

MATERIAL HANDLING MANAGEMENT: A PANACEA FOR ENHANCING ORGANISATIONAL PERFORMANCE

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Abstract

Today there are dramatic evolutions in the market environment, forces in the market are posing threat signals to every organization. Managers need to strive and keep their business alive by managing their resources in which materials constitute major part. This study was conducted to examine the impact of material handling management on organizational performance of international breweries Ilesa, Osun State Nigeria. Survey method was employed and data were collected through administration of questionnaires on 160 respondents from the selected concern departments of the company. Also secondary data (profit after tax, inventory materials management extracted from annual report of the organization from 2010-2015. Regression analysis and error correlation method, were used to analyze the formulated hypotheses. The findings showed that ($R^2 = 0.96$, f -test = 987.667; $sig = 0.000$ for hypothesis 1); ($adjusted R^2 = 0.23$, F -statistic = 0.2403, $prob=0.657$ for hypothesis 2) with the profit after tax for hypothesis 2) all the hypotheses were statistically significant at 5% level, revealing that materials handling management have positive impact on the quality of production capacity and profit after tax. The study revealed that 1% increase in the level of inventory materials management will lead to about 41% increase in the profit after tax made by the organization in the immediate year. Therefore, the study recommended that manufacturing companies are encouraged to increase its resources commitment to material handling management activities such as staff training (research and development) in materials handling, stock level management and buffer stock should be maintained to keep the production process smoothly and boost the profitability level of the organization. Keyword: Material Handling Management, Quality of Production and Capacity, Profit after Tax and Error Correlation Model.

Introduction

Organizational sustainability depends on material input and output. The level of market share attain is output process of how resources are managed in which materials remain component factor. No organization can operate without material input. The efficiency of any activity for production of goods and services depends on the supply of materials, equipment and manpower made available in their right proportions. Lee and Dobler, (1997) see this concept as the total of all those tasks, functions and routines which are concerned with the transfer of external materials and services into the organization and the administration of same until they are consumed or used up in the process of production, operations or sales. Material handling

is an inevitable part of every manufacturing organization to sustain the organization in the face of economic depression. The present economic situation in today's business environment calls for special attention for proper monitoring and handling of materials to attain corporate goals.

In some years past, there is no definite definition offered to logistic movement of material through supply chain manufacturing companies (Alan, Croucher & Peter, 2011).

Department was spending on materials while store was holding huge inventory of materials, blocking money and space (Ramakrishna, 2005). However, with the process of liberation and opening up of global economy, there has been a drastic change in the business environment. Resulting in manufacturing organizations exposed to intense competition in the dark place. The manufacturing companies worldwide has been forced to work out various strategies to face the challenges and cut down manufacturing costs to remain competitive, Ramakrishna, (2005) recognized that materials manufacturing can provide opportunities to reduce manufacturing costs and can be treated as a profit center.

Materials handling involves perfect movement of materials from the supplier, protection, storage, monitoring during production process as semi-finished materials and finished goods shipped to the warehouse and distributed to the customers. Material handling is the art and science of moving, protecting, controlling and effective distribution of material across to the end users. Manufacturers need to be more focused on material movement to ensure that right quantity, quality in the right order, at the right place in the best sequential order, provided at the right time, price and time to market. Material handling cost 20% -50% of the operating cost and annual turnover in manufacturing industries. (Ogbadu, 2009). Managers need to strive and keep their business alive because major competition has shifted from the market to the production arena so as to cut cost and boost profitability, backed by advanced technology's firms that are closely monitoring their manufacturing costs and embarking on efficient management of materials (Ondiek, 2009).

Organisation should not afford to waste materials and increase scrap in the present day business operations. Wastage and deterioration allowance should be reduced and if not totally eliminated. Most a time, materials are ordered on specification sustain and meet customer's requirement but may fail if supplier is not diligent enough in their operations then ordering firms may likely face the consequence. Therefore, no organization can operate without proper and effective monitoring of material movement from the supplier, production process and across to the customers as finished goods, material handling management helps organization to improve on – time delivery (time market), save cost and reduce scraps. It has come to lime light to manage the material movement within and outside the organization to achieve corporate goal.

Many organizations have not noticed the relative impact of effective material handling management on cost of operations, the major focus is on space and scrap management. But the operations of material handling management have improved beyond these scopes. The believes of a few scholars in the literature is that material management deals with storage and flows into through production point through to the customers (Alan, Croucher & Peter, 2010). But today problems of material handling management cut across management of materials from suppliers, production process and distribution to the customers at a reduced cost. With high cost of materials in Nigeria, effective material handling management should aim at reducing cost so as to maintain

high level of profitability. It should not be seen as an activities within the organisation only. The magnitude of the problem is indicated by the fact that the cost of materials handling is all forms accounted far from 20 to 25 percent of the cost converting the raw material into the finished product (Jain & Aggarwal, 2014).

In recent years, manufacturing companies are suffering from appropriate management of resources especially with outside the organisation, high cost of material which has resulted in invaluable economic and social losses to the society. On this surface, products are supplied to the customers at high costs and the rate at which customers purchase items have reduced drastically and this has affected the profit of the organization. The view of the scholars also differs in term of material handling management capacity to reduce cost and increase profit. Occupational safety and health administration (2002) asserted that material handling management brings safety of workers, Alan et al, (2010) focused on perfect movement of material from supplier to consumers, and while Pauline, Daniel and Salome (2014) concluded that material management in Kenya manufacturing company enhances organizational profitability. Therefore the study intends to position the place of material handling management in term of quality production capacity and the level of profitability in International Breweries Company Ilesha Osun State, Nigeria.

Objectives of the study

The broad objective of this study is to examine the impact of material handling on management performance of International Breweries Plc. Other specific objectives are to:

1. Determine the impact of material handling management on overall quality of production capacity.
2. Examine the impact of material handling management system on Profit After Tax (PAT) of the organization.

Literature Review

Material Handling Management Defined

Material handling is actually the process of managing the procurement of raw materials, include reception, storage, issue to production department for processing and handling of the finished goods. Packaging, storage and distribution. In other words, materials handling is the art of moving things economically and safety with the mind of increasing production rate and reducing the scrap, expenses to improve sale revenue. Material handling is defined by the Materials Handling Institute (MHI) as the movement, storage, control, and protection of materials and products throughout the process of their manufacture, distribution, consumption, and disposal (www.mhia.org).

Handling of Materials in Inventory, Production and Distribution Stage

Materials are life blood of any manufacturing industry, just like blood in the life of human being and no government industry or organisation operates without it. Materials must be available at the proper time, in proper quantity, at the proper place and at the right time. Failure of any of these responsibilities concerning material, add to organizations cost and decreases organisation profit.

Morse (1981) explains that effective management of economic order quantity and re-orders point will help companies to reduce cost and earn more profit. Economic order quantity is the quantity of inventory that should be ordered at once that will give the best economic value; it is the optimal quantity that will help organisation to achieve their target goals at lower

cost. Babatunde,(2010). The scholar noted that the quantity of inventory ordered at once do affect inventory ordering and holding costs and will ultimately enhance the level of profitability.

Material handling consumes time, manpower and money. Material handling must therefore be controlled and carried out properly if a high standard of efficiency and cost effectiveness is to be achieved. Better materials handling in an organization reduces: operation cost, ordering cost, damage for poor handling, labor cost, production and marketing waiting time. Better handling of material also increases:

- a. Quality of material received from the supplier and perfect order according to specification.
- b. Effectiveness and quality of work in an organization.
- c. Safety positioning of both machines and men within the firm premises.
- d. Production capacity and effective plan layout
- e. Efficiency in storage and dispatch to production department when the needs arise.
- f. Packaging and appropriate distribution of quantity needed according to production capacity and demand request.

Therefore, proper material handling needs a lot of pre-planning which should begin with a systematic analysis of nature of the materials to be handled. The layout of facilities and the required movement as well as the required handling capacity should be carefully considered. Another thing here is that an analysis needs to be carried out probably related to the product and its components which are being manufactured, stored as quantity to be distributed to the end users. The distribution aspect is concerned with the appropriate sorting, packaging and distributing the right quantity of the right product to customers.

Reasons for Material Handling Management

1. Material handling management helps to reduce cost at different level of operations, regulate inventory by keeping economic order quantity toward the organizational goal.
2. It brings about better utilizing of spaces available at optimum. The proper handling of materials keeps the organization at a saver side in term of space utilization.
3. Reduce waste through proper control over the material received from suppliers, store, and issues to the production department.
4. Increase machine efficiency through reduction of down time or idle time.
5. Material handling enhances smooth operations and improves production control.
6. Reducing worker fatigue, it save life and improve healthy working conditions.
7. Increase efficiency of distribution across to various key distributors and customers.
8. Material handling management improves efficiency of a production system by ensuring the right quantity of materials delivery at the right place at the right time most economically

Evaluation of Profit as a Performance Indicator

Profit represents the balance from sales revenue after all costs have been deducted. It is a controllable factor to the extent that management can control his revenue through price on one hand and through costs on the other hand (ogbadu, 2009); Ramakrishna,(2005) articulated

that profit can be obtained by deducting the manufacturing cost from the selling price (SP) and suggested ways in which materials management via purchasing can help to minimize materials cost and increase profitability.

They include obtaining materials at lower prices through development of new suppliers, effective price negotiations with vendors and using cost-price analysis to determine the right price for materials, reducing the cost of packaging, transportation costs to ensure right and quality materials get across to the final users. Effective materials handling management contributes a great in achieving business profit through effective acquisition, control, handling and movement of materials.

This can be done by procure material from suppliers with efficient economic cost. The effect of acquiring defective materials can be reduced also by buying from the right suppliers at the right price without comprising quality, checking of materials supplied before storage. Defected material and sub-quality materials are rejected thereby preventing the firm from incurring unnecessary cost and thus enhancing the level of profitability. Profit can be indirectly increased by ensuring that quality and quantity of materials ordered for are efficiently supplied.

The placement of order should base on economic order quantity otherwise known as re-order quantity. This model reduces the cost of ordering, carrying cost to great extent that makes significant positive impact to the profit of the organization. Aspect of materials inspection, storage and carefully handling of the stock supply to production department can improve the operations effectively, the smooth production process with adequate monitoring of materials to produce customer's requirement has the capacity to reduce scrap and wastage which in return affect profit positively.

Performance by Quality of Production Capacity

Quality of performance can be assessed through measurement of physical products, end result of an organization. Quality refers to the ability of a product to satisfy the needs and exceed the expectation of the customers. To the producers, it is the ability of a product to confirm to stand or customers requirement, when this is done, the product advertise itself and call for more potential customers. Production quality can be improved upon if special considerations are placed on material management.

Ogbadu (2009) in a research study of profitability through effective management of materials, the study adopted survey research design. Random sampling technique was used. The results showed that there is a positive and significant relationship between materials management problems and the frequent breakdown of the plant. The study suggests that for a firm to achieve profitability, the goal of materials management should be properly carried out. Viera, Pasa, Borsa, Williams, Pandolto, (2011) concluded that material management system enlarged service ability and reliability and reduced costs. RSM Insight (2012) concluded that there are clear benefits to be gained from improving internal logistics and those improvements will in due course help to improve corporate revenues.

A research conducted by Asaolu, Agorzie, and Unam (2012) Materials management: An Effective tool for optimizing profitability in the Nigeria food and beverage manufacturing industry. Relevant publications and Interview with key individuals in the company. This study employed judgmental sampling, the results revealed significant increase in the company's profitability as a result of efficient management of materials. Pauline, Daniel and Salome (2014) observed that material

management have the capacity to increase profit. Katherima, Ombul and Iravo, (2016) examined the effects of materials handling system on performance of cement manufacturing firm and the result showed that material handling has positive impact on the company's performance

Methodology

The study adopted a descriptive survey research design. The target population involved staff of international breweries company, Ilesha Osun State. There are (4) concerned departments based on their population, perceived to be directly involved and have information on material handling management of the organization. 180 respondents were selected using stratified sampling technique both primary and secondary data were used in this study. The primary data was collected through a self-administered structured questionnaire and this was validated by the researcher. Secondary data was obtained from the already written literature and data on sale revenue, profit after tax from annual report of the organization from 2010-2015.

The researcher re-checked the data to ensure their completeness and consistency, entering of data into system using statistical package for social scientist version 20 (SPSS) computer software to generate cumulative frequencies and percentages. The software package was chosen because it is the most used package for analyzing survey data and regression criterion variable against predictor's variables. Also E-view version 17 was used further to collaborate the result of the survey design method. Sample sizes were selected using stratified sampling technique from the following departments:

Statement of Hypotheses

H0₁: Material handling management does not have any significant impact on the overall quality of production capacity of the manufacturing company.

H0₂: There is no significant impact of material handling management system on organisational profit after tax.

The significance of the study is that it will provide a broad idea to the production companies on how they can effectively manage their material to improve operations performance, production and enhance the level of profitability.

Table1. Sample Size selected from each Department

Department	Number of Respondent Capture
Production/Warehouse	70
Marketing/Logistics	60
Account/Finance	20
Research and Development	10
TOTAL	160

(Research field survey, 2016).

The research used both primary and secondary data in the study. Primary data entails the use of questionnaire, the questions are divided into three scales namely; material handling management scale, perceived level of profitability scale and quality of production scale.

Model Specification

$$Y = a + bx$$

Y = organizational Profitability (dependent Variable), x = Material handling management (independent Variable), a = Constant, b = Co efficient of x

y_1 = Perceived Level of Profitability (PELPvar)

y_2 = Overall Quality of Production Capacity (OQVPCvar)

X = Material Handling Management (MHMvar)

x_1 = Buffer Stock Management (LBSMvar)

x_2 = Production Materials Requirement Management (PMRvar)

x_3 = Effective Requisition and Ordering of Quality Material for Production (EROQMPvar)

x_4 = Safety in Material Handling and Service after Production (SMHSPvar)

x_5 = Stock Level Management (SKLMvar)

x_6 = Personnel Training to Handle Material before, during and after Production (PTHMvar)

x_7 = Inventory Material management (IMS)

Table 2. Extract from the Annual Report of International Breweries Ilesha Plc. (2010 - 2015)

Variables	2010	2011	2013	2014	2015
	N,000	N,000	N,000	N,000	N,000
Profit (loss) Tax	2,800,036	(12,172,888)	2,327,342	2,105,500	1,946,490
Inventories (Material Management)	1,304,562	1,636,459	2,439,885	2,236,649	2,800,392

Source: Researcher's Compilation from Annual Report (2010-2015).

Table 2 showed the extract from the annual report of International Breweries Ilesha, Osun State Nigeria. The information was not provided in year 2012. In 2011, the company recorded loss and after 2010. The profit after the tax of the organization started reducing drastically till 2015 due to other factors that are beyond the scope material handling management. Details of the analysis and the relationship between the variables are considered in objective two below.

Results and Discussion

Table 3: Sample Size selected from each Department

Department	Frequenc	Percentage (%)
Production/Warehouse	70	37.5
Marketing/Logistics	60	43.7
Account/Finance	20	12.5
Research and Development	10	6.3
TOTAL	160	100

(Research field survey, 2016).

Table 3 indicated that 70 representing (43.7%) of the respondents were from production department, 60 (37.5%) from marketing department, 20 (12.5%) were from Account/Finance department and 10 (6.3%) in Research and Development. This means that employees that handled materials in the organization have the highest number from production and marketing department. Of course, effective material handling is majorly needed during the production process and also marketing/ logistic activities includes purchasing of material and storing of the materials received from the suppliers and distribution across to various customers.

Discussion of the Objectives with Corresponding Hypothesis of the Study

The specific objectives of this study is to examine the impact of material handling management on quality of production capacity and to determine the significant impact of material management system on profit after tax of Nigeria Breweries Ilesha Osun State. The results of tests that help to achieve these objectives are discussed below;

Research Hypothesis One. $OQVPCvar = \beta_0 + \beta_1LBSMvar + \beta_2PMRMvar + \beta_3EROQMOvar + \beta_4SMHSvar + \beta_5SKLMvar + \beta_6PTvar + \epsilon$

In order to test this research hypothesis and achieve the corresponding objective, a standardized multiple regression analysis was employed.

Table 4: A Summary of the Multiple Regression Analysis of the Interactive impact of MHMvar on OQVPCvar.

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.981	.962	.961	.239

*p<0.05 a. Predictors: (Constant), Personnel are well Trained to handle Material before, during and after Production (PTHMPvar), Stock Level Management (SKLMvar), Production Materials Requirement Management (PMRMvar), Effective Requisition and Ordering of Quality

Materials for Production (EROQMPvar), Level of Buffer Stock Management (LBSMvar), Safety in Material Handling and Services after Production (SMHSPvar).

The model summary Table 4 revealed the R (0.981) and adjusted R² (0.962). This shows that MHMvar have strong Positive impact on OQVPCvar. Thus this model is predicting 96% of the variance in OQVPCvar pooling all predictors together simultaneously; meaning that 9.2% of the variance in OQVPCvar can be predicted from the various MHMvar in the selected company which is the combination of personnel that are well trained to handle material before, during and after production (PTHMPvar), stock level management (SKLMvar), production Materials requirement management (PMRMvar), Effective requisition and ordering of quality materials for production (EROQMPvar), Level of Buffer Stock Management (LBSMvar), safety in Material Handling And services After Production (SMHSPvar).

Table 5: Multiple Regression Analysis Showing Significance of Predictors on OQVPCvar

Model	Sum of Square	df	Mean Square	F	Sig
Regression	339.582	6	56.597	987.667	.000 ^b
Residual	13.352	153	.057		
Total	352.933	159			

*p<0.05 a. Dependent Variable: Overall Quality of Production Capacity (OQVPCvar)

The Table 5 shows that the model of **MHMvar** used in the selected Manufacturing industry is significantly predicts the success of **OQVPCvar**, F (6, 159) = 987.667, sig < 0.05. F – statistical indicated that the overall regression model is highly statistically significant in terms of its goodness of fit.

Table 6: Contribution of each Predictor to OQVPCvar

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.119	.106		1.124	.262
Level of Buffer Stock Management (LBSMvar)	.045	.016	.045	2.800	.006
Stock Level Management (SKLMvar).	.938	.015	.951	62.055	.000
Production Materials Requirement Management (PMRMvar).	.007	.015	.007	.485	.004
Effective Requisition and Ordering of Quality Materials for Production (EROQMPvar).	.025	.015	.024	1.632	.001
Safety in Material Handling and Services after Production (SMHSvar).	.016	.020	.014	.798	.004
Personnel are well Trained to handle Material before, during and after Production (PTHMPvar).	-.049	.016	-.047	-3.101	.002

Source: Author’s Computation using SPSS, (2016).

The Table 6 shows the contribution of each of the predictors. In this case Stock Level Management (SKLMvar) in place has highest contribution with Beta = .951, p < .05 and t-value = 62.055, follows by Level of Buffer Stock Management (LBSMvar) with value = .045, p < .05 and t-value = 2.800, Quality Materials for Production (EROQMvar) has Beta value = .024, p < .05 and t-value = 1.632, Safety in Material Handling and Services after Production (SMHSPvar) with Beta = 0.014, p < .05 and t = 0.798. While Personnel that are well Trained to handle Material before, during and after Production (PTHMPvar) contributed less Beta value = -.047, p < .05 and t = -3.101 but this variable is statistically significant to the organization business success in term of OQVPCvar.

All their contributions are statistically significant to OQVPCvar. Hence, the null hypothesis is rejected and the study concluded that Material Handling Management has significant impact on overall quality of production capacity. The resulting prediction equation was $OQVPCvar = 0.119 + \beta_1 0.045 + \beta_2 0.007 + \beta_3 0.025 + \beta_4 0.016 + \beta_5 0.938 - \beta_6 0.49 + \epsilon$ **(Objective one achieved).**

Research Hypothesis 2: There is no significant impact of material management system on profit after tax of the organization. The objective two, (i.e. to examine the level of impact of material management system and profit After Tax of the selected organization).

Table7: Regression analysis of the materials handling management (inventories material management) and Profit after Tax.

R-squared	0.074180		
Adjusted R-squared	0.234427		
Log likelihood	-78.94642	F-statistic	14.33150
Durbin-Watson stat	2.330215	Prob(F-statistic)	0.657557

Source: Author’s Computation using E-View 20, (2016).

$$PAT = C1 + C2 * IMS + E$$

The model summary Table7 gives the adjusted R2 (0.234). This shows that material handling management has positive impact on Profit after Tax (PAT). Thus, this Model is predicting 23% variance in the level of the Profit after tax made by the organization within the selected years (2010-2015).

Table 8: Error Correlation Method (ECM) Results of the PAT and IMS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-492500.2	3991455	-0.123389	0.9096
IMS	0.408910	1.853877	0.490275	0.6576

Dependent Variable: PAT

Source: Author's Computation using E – View, (2016).

Table 8 explains the significant contribution of materials handling management to profit after tax. The result shows that the IMS contributes to profit after tax of the organization positively and is statistically significant despite the degree in profit after tax since 2011. ($P = 0.65$, $P > 0.05$). Moreover, 1% increases in the level of inventory miscalculating management activities (expenditure) will lead to about 41% increase in the PAT made by the organization in the immediate year.

Conclusion and Recommendations

The study show that is a positive and significant relationship between efficient materials handling and firm's profitability. Through efficient handling of materials and inventory control, organization can achieve significant cost saving, improvement in production efficiency, and increase in profitability. This conclusion consistence with the view of Agbadu (2009), Asaolu et al, (2014) and Kathurima et al, (2016) that material handling management enhances the profitability level of an organisation. However, the study provided more empirical findings beyond the scope covered by Viera at al, (2011) and RSM insight (2011) in term of quality capacity production.

Among the factors that positively influence Material Handling is effective inventory management. Inter-departmental coordination, staff training, good relationship with supplier effective stock level management level of buffer stock management, quality materials for production, safety in material handling and services after production, were found to be the key factors to business success. The findings of this study agree with some of the literature as sighted above as they are based on different field of enquiry and manufacturing industries at large.

As a matter of fact material handling management is life wire of any manufacturing organisation. Therefore manufacturing companies are encouraged to increase its resource commitment to material handling management activities such as regular staff training, research and development in materials handling, stock level management and buffer stock should be maintained to keep the production process smoothly and boost the profitability level of the organization.

Personnel should be trained and re-trained to handle materials before, during and after production to boost production capacity and reduces scraps. Effective handling of material should not stop at inspection and during production process; it should be spread to delivery stage (customers).

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