

## **Inventory Management Practices and Organization Performance of Steel Industries in Nairobi County, Kenya**

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### **ABSTRACT**

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*Industries are key to many economies they are used as a proxy for country's economic growth and development. The steel industry constitutes about 15% of the aggregate production by manufacturing firms hence it plays a key role in the performance of a country's GDP and many are forecasting that its demand will continue to rise due to various development activities the national government and private firms have embarked on towards realisation of the country's vision 2030. Inventory management is critical in the aspects of organization performance within the context of steel industries therefore steel companies must check on their inventory management practices in order not to impact on their Organization performance. This is achievable through operation at absolute minimum stock out events with prompt response to market fluctuations while at the same time carrying minimal buffer stocks. The study sought to fill the existent literature gap in the area of inventory management and organization performance in the steel industry. Descriptive research design was used in the study. The target population for this study were employees in the, Quality, administration, sales and marketing, production departments of three steel companies in Nairobi County Kenya. The study employed both primary and secondary during the stages of data collection where questionnaires were administered through drop and pick method while secondary data was obtained from the firms published comprehensive profit and loss statement particularly the company's sales. A sample size of 45 respondents was utilized. The pilot study was conducted using a pretest of the questioner using 10% of the respondents that is 5 respondents. The validity of the data collection instrument was examined during the pilot study using a set of experts in the area inventory management as well as the supervisors. The reliability of the data collection was examined through the use of the cronbach alpha coefficient of a threshold of 0.7 and above. The researcher used descriptive method as well as SPSS. V.23 to analyse data. The research established that there is a positive and significant correlation between Economic order quantity and organization performance of steel manufacturing companies in Nairobi County. The study also found a significant positive correlation between Material/Inventory control and organization performance. It also established an existence of a positive and significant correlation between quality control and organizational performance. However, the study found a negative correlation between Legislation and organization performance. The study concludes that organization performance among steel firms in Nairobi County is influenced by Economic order quantity, material/inventory control and quality control. The study therefore recommends that the stakeholders should consider these factors in order to improve the performance of steel manufacturing firms as well as developing policies to protect local steel manufacturing firms from stiff completion from firms in developed countries particularly from China and U.S.A.*

**Keywords:** Inventory Management Practices, Organization Performance, Steel Industries in Kenya

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**1. INTRODUCTION**

Inventory management practices in relations to organization performance have been of interest to diverse scholars across the world. Godana & Ngugi, (2014) study on inventory at Kenol Kobil indicated diverse uses of inventory management in an organization. The study noted that the inventory enables the production capacity of a manufacturing organization to continue operations at optimum capacity, and ensures the availability of a company's products in the market when they are needed. Inventory management also ensures optimum operational levels for the manufacturing company through ensuring that the company has sufficient stocks for operations. Within the context of a manufacturing firm, Rana, Osman, & Islam (2015) study on Vendor Management Inventory (VMI) and organization noted that inventory management is extremely critical. This is due to the fact that inventory management ensures there is sufficient production related activities going on, the plants and machinery are fully occupied, and diverse operational aspects are met. Inadequate inventory results in diverse challenges including tying up capital that could be used for other activities hence resulting into opportunity costs. On the other hand, low inventories could lead to missed economic opportunities in an organization. Poor inventory management may also lead to operational costs increases as a result of shortages of inventory management leading to idle machinery capacity and related costs. Other challenges related with inventory management come as a result of experiencing stock outs as well as overstocking leading to wastage of inventory.

Inventory management is critical in the aspects of organization performance within the context of steel industries. This is because the steel industry is capital intensive, and the steel products have a long lifecycle thus necessitating need for low cost of production (Barasa, 2016). Steel manufacturing firms play a key role in the performance of the country's GDP as in many cases the demand for steel products is used by the statisticians to reveal the level of investment in the country. It's projected that the demand for steel product will be on the rise in the country as the country is still on the take-off stage and many buildings and projects are undertaken by both the government and private investors. The key projects undertaken in the country include the construction of SGR, LAPSET project, by-passes in Nairobi to ease traffic, expansion of the country's airports to meet international standards as well as the ruling party agenda of improving the housing standards in the country. The industry contributes about 20% of the total revenues in the manufacturing sector which contributes immensely to the country GDP. The country has deposits of metal ore but not to commercial levels (Kenya Industrial Magazine, 2016).

The competition within the steel industry implies that the steel companies must check on their inventory management practices in order not to impact on their organization performance; Local industries supplying the Standard Gauge Railway amongst other projects through utilization of the local manufacturer's quota need to meet increased steel demand, competition arises from the presence of over 20 steel makers in Kenya, and an increasing competition from cheap imported steel from China. On the other hand, the construction industry in Kenya inclusive of the heavy transport infrastructure continually to make demands for steel products necessitating responsiveness to customers. This is achievable through operational at absolute minimum stock out events with prompt response to market

fluctuations while at the same time carrying minimal buffer stocks (Barasa, 2016). The study targeted steel manufacturing companies situated in Nairobi City County. The list of these companies was acquired from KAM directory. The directory reveals that there are about 12 steel firms operating in the county including; there are four top companies; Tononoka rolling mills ltd, apex steel, insteel and steel structures. The researcher chose Nairobi County as many steel manufacturing firms are located in the county and the case study involved the three top manufacturing steel companies as listed above.

## **2. STATEMENT OF THE PROBLEM**

The steel manufacturing sector in Kenya has become more competitive due to the importation of cheap steel from developed nations particularly China and USA putting local steel manufacturing firms to adopt cost effective methods and at the same time improve the quality of their products in order to remain competitive. Kamakia (2015). There are numerous hurdles faced by steel manufacturing firms in the country ranging from high electricity costs, poor infrastructure, high costs of firm inputs, high taxes, unstable market prices and high cost of capital to start businesses (KAM, 2012). This has left the local steel manufacturing firms disadvantaged making it hard to compete with established steel firms particularly those in the developed states where conditions are favourable. With the available literature on the ways of solving the challenges faced by firms in order to remain competitive, the management of many firms have adopted Inventory management practice to improve their profitability through cost minimisation as well as producing products of high quality (Hayes *et al.*, 2005).

Steel manufacturing firms require huge amount of capital to start and the products are long lasting as well as experiencing huge wastage of raw material particularly during the production stages (TATA 2016) hence high production are needed to bolster performance and reduce the payback period for the capital invested. However, there are many obstacles faced by steel firms ranging from conforming to the sector laws and regulations, stable markets, production of environmentally friendly products as well as the notion that local steel manufacturing production cannot meet the increased local demand for steel due to various projects undertaken by both the national government and private sector (Kenya Industrial Magazine 2016). Local steel companies in recent times have been facing increased competition from established steel companies from Asian Giants, Europe and USA which produce high quality products at lower costs. The local market is flooded as well with new entrants' year in year out. Regionally, the agreement by the East African Bloc which allows for free trade between the member states has further increased competition in steel industry.

There is existing literature on the topic under study both locally and internationally. Global literature include; Bai and Zhong (2008) carried out a study on the impact of inventory management practices on the performance of steel manufacturing firms in Sweden, Koumanakos (2008) accessed the effect of inventory management on the return on investment among steel manufacturing firms in South Europe. Asare and Prempeh (2016) analysed the impact of Inventory management on the ROI among West African steel producing companies. Locally, Ndunge (2013) analysed the impact of Inventory management on the profitability of manufacturing companies. Mwangi (2013) accessed the effect of Inventory management on the ROI of Chemical producing firms. Ngumi (2015) carried out a study on the impact of Inventory management practices on Return on assets in the manufacturing sector. From the studies above, none was carried out on the role of inventory management practices including; warehouse/security, Economic order quantity, material handling, quality control, and legislation on the performance of steel industry. It is against

this background that the purpose of this study will be to determine the influence of inventory management practices on performance of steel industries in Nairobi County, Kenya.

### **3. OBJECTIVES OF THE STUDY**

The general objective of this study was to examine the influence of inventory management practices on organization performance of steel industries in Nairobi county Kenya.

The study was guided by the following specific research objectives;

- i) To determine the effect of Economic Order Quantity (EOQ) on the performance of steel industries in Nairobi county, Kenya.
- ii) To determine how material/inventory handling affect performance of steel industries in Nairobi County, Kenya.
- iii) To examine the extent to which quality control affect performance of steel industries in Nairobi County, Kenya.
- iv) To establish the influence of legislation on steel industries in Nairobi County, Kenya.

### **4. THEORETICAL REVIEW**

#### **4.1 Human capital theory and Production**

The theory examines the efficiency of the inventory and production systems that results into optimum cost efficiency and organizational performance. The theory examines the whole set of diverse functions within the organization and their influence on the organizational performance. Thus the theory examines the supply chain warehousing, manufacturing and production, spare part allocation, and logistics amongst other aspects. This is due to the fact that the availability of the inventory is critical in the organizational performance it ensures that the inventory is available in sufficient quantities and in the right time when it is required. JIT is a technique whereby stocks are manufactured when there is demand to avoid wastage and reduce costs associated with underutilisation of resources (Mazanai, 2012). JIT refers to a group of practices that cast off waste. These business enterprise huge practices encompass the whole deliver chain. The elements of JIT include shared designs with suppliers and clients, movement in the direction of unmarried sourcing, reduced machine set-up times and overall preventive protection In an effort to achieve JIT, Bicheno (2014) argue that the process have to have indicators of what is going on everywhere inside the system. The main challenge most manufacturing companies have to overcome is establishing an efficient and effective inventory management practices (Brason, 2005). there are various inventions in inventory management intended to ensure that stocks are maintained at optimal levels hence maximizing firm revenues as well as customer satisfaction (Simchi – Levi, 2009).

MRP is typically applied to manipulate inventory movement in the organization and is primarily based on the manufacturing requirements (Simchi – Levi, 2009). Material requirements need to be listed on a sheet which ensures that the required quantity as well as their prices. The sheet is generally known as Bill of Materials (Brason, 2005). The advantage of automation is that it ensures stock levels are tracked and therefore makes data analysis easy which is vital in projecting firm performance. The inventory management techniques have been constantly changing to ease the process involved in handling inventory. Cassidy (2014) cites the blessings of EPOS as together with decreased take on decreased stock outs, stock ranges, shrinkage and compelled markdowns, time taken for the order to reach the intended client as well as consignment tracking cost. Automation leads to cut in costs involved in processing stocks and this improves on the revenues by the firms. It additionally allows the income of any item to be calculated at any time in addition to growing customer service (David & Alex, 2014).

Vendor Managed Inventory (VMI) is a method which involves the duty of managing the purchaser's inventory (Smaros et al., 2003). The purchasing firm or individual can easily access purchaser's inventory and demand statistics for reasons of tracking the customer's stock level. Moreover, the vendor has the authority and the obligation to replenish the purchaser's inventory according to collectively agreed inventory control concepts and targets (Smaros et al., 2003). As soon as the purchase order is made, a boost transport observe informs the customer of substances in- transit. The merchandize is then shipped, delivered and "logged", in line with the shipment method (Frahm, 2003).

#### **4.2 Transaction cost theory**

Ronald H. Coase, in 1937, was the first to highlight the importance of understanding the costs of transacting, but transaction cost economics(TCE) as a formal theory started in earnest in the late 1960s and early 1970s as an attempt to understand and to make empirical predictions about vertical integration ("the make-or-buy decision" and how should a complex contractual relationship be governed to avoid waste and to create transaction value (Mikko Ketokivi and Joseph T. Mahoney, 2017) every firm can grow as long as they can reduce their operational costs (Ronald Coase, 1937). Transaction Cost Theory (TCT) has been widely used in information and automation technology, Vijay (2004) referred to automation as the ways in which business processes are automated to ease the processes of accessing firm services as well as making them cheaper. This is a vital department particularly to the manufacturing companies where most of the costs associated with the companies are incurred. Most firms around the world have realized how labour impacts on their profits hence not able to meet their revenue maximization objective thus choosing to automate majority of their production activities to maximize on their profits. From the statements from various scholars above, it's clear that automation is the most appealing technique of cost reduction especially on labour intensive companies where labour costs are high which in the end leads to increased profits (Ken, 2010).

Transaction cost economics is the most preferred technique especially in outsourcing firms where the demand varies from time to time and ensures they are always prepared when the demand is high. This is also due to the fact that job fluctuations and renegotiating contracts may prove costly (Williamson, 1979). Transactions costs are incurred each and every time a product is transformed from one form to the other as new methods of production are applied which may have different production costs associated with them. Transactional costs are related to the exchange of resources with the external environment. Unpredictable costs incremental are some of the main causes of the revenue fluctuations witnessed in many firms.

Transaction cost is a theory of how should a complex transaction be structured and governed so as to minimize waste? The efficiency objective calls for identifying the comparatively better organizational arrangement, the alternative that best matches the key features of the transaction. For example, a complex, risky, and recurring transaction may be difficult to manage and in many a times leads to forward shift as the costs are forwarded to the buyers. The theory seeks to describe and to understand two kinds of heterogeneity. The first kind is the diversity of transactions: what are the relevant dimensions with respect to which transactions differ from one another? The second kind is the diversity of organizations: what are the relevant alternatives in which organizational responses to transaction governance differ from one another? The ultimate objective in TCT is to understand discriminating alignment: which organizational response offers the feasible least-cost solution to govern a given transaction? Understanding discriminating alignment is also the main source of prescription derived from TCE. (Mikko Ketokivi and Joseph T. Mahoney, 2017)

### **4.3 Resource based view theory**

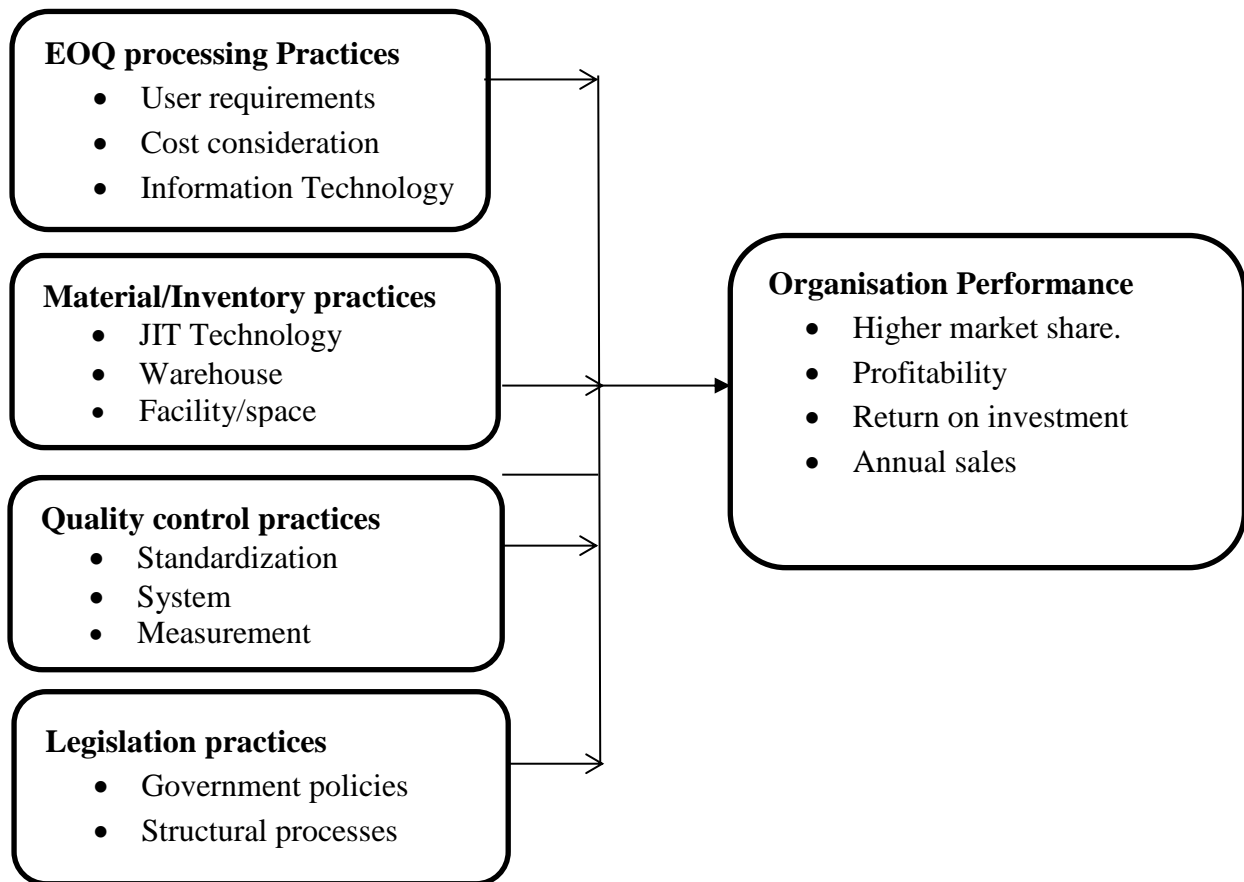
The theory reiterates that firms which possess vital resources gain a competitive advantage over other firms in the same industry (Barney, 1991). The opportunities in turn can help the organization enjoy strong profits, and become more competitive. The resources the researcher refers to include; human skills, patent rights, trade marks, physical assets as well as access to vital information pertaining the industry. Strategic resources refer to vital assets which add value to firms' performance. They are non substitutable and rare as well as Competitors find it difficult to replicate. There is an assumption that the resource endowment particularly those used by majority of the manufacturing firms are dissimilar in nature. Therefore, the statement implies that the firms situated in the same industry seem to own similar kind of resources (Barney, 1991). Other assumptions reiterate that resources are nontransferable across the industry as they remain constant over a long period of time (Black, and Boal, 1994). Due to the fact that resources are nontransferable across the industries, it means that the resources are unique to each and every firm and the more endowed the firms is, the more competitive it becomes. Resources can be both tangible and intangible in nature and can be converted into goods or services respectively. The productivity of one firm can determine the efficiency into which a firm converts inputs from raw materials to finished products where some firms are more efficient than others which gives them a competitive edge. The heterogeneity of firms implies that all firms in the same industry can compete fairly in the market (Strategic management journal 2016).

Collins (1994) made a proposition that firm resources should be subdivided into two; those involving primary functions like production and those involving secondary firm functions involving developmental and meeting long-term firm objectives. The other division involves the firm capability of recognizing its resource valuation. It comes in handy when the firm embarks on implementing short and long-term strategy in order to gain a competitive edge. This can only be achieved when the firm is endowed with resources dissimilar to its competitors as well as immobile which hinders resources from trickling down to their competitors hence maintaining competitive advantage. The traditional theories support the notion that firms should often carry out SWOT analysis which analyses the both firm strengths as well as weaknesses hence improving firm revenues in short and long-term.

## **5. CONCEPTUAL FRAMEWORK**

Conceptual framework is a phenomenon which provides a clear picture on the association between the study variables (Jabareen,2009). Mugenda, (2008) defines conceptual framework as presentation of the study variables on a diagram hence making the work to be understood with ease.

This conceptual framework examines association linking independent variables and the dependent variable. The independent variables for this study are EOQ processing practices, and material/ inventory control practices, quality control practices and legislation practices. The dependent variable is organizational performance.

**Independent Variables****Dependent Variable***Figure 1; Conceptual Framework***6. RESEARCH METHODOLOGY**

This study adopted a descriptive research design because it describes the state of affairs as it exists and it will make assertions on how inventory management practices enhance organizational performance. Descriptive research is suitable where the researcher intends to gather detailed facts by means of descriptions and is important in establishing variables and logical conclusions. The target population in this case was 225 staff selected from three steel Companies. Staff were selected from four key departments. In each department, the study targeted top administration staff, heads of department, middle level supervisory staff and operational staff. The target population was accessible and representative on which the results of the study were generalized.

The study employed simple random sampling method as the sampling procedure. The goal of simple of this method is ensuring that each item of the population stands an equal chance of being chosen since the groups were homogeneous. The study population was 225 respondents where 20% which is 45 respondents representing sample size. The study employed both primary and secondary during the stages of data collection where questionnaires were administered through drop and pick method while secondary data will be obtained from the firms published comprehensive profit and loss statement particularly the company's sales. According to Owens (2002), the use of questionnaires in a research study is preferred as it less time consuming, less costly as well as collecting huge data and can be used to collect data from a large area. After obtaining data, the questionnaires were subjected to further

scrutiny before coding via SPSS.V.23 software. Quantitative analysis was done through use of mean and statistical frequencies.

## 7. STUDY FINDINGS

In the quest to link the four independent variables with the dependent variable, the regression model was applied. The independent variables were; Economic order quantity, material/inventory control, Quality control and Legislation while the dependent variable was organisation performance. The model summary was as shown in table below;

**Table 1: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.869 <sup>a</sup>	.765	.685	.39241

a) Predictors: (Constant), Economic order quantity, Material/inventory control, Quality control and Legislation.

R is the square root of R-Squared and is the relationship between the observed and the predicted values of the dependent variable. R-Squared is the proportion of variance in the dependent variable (Organisation performance) which can be predicted from the independent variables. The R-square value in the model was 0.765 meaning 76.5% of the variation in operational performance could be explained by the four independent variables utilized for the study while the other 23.5% was due to other factors that were not covered in the study.

**Table 2: ANOVAa**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	10.756	6	1.946	12.803	.000 <sup>b</sup>
Residual	3.427	26	.152		
Total	14.183	32			

a. Dependent Variable: Organisation Performance

b. Predictors: (Constant), Economic order quantity, Material/Inventory control, Quality control, Legislation

Significance test for the model is represented in the ANOVA table under F and Sig Columns. The F value is the Mean Square Regression Divided by the Mean Square Residual. These values are used to determine if the independent variables reliably determine the dependent variable and thus the suitability of the Model. The P value of 0.00 compared to the alpha level of 0.05 is lesser meaning that the independent variables reliably predict the dependent variable.

**Table 4.8: Coefficients**

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
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	B	Std. Error	Beta		
(Constant)	1.569	.645		2.151	.041
Economic order Quantity	.412	.091	.237	2.223	.035
Material/Inventory control	.546	.098	.476	3.352	.002
Quality control	.475	.059	.294	2.438	.022
Legislation	-.215	.080	-.620	-4.063	.000

*Dependent Variable: Organisation Performance*

*Predictors: (Constant), Economic Order Quantity, Material/Inventory control, Quality control, Legislation.*

From the table of coefficients above, the following regression model was established  $Y = 1.569 + 0.412X_1 + 0.546X_2 + 0.475X_3 - 0.215X_4$ .

The T test values depict the individual effect of each independent variable on the dependent variable. Regression results as shown in the table indicated that Economic order quantity positively and significantly influenced organisation performance of steel manufacturing companies in Nairobi County (Beta= 0.412, P= .035). The implication of the result is that a unit change in the EOQ results to 0.412 significant increase in organisation performance. Regression results also indicated that Material/Inventory control positively and significantly influenced organisation performance of steel manufacturing companies (Beta= 0.546, P=.002). The implication of the result is that a unit change in the Material/Inventory control results to 0.546 significant increase in organisational performance. The results of the regression analysis further show that quality control positively and significantly influenced organisational performance of steel manufacturing companies (Beta= 0.475 , P=.022). The implication of the finding is that change in quality control results to 0.475 increase in Organisation performance. Regression results as shown in table indicated that Legislation negatively and significantly influenced organisation performance of steel manufacturing companies in Nairobi County (Beta= -.215, P= .000). The implication of the result is that a unit change in Legislation processes results to -0.215 significant decline in organisation performance. These findings disagree with those of (Rae, 2007) that Legislation helps organizations to gain competitive advantage and reduce risk of failure.

Steel manufacturing sector in Kenya has become more competitive due to the importation of cheap steel from developed nations particularly China and USA putting local steel manufacturing firms to adopt cost effective methods and at the same time improve the quality of their products in order to remain competitive. Kamakia (2015). This study examines the influence of inventory management practices on organization performance of steel industries in Nairobi county Kenya. From the findings on the management practices, it can be deduced that the steel manufacturing companies appreciate the contribution of management practices in transforming the organization performance. This is evidenced by high average means obtained from the different tables used to measure the various management practices which are Economic order processing 4.242, Material/Inventory control 3.561, Quality control and

Legislation 3.727. Despite few limitations, it can be concluded that material Inventory practices enable steel manufacturing companies to eliminate inefficiencies and provide high quality product as well as maintain high levels of productivity in the process thus improving their organization performance.

From the regression analysis model on the influence of inventory management practices on organization performance, the R square value was 0.765. This implies that 76.5% of the variation in organization performance in steel manufacturing companies in Kenya is explained by management practices. Furthermore, at 95% confidence level, the model was found to be significant as demonstrated by a p value of 0.000 ( $p=0.000$ ) which was less than the conventional 0.05. This therefore implies that inventory management practices are significant in explaining the organizational performance. Steel manufacturing companies should therefore invest in inventory management practices so as to realize improved organizational performance. These findings are in line with (Godana & Ngugi, 2014)) who state that inventory management practices assists organizations to understand how their processes, and systems support directly or indirectly to the customer's end-to-end journey thus leading to improved organizational performance.

## 8. CONCLUSION

It can therefore be argued from the findings that the inventory management practices affect the organizational performance of steel manufacturing companies. This is evidenced by high average means obtained on the attributes asked with respect to the different research objectives. The study notes that inventory management practices are vital in improving the performance of steel manufacturing firms' productivity and elevating their operational levels. Therefore, improved organizational performance in the steel industry can be attained by practicing the four inventory management practices which are; Economic order quantity, material/inventory, quality control and legislation. The study results indicated that Economic order quantity positively and significantly influenced organisation performance of steel manufacturing companies (Beta= 0.412,  $P= .035$ ). Implying that a unit change in the Economic Order Quantity results to 0.412 significant increase in organisation performance.

The results further revealed that Material/Inventory control had direct and significant correlation to organisation performance of steel manufacturing companies (Beta= 0.546,  $P=.002$ ). This implies that for any firm to improve its performance, it should have Material/Inventory control in place. The study also show that quality control positively and significantly influenced organisational performance of steel manufacturing companies (Beta= 0.475,  $P=.022$ ). The implication of the finding is that quality control is significant factor to Organisation performance as customers are becoming more conscious about quality of products and product defects may lead to loss of clients. Finally, to establish the influence of legislation on steel industries. The average mean on legislation attributes was 4.3108 implying that Legislation helps organizations to gain competitive advantage and reduce risk of failure. The study also identifies significant issues such as competition among steel manufacturing companies. The study concluded that inventory management practices have a significant effect on the organizational performance of steel manufacturing companies in Kenya. This is evidenced by the findings from the regression model analysis where ( $P=0.000$ ) was found at 95% confidence level. These findings are supported by the theory of inventory and production and transaction theory.

## 9. RECOMMENDATIONS

From the findings, it is evident that inventory management practices have a significant effect on steel manufacturing companies' organizational performance. The study recommends;

Steel companies should invest more on inventory management practices in order to realize improved organizational performance. Inventory management allow for companies to reduce costs of production as well as being able to adapt to the unpredictable rapid changes that are occurring inside and outside the organization environment. Firms should maintain their inventories at optimal levels by ensuring the stock levels are not too little or too much. Low stock levels leads to stock outs leading to reduced sales and loss of goodwill from its clients while on the other hand too much stock may lead to obsolete stock which affects the firm's cash flow. This indicates the importance of maintaining Economic Order Quantity at optimal levels by steel manufacturing companies.

This study also recommends to the management of steel manufacturing firms in Nairobi to adopt effective material/inventory control practices like just in time and material requirement planning. This is because such inventory management practices would improve their profitability and operating cash flows. The study also recommends the management of steel manufacturing firms in Nairobi County to adopt quality control practices to ensure their products meet the highest quality possible in order to retain their clients as customers are becoming more conscious about product quality and reduce defects which may lead to huge loss and at the same time improve the quality of their products in order to remain competitive. The study also recommends the Kenyan government to pass laws which protect local steel manufacturing firms as the sector has experienced still completion due to the importation of cheap steel from developed nations particularly China and USA which will in turn help these organizations to gain competitive advantage and reduce risk of failure

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