

Effects of Materials Management on the Productivity of an Organisation

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Abstract— Many business organizations in Nigeria fail to value the role of materials management in improving their productivity. In most situations, the function seems to be a reserve in the system, while in other situation the roles are actually applied firmly. Some organizations are of the certainty that material management is just a regular function of the procuring department thereby moderating it to the background. Rising from this backdrop, this study specific aims are finding out how an organization can tackle the problems identified and how effective material management can increase the profitability of an organization. The study discovered that material management used by the organization adds to the profitability of the company, sufficient storage facilities stops interruption on production process amongst other things. As an outcome of the above, it was suggested that there should be respectable record system of materials for the processes of the organization as it influences production and the training of staff to obtain new skills and knowledge required for the work for the profit of the organization.

Index Terms— Materials, Management, Organisation and Productivity.

I. INTRODUCTION

Material management is the procedure for planning, executing and controlling the field and office events in construction. The main objective of material management is to make sure that construction materials are always available at their point of use when required. Material management is the system for planning and overseeing all of the efforts that are mandatory to ensure that the precise quality and quantity of materials are correctly specified in a timely order, gotten at a reasonable price and most importantly, always available at the point of use when needed. A poor materials management can bring about increase in costs during construction [1].

Reference [2] said materials management is a notion which organizes the responsibility for deciding the manufacturing necessity that is scheduling the manufacturing procedure and purchasing, storing and dispensing materials [2], [3]. An integrated method to material management describes it as the function accountable for the coordination of planning, sourcing, purchasing, moving, storing and controlling materials in a best manner so as to afford a predetermined service to the customer at a lowest cost. These statements provide the scope of materials management which involves materials requirements planning (MRP), determination on purchasing, procurement of materials, inventory management,

staffing, stores and warehousing management, production and supply of finished goods at lowest cost at due time. To manage materials is to manage the life of an organization. No organization can make it without proper management of materials. The bottom line and efficient flow of input material either procured from outside manufacturing or produced in house [1]. Keeping of materials of lowest cost is a management function of planning, organizing and controlling all the events that contributes to materials cost management thus, includes the total process from a necessity, for material/or services or works rising, right across to the supply of works to the user and in numerous causes, the product being made available always to the final customer or consumer from the above, it important to carry out an efficient control over materials by creating a separate function/department to be in custody of materials and this will be termed materials management department. This department should have planned duties of total cost control, elimination of materials waste and profit optimization [4].

Materials management is now said to be the last limit for cost control and profit improvement, influencing to higher production and productivity and thus widely created for cost-effectiveness in any individual business management echelon must appreciate that it is not the materials manager's main prerogative, but in fact this laurels. Whatever and whenever realized, depends primarily on top management support and without its approval all his efforts are exercise in futility [5].

In management or enterprise management we understood that for a company to ascertain their goals and objectives there must be well-organized and effective use of planning, organizing, controlling and coordinating therefore for the results of the materials to come out positively the company should strategize how to carry out their production, purchase and supply schedules of materials received and handled transportation, warehousing etc. with efficient planning of those mentioned above the organization with safeguard of timely and available of materials be able to meet the agreed projected demand and also meet their specific goals [6].

Efficient management of materials brings about substantial savings in project costs. If materials are procured too early, capital may be seized up and interest charges sustained for the excess inventory of materials. Materials may lose value during storage or get stolen unless special care is taken. Delays and extra expenditure may be sustained if materials needed for particular activities are not available. Reference [7] shows Effective construction materials management process is very essential to success of a construction project.

II. STATEMENT OF THE PROBLEM

As a current cessation from inappropriate material management and utilization were organizational productivity are founded on the life wire and the total margin output of any organization is on how effective and efficient are the materials managed and used. But the opposite has been the case, as the materials purchased by many organizations are not properly managed in order to ascertain the strategized objectives of an organization.

Thus, it is doubtful whether an organizations make use of effective planning, organizing, controlling and coordinating of their material at their disposal before properly implementing them in order to achieve the desired goals and the different banners practiced in the process of importing and transporting material purchased by the purchasing managers and the sideeffects of ineffective management of materials in an organization.

This research therefore was determined by these hydra-headed problems with respect to assessing the effects of materials management on organizational productivity.

III. OBJECTIVES OF THE STUDY

The purpose of the study is to examine effects of materials management on the productivity of an organisation. however, the objectives aimed are as follows:

- i. To ascertain the relationship between the effective management of materials and the level of productivity in an organization.
- ii. To examine if the positive effect of these materials management has helped improving the company productivity.

IV. RESEARCH HYPOTHESES

The following alternate hypotheses will be used for the study:

H₁: There is a relationship between the effective management of materials and the level of productivity in an organization.

H₂: Material management help in improving the company's productivity

V. RESEARCH METHOD

This research therefore covers two selected construction firms in Abuja, namely Arab Contractors and Dantata and Sawoe Construction Company, Abuja. Secondary data were obtained through books, journals, and internet. Empirical works of other scholars were consulted. A simple size of 255 was obtained from the population of 705 at 5% error tolerance and 95% degree of freedom using Yamane's statistical formula $255(100\%)$ of the questionnaires distributed 250 (98%) were returned and 5(2%) were not returned. The questionnaire was designed in Likert scale format. The researchers conducted a pre-test on the questionnaire to ensure the validity of the instrument. Pearson moment product co-efficient and regression analysis were used to test the hypotheses

VI. LITERATURE REVIEW

A. Concept Of Materials Management

Material management is defined as the process to provide accurate material at the exact place at right time in right quantity so as to minimize the cost of project. Material management is associated with the planning, identification, procuring, storage, receiving and distribution of material. The responsibility of Material management department for the flow of material from the time the material is ordered, received, and stored until they are used is the basic responsibility of material management.

Materials Management is a means to optimize performance in meeting up with customer service requirements at the same time increasing profitability by minimizing costs and making the best utilization of available resources. The basic goal of Materials Management as explained by [8] and [9], is to make sure that the right item is purchased and made available to the manufacturing operations at the right time, at the right place and at the minimum cost. According to [2], materials management is a view which brings about the responsibility for deciding the manufacturing requirement that is setting up the manufacturing processes and purchasing, storing and dispensing materials [2], [3].

Reference [10] states that materials management provides an integral system approach to the proper arrangement of materials activities and the total material price. They see it as something that stand as assigning to a single operating department all main activities, which contribute to the price of materials. The goal is to enhance performance of materials systems, as opposed to sub-optimizing the performance of sub-individual operating units that are fragment of the material system. Reference [11] argued that the objectives of materials management is to make sure that the right item is at the right place, at the right time and at a manageable cost.

The main objective of material management is to make sure that the materials are always available at their point of utilization when needed hence, efficient purchasing of material represents a key role in the accomplishment of the work. In order to make materials management on site efficient for fast-track projects there requirements to be an integrated material handling process from the design stage to the usage of materials. Three important phases that holds the key to a successful materials management are materials purchasing, materials usage, and storage. It is used to reduce the cost, which increases profitability and streamlines the production. Apart from management of material cost and its supply it helps in its proper utilization, transportation, storage, handling and distribution.

B. Objectives and Roles of Materials Management

Reference [12], stated that the objective of material management are to solve material problems from a total organisational view point (optimizing) by controlling the performance of the various material functions, providing a communication network and controlling material flow. The introduction of computer into organization, provided further reasons to adopt materials management, because material function have many common data needs and can share a common data base. The share of corporate resources required for material in organization form the larger part of the

organisation's revenue that the use of materials must be a primary concern of management to achieve the objective.

The Classical definition of the objectives of material management is the acquisition of materials and services of the right quality, in the right quantity, at the right price, from the actual source and at the right time. Apart from these general objectives, the following under listed points also constitute some of the objectives of materials management.

- i. To support the company operations with an undisturbed flow of materials and services. This can be ascertaining through detailed procedure of the supply of materials, parts and components so that they are transported together at the right time and in the right work location.
- ii. To maintain inventory investment losses (due to deterioration, obsolescence and theft) under control. Also making the maximum economical use of plant and equipment by smoothing out production procedures and scheduling to the best of usage.
- iii. To purchase wisely and competitively which include two different considerations, keeping in touch the forces of supply and demand of elements that control prices and availability of materials; and a concurrent search for better values that bring the best combination of competitive buying and wise purchasing that attributes mostly to maximizing a company's profit.
- iv. To decrease the cost of transportation of moving materials by making right decisions on route to follow, the means of transportation and the vehicle to use.
- v. To provide information service for regulating the distribution of products, production management, manufacturing, instruction, routes and other background production information.
- vi. To have an advanced control of quality of company's product and to provide needed level of customer services. This can be done by maintaining favorable relationship with supplier's evenness of quality.

C. Importance of Material Management

In An Organization Material management represents an important asset and it is the largest single item of costs in almost every business organization. It is an important aspect of factory and industrial process which covers the entire spectrum of function such as material handling, material acquisition, assembly line management, storage, as well as material transport. Material management and control include several smaller components that work side by side to ensure the organization is more efficient and cost effective.

Reference [13] outlined the importance of introducing material management and control in organizations as follows;

1. Better coordination of the people and activities dealing with materials.
2. Elimination of bulk-purchasing.
3. Low price of material and equipment.
4. It hastens inventory turnover.

5. Better communication and cooperation between the various departments.
6. It reduces duplication of efforts and also facilitates the introduction of computerbased operations.
7. It increases the morale of staff.
8. It reduces material obsolescence.
9. It facilitates better records and information.
10. It improves control of quality and improves profitability level.

Reference [14] explained that the question of managing materials arises only when the company holds inventories. Maintaining the inventories involved trying to hold up to organisation's funds and incurrance of storage and handling cost. He further explained three (3) motives for holding inventories which are:

Transaction/Production Motive: This motive emphasis the need to maintain inventories to facilitate smooth production and sales operations.

Precautionary Motive: This motive necessitate the holding of inventories to guide against the risk of unpredictable changes in demand and supply forces as well as the growing level of globalization/computerization.

Speculative Motive: This motive influences the decision to increase or reduce inventory level to take advantage of price fluctuation.

D. Attaining Profitability through Materials Management

The major contributions of materials management to profitability are discussed below:

i. Make or Buy Decision

A construction company should be able to make prudent decision between buying raw materials and producing them. In taking this decision, the comparative advantage of making in or buying out should be analyzed. According to [15], many factors have to be considered when arriving at make or buy decision. Factors in favour of buying raw materials include:

- a. When it is cheaper to do so.
- b. Quantities required are too small for economic production.
- c. Spread of financial risk between customers and suppliers. ⌘ When source of supply can no longer be guaranteed.
- d. On the other hand, the decision to produce raw materials can increase profitability when carried out under these circumstances:
- e. Chance to use up idle capacity and resources.
- f. Possibility of scrap utilization.
- g. Greater purchasing power with large orders of a particular material.
- h. Ability to manage resources

ii. Materials acquisition

Economic buying is the aim of any firm but the inexpensive materials may not necessary be qualitative. Therefore, a material manager will struggle for the inexpensive and qualitative raw material. Materials acquisition function starts with the receiving of the purchase requisition from the store. The purchase order is therefore arranged based on the contents of the requisition form. The most significant thing to bear in mind while planning for

profit is to purchase the right quality at the right price. Procurement in high technical areas requires skill and experience on the part of the buying manager.

Cost improvement is simply the result of learning effect amongst workers, reflecting the development of skill and handiness that occurs when a task is performed concurrently. According to [16], acquisition circle involves the recognizing and describing the need; transporting the need, investigating and selecting the supplier, order, receipt and inspection of good supplied, auditing the invoicing and closing the order. The result of acquiring substandard materials can be reduced by buying from the right suppliers at the right price without negotiating quality.

iii. Receipt of materials

One significant aspect of receipt of materials is to check the source of good supplied and to make sure they conform to the specification as contained in the purchasing order. Spoilt and sub-standard materials are rejected thereby preventing the firm from sustaining unnecessary cost and thus promoting profitability. The effect of mediocre materials to both the machine and the profitability of the organization must be put up with as they cause production hold up which may direct to substantial losses to the firm.

iv. Material storage

This includes a careful handling of the stock and maintaining a perfect control over them. Handling of material is one of the events performed by materials managers and can be an efficient tool for saving cost and holding up profit. Storage of materials hinged on the nature and how they are used in the manufacturing procedures. Coal and iron ore are usually stored on the ground Liquids. Chemicals, paints and oils are kept in tanks. Profits can be achieve if managers successfully manage issues relating to stores location, layout and equipment inspection, protection of stores, issues to production, stock records and disposal of obsolete materials.

v. Inventory control

Reference [17] suggests that inventory control improves profitability by reducing costs involving 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. 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 disruption of products for sales; customer relations are hurt, while machines and equipment becomes underutilized. Therefore, a company can only realize substantial savings by using a rational procedure for inventory control.

vi. Scrap and surplus disposal

Removal of scrap and surplus are very important feature of material management function, and if efficiently done can attribute to the profitability of the firm. Scrap, according to [18] is the residue of process materials left behind during production while surplus is the materials from purchases

which were not wholly consumed in the production. To achieve profitability in disposal of scrap and surplus, it involves managerial decisions in the areas of return to suppliers, selling to suppliers, selling to other firms, selling to dealers, etc

vii. Transportation

The traffic section, which is involved in the physical movement of materials throughout the entire production stages, is important for profitability and cost reduction. Materials movement could be in - house or external. The in-house are determined by the nature of the materials by the layout of the factory and by the type of product made. It makes use of such devices as cranes, pipelines, trucks, forklift, and other forms of vehicles.

viii. Profits as Business Objective

Profit means different things to different people. To some organization, they are called profit while to some they are referred as surplus. Reference [19] defines profit as income occurring to the equity holders, in the same sense as wages accrue to the labour, rent to the owners of rentable assets, and interest accrue to money lenders.

Reference [14] stated that, the figure of profit in accounting is the result of the application of General Accepted Accounting Principle (GAAP) which uses the account's judgment that is based on arbitrary assumption for measurement. It considers profit as a surplus of revenue over and above all paid out costs including both manufacturing and overhead expenses. He further arrived that economic profit would mean net increase in the wealth viz-a-viz cash flow plus change in the value of the firm's asset. Therefore, for an organization to obtain maximum profit in its production there is need for the organization to ensure adequate and efficient utilization of its resources through its management of materials.

Reference [20] opined that, a firm can also keep adequate inventories on materials in various forms to ensure profit for the organization. Thus, inventories serve as a link between the production and consumption of goods. With these categories of inventories held, there is the need for adequate utilization of these resources to achieve the objectives of the organization that becomes the essence of management.

VII. TEST OF HYPOTHESES

Hypothesis one

H₁: There is a relationship between the effective management of materials and the level of productivity in an organization

H₀: There is no relationship between the effective management of materials and the level of productivity in an organization

Table I: Table of correlation between effective material management and level of productivity
Correlations

		Effective material management	Level of productivity
Effective management of materials	Pearson Correlation	1	.536 **
	Sig. (2-tailed)	.000	.000
	N	250	250
Level of productivity	Pearson Correlation	.536 **	1
	Sig. (2-tailed)	.000	.000
	N	250	250

** . Correlation is significant at the 0.01 level (2-tailed).

According to above calculations it is observed that amount of correlation coefficient between level of productivity and effective material management is equal to 53.6 per cent and considering that a significant level is less than 5%. Then we can say that there is a positive relationship between effective material management and level of productivity. This implies that one percent increase in effective material management will lead to 53.6% increase in level of productivity.

Table II: Regression analysis test of level of productivity and effective material management

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.965 ^a	.716	.586	3.79952

a. Predictors: (Constant), effective material management

Regression coefficient of R = .965 or 96.5% indicate that relationship exist between independent variables and dependent variable. The coefficient of determination $R^2 = 0.716$ which show that 71.6% of variation in level of productivity is explained by effective material management. The adjusted R-square in the table shows that the dependent variable, (level of productivity) is affected by 58.6% by independent variable (effective material management). It shows that effective material management is responsible for level of productivity for the construction company.

Table III: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)effective material management	12.310	.901		13.656	.002
	1.056	.085	.536	12.426	.000

a. Dependent Variable: level of productivity

The coefficient of determination for effective material management is positive (1.056) and is highly significant (0.001) in ensuring level of productivity. The p-value of 0.000 is less than the t-statistic value of 12.426 and the standard error value of 0.085. This implies that a unit increase in effective material management will lead to 1.056 increases in level of productivity. Therefore, the null hypothesis is rejected and alternate hypothesis is accepted, which means that there is a relationship between the effective management of materials and the level of productivity in an organization.

Hypothesis two

H₂: there are positive effects of materials management on improving the company productivity.

H₀: there are no positive effects of materials management on improving the company productivity.

Table IV: Table of correlation between material management and improving the company productivity Correlations

		Materials management	Improving the company productivity
Materials management	Pearson Correlation	1	.473**
	Sig. (2-tailed)	.200	.000
	N		250
Improving the company productivity	Pearson Correlation	.473 **	1
	Sig. (2-tailed)	.000	.200
	N	250	

** . Correlation is significant at the 0.01 level (2-tailed).

According to above calculations is observed that amount of correlation coefficient between materials management and improving the company productivity is equal to 47.3 per cent and considering that a significant level is less than 5%. Then we can say that there is a positive relationship between materials management and improving the company productivity. This implies that one percent increase in materials management will lead to 47.3% increase in improving the company productivity

Table VI: Regression analysis test of materials management and improving the company productivity Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.773 ^a	.624	.722	3.96426

a. Predictors: (Constant), materials management

Regression coefficient of $R = .773$ or 77.3% indicate that relationship exist between independent variables and dependent variable. The coefficient of determination $R^2 = 0.624$ which show that 62.4% of variation in improving the company productivity is explained by materials management. The adjusted R-square in the table shows that the dependent variable, (improving the company productivity) is affected by 72.2% by independent variable (materials management). It shows that there are positive effects of materials management on improving the company productivity.

Table VII: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1(Constant)	15.036	.806		18.644	.000
materials management	1.319	.125	.473	10.520	.000

a. Dependent Variable: improving the company productivity

The coefficient of determination for materials management is positive (1.319) and is highly significant (0.000) in improving the company productivity. The p-value of 0.000 is less than the t-statistic value of 10.520 and the standard error value of 0.125. This implies that a unit increase in material management will lead to 1.319 increases in improving the company productivity. Therefore, the null hypothesis is rejected and alternate hypothesis is accepted, which means that there are positive effects of materials management on improving the company productivity.

VIII. CONCLUSION

This research paper found out that there is a significant relationship between materials management problems and the frequent breakdown of the plant. This can be expected since the existence of materials management problems result in the breakdown of the plant. Out-of stock and lack of spare parts interrupts production and hinder profitability.

This research has shown how profitability can be achieved via effective management of materials with particular attention to sourcing, receiving, storing and issuing materials.

Prudent management of materials reduces depreciation, pilferage and wastages and ensures availability of materials. We would like to re-emphasize that for a firm to achieve profitability the goal of materials management should be properly planned.

It is clearly significant to manage all materials from the creation stage to the construction stage. The waste of materials should also be minimized throughout the construction stage in order to avoid loss of profit. Failure in managing site material and inventory will result in cost overrun, postponements in project completion and reduce overall project performance. Better management among purchase and finance department will help in attaining greater efficiency in Inventory management. Firm, employing proper and efficient material management system can have increased their overall efficiency by 35%.

IX. RECOMMENDATIONS

Based on the findings from the study is on the effect of materials management on the productivity of an organization and in light of data collected by personal observation and though the questionnaire conducted in the organization; it is

necessary to offer the following recommendations.

- i. Material supply should be optimum to avoid "stock out" while work in process.
- ii. Organizations should always take into knowledge the cost of production or price of raw materials before arriving at selling price
- iii. There should be good and effective record system of materials for the operations of the organization especially as it affects production.
- iv. Rate of spoilage and wastages should be minimized as much as possible and ensure that products pass quality control.
- v. There is the need to train staff in the area of material management to further enhance the knowledge of the job.
- vi. Organizations should computerize their material management system in line with the global changes in order to be able to track the movement of materials in the store.
- vii. It is also recommended that further studies be carried out in the area of material management considering the importance to profitability of an organization.

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