



**ROLE OF MATERIAL MANAGEMENT ON PERFORMANCE OF SUGAR MANUFACTURING INDUSTRIES IN KENYA  
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**ABSTRACT**

*The efficiency of any activity for production of goods and services depends to a great extent, on the supply of materials, equipment and manpower made available in their right proportions. A manufacturing firm will remain shaky if materials are under stocked, overstocked or in any way poorly managed. This study sought to establish the effect of material management on performance of Mumias Sugar Company Limited. The specific objectives of the study were to determine the role of materials procurement and inventory control on performance of sugar manufacturing industries in Kenya. The study adopted the descriptive design. The population under consideration which was the unit of analysis comprises of Mumias Sugar Company. The respondents for this study were drawn from the employee listings which were obtained from Mumias Sugar Company. Stratified random sampling was used to select 79 respondents in the Company. The sample of 79 was equivalent to 10% of the target population which is regarded as statistically significant in a descriptive study with a finite universe. The study utilized a research questionnaire. The researchers delivered the questionnaire and gave the selected respondent a maximum of 3 days after which the researcher collected the completed questionnaire for analysis. At the completion of the data collection process, the questionnaires were sorted, coded and analyzed. The Statistical package for social sciences (SPSS) was used to generate the required frequencies and percentages to answer the research questions. The study concluded that materials procurement and inventory control positively influenced the performance of sugar manufacturing industries in Kenya. the study recommended for full adoption of materials procurement tool as this function was found to helpful in auditing the invoicing, receipt and inspection of goods, quality control, supplier appraisal and clarification of payments. Manufacturing industries should implement inventory control system as they were found critical to lowering costs and providing a more streamlined operation. Manufacturing industries should have flexible supply chain emplace.*

**Key Words:** Materials Procurement, Inventory Control, Materials Management

## **Background of the Study**

No organization can operate without material input. The efficiency of any activity for production of goods and services depends to a great extent, on the supply of materials, equipment and manpower made available in their right proportions. Therefore, in order to meet the needs of the customer while meeting the set objectives there is a great need for a continuous production schedule this is only made possible by holding of the aforementioned ingredients in form of stock (Oniwon, 2011). Every organization invests a considerable amount of capital on materials. In many cases, the cost of materials exceeds fifty percent of the total cost of goods produced. Such a large investment requires considerable planning and control so as to minimize wastage which invariably affects the performance and profitability of organizations. Materials are the lifeblood and heart of any manufacturing system. No industry can operate without them. They must be made available at the right price, at the right quantity, in the right quality, in the right place and at the right time in order to co-ordinate and schedule the production activity in an integrative way for an industrial undertaking.

A manufacturing firm will remain shaky if materials are under stocked, overstocked or in any way poorly managed (Banjoko, 2010). Materials management includes all the activities relating to the acquisition, handling and control, and movement of materials and supplies used in the production for a firm's final product. Materials Management is a tool to optimize performance in meeting customer service requirements at the same time adding to profitability by minimizing costs and making the best use of available resources (Wanjogu, 2015). Materials Management encompasses all operations management functions from purchasing of raw materials through the production processes to the final delivery of the end products. It brings together under one management responsibility for determining the manufacturing

requirement, scheduling the manufacturing processes and procuring, storing and dispensing materials (Ondiek, 2009). International Federation of Purchasing and Materials Management (IFPMM, 2014) defined it as a total concept having its definite organization to plan and control all types of materials, its supply, and its flow from raw stage to finished stage so as to deliver the product to customer as per his requirements in time. Thus, Materials Requirements Planning (MRP), purchasing, procurement of materials, inventory management, storage, materials supply, transportation and materials handling are the activities of materials management (Monday, 2008). Materials Management came to limelight at the advent of liberalization and globalization which posed intense competition on the business environment. Before that time, the concept was treated as a Cost Centre since Purchasing Department was spending money on materials while Store was holding huge inventory of materials, blocking money and space (Ngwu, Okolie & Ezeokonkwo, 2015). However, with the process of liberalization, there has been a drastic change in the market which has forced manufacturing companies to devise strategies to minimize production costs in order to remain competitive. Since then, materials management has been recognized as a source of opportunities to reduce production costs and can be treated as a profit centre. Sturkhart (2007) states that the total cost of installed materials or value of materials may be 60% or more. In many cases, the cost of materials exceeds 50% of the total cost of goods produced. Such a large investment requires considerable planning and control so as to minimize wastage which invariably affects the performance of the organization (Ramakrishna, 2005). Majority of the companies attain significant savings from effective materials management, which amounts between 50%-60% of total costs (Song *et al.*, 2006).

Effective management of materials can lead to a reduction in cost, resulting in a significant saving. A potential 6% saving on total cost through effective material management is achievable (Oniwon, 2011). The various types of materials to be managed in any organization include purchased materials, work-in-progress (WIP), materials and finished goods (Banjoko, 2009). Ogbadu (2009) identified basic price, purchasing cost, marketing cost, obsolescence and wastages as the various costs involved in these materials. Thus, the management of these materials so as to reduce the costs associated is what it is referred to as material management. This shows clearly that priority should be given to management of materials in organizations to avoid unnecessary costs. Kenyan production and manufacturing firms, and specifically businesses in the sugar sector are facing competition in the current markets which has led to the need for coming up with better ways and strategies of managing material resources hence eliminating wastage in the value chain and thus enhancing organizational performance.

Globally, Manufacturers' materials management strategy is increasingly highlighted as a source of competitive advantage and, at the same time, is under stakeholder pressure to become more environmentally sustainable (Kulmala, 2009). Today, there are dramatic evolutions in the market environment and every organisation must strive to keep itself in business. Major competition has shifted from the market to the production floor where manufacturing costs can be cut down and profitability boosted for firms to compete favourably. Backed by advanced technology, firms are closely monitoring their manufacturing costs and embarking on efficient management of materials (Ondiek, 2009).

Materials also play a key role in African manufacturing firms as it represents the major component of manufacturing cost and profitability (Asaolu, Agorzie & Unam, 2015). The accumulation

of, and need for materials in the form of inventories, is a significant variable for managers to concentrate on, monitor and control. However, most organizations especially in manufacturing and in production does not have materials management department. Management in those organizations are of the view that any department within could be a materials or purchasing manager. They assume that, it is a matter of making sure materials comes into the organization and are issued to production as and when it's needed. Since there is an absence of materials management concept in these organizations, the departments that are in charge of materials handling report directly to accounts department. According to Adafin, Daramola & Ayodele (2010), the materials management concept has often been neglected when it comes to involvement in forward planning discussions and meetings, and many companies have found to their cost the error of leaving out a major part of the organization so directly involved with operations. Kenyan manufacturing firms have realized the benefits of adopting good materials management practices and are giving attention to materials management since long-term success and survival of any firm depends on how well their costs are managed (Ondieki, 2009). However, generally Kenyan firms are not practicing professionalism in materials management and owing to the huge amount of resources they were committing on materials related activities. The problems encountered by the material management approach were lack of flexibility, entrusting a lot of sensitive activities to one department and lack of well-integrated database to support information flow (Wanjogu, Iravo & Arani, 2015).

The development of the sugar industry in Kenya started with private investments at Miwani in 1922, followed by Ramisi Sugar company in 1927 and after independence six additional companies were established i.e. Muhoroni in 1966; Chemelil in 1968,

Mumias in 1973; Nzoia In 1978; South Nyanza in 1979; West Kenyan 1981 and Zony in 1996. These parastatals were formed in order to accelerate socio-economic development, address regional economic imbalances, increase Kenyan citizen's participation in the economy, promote indigenous entrepreneurship and promote investment through joint ventures (Kenya Sugar Board, 2014).

With the exception of a period in the early 1980s, Kenya has had to rely on sugar imports to meet domestic demand. Domestic demand for sugar has steadily risen from 217,462 tonnes in 1973 to 609,428 tonnes in 1998 while production has risen from 137,808 tonnes to 471,283 tonnes in the same period. The production of 471,283 tonnes in 1998 was the highest since the inception of the sugar industry. Historically, year-round growing conditions have given Kenya a comparative advantage in sugar production. Kenya has the potential to become self-sufficient in sugar production and to retain that status, and also produce a surplus for export (Kenya Sugar Authority, 1999). Chalon reported that factories had to increase capacity utilization and reduce the cane input to achieve a high level of output. The Mumias factory was the most efficient, with a capacity utilization of 86.7 percent and total cane (TC) to total sugar (TS) ratio of 8.91 in 1999 (Chalon, 1994).

#### **Statement of the Problem**

According to the Kenya Sugar Industry strategic plan 2010-2014, all sugar industries need to be privatized in order to compete effectively. Despite developing strategic plans, public sugar companies in Kenya rely on Government cash bail out to make them survive. For example Mumias Sugar Company received over Kshs 1 billion in June, 2015 from the National Treasury against an unexpected over Kshs 6 billion (RoK, 2015). The industry produces 68% of Kenya's domestic sugar requirement, making the country a net importer of sugar (RoK, 2013). The decline in sugarcane production and sugar output can be attributed to the existing major material

management problems in the industry; the rising level of inefficiency in sugar production, milling and transportation. Due to factors attributed to performance, the Kenya sugar industry has not met COMESA sugar safeguards for the last 12 years, since 2001 (RoK, 2014). This has resulted in the Government of Kenya request for extension of the COMESA safeguards year in year out. Kenya's sugar production has recorded under production from the various sugar millers, against what is expected from the forecasted annual production (MOA, 2015). The expiry of preferential trade tariff prices from the COMESA region in 2016 has complicate matters to the local millers as their sugar will compete with cheap imported sugar (Mwanje; Guyo & Muturi, 2016).

The Cost of producing sugar in Kenya is higher than those in other producing countries in East Africa and COMESA member states. The Kenya Sugar Industry Strategic plan (2010-2014) puts the cost of producing sugar in Kenya at 415-500USD/ton while that of Uganda and Tanzania are put at 180-190 USD/ton and 140-180USD/ton respectively. Report by The Kenya Sugar Industry Strategic plan (2010-2014) indicated the challenges such as irregular factory maintenance, low crushing capacity, low sugar extraction rates, slow adoption of new and appropriate technology, inadequate industrial research, high cost of sugar production, narrow product base, dilapidated processing equipment, inefficient factory operations and wastage in cane yard (RoK, 2015).

While Mumias Sugar Company (MSC) has been the most successful of the ten sugar factories in Kenya, its survival remains uncertain due to increased competition for both market and raw materials. In its endeavor to improve efficiency, the company installed a high capacity processer (diffuser), but this was met by another problem of shortage of the raw cane as a good number of farmers contracted to the company uprooted their crops as they went

for other substitutes which they believed offered better returns.

MSC has in the recent past suffered continuous losses arising from mainly operational challenges attributed to poor planning of logistics management practices and poor material management (Mukolwe & Wanyoike, 2015). From 2012, Mumias Sugar Company has been experiencing low sugar output and decreased profits which have been blamed on internal inefficiencies and fall in cane supply. According to a forensic audit carried out by KPMG, the company registered a loss of up to Ksh. 1 billion in 2012. A further loss of Ksh. 2.7 billion was recorded in 2014. The Gross loss for 2015 was 1,660,212,000 which rose to 1,754, 422,000 for the year ending June 2016 (Mumias Sugar Annual report, 2016). The challenges experienced by MSC majorly circulate around poor logistics management, processing, material handling and control, distribution and consumption coupled with raw material shortage (Annual Report, 2016). The Effect of proliferation of mills created competition for the available cane in the western region, while the general impact of the financial pressures on farming led to inadequate inputs to obtain optimum cane yields. High unit cost of production arose mainly from underutilisation of factory capacity due to low cane supply and high cost of servicing the factory. Further, the company has been bogged with poor material planning and poor inventory control. This study therefore seeks to establish the effect of material management on performance of Mumias Sugar Company Limited.

### **Objectives of the Study**

The general objective of the study was to establish the role of material management on performance of sugar manufacturing firms in Kenya with reference to Mumias Sugar Company Limited. The specific objectives were;

- To determine the role of materials procurement on performance of sugar manufacturing industries in Kenya
- To assess the role of inventory control on performance of sugar manufacturing industries in Kenya

## **LITERATURE REVIEW**

### **Theory of Supply Chain Management**

The connections and nodes in a Supply Chain achieve functions that contribute to the value of the goods transporting through the chain and thus its achievement. Any connection that does not carry out well reduces the overall effectiveness of the whole Supply Chain. The notion of Supply Chain management as used in many research is usually linked with the globalization of producing and the penchant for manufacturers to source their inputs planetary, which necessitates management of profitable ways of regulating worldwide flows of inputs or outputs. The principal focus of market competition in such situations is not only between goods, but between the Supply Chains delivering the goods.

As competition in international markets is progressively dependent upon the of arrival time of goods as well as their quality, coordination between suppliers and distributors has become an important characteristic of the Supply Chain. As the customer satisfaction is a crucial benchmark of the success of the Supply Chain, effective management of the linking processes is crucial (Trkman, Stemberger & Jaklic, 2005). Additionally, market uncertainty necessitates Supply Chains to be easily flexible to changes in the situation of trade. Such flexibility in supply requires effective Supply Chain Management.

According to Grant, Lambert, Stock and Ellram (2006), Supply Chain management refers to corporate business processes integration from end users through suppliers that provide information, goods, and services that add value for customers.

Supply chain can be summed up as a series of interconnected activities which are concerned with planning, coordinating and controlling materials, parts and finished products from supplier to customer (Lourenco, 2001). The key success of SCM will rely on the incorporation of the activities of the supply chain, meaning cooperation, information sharing and organization throughout the entire supply chain. The supply chain in the manufacturing industry is considered a complex one where there exists a linkage between upstream suppliers, downstream distributors, information capital and flow through the chain.

### **The Deterministic Model of Inventory Control**

Deterministic models are a type of inventory control model that is used to determine the optimal inventory of a single item when demand is largely unknown. An example of this type of model is the classical lot size model, which assumes that demand is constant and continuous and that there is no delivery time and no shortage costs. When this model is used, inventory is built up at a continuous rate to meet a specified, or assumed, demand.

In case of the standard models it is therefore necessary to substitute the real existing process of demand by a row of forecasts:

$$dt(t + \beta), \beta = 0, 1, 2 \dots$$

where  $dt(t + \beta)$  means the forecast of demand in period  $t + \beta$ . Those forecasts will be repeated as often as necessary, in order to minimize the errors. Thus the standard models are used in rolling planning: after every forecast the order rules are calculated anew. But not every forecast error can be averted; therefore the safety stock  $S_B$  is needed. An abstraction to the chaotic behavior is to assume that items are withdrawn from the inventory at an even rate  $a$ , lots are of a fixed size  $Q$ , and lead time is zero or a constant. This deterministic is used model of the system to explain some of the notation associated with inventory. Because of its simplicity, we are able to find optimal solutions to the deterministic model for several

operating assumptions. This section lists the factors that are important in making decisions related to inventories and establishes some of the notation that is used in this section. Dimensional analysis is sometimes useful for modeling inventory systems, so we provide the dimensions of each factor.

The assumptions of the model show a plot of inventory level as a function of time. The inventory level ranges between 0 and the amount  $Q$ . The fact that it never goes below 0 indicates that no shortages are allowed. Periodically an order is placed for replenishment of the inventory. The order quantity is  $Q$ . The arrival of the order is assumed to occur instantaneously, causing the inventory level to shoot from 0 to the amount  $Q$ . Between orders the inventory decreases at a constant rate  $a$ . The time between orders is called the cycle time, and is the time required to use up the amount of the order quantity, or  $Q/a$ . At the optimum, the holding cost is equal to the setup cost. Optimal inventory cost is a concave function of product flow through the inventory ( $a$ ), indicating that there is an economy of scale associated with the flow through inventory. For this model, the optimal policy does not depend on the unit product cost. The optimal lot size increases with increasing setup cost and flow rate and decreases with increasing holding cost.

A deterministic model considered in this section allows shortages to be backordered. In this model the inventory level decreases below the 0 level. This implies that a portion of the demand is backlogged. The maximum inventory level is  $S$  and occurs when the order arrives. The maximum backorder level is  $Q - S$ . A backorder is represented in the figure by a negative inventory level. The inventory analyst has three principal tasks: constructing the mathematical model, specifying the values of the model parameters, and finding the optimal solution. The model can be varied in a number of important aspects. For example, non-instantaneous replenishment rate, multiple products, and

constraints on maximum inventory are easily incorporated.

When a deterministic model contains a nonlinear total cost function with only a few variables, the tools of calculus can often be used find the optimal solution. Some assumptions, however, lead to complex optimization problems requiring nonlinear programming or other numerical methods. The classic lot size formulas derived in this section are based on a number of assumptions that are usually not satisfied in practice. In addition it is often difficult to accurately estimate the parameters used in the formulas. With the admitted difficulties of inaccurate assumptions and parameter estimation, one might question whether the lot size formulas should be used at all. It is wise to point out that whether or not the formulas are used, lot size decisions are frequently required. However abstract the models are, they do recognize important relationships between the various cost factors and the lot size, and they do provide answers to lot sizing questions.

**Figure 1: Conceptual Framework**

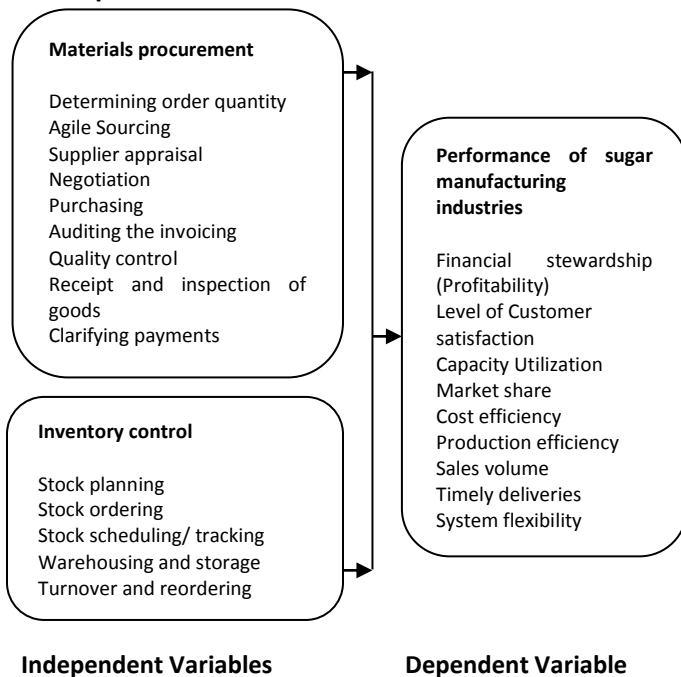
**Materials Procurement**

Material procurement takes into cognizance buying wisely and competitively which entails keeping abreast the forces of supply and elements that regulate prices and availability of materials. Efficient and effective materials procurement entails constant search for better values that yield the best combination of competitive and wise buying that contributes to maximizing organization’s profit. Unam (2012) postulates that cost of raw materials can be reduced by buying from the right suppliers at the right price without compromising quality. Materials manager will possess a good bargaining skill and strive for the cheapest and qualitative raw material, and in doing this, what the material procurement manager will bear in mind is to procure the right quality at the right price (i.e., best price without compromising quality).

Material procurement has to do with determining order quantity, work in processing, store requisition, issue of enquiries, evaluation of quotations, supply appraisal, negotiations, placing of contracts, processing of deliveries and clarifying payments. ICAN(2006) maintains that material acquisition include but no narrowed to; purchase procedure, receipt of materials, inspection or test of the materials, Debit notes to the supplier in respect of defects and rejection. On the receipt of material, Ogbadu (2009) maintains that the quantity, quality and the condition of items must check against what was ordered. The movement of material procured is another cost reduction factor. The movement is determine by the nature, distance and quantity of the materials and involves cranes, pipelines, trucks, forklift, waterways, railroads, airline, etc. The decision on the best and most economic means to be used will save cost and improve profitability to a great extent.

According to peurifoy (2010), the purchase cost of an item is the purchase price from an external

**Conceptual Framework**





source including transportation and freight costs. For construction materials, it is common to receive discount for bulk purchases, as the unit purchase cost declines as quantity increases. These reductions may reflect manufacturer's marketing policies, economies of scale in the material production, or scale economies in transportation. There are also advantages in having homogeneous material. For example a bulk order to insure the same color or size of items such as bricks may be desirable. Accordingly, it is usually desirable to make a limited of large purchases for materials. Cordell (2014) noted that proposes that the cost of materials is based on bargaining leverage, quantities and delivery time" Cordell continues that organization with potential for long term purchase volume can command better bargaining leverage. While orders in large quantities may result in lower unit prices, they may also increase holding costs and thus cause problems in cash flow. Requirements of short delivery time also adversely affect unit prices. Furthermore, design characteristics which include items of odd sizes or shape should be a void. Since such items normally are not available in the standard stockpile, purchasing them causes higher prices.

### **Inventory Control**

Chary (2008) observed that inventory control helps organization to establish the proper inventory levels through the economic order quantity; and to keep track of this level through inventory control system which may be manual such as two bin method and red line method, or computerized inventory control systems. Proper inventory controls also require an organization to undertake stocking and use appropriate method to value stock so as not to under or over state profits (Kotabo, 2002). Inventory control can be done through introduction of different measures so as to prevent the company from incurring unnecessary losses made by different departments. According to Chary (2008) material inventory is kept in operations for three

reasons; transactions, precautions and speculation. While speculative inventory cannot be encouraged particularly in a developing countries, there is need for transaction or "regular" inventory due to the lack of perfect synchronization of inflow and outflow of material and for precautionary or "safety" inventory to provide cover of any inability to predict demand supply of material.

Inventory control enhances profitability by reducing costs associated with storage and handling of materials. Inventory control is a means by which materials of the right quality and quantity are made available as when needed with due regards to the economy of shortages, ordering cost, purchase price and working capital (Chary, 2008). Inventory control determines the extent of stock holding of materials. It equally makes it possible for materials manager to carryout accurate and efficient operation of the manufacturing organization through decoupling of individual segment of the total operation and it entails the process of assessing of stock into the store house and the issue of stock. Comparatively, shortage of materials can lead to interruption of products for sales; customer relations are hurt, while machines and equipment becomes under-utilized. Therefore, a company can only realize substantial savings by using a rational procedure for inventory control.

Brackus (2010) argue that material control is concerned with two parts of Accounting; physical property and value of the property. Brackus (2010) shows material control as one of the policy procedures employed in the management of materials and these include internal checks as in continuous, period, spot and .or any other type of control established by management to carry out activities aimed at ensuring an effective and efficient material management procedure. Other forms of material control include ensuring high security of the store house and stock yard, good custody of keys, limiting access to premises and

making of materials as in coding, to minimize theft, segregation of prescribed item.

According to Kotabo (2012), though there are many systems for control of stock, both manual and automatic, there are really two basic approaches on which these systems are based. Recording method which may take place either when materials fall to a pre-determined level or according to the situation discovered when levels are received on a periodic regular basis. The action level method of controlling stock by quality which involves fixing stock levels for each commodity which is recorded in the stock system. Under the action level methods of provision, commodities are ordered at unspecified intervals as and when ordering levels are related. This means that orders can only be placed usually for one item at time. Nyanga (2000) say that in any efficient business material levels are established with as much care as production levels, a careless choice of the material level can easily precipitate production slow down caused by lack of badly needed materials. He continues that as a result of tighter controls over materials, items and meticulous records keeping, the cost of maintaining adequate levels of materials is reduced with adverse effects on the continuity of operations.

### **Empirical Review**

Keitany, Wanyoike and Richu (2014) conducted an assessment on the role of materials management on organizational performance, a case of new Kenya Cooperative Creameries limited, Eldoret Kenya. The main objective of the study was to assess the role of materials management on organizational performance. Specifically, the study intended to assess how inventory control systems and lead time affect organizational performance. The empirical analysis of the study focused mainly on the New Kenya Cooperative Creameries, Eldoret, Kenya, being one of the largest and the oldest dairy company in East and Central Africa. The target

population of the study was 56 employees of New KCC Ltd. Eldoret. A sample of 49 respondents was selected from this population using the stratified random sampling technique. Data was collected through a structured questionnaire, consisting mainly of closed ended and open-ended questions. The data was analyzed through descriptive statistics such as mean, standard deviation, median and percentages. Results showed that there was significant increase in organizational performance as a result of inventory control system involvement. The study recommended that dairy companies adopt the use of Information Communication Technology (ICT), use of proper codes in all materials, and the employees be trained on the use of inventory control systems.

Okorie and Ibegbulem (2015) conducted an assessment of materials management and profitability of an organization. This study aims at finding out how an organization can tackle the problems identified and how effective material management can increase the profitability of an organization. The study revealed that material management used by the organization contributes to the profitability of the company, adequate storage facilities prevents interruption on production process among other things. As a result of the above, it was recommended that there should be good record system of materials for the operations of the organization as it affects production and the training of staff to acquire new skills and knowledge needed for the work for the benefit of the organization.

Wanjogu, Iravo and Arani (2015) studied on factors affecting materials management: a survey of small and medium-sized manufacturing firms in industrial area Nairobi, Kenya. The study was guided by the following objective: to analyze the effect of inventory control and information communication technology; on materials management in small and medium-sized manufacturing firms. The research

involved a cross-sectional survey of small and medium manufacturing firms in Nairobi. The study adopted descriptive research design to determine factors affecting materials management. A sample size of 46 respondents was selected from a list of 455 manufacturing firms. The data was collected from the respondents (material managers) through a questionnaire which was self-administered and analyzed using SPSS. The data was then presented in form of tables and charts. Regression model was used to show the relationship between independent and dependent variables. The study found that good inventory control is important in materials management because it reduces stock levels and hence increases profitability. The study recommends that firms should embrace good inventory control systems in order to minimize cost associated with materials management and maximize profit through employing effective and efficient methods of controlling materials management.

Assiamah, Allotey and Hanson (2008) established materials management and its effect on cost of supplies. A case study of cocoa processing company of Ghana. The aim of this research is to illustrate how the application of materials management concept can minimize the cost of supplies in Cocoa Processing Company of Ghana. Primary data was collected through interviews (face-to-face, telephone) and questionnaire. Secondary data was sourced through literature from the university library and internet sources, qualitative design method was chosen over others because of the nature of the research work. Conclusion was that, financially, materials (inventories) are very important to manufacturing companies and on the balance sheet they usually represent from twenty to sixty percent of total assets. Therefore, if the application of the concept of materials management is accepted with well qualified personnel, it could lead to the minimization of cost. The function of a materials manager is to promote

coordination and integration within the supply chain and the major benefits are assumed to be; reduction in interdepartmental conflicts, reduction of inventory levels, increased knowledge of total corporate operations and reduction of materials handling costs among others.

Atieno and Wanyoike (2015) conducted an assessment of the effect of logistics management practices on operational efficiency at Mumias Sugar Company Limited, Kenya. The objective of this study was to assess logistics management practices on operational efficiency of Mumias Sugar Company Limited, Kenya. The target population for the study included staff from selected departments of Mumias Sugar Company, representatives of farmers, and officials from the Ministry of Agriculture and the Kenya Sugar board. Stratified sampling technique was used to select the predetermined sample size of 92. Purposive and convenience sampling methods were used to select sample elements for interviews. Data was analyzed using mean, standard deviation and inferentially through correlation and regression analysis. The study revealed that effective management of information flow improves the company's internal and external processes. The study recommends a strategic approach to logistics management practices through embracing modern technology and employee training.

Asienga (2005) researched on materials management on construction projects: a case study of concreting works on sites in Nairobi. The objectives of the study were to establish the extents of materials management and materials attributes on the construction sites, and to establish the relationship between the two. In order to achieve the objectives, the study carried out a survey of concreting works on accessible active sites in both formal and informal construction in Nairobi. Data from the sites was statistically analyzed. Regression analysis between the two major variables; extent of materials management and extent of materials

attributes, was carried out using SPSS software. Inferential statistics was used in hypothesis testing and generalization of the results. The study concluded that inadequate management of materials has resulted in the poor level of materials attributes on construction sites. The problem was found to be more severe on informal sites than on formal sites. The study recommends that a systematic and integrated approach is needed to manage materials and minimize the costs and effects associated with inadequate materials management.

Ondiek and Odera (2012) did an assessment of materials management in Kenyan manufacturing firms. This study examined the recognition Kenyan manufacturing firms are giving to materials management and the benefits of adopting good materials management practices since long-term success and survival of any firm depends on how well their costs are managed. The study surveyed medium and large manufacturing firms based in Nairobi, Kenya. A stratified random sampling technique was used to select 55 firms while the data was collected using a structured questionnaire consisting mainly of both close-ended and open-ended questions. The data was analysed through descriptive statistics such as proportions, percentages, median and mean. 23 percent of the firms were found to recognize materials management as they had an in-charge reporting directly to the chief executive officer. However, generally Kenyan firms were not practicing professionalism in materials management and owing to the huge amount of resources they were committing on materials related activities; a lot of emphasis need to be directed towards materials management and it should be recognized as a top management function.

Asaolu, Agorzie and Unam (2012) examined the effect of materials management on the profitability of Nigerian Food and Beverage (F&B) Manufacturing firms using a case study of Nigerian

Bottling Company (NBC) Plc. Data was collected through a structured questionnaire, relevant publications and interview with key individuals in the company. The results showed that there was significant increase in the company's profitability as a result of efficient management of materials, which was aided by inter-departmental coordination among materials related departments, inventory management, good relationship with vendors, and state-of-the-art facilities/ICT. However, the major constraints to Materials Management in the company included epileptic public power supply and poor transportation network. This study advocated that priority should be given to Materials Management in F&B Manufacturing Industry in order to achieve significant cost saving, improvement in production efficiency, and increase in profitability and competitiveness. Recommendation was made for government to provide adequate infrastructural supports to boost Materials Management in Nigerian F&B Manufacturing Industry.

## **RESEARCH METHODOLOGY**

This study adopted the descriptive design. The population under consideration which was the unit of analysis comprised of Mumias Sugar Company. For the purpose of this study, Mumias Sugar Company was selected to investigate the role of material management on performance of manufacturing firms in Kenya. As such, the target population comprised of the staff working with Mumias Sugar Company. This was the total workforce of 785 employees on permanent and contractual terms as per the records in the company's human resource department. The respondents for this study were drawn from the employee listings which were obtained from Mumias Sugar Company. The study utilized stratified random sampling. This study utilized a research questionnaire as the main data collection instrument. Questionnaires are a series of written

questions on a topic about which the respondents' opinions are sought. The pilot study was carried among 15 respondents purposively chosen from Mumias Sugar Company offices in Nairobi. The respondents were informed that the research was meant for academic purposes only and that the study had no intention of using the information for personal gains. The reliability test was conducted by both the principle researcher and the research assistants to enhance clarity of the questionnaire. To establish the validity of the research instrument the researcher sought opinions of scholars and experts including the supervisor. This allowed modification of the instrument thereby enhancing validity. The study used primary data which was collected by use of questionnaires. In order to enhance simplicity and ease of understanding, tables and figures were used to present the data.

#### **DATA ANALYSIS, INTERPRETATIONS AND PRESENTATION**

The study targeted a sample size of 79 respondents from which filled in and returned the questionnaires making a response rate of 84.1%. The study sought to determine the gender category of the respondents; this was done in view of ensuring that both elderly men and women were equitably engaged in this research. From the analysis, the studies revealed that majority of the respondents 68.7% were males whereas 31.3% was females. This implies both genders were fairly engaged in this research and therefore the findings of this study did not suffer from gender biasness. On age factor most of the respondents 37.3% were aged between

36-45 years, 26.9 % of the respondents were aged between 25 -35 years, 17.9% of the respondents were aged between 46-55 years,13.4%ere aged above 55 years while 4.5% of the respondents were aged below 25 years. This implies that respondents were fairly distributed across age groups. On education levels, most of the respondents 37.3% were under graduate, 35.8% of the respondents indicated graduates, 13.4 % of the respondents had diploma certificates, 9 % of the respondents indicated post graduate whereas 4.5% of the responders indicated secondary school certificate. This implies that majority of the respondents were well educated which implies that they were in a position to give respond to research questions with easy. On period of service, the study established that most of the respondents (44.8%) had worked with industry for a period of 5 to 10 years, 28.4% indicated More than 10 years, 20.9% indicated to have worked for a period of 2 to 5 years while 6.0 % indicated to have served for a Less than 1year. This implies that majority of the respondents had worked with the organisation for a considerable period of time which implies that they were in a position to give credible information relating to operation efficiencies of the business firm.

#### **Materials Procurement**

##### **Extent to which material management tools had been implemented by SMI**

The study sought to determine the extent to which management tools had been implemented by sugar manufacturing industries in Kenya.

**Table 1: Extent to which material management tools had been implemented by SMI**

<b>Extent</b>	<b>Frequency</b>	<b>Percentage</b>
Very great extent	29	43.3
Great extent	24	35.8
Moderate extent	7	10.4
Little extent	7	10.4
<b>Total</b>	<b>67</b>	<b>100.0</b>

From the analysis, majority of the respondents as shown by 43.3% indicated that materials procurement influenced had been implemented to a great extent, 35.8% indicated to a great extent, while 10.4% indicated to a moderate extent or little extent. This implied that materials management tools had been implemented by sugar manufacturing industries to a very great extent. The

findings were in line with research by Banjoko (2000) process Materials Management tool helps to optimize performance through customer service.

The study sought to determine the extent to the following aspects of materials procurement influenced the efficiencies at sugar manufacturing industries in Kenya.

**Table 2: Aspects of materials procurement influencing performance**

	Mean	Std deviation
Determining order quantity	3.67	0.93
Agile Sourcing	3.66	1.32
Supplier appraisal	3.76	1.19
Negotiation	3.61	0.82
Purchasing	3.53	1.17
Auditing the invoicing	4.07	0.91
Quality control	3.91	1.11
Receipt and inspection of goods	4.06	0.74
Clarifying payments	3.69	1.08

From the analysis, majority of the respondents agreed that materials procurement process helped to auditing the invoicing (mean = 4.07), receipt and inspection of goods (mean = 4.06), quality control (mean = 3.91), supplier appraisal (mean = 3.76), clarifying payments (mean = 3.69). The findings are in line with research by Ondiek, (2009) that Materials Management tool helps to minimize costs while using the available resources thus ensuring that materials are of the right quantity, and quality. The study also revealed that materials procurement process aided in determining order quantity (mean = 3.67) agile sourcing (mean = 3.66), in negotiation (mean = 3.61) and purchasing (mean = 3.53), The findings are in line with research by Banjoko (2000) and Jacobs et al., (2009), process Materials Management tool helps to optimize performance through customer service and that the firm has achieve significant cost saving, improvement in production efficiency.

The study also revealed that Materials Management tool ensures that the right items are bought and made available to the manufacturing operations at the right time; materials procurement process ensures that raw materials are availed at the right place and sourced at the lowest possible cost. The findings are in line with research by Banjoko (2000) and Jacobs et al (2009), materials Management is a tool to optimize performance in meeting customer service requirements at the same time adding to profitability by minimizing costs and making the best use of available resources.

**Inventory Control  
Implementation of Inventory Control Systems by sugar manufacturing industries**

The study sought to establish the the implementation of Inventory Control Systems on sugar manufacturing industries in Kenya

**Table 3: Implementation of Inventory Control Systems by Sugar Manufacturing Industries**

	Mean	Std deviation
Just-In-Time	3.71	1.44
Lot-for-Lot	3.68	0.95
Buffer Stock	3.50	0.92
Material Requirement Planning(MRP)	3.91	0.69
Electronic Data Interchange (EDI)	3.76	0.94
Enterprise Resource Planning (ERP)	3.75	1.26
ABC Analysis	4.00	1.00
Intelligence Resource Planning	4.16	1.02

From the analysis, majority of the respondents agreed that implementation of Inventory Control Systems aided in intelligence resource planning (mean = 4.16), ABC analysis (mean = 4.00), material requirement planning (MRP) (mean =3.91) and in electronic data interchange (EDI) (mean = 3.76) The findings are in line with research by Kotabo, (2002) that Inventory control helps the firm to establish the proper inventory levels, and that Inventory control facilitates regular and timely supply to customers through adequate stocks of finished products.

The study also revealed that inventory control tool helped in enterprise resource planning (ERP) (mean = 3.75) just-in-time purchasing (mean = 3.71) lot-for-lot (mean =3.68) and in buffer stock (mean =3.50) the findings are in line with research by Chary (2008) that

Inventory control tool ensures smooth production operations are achieved though maintenance of reasonable stocks of materials.

The research further revealed that Inventory control helps to minimise loss by obsolescence, deterioration, damage. Inventory control facilitates production scheduling, avoids shortage of materials and duplicates ordering and that Inventory control protects the firm against variations in raw materials delivery time.

#### **Extent to which inventory controls tool had been implemented by SMI**

The study sought to determine the extent to which Extent to which inventory controls tool had been implemented by sugar manufacturing industries in Kenya.

**Table 4: Extent to which inventory controls tool had been implemented by SMI**

Extent	Frequency	Percentage
Very great extent	24	35.8
Great extent	24	35.8
Moderate extent	10	14.9
little extent	9	13.4
<b>Total</b>	<b>67</b>	<b>100.0</b>

Form the analysis, majority of the respondents as shown by 35.8% the agreed that inventory controls had been implemented by sugar manufacturing industries to a very great extent, or great extent, 14.9% indicated to a moderate extent while 13.4% indicated to a little extent. This implied that

inventory controls had been implemented by sugar manufacturing industries to a great extent or very great extent. The findings concurs with research by Chopra and Meindl (2007) reliable supply chain system promotes customer service through timely deliveries

The study sought to determine the extent to which the following aspects of Inventory control influence

operations at sugar manufacturing industries

**Table 5: Extent to which the following aspects of Inventory control influence the efficiencies at sugar manufacturing industries**

	Mean	Std deviation
Stock planning	3.84	0.86
Stock ordering	3.96	1.26
Stock scheduling/ tracking	3.88	1.15
Warehousing and storage	3.87	1.00
Turnover and reordering	3.88	1.17

From the analysis, majority respondents agreed inventory control tool enhanced stock ordering process (mean = 3.96), stock scheduling/ tracking, turnover and reordering, (mean = 3.88), stock planning (mean = 3.84). The findings are in line with research by Chary (2008) material inventory is kept

in operations for three reasons; transactions, precautions and speculation

#### Performance of Sugar Manufacturing Industries

The study sought to determine the performance trend of the company in the following aspects

**Table 1: Performance of Sugar Manufacturing Industries**

Statement	Mean	Std deviation
Financial stewardship (Profitability)	3.79	1.09
Level of Customer satisfaction	3.81	1.40
Capacity Utilization	3.64	0.93
Market share	3.69	0.92
Cost efficiency	3.72	0.95
Production efficiency	3.75	0.93
Sales volume	4.03	0.92
Timely deliveries	4.04	0.88
System flexibility	3.91	0.73

From the analysis, majority respondents indicate that the company had recorded great improvement in the following areas: timely deliveries (mean = 4.04), sales volume (mean = 4.03), system flexibility (mean = 3.91), level of customer satisfaction (mean = 3.81), financial stewardship (profitability) (mean = 3.79), production efficiency (mean = 3.75), cost efficiency (mean = 3.72), market share (mean = 3.69), capacity utilization (mean = 3.64)

#### SUMMARY OF FINDINGS CONCLUSION AND RECOMMENDATIONS

The study revealed that sugar manufacturing industries had implemented materials procurement to a very great extent. Results obtained from regression test predict that a unit increase on materials procurement would enhance performance of sugar manufacturing firms by factors of 0.691. The study also noted that materials procurement process helped to auditing the invoicing, receipt and inspection of goods, quality control, supplier appraisal, clarifying payments. The



findings are in line with research by Ondiek, (2009) that materials management tool helps to minimize costs while using the available resources thus ensuring that materials are of the right quantity, and quality.

The study also revealed that materials procurement process aided in determining order quantity, agile sourcing, in negotiation and purchasing, The findings are in line with research by Banjoko (2000) and Jacobs et al., (2009), process Materials Management tool helps to optimize performance through customer service and that the firm has achieve significant cost saving, improvement in production efficiency.

The study also revealed that Materials Management tool ensures that the right items are bought and made available to the manufacturing operations at the right time; materials procurement process ensures that raw materials are availed at the right place and sourced at the lowest possible cost The findings are in line with research by Banjoko (2000) and Jacobs et al., (2009), Materials Management is a tool to optimize performance in meeting customer service requirements at the same time adding to profitability by minimizing costs and making the best use of available resources.

Results predict that a unit increase in Inventory control would enhance internal efficiencies of sugar manufacturing firms by factors of 0.573, descriptive results also revealed that inventory control tool helped in intelligence resource planning, ABC analysis, material requirement planning (MRP) and in electronic data interchange (EDI). The findings are in line with research by Kotabo, (2002) that Inventory control helps the firm to establish the proper inventory levels, and that Inventory control facilitates regular and timely supply to customers through adequate stocks of finished products

The study also revealed that inventory control tool helped in enterprise resource planning (ERP), just-in-time purchasing, lot-for-lot, and in buffer stock

the findings are in line with research by Chary (2008) that inventory control tool ensures smooth production operations are achieved though maintenance of reasonable stocks of materials. inventory control tool enhanced stock ordering pprocess, stock scheduling/ tracking , turnover and reordering , stock planning The findings are in line with research by Chary (2008) material inventory is kept in operations for three reasons; transactions, precautions and speculation

The research further revealed that inventory control helps to minimise loss by obsolescence, deterioration, damage, inventory control facilitates production scheduling, avoids shortage of materials and duplicates ordering and that inventory control protects the firm against variations in raw materials delivery time, inventory controls influence the performance of sugar manufacturing industries to a great extent or very great extent.

The study concludes that implementation of materials procurement tool positively influenced the performance of sugar manufacturing industries in Kenya. Manufacturing industries had implemented Material Management tool to a great extent. Material Management tool helped to optimize performance through customer service and that the firm had achieved significant cost saving, improvement in production efficiency and that Materials Management tool ensured that the right items are bought and made available to the manufacturing operations at the right time

The study concluded that implementation of inventory control positively influenced performance of sugar manufacturing industries in Kenya, further investments in inventory control tools would promote efficiencies in manufacturing industries and that inventory control tool ensured smooth production operations are achieved though maintenance of reasonable stocks of materials.

Based on the findings, the study recommended for full adoption of materials procurement tool as this function was found to be helpful in auditing the invoicing, receipt and inspection of goods, quality control, supplier appraisal and clarification of payments.

Manufacturing industries should implement inventory control system as they were found critical to lowering costs and providing a more streamlined operation. Firms with computerized inventory control were likely to enjoy benefits like intelligence resource planning, ABC analysis, material

requirement planning (MRP) and in electronic data interchange.

Manufacturing industries should have flexible supply chain emplace.

Other studies may focus on effect of knowledge management for future positioning on strategy implementation in manufacturing firms in Kenya. Other studies may establish effect of discontinuous innovation on strategy implementation at manufacturing firms in Kenya.

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