very important component of total investment. The maintenance of inventory means blocking of funds and so it involves the interest and opportunity cost to the firm. In many countries especially in Japan great emphasis is placed on inventory management. Efforts are made to minimize the stock of inputs and outputs by proper planning and forecasting of demand of various inputs and producing only that much quantity which can be sold in the market. The inventory cost is not only interest on stocks but also cost of store building for storage, insurance and obsolesce and movement of inputs from place of storage to the factory where the materials have to be finally used to convert them into finished goods. In japan industries have adopted concept of JIT (Just in Time) and components, materials are received when required for which detailed instructions are given to suppliers (Ongeri & Osoro, 2021).

Adams et al. (2014), as against this by and large in India the inventory of coal, raw materials and packing materials is very high and many items become junk or obsolete causing heavy loss to the enterprise. Lack of inventory planning in India has been pointed out by various committees but due to uncertainties in supplies, problem of timely receipt of railway wagons, lack of planning and unreliable suppliers the investment in inventories is quit high. The fluctuation in demand affects inventory of finished product of which cement industry has been a victim many times.

2.1.3 Transport Management

Transportation management systems are information technologies used to plan, optimize, and execute transportation operations. A TMS can facilitate transportation management activities that take place before, during, and after the transportation movement by optimizing freight flows among multiple facilities, tracking freight in transit, and managing the freight payment process (Ongeri & Osoro, 2021). While TMS technology has existed for quite some time, the imperative for their adoption has never been greater given logistics managers' concerns of dramatically rising freight costs, capacity shortages, and increasing complexities in transportation management today. Though the trade press is laden with case studies of successful TMS implementations and solution vendors readily publicize the merits of their software, little independent research has examined the motives for adoption, benefits achieved, comparative costs, and challenges of implementation. The purpose of this article is to examine the state of TMS development and adoption, giving particular attention to the motives, means, costs, and benefits of adoption by reporting the experiences of 45 North American firms (Adams et al., 2014).

The article includes a review of the relevant literature of information technology in logistics and transportation management (Ongeri & Osoro, 2021). Information technology in logistics and transportation Logistics information systems (LIS) have represented a rich area of research since the ready application of computers to logistics management over the past 25 years. Logistics offers a natural area of application for advanced information technology given the complexity of facilitating physical flow management. As noted, information technology has the potential to improve logistics capabilities while simultaneously reducing costs. Information systems convert data into information to improve managerial decision-making, yielding greater effectiveness, efficiency, and flexibility in logistics activity (Adams et al., 2014).

All of sudden, product packaging has become one of the hottest areas of supply chain management (Ongeri & Osoro, 2021). It started with soaring fuel and transportation costs a few years ago, as companies realized that "over packaging" and packaging redesigns offered significant opportunities to reduce the dimensions of products for shipping – allowing companies to ship more products in the same carton, pallet or trailer. That directly lowered transportation costs. Then, even as transportation costs moderated, green supply chain considerations started to rise, where packaging again is seen as playing a critical role, both in reducing waste and eliminating energy use – and with that also reducing transportation expense. The hazards in the supply chain that will and can affect the condition of packaging must be identified (Adams et al., 2014).

Paine and Paine (1992) point out that it should be determined what happens to the package on its journey to the consumer. It is necessary to know the method of transport, the probable storage conditions, and the duration of both journey and storage. Once the hazards are identified it is important to design packaging in such a way that it can protect the product throughout the supply chain. For instance packaging must be strong enough to be stacked on top of each other in while in storage. According the Adams et al. (2014), nearly all logistics activities are affected by packaging. Utilities, effective distribution and materials handling require a proper packaging solution. But packaging is usually not considered until the product design has been decided upon, which limits the packaging design. This may hamper possible logistics solutions throughout the supply chain (Ongeri & Osoro, 2021).

Upon closer examination, transportation management offers a particularly rich area for technology application (Ongeri & Osoro, 2021). He noted that traffic management has long represented an information-intensive undertaking. This observation is particularly true today in light of increasing complexity in the transportation environment, given interest in managing inbound and outbound flows, globalization and extended supply chains, heightened documentation and tracking requirements for international shipping, just-in-time operations with narrow delivery windows, revised hours of service regulations for U.S. motor carriers, and Sarbannes-Oxley (S-OX) compliance, to name a few added complexities. Most research of technology use in transportation management is directed toward communicative technologies. Important work was conducted by Adams et al. (2014), among others, on the implementation of electronic data interchange (EDI) throughout the 1990's.

More recently, research has examined the roles, benefits and challenges of new communicative technologies, like the Internet, mobile communications, and satellite-based systems. Despite the impressive TMS adoption data presented in the introduction, exploration of recently developed decision support tools for transportation management has been limited. He examine electronic transportation marketplaces and propose the linkage between transportation exchanges and TMS technology. He illustrate a web-based decision support tool for transportation mode selection. Similarly, Adams et al. (2014) present an optimization-based transportation procurement approach facilitated by on-line auctions. There has yet to be research that examines TMS technology, in particular, and the current state of TMS adoption (Ongeri & Osoro, 2021).

A preliminary survey instrument was developed and distributed to three consultants and four logistics researchers familiar with the subject topic area to ensure the survey was thorough and contained content and language consistent with that currently in use (Ongeri & Osoro, 2021). Following modification from this first review, the survey was distributed to a group of practitioners with TMS adoption experience to further assess content and survey length. Once comments from this review were incorporated, the web-based survey was developed and tested. Potential respondents were notified by electronic mail that a survey regarding transportation management systems was being conducted and the website hosting the survey was provided. Past research has shown that the quality of the data obtained from surveys of this nature can be considered equivalent to mail surveys while the speed of response is generally quicker (Adams et al., 2014).

2.1.4 Performance of Manufacturing Firms

Organization performance is described as the way in which a firm accomplishes its market-based objectives and additionally its financial objectives. Performance is an ongoing process and flexible procedure which includes manager and those they manage (Ongeri & Osoro, 2021). They take a role of partners in a system created to empower them accomplish the required outcomes. Practicing strategic management can be supported as long as it enhances the firm's performance. Performance in itself is the final product of the activities that it incorporates and the actual outcome of the strategic administration process. Organizational performance is attainment of ultimate goals of the organization as set out in the key Organizational plans. Organization performance is a multidimensional construct operationalized by a variety of financial measures (which include sales, value of net assets and profit) and non-financial measures which include number of workers, market share and overall customer satisfaction (Muttimos, 2014).

In addition, factors such as overall satisfaction and non-financial goals of the firms are also very important in evaluating performance. Organization performance cannot be adequately determined without considering both financial and nonfinancial measures. According to Muttimos (2014), organizational performance comprises of three distinct areas of company results: Financial performance, commodity market performance and shareholder return. He noted that an organization performance may essentially be a reflection of changes in the market size or financial conditions rather than sales figures alone. A company's performance in respect to competitors can be measured by its share in the market. Firms try to build their business with respect to competitors essentially expanding their share in the market to profit from the economies of scale. Economies of scale can contribute in working up a cost advantage. Sales increase in a slow industry is the inspiration to enlarge the market share (Ongeri & Osoro, 2021).

After study Muttimos (2014)'s research, we are going to discuss two companies' performance through three aspects: firm understanding about what is to be achieved; develop the capacity of people to achieve it; provide support and guidance to the employees for high performance. Based on the theory and then compare the reality, it is ensured to treat JULC as a none-professional towards performance management (Ongeri & Osoro, 2021). Although they have a relatively clear concept about their goals, which is low cost and high profit. Their methods to achieve it are quite vague and ineffective though. The good part is JULC presents and analyzes their internal reports from previous years and has shown a potential trend to have a scientific performance assessment in the future. Refer to UPS, situation gets better. The three "criteria" are integrated, and the most important thing is they have a systematic assessment method to implement the performance reports. Both of the host companies will not neglect the chance to summarize the achievements of the past year, and they choose annual report as a media to reveal how things go on (Muttimos, 2014).

As far as the authors thought, a comprehensive report on a company's activities and finance performance throughout the preceding year is the foundation to know the company's status, as well as development trends (Ongeri & Osoro, 2021). Thusly, corresponding adjustments on a certain issue, or even the holistic layout could be adapted. These could turn out to be the advantages of tracking the effects on management in the dynamic marketplace. The differences of the two companies on performance management lay in the selection of the people who actually conduct the report, the process of them to generate the annual report, and the aspects that they take into consideration. JULC's annual report is produced by a team of fixed assigned clerks who come from different departments, and the investigation is focus on the complaints of customers, annual capacity, annual turnovers and profits, administrative and productive costs (Muttimos, 2014).

3.1 Research Design

The study used descriptive cross-sectional research design. Descriptive cross-sectional survey research design is proposed for this study because it involves measuring different variables in the population of interest at a single point in time (Kothari, 2014). Descriptive cross-sectional survey research is a method of collecting information by interviewing and administering questionnaires to a sample of individuals at a point in time (Mugenda & Mugenda, 2008). The main advantage of the cross-sectional survey is that it offers a quick way to collect data even from a large targeted population.

3.1.1 Reliability Test

Reliability is the extent to which results are consistent over time and are accurate representation of the total population under study (Crossman, 2020). Reliability of the research instrument was tested by use of Cronbach's alpha with an acceptance level of >.7 as guided by Castilio (2009) Reliability test results for the variables; warehouse and materials handling, packaging management, inventory control management, transport management and performance of manufacturing firms was .756; .863; .818; .728 and .844 respectively as shown in table 1.1 .All the variables recorded a Cronbach's alpha figure of >.7 which implies that internal consistency was adequate and the data can statistically be processed further.

Table 1.1 Reliability Test

Variables	Cronbach's Alpha	N of Items	Comments
warehouse and materials handling	.756	6	Acceptable
packaging management	.863	6	Acceptable
inventory control management	.818	6	Acceptable
transport management	.728	6	acceptable
performance manufacturing firms	.844	6	Acceptable

3.1.2 Warehouse and Materials Handling

Respondents were asked to give their opinion on the variable warehouse and materials handling. From table1.2 below, the respondents unanimously agreement that warehouse and materials handling ensured performance of and periodic review in manufacturing firms viable (M=3.740, SD=1.060); Through materials movement the in north rift region has been able to make rational decisions on priority and non-priority projects (M=3.830, SD=.920); handling of automation has contribution to the quality and innovation of the planning team (M=3.900, SD=.900); handling of equipment's in warehouse and materials handling it is important to put in place and maintain procurement record or register (M=4.058, SD=.825); The warehouse management of manufacturing firms has improved performance of north rift region (M=3.838, SD=1.301); and warehouse and materials handling enhances performance of at Manufacturing firms (M=3.563, SD=.801). These findings concur with the findings of Nyile *et al.* (2022) who observed that clear description of warehouse and materials handling, an enhance effective performance of firms

Table 1.2 : Warehouse and materials handling

Statement	Mean	Std. Dev.
In north rift region always ensures materials movement through Real time basis	3.374	1.060
Handling automation north rift region in Warehouse	3.830	.9201
Responsiveness of handling equipment on performance of Manufacturing firms In north rift region	3.900	.900
By Quick, frequent & accurate information transfer warehouse and materials handling	4.058	.825
The management of my in north rift region materials handling	3.838	1.301
Warehouse and materials handling enhances performance of Manufacturing firms in north rift region	3.563	.801

3.1.3 Packaging Management

From table 1.3 below , respondents agreed that: The manufacturing firms considers Strategic alliances on packaging management (M=3.848, SD=.831); A packaging management is likely to deliver based on performance of manufacturing firms (TORs) (M=4.030, SD=.1890); Good for safety on performance of Manufacturing firms (M=4.038, SD=.8301); Through good for secure has been able to get performance of manufacturing firms (M=4.108, SD=.711); proper supplier evaluation are supposed to have performance of manufacturing firms (M=4.091, SD=.800); good for reuse enhances performance of manufacturing firms (M=4.249 SD=.816) . These findings was in agreement with the findings of Ongeri and Osoro (2021) that the goal of packaging management is to ensure performance of manufacturing firms in Kenya. Effective Packaging management minimizes or eliminates problems and potential claims and disputes. This concurs with the finding of Omide et al. (2022). It is essential for packaging management to understand the provisions of the supplier evaluation, have the ability to perform to all practices involved, and maintain control over the performance of manufacturing firms

Table 1.3: PACKAGING MANAGEMENT

Statement	Mean	Std. Dev.
In north rift region considers good for safe on performance of Manufacturing firms	3.848	.831
Early good for secure enables on performance of Manufacturing firms	4.030	.189
Good for reuse enhances Performance of Manufacturing firms	4.038	.830
Good for safe enhances performance of Manufacturing firms	4.108	.711
Packaging enhances procurement performance of Manufacturing firms	4.09	.800
packaging management can boast procurement		

Performance of Manufacturing firms 4.249 .816

3.1.4 Regression Analysis

To establish the degree of the effect of supply chain for a regression analysis was conducted, with the assumption that: variables are normally distributed to avoid distortion of associations and significance tests, which was achieved as outliers were not identified; a linear relationship between the independent variables and dependent variable for accuracy of estimation, which was achieved as the standardized coefficients were used in interpretation. The multiple regression model was as follows:

$Y = \beta_0 + \beta_{1x1} + \beta_{2x2} + \beta_{3x\ 3} + \beta_4 x_4 + \varepsilon$

Performance of Manufacturing firms = β_0+ β_1 (warehouse and materials handling) + β_2 (packaging management) + β_3 (Inventory control management) + β_4 (transportation management) + error term. Regression analysis produced the efficient of determination and analysis of variance (ANOVA). Analysis of variance was done to show whether there is a significant mean difference between dependent and independent variables. The ANOVA was conducted at 95% confidence level.

3.2 Model of Goodness Fit

Regression analysis was used to establish the strengths of relationship between the performance of Manufacturing firms (dependent variable) and the predicting variables; warehouse and materials handling, packaging management, Inventory control management and transportation management (Independent variables). The results showed a correlation value (R) of 0.764 which depicts that there is a good linear dependence between the independent and dependent variables. This outcome is in line with the results of Ongeri and Osoro (2021). They observed that this also to depict the significance of the regression analysis done at 95% confidence level. This implies that the regression model is significant and a thus be used to evaluate the association between the dependent and independent variables. This finding is in line with the findings of Ittmann (2018), who observed that analysis of variance statistics examines the differences between group means and their associated procedures.

Table 1. 4: Model Goodness of Fit

R	R2	Adjusted R	Std. Error of the Estimate
0.774	0.764	0.731	0.065

With an R-squared of 0.764, the model shows that warehouse and materials handling, packaging management, Inventory control management and transportation management an contribute up to 76.4% on performance of manufacturing firms , while 23.6% this variation is explained by other indicators which are not inclusive in this study or model. A measure of goodness of fit synopses the discrepancy between observed values and the values anticipated under the model in question. This finding is in line with the findings of Mwakubo and Ikiara (2007).

3.2.1Analysis of Variance (ANOVA)

From the results in table 1.5 below, analysis of variance statistics was conducted to determine the differences in the means of the dependent and independent variables to show whether a relationship exists between the two. The P-value of 0.005 implies that performance of manufacturing firms have a significant relationship with warehouse and materials handling, packaging management, inventory control management and stakeholders management which is significant at 5 % level of significance.

Table 1.5 ANOVA TEST

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	4.256	1	1.059	.431	.002
Residual	6.465	188	.531		
Total	**10.711**	**189**			

From the result shown below, it's clear that when all the independent variables are regressed against the dependent variable the constant gives a negative result meaning there is a strong relationship and how each predator has an effect on the dependent variable.

Table 4.16 Regression coefficient Results

	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Std. Error	Beta		
(constant)	-.131	.060	-1.144	.004	.002
W/h & Materials.	.450	.132	.838	5.471	.001
Packaging mgt .212	.068	.162	2.471	.003	
Inventory control mgt	.153	.059	.567	4.386	.001
Transport management .203	.115	.321	2.654	.001	

A unit change in warehousing and materials handling would thus lead to a .450 effect on performance of Manufacturing firms sector ceteris paribus; while a unit change in packaging management would have an effect of .212 change in performance of Manufacturing Firms of Manufacturing firms North rift region; also unit change of Inventory control management would lead to .153 of performance of Manufacturing firms In north rift region, further unit change in supplier relationship management would lead to .203 of sector also a unit Inventory control management would have an effect of .153 change in on performance of Manufacturing firms and finally a unit change in dispute resolution would have an effect of -.131 of performance of Manufacturing firms This finding is in line with the findings of Ongeri and Osoro (2021). This implies that among other factors, warehouse and materials handling, packaging management, Inventory control management and transportation management are significant determinants of performance of manufacturing firms in Kenya.

Conclusion

Therefore, from the foregoing, this study concludes that warehouse and materials handling have broadly impacted on performance of manufacturing firms in Kenya. The findings conclude that any north rift region should drive to embrace the best performance of manufacturing firms after improving supplier evaluation in Kenya. The study conclusion confirms that firm's production can be highly embraced through packaging management, Inventory control management, and transportation management then the implementation of performance of manufacturing firms in Kenya.

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