



**INFLUENCE OF MATERIAL HANDLING PRACTICES ON PERFORMANCE OF LARGE SCALE MANUFACTURING FIRMS IN NAIROBI COUNTY, KENYA**

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**ABSTRACT**

*The purpose of the current study was to examine the influence of Material handling practices on performance of manufacturing firms in Nairobi Kenya. The specific objectives was to determine the influence of material stock control on Performance of large-scale manufacturing firms in Nairobi, to examine the influence of material handling automation on Performance of large-scale manufacturing firms in Nairobi, to determine the influence of Material packaging on Performance of large-scale manufacturing firms in Nairobi and to examine the influence of material logistics planning on Performance of large-scale manufacturing firms in Nairobi. The study adopted descriptive survey design and the target population was 355 large -scale-manufacturing firms in Nairobi county Kenya. Stratified random sampling was adopted to select a sample size of 188 large-scale manufacturing firms in Nairobi County, Kenya. Primary data was collected using structured questionnaires inform of Likert scale. The general managers of each manufacturing firm selected were involved in data collection. Filled questionnaires were reviewed for completeness and then coded and entered in SPSS. Data analysis was involved both descriptive and inferential statistics. The analysed data was presented inform of tables together with associated explanations. A good response rate of 71.3% was realized. It was established that most of the material handling practices indicators have positive impact on performance of the firm. The study further adopted a regression analysis to determine the relationship between the variables at 5% confidence level of significance. The study findings showed that the four variables had a significant influence on performance of the firms. The study recommended that a similar research should be conducted in a different field*

**Key Words:** *Material Stock Control, Automation, Material Packaging, Logistics Planning*

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## INTRODUCTION

In the current exceedingly aggressive worldwide commercial environment, the weight on firms to discover better approaches to convey value to their clients is becoming ever challenging. The expanding requirement for industry to offer items in a worldwide market based on cost and quality has generated the need to implement more productive warehousing methodologies. Material handling has come to be perceived as an unmistakable crucial with the operation of large-scale manufacturing firms. Material handling comes before processing of completed products held for distribution to customers (Coyle et al, 2014). Material handling with is essential hubs in a supply chain network as it perform important functions that help the development of materials, handling items, de-massing vehicle loads, making stock keeping unit combinations and gathering materials for shipments purposes (Andre Langevin and Riopel Diana, 2015). The effective material dealing in the stores ensures optimal production and dissemination complete products with main objective of cost decrease and firm performance improvement.

Kenyan manufacturing firms have understood the advantages of embracing great materials administration and are taking keen interest regarding materials administration since survival of any firm relies upon how well their expenses are overseen (Ondieki, 2014). Nevertheless, most Kenyan firms are not applying refined methods of materials administration in comparison to resources spent on acquisition and maintenance of materials in various firms. The issues experienced in material administration includes absence of adaptability, entrusting a great deal of delicate material exercises to one office and absence of all around coordinated database to help data stream on materials (Wanjogu, Iravo & Arani, 2015). Materials Management envelops all activities of administration over materials

from obtaining of raw materials through the production process to the last step of conveyance of the finished goods to the customers. It unites under one administration duty regarding deciding the assembling prerequisite, booking the assembling forms and obtaining, putting away and administering materials (Ondiek, 2014).

Kenya has a huge scale-manufacturing segment serving both the local market and export to the East African community and beyond. Assembling and manufacturing added to around 25% of the Gross Domestic Product (GDP) in 2013 (KNBS, 2014). Assembling and manufacturing firms output contributed about 17% of formal work and 15% of Kenya's aggregate export in 2013. As indicated by Kenya Association of Manufacturers (KNBS, 2014), there are 700 registered manufacturing firms in Kenya. These are segregated into three group's including large scale, medium scale and large-scale producing firms based on yearly normal turnovers made by the firms. The KAM characterizes small-scale producers as those assembling firms with a turnover of between ten million and twenty million Kenya shillings (KNBS, 2014). Medium scale producers extend in turnover between twenty million and two hundred and fifty million while the large-scale makers have turnovers more than two hundred and fifty million Kenya shillings annually.

### Statement of the Problem

Material handling practices are critical to an organizations success in today's competitive and dynamic market, Dimitrios (2008). In most organizations, direct materials represent up to 50% of the total product cost, as a result of the money entrusted on materials, thereby affecting the profitability of the organization (Rajeev 2010). According to vision 2030, the manufacturing sector should account for 20% of GDP by 2030. However, this has not been achieved with the sector's contribution stagnating at an average of 10% for more than ten years with a growth of 3.1% percent

which is lower than the overall countries economic growth of 5% (WB 2015). According to KNBS (2012) poor performance in manufacturing firms in Kenya led to decline in GDP to 4.4 percent in 2011 from 5.8 percent in the year 2010. According to Amoro (2011), most manufacturing firms in Kenya face problems of stock outs, over supply, over stocking, stock obsolescence, poor forecasting, stock pilferage, poor responsiveness to customer needs and lack of proper material handling equipment, methods and practices results into poor performance. According to Ross, (2010) many firms in manufacturing sector in Dar Es Salaam complained of additional material handling costs that resulted into decline in profit margins.

Other challenges involves high and extreme cost of production, low demand of Kenyan produced items; sale of counter fait products, substandard merchandise; high living expenses that drives up wage costs and lower consumer purchasing power; insufficient export support by government and poor linkages with nearby supplies.

Edwin *et. al* (2015) conducted a research on the effect of material handling on profitability of cement manufacturing companies in Kenya: case of Bamburi cement company where the findings showed that proper streamlined material handling systems had a positive impact on the profitability in the company. Wilfred (2014) carried out a study on the effect of the effective system of material handling techniques on organization performance in the seven-up bottling company in Nigeria where he came up with the conclusion that organizations benefits from material control management by way of easy storage and retrieval of material, improved sales effectiveness, and reduced operational cost. Therefore, this study was undertaken to fill the knowledge gap by assessing the influence of material handling practices on performance of large scale manufacturing firms in Nairobi County.

### **Objectives of the Study**

The general objective was to establish the influence of material handling practices on Performance of large-scale manufacturing firms in Nairobi. The specific objectives were;

- To determine the influence of stock control on Performance of large-scale manufacturing firms in Nairobi.
- To examine the influence of material handling automation on Performance of large-scale manufacturing firms in Nairobi.
- To determine the influence of packaging standardization on Performance of large-scale manufacturing firms in Nairobi.
- To examine the influence of logistics planning on Performance of large-scale manufacturing firms in Nairobi.

### **LITERATURE REVIEW**

#### **Resource Based view theory (Material handling Automation)**

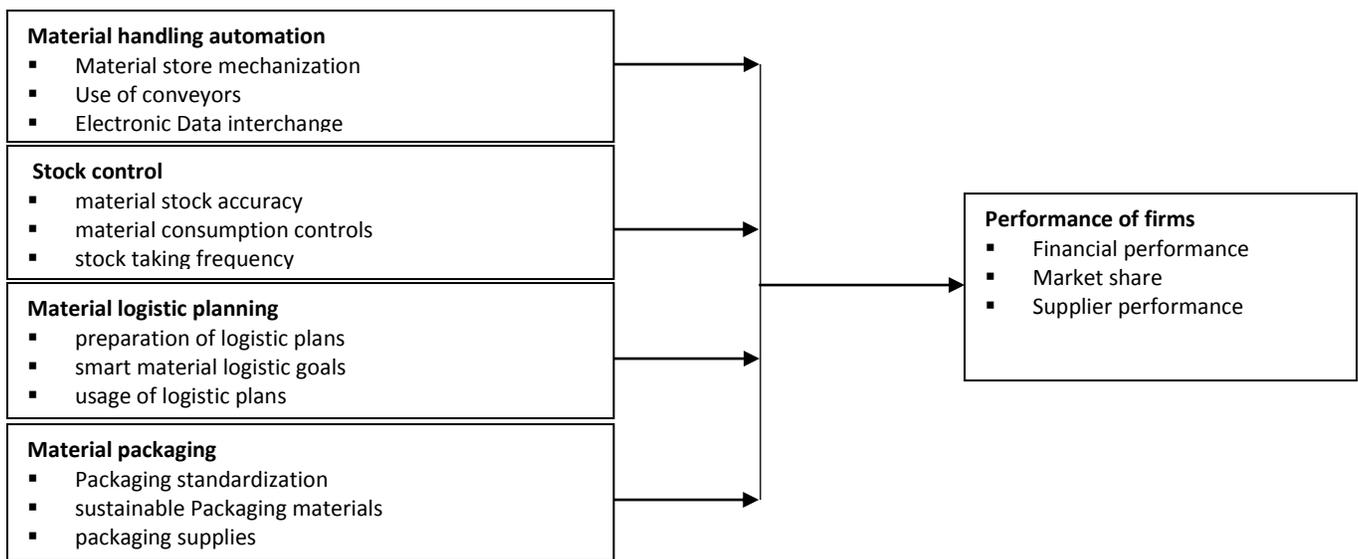
Resource based view sought to clarify the internal sources of a company's competitiveness in business (Kraaijenbrink, Spender, & Groen, 2015). The Resource Based View (RBV) of the firm hypothesized that, assets inside to the firm were source of competitiveness of a firm (Tukamuhabwa, Eyaa, & Derek, 2014). Such assets were important, uncommon, exceptional and hard to substitute. Assets accepted to be profitable were those that were equipped for encouraging usage of methodologies that enhanced performance (Barney & Clark, 2007). The two suppositions for RBV theory were, assets and abilities were heterogeneously dispersed among firms; and assets and capacities were defectively portable across firms, which made the firms possessing the scarce resources to be competitive compared to other disadvantaged firms (Karia, & Wong, 2011). Each firm was heterogeneous as far as the assets and capacities a firm has or gets to.

### Pareto (ABC) Model (Material stock control)

The Pareto ABC model was proposed by Vilfredo Pareto in 1887. ABC model is a classification method which depends on Pareto Principle. This rule helps in assurance of what things to be given Priority in administration of a firm's inventory. In ABC examination inventories are normally classified to three classes. That is, class A, class B, lastly class C. The firm gives maximum attention and oversights over administration of class A items. Class C things normally get the slightest consideration from the administration while class B things are given medium consideration somewhere between Class A and class C items (Ravinder & Misra, 2014). With the ABC display, items are arranged relying upon their significance levels. Significance might be from the measure of money streams to be created from an item, stock out expense related with an item, the items deals volume, productivity et cetera. When order is done, limits are additionally chosen for each (Class A, class B and class C) (ObiriYeboah, Ackah & Makafui, 2015).

### Network Perspective Theory (Material logistics Planning)

The network perspective theory underscores importance of developing valued networks for movement of resources across firms (Skjoett-Larsen, 2014). The centrality of this theory is legally binding relations that a firm enters into subject to firms' capacities to deal with their contractual connections. Further involvement with dealing with these connections results in the advancement and refinement of focused schedules for overseeing between firm exchanges and data exchange crosswise over firm limits. The network perspective theory adds significantly to the comprehension of the elements of outsider relations between people inside the parties. The basic comprehension and information of one another's dreams, states of mind and past relations encounters have a noteworthy influence in the advancement of outsider participation.



**Independent variable**

**Dependent variable**

**Figure 1: Conceptual Framework on Material handling practices and Firm Performance**

## Empirical Review

An empirical examination by Samuel & Ondiek (2014) examined the degree of stock administration computerization and to decide the impact of stock administration automation on the performance of stores in Western Kenya. The investigation focused on every one of the markets in Kisumu, Kakamega and Bungoma. Information was gathered from 11 out of the 12 operational grocery stores and a reaction rate of 90.9% was accomplished. The discoveries of the examination uncovered that stock administration automation influenced the performance of the stores and that there was a positive direct connection between stock administration computerization and the performance of the general stores. The regression showed that 64% of the supermarkets' performance could be clarified by stock administration computerization ( $r^2 = 0.64$ ). The degree of stock administration was observed to be high among the grocery stores, with a general mean score of 3.94, and the performance was likewise observed to be high with a general mean score of 4.1 the two factors being evaluated on a size of 1 to 5.

Munyao et al. (2015) analyzed the job of stock administration practices in performance of the manufacturing and assembling firms in Mombasa County. The investigation used a sample of 45 fabricating firms while information was gathered utilizing polls. The investigation uncovered that manufacturing and assembling firms utilize different stock administration procedures, for example, JIT, EOQ and intermittent audit system. The investigation discovered that regardless of the way that that MRP was best in adding to performance of the generation division most associations in the assembling business utilized activity level techniques.

Ogbo, Onekanma & Wilfred (2014) did an examination on the impact of effective system of stock administration on association performance in the seven-up bottling organization, Nile Mile Enugu.

The analysts were propelled to set out on this investigation, with the end goal to convey to fore the significance of powerful stock control framework on authoritative performance as it identifies with the packaging organization. A sum of eighty-three respondent comprise the example for the examination. Four research questions were produced and tried at 10% level of significance. The aftereffect of the investigation demonstrated that flexibility in stock control administration is an essential way to deal with accomplishing performance of an organization. It was discovered that associations profits by stock control administration by method for simple stockpiling and recovery of material, enhanced deals adequacy, and diminished operational expense.

Study led by Opeyemi et al. (2013) on mechanized stock control framework for grocery stores uncovered that a big percentage of the general stores utilize modernized stock control framework to learn stock dimension of a market, when to arrange for more items, keep status and updates of exchanges, along these lines helping administrative choices, advance dimension and stock taking. The investigation further realised that there is requirement for development in any product regardless of how effective the framework might be with the goal that the framework can be sufficiently adaptable for future alterations. These results agree with the results of Arshed et al. (2016) that modernized stock administration framework can help enhance the proficiency of the store division. Modernized stock administration framework is precise, dependable, predictable, quicker, productive and simple to utilize. The framework expels repetition/duplication and immateriality and can undoubtedly be custom fitted for multi-client condition with minor adjustments. The framework furthermore is related with upgraded effectiveness, exactness, ease of use and compactness.

Mwangi (2014) examined on stock administration and store network performance of NGOs in the

farming area in Kenya. Study considered stock coding as one of the systems and realized that stock coding among different practices upgrades evaluation of stock amount, helps in precise gauging of stock prerequisites in this manner improving purchase performance. A comparative study by Lwiki et al. (2014) on the Impact of Inventory Management Practices on Financial Performance of Sugar Manufacturing Firms in Kenya noted that there is solid connection between's stock control, stock records and performance of the firm. The examination further suggested that sugar manufacturing firms to set up policy to encourage quicker execution of the best stock administration practices, for example, JIT and MRP. Moreover, the organizations ought to consider putting resources into current innovation and execute EDI. This was diminishing stock expenses and enhances stock exactness.

Paper by Odhiambo (2015) researched on the crude materials conveyance frameworks in the agrochemical firms in Kenya and their impacts on the tasks of the firm. The purpose of the investigation was to determine the connection between crude materials conveyance frameworks and operational performance of agrochemical firms in Kenya. The investigation established that crude material conveyance frameworks gave firms an aggressive edge in spite of the poor computerization of frameworks among agrochemical firms in Kenya. The investigation established that organizations that adopted transport management of raw materials acknowledged operational proficiency and viability.

Study by Patlins (2016) noticed that today it is critical to design transportation by ideal approach to decrease the transportation costs, and in addition, the conveyance time, giving precise conveyances of perishable products to the clients and fulfilling their requirements in this the forwarder gives proficient transportation. There is a great deal of standards administrators and administrators may use to

accomplish proficient transportation of short-lived merchandise. From one perspective, it is noteworthy to utilize appropriated vehicles, contingent upon the sort and limit. Then again, organizations need to diminish the vehicle variable and settled costs, fuel utilization and driving time. Packaging of products additionally impacts the consequence of the transportation procedure. Retailers are profoundly concerned to get short-lived products that are anything but difficult to deal with in coordination's terms, don't be excessively expensive, making it impossible to package or handle, yet hold their offering capacity on racks. Additionally packaging impacts the products security and vehicle stacking time criteria, which likewise portrays the productivity of transportation.

Study by Patlins (2016) noticed that Packaging of merchandise additionally impacts the efficiency of the transportation procedure. Shoppers for the most part purchase items in little amounts. They settle on buy choices dependent on the item packaging. Retailers are profoundly concerned to get perishable products that are anything but difficult to deal with in logistics terms, not to be excessively expensive, making it impossible to package or handle, yet hold their offering capacity on racks. Likewise, packaging affects the merchandise security and vehicle stacking time criteria, which additionally describes the proficiency of transportation. The paper prescribes standardization of products packaging to utilize the vehicle limit in ideal way, diminish the vehicle stacking/emptying time, giving an abnormal state of merchandise wellbeing in the transportation procedure. Packaging of merchandise additionally affects the transportation procedure.

Nwosu (2014) analysed the effect of materials administration on productivity of Nigeria packaging organizations utilizing a sample of 368 organizations. The investigation utilized interview and questionnaires to gather information. The examination realised that materials purchase and

storage has noteworthy impact on returns of packaging organizations. The examination likewise discovered that materials stock has a noteworthy commitment to profitability level of fermenting organizations; and that interdepartmental cooperation fundamentally added to the productivity of preparing firms. The examination established further that materials management is key to preparing firms in making profits.

## METHODOLOGY

This study used descriptive research design. The target population for this study was supply chain staff from large manufacturing firms, Kenya. A total

sample size of 188 respondents was taken using Slovin's formula. The study used stratified random sampling technique in choosing the sample size from the three levels of management staffs. This research used a questionnaire to collect primary data. Pilot study was administered in order to test for validity, reliability and practicability of the research instruments. This study gathered both quantitative and qualitative data. Qualitative data was analysed by use of content analysis. Quantitative data was coded then analysed using Statistical Package for Social Sciences (SPSS) computer software version 22. The study also adopted multiple regression analysis to test the relationships between the variables.

## RESULTS

**Table 1: Descriptive analysis of material handling automation**

Statements	Mean	Std. Dev.
Our firm is using the latest technology in receiving raw materials in the store	2.85	1.54
Our firm has latest coolers for keeping perishable materials	2.55	1.43
Our firm has latest machines for moving materials while in the store	2.55	1.32
Our firm uses data information inter change to share information on material stock levels with suppliers	2.02	1.23
Utilization of latest machineries in the store have improved store efficiency	3.99	1.39
<b>Average</b>	<b>2.792</b>	<b>1.382</b>

The study sought to determine from the respondents the extent to which they agree the firms implemented the Material handing automation in an effort to improve performance in the large manufacturing firms.

From the research findings, majority of the respondents indicated that they neither agreed nor disagreed that the firms is using the latest technology in receiving raw materials in the store based on the average mean of 2.792. Majority of the respondents neither agree nor disagree that the firms has latest coolers for keeping perishable materials as shown by a mean of 2.85; the respondents also had moderate stand firm has latest machines for moving materials while in the

store as shown by a mean of 2.55; respondents also were in moderate agreement on firm uses data information inter change to share information on material stock levels with suppliers as shown by a mean of 2.55. Majority of the respondents were in moderate agreement that uses data information inter change to share information on material stock levels with suppliers as shown by mean of 2.02. Concisely, majority of the respondents agreed that Utilization of latest machineries in the store have improved store efficiency as shown by a mean of 3.99. This implies that majority of the firms had started recognizing the role of material handling planning on enhancing performance with other firms in the large manufacturing firms. The findings of this study were in tandem with literature review by singer, (2017) who observed that material handling techniques that

are enhance issues such as using effective purchasing strategies, waste reduction, and budget review and planning of the materials.

**Table 2: Material stock control**

Statements	Mean	Std. Dev.
The firm achieves accurate demand forecasting to determine stock coverage	3.12	1.32
Material stock control leads to Reduction in wastes	2.94	1.3
Material stock control contributes to Reduction in production costs	3.53	1.45
The firm has well defined stock taking schedules	3.81	1.4
Our firm has accurate material stock records	4.17	1.12
<b>Average</b>	<b>3.314</b>	<b>1.318</b>

The study sought to determine from the respondents the extent to which they agree the firms implemented the material stock control in an effort to improve performance function in the large manufacturing firms. From the research findings, majority of the respondents indicated that they neither agreed nor disagreed that the firms have effective just in time techniques based on the average mean of 3.31. Majority of the respondents agreed that the firm achieves accurate demand forecasting to determine stock coverage as shown by a mean of 3.12; the respondents also had moderate agreement stand that Material stock control leads to Reduction in wastes as shown by a mean of 2.94; respondents also were in agreement that Material stock control contributes to reduction in production costs as shown

by a mean of 3.53. Majority of the respondents were in agreement that firm has well defined stock taking schedules shown by mean of 3.81 and the respondents were in agreement that firm has accurate material stock records as shown by mean of 4.17.

This implied that majority of the firms had started recognizing the role of material stock control on performance with other large firms in the manufacturing sector. The findings of this study were in tandem with literature review by Tozay, (2012) who observed that material stock control enhance issues such as using effective reduction in inventory costs, effective's management of material and enhancement of performance.

**Table 3: Material packaging**

Statements	Mean	Std. Dev.
All materials are received in the store is packaged	3.77	0.181
The materials package are environmentally friendly	3.70	0.139
The materials come packaged in standardized packaging materials	3.58	0.189
The cost of packing is affordable to the firm	3.18	0.175
Materials packaging is sustainable in the long run to the firm	3.64	0.162
<b>Average</b>	<b>3.57</b>	<b>0.138</b>

The study sought to determine from the respondents the extent to which they agree the organization implemented the material packaging to boost their performances. From the research findings in majority of the respondents agreed that all materials are

received in the store is packaged as shown by average mean 3.77. Respondents agreed that the materials packages are environmentally friendly as shown by average 3.70. The respondents agreed that the materials come packaged in standardized packaging

materials as shown a mean of 3.58. The respondents agreed that the cost of packing is affordable to the firm as shown by mean of 3.18. The respondents agreed that materials packaging is sustainable in the long run to the firm as shown by a mean of 3.64. This implied that majority of the firms have started recognizing the role of effective material packaging in

enhancing performance with other firms in the large manufacturing firms. The findings of the study are in agreement with literature review by Waithaka (2012), who indicated that effective good material packaging approach improve productivity and performances of a firm.

**Table 4: Descriptive analysis of material logistics planning**

Statements	Mean	Std. Dev.
The firm prepares detailed materials logistics plan	3.30	1.28
The firm has a outsourced transport activity of materials	3.62	1.27
The firm sets SMART materials logistics goals	4.07	0.95
The firm uses the materials logistic plan to control movement of materials to the firm	3.50	1.54
The material logistics plan shows means of movement of materials to the firm	3.53	1.45
<b>Average</b>	<b>3.622</b>	<b>1.26</b>

The research requested the respondents to indicate the extent to which they agreed the firms had implemented the material logistics planning in an effort to enhance their performances in the large manufacturing firms. From the results, majority indicated that they neither agreed nor disagreed that the firm prepares detailed materials logistics plan shown by a mean of 3.30. The respondents agreed that the firm had outsourced transport activity of materials as shown by a mean of 3.62. The respondents agreed that the firm sets SMART materials logistics goals as shown by a mean of 4.07. The respondents agreed that the firm uses the materials logistic plan to control movement of materials to the firm shown by a mean of 3.50. The respondents agreed that the material logistics plan shows means of movement of materials to the firm as shown by 3.53. The above findings corroborated with literature review by Sandeep (2007) who indicated that material logistics plan are achievable through; vendor involvement and sensitization of suppliers. According to Eyaa & Oluka (2011), the material logistics plan accuracy is another important aspect of enhancing performance of firms.

#### **Performance of the large manufacturing firms**

The research requested the respondents to indicate the extent to which they agreed firms implemented the material handling practices enhance their performances in their firms. From the research findings, majority of the respondents neither agree that; the firm's implementation of material handling process positively affects the performance, as such all the variables had effects on the performance of the firm as an important element in its material handling. The firms incorporated material handling practices also had positive impact on the financial performance, supplier performance and market performance as shown in the figure above.

#### **Inferential Analysis**

##### **Correlation Analysis**

Correlation findings presented in Table 5 Indicated that the correlation between material handling automation and performance at manufacturing firms was 0.493 with a corresponding p value of 0.000. The correlation coefficient was therefore significant and positive implying that if Material handling automation increases the performance at large manufacturing

firm also increases. The finding concurs with Karimi Namusonge (2014) findings who also revealed that store mechanization, material stock accuracy and logistics planning affected performance in the manufacturing sector. The results further revealed that the correlation between material stock control and performance at 0.575 with a corresponding p value of 0.000. The correlation coefficient was also significant and positive which implied that if increase in material stock control increases the performance of large manufacturing firms. This finding conforms to those of palmer (2013) who found out that there is a strong relationship between approval rating of material stock control and performance of a firm. The findings also indicate that the correlation between material logistics planning and performance of large manufacturing firms was 0.679 with a

corresponding p value of 0.000. The correlation coefficient revealed a significant and positive association implying that if material logistics planning increases the performance of the large manufacturing firms also increases singer (2017) also emphasizes that the scope of material logistics planning is determining whether the operational material approach and structural material approach.

The finding results indicated that the correlation between material packaging and performance of large manufacturing firms was 0.576 with a corresponding p value of 0.000. The correlation coefficient revealed a significant and positive association implying that increase in material packaging increases the performance of large manufacturing firms.

**Table 5: Correlation Matrix**

		Material handling automation	Material stock control	Material logistics planning	Material packaging
Material handling automation	Pearson correlation	1			
Material stock control	Sig Pearson correlation	.538** 0.000	1		
Material logistics planning	Sig Pearson correlation	.535** 0.003	.613** 0.000		
Material packaging	Sig Pearson correlation	.154** 0.014	.373** 0.000	.477** 0.001	
Performance	Sig Pearson correlation	.493** 0.000	.575** 0.000	.679** 0.000	.576** 0.000

**Simple Regression Analysis**

In order to establish the statistical significance of the hypothesized relationships, simple linear regression was conducted at 95 percent confidence ( $\alpha=0.05$ ). The results were presented in table 6. The findings revealed a relationship  $R=0.640$ , indicating a strong

positive association between material handling automation, material stock control, material logistics planning, material packaging and performance.  $R^2=0.64$  indicated that 64% of variation in the performance can be explained by the four variables.

**Table 6: Simple Regression Analysis**

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. error of the estimate
1	0.640 <sup>a</sup>	0.64	0.401	0.54908

The result of ANOVA test showed that the F value is 43.602 with a significance of p value =0.000 which was less than 0.05, meaning that there is a significant relationship between material handling automation, material stock control, material logistics planning, material packaging and performance of a firm. The ANOVA statistics at 5% level of significance showed

that the value of F calculates (F computed) was 43.602 and the value of F critical (F tabulated) at 4 degrees of freedom and 83 degrees of freedom at 5% level of significance was 2.44. F calculated (F computed) was greater than the critical (F tabulated) (43.602>2.44), this showed that the overall model was statistically significant at 5% significance level.

**Table 7: Analysis of various (ANOVA) results (overall model significance)**

Model		Sum of squares	Df	Mean square	F	Sig
1.	Regression	52.583	4	13.146	43.602	.000 <sup>b</sup>
	Residual	75.674	130	0.301		
	Total	128.257	134			

a) dependent variable: performance

b) Predictors: (constant), material handling automation, material stock control, material logistics planning, material packaging.

The coefficient of material handling automation was ( $\beta=0.196$ ,  $p=0.000$ ,  $<0.05$ ) showed a statistically significant relationship between material handling automation and performance. The results implied that a unit increase in material handling automation would result to an increase of 0.196 units in performance. Similarly, Vorster (2013) study concluded that material handling automation affected performance of an organization. It was therefore recommended that the implementation of material handling automation indicators have impact on the performance of a firm.

The coefficient of material stock control was ( $\beta=0.260$ ,  $p=0.000$ ,  $<0.05$ ) shows a statistically significant relationship between material stock control and performance. The results implied that unit increase in material stock control would results to an increase of 0.260 units in performance. This finding conforms to those of Weele (2010) who found out that there is a strong relationship between material stock control and performance, therefore

the study conclude that the presence of a material stock control positively affects performance in organization.

The coefficient value of material logistics planning was ( $\beta=0.217$   $p=0.000$ ,  $<0.05$ ) this shows statistically significant relationship between material logistics planning and performance function of a firm. The results are tandem with the research done by Schmalensee (2013) who found out that material logistics planning is effective in utilization of operational activities in the organization increases the performance of the firms.

The coefficient of material packaging was ( $\beta=0.198$ ,  $p=0.000$ ,  $<0.05$ ) shows a statistically significant relationship between material packaging and performance. The results implied that a unit increase in material packaging would results to an increase of 0.198 units in performance of the firm Tozay (2012) also emphasized that the extent of material packaging implementation is to determine the

suitable packaging process as represented by management, is adequate and functioning in a

manner which ensures that the packaged products are appropriately identified and managed.

**Table 8: Regression coefficient Results**

	B	Std error	T	Sig.
<b>(constant)</b>	2.331	0.173	13.473	0.000
Material handling automation	0.196	0.042	4.666	0.000
Material stock control	0.260	0.065	4.000	0.000
Material logistics planning	0.217	0.052	4.173	0.000
Material packaging	0.198	0.061	3.245	0.000

Dependent Variable: performance function

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

$$Y = 2.331 + 0.260X_1 + 0.217X_2 + 0.198X_3 + 0.196X_4 + \epsilon$$

Y= performance, B<sub>0</sub>= Constant, X<sub>1</sub>= Material handling automation, X<sub>2</sub>= material stock control, X<sub>3</sub>= Material, logistics planning, X<sub>4</sub>= Material packaging.

### CONCLUSIONS

The study out found that material handling automation had impact on the large manufacturing firm performance. The extent of material store mechanization, material requirement planning and electronic data interchange improves the performance of the firm. This is because material handling automation enhances Utilization of latest machineries in the store had improved store efficiency.

The receiving process of materials coming into the firms should be effectively and efficiently controlled through material stock control techniques and ensuring that the receiving bay or section is at most proximal location. Materials stock control should be used for handling outlined materials correctly while putting the consideration that extra handling does not add value. Quantity and quality inspection should always be done and ensuring that there is no traffic of materials in the receiving section

The study found that effectiveness of material logistics planning such as preparation of logistics plans, smart materials logistics goals and usage of

logistics plans enhances the ability of the organization to maintain optimum stocks.

The study found that material packaging elements have an impact in overall performance of the manufacturing firms. Many respondents agreed that much time was incurred during packaging standardization and packaging of materials. Therefore, the performance of large manufacturing firms was being undermined because of extra costs incurred and thus inability to save on purchases.

### RECOMMENDATIONS

In the light of above findings, some pertinent recommendations can be made. These recommendations were geared towards enhancing the effective and efficient material handling approach with a view to improving the performance of large manufacturing firms. This study recommends the following;

Large manufacturing firms should embrace expertise in formulation of material automation program at early stages of materials design. User departments should always be involved and consulted in development of material requirement planning. The material planning techniques should always be reviewed to meet requirements for use and purpose. This was improve the performance of firm as it was be able to meet the requirements of users and also reduce disputes among suppliers.

The receiving process of materials coming into the firms should be effectively and efficiently controlled through material stock control and ensuring that the receiving bay or section is at most proximal location. Material stock control of handling should be used for handling outlined materials correctly while putting the consideration that extra handling does not add value. Quantity and quality inspection should always be done and ensuring that there is no traffic of materials in the receiving section. These activities enhance the performance of the firm as they ensure the right quality is received, extra costs are not incurred and production is not delayed.

Large manufacturing firms should practice proper logistics planning with suppliers and develop strategies to develop them so that they can be able to deliver the quality required without errors and defects and at the right place without delays. Reliable logistical communication practices should be adopted among the suppliers and the buying organization so as to curb costs from quantity and product deviations. Firms should outsource logistical services from expertise firms so as to minimize damages and delays in materials in transport. These activities improve the performance of the firm as they reduce or prevent costs from deviations in delivery.

Large manufacturing firms should adopt the material packaging which are environmentally friendly and well standardized. These should be done by having a definite automated material packaging system that was improving the production scheduling, makes flexible manufacturing processes and fast and

effective recognition of goods in the stores. This was aid in improving firm's performance as much packaged materials can be traced easily and the location is identified

### **Areas for Further Research**

The objective of the study was to assess the influence of material handling practices on performance of manufacturing firms Kenya. It recommended that a similar research should be conducted with other variables or of other firms in other sectors, including the service industry in the Kenyan market. A review of literature indicated that there has been limited amount of research on the same topic. Thus, the findings of this study serve as a basis for future studies on material handling practices. The material handling practices and performance of manufacturing firms, has not been widely studied which presents gaps in African and Kenyan contexts. The study has contributed to knowledge by establishing that material handling automation, stock control, material logistical planning and material packaging on performance of large manufacturing firms in Kenya. Apparently, Future research may be designed to compare the findings in this study with findings that relate to firms in other regions in Kenya and other countries. Concisely, the findings showed that 51.0 % of the performance is explained by the four variables that are material handling automation, stock control, material logistical planning and material packaging and the remaining 49.0% can be accounted by the standard error.

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