Journal of Business and Economic Policy
UNIZIK Business School, Nnamdi Azikiwe University, Awka

UBSJBEP Volume 1 Issue 4
https://journals.unizik.edu.ng/index.php/ubsjbep
Quarterly Journal of UNIZIK Business School, Awka, Nigeria

ASSESSMENT OF MATERIAL MANAGEMENT ON PROJECT PERFORMANCE OF DEUX PROJECT LIMITED

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CITATION: Eretan, G.O. (2023). Assessment of Material Management on Project Performance of Deux Project Limited, *UBS Journal of Business and Economic Policy*, 1(4), 168 - 185.
***Paper Type**: Original Research Paper; **Correspondence**: geretan@unilag.edu.ng*

Abstract

The study examined the assessment of material management on project performance of Deux Project Ltd. Previous researches have shown that materials account for more than fifty percent of the annual turnover in the construction firms. This shows clearly that priority should be given to Materials Management in construction firms in order to achieve significant cost saving, improvement in construction efficiency, and increase in profitability, reduces waste of materials and competitiveness. The aim of this research was to examine the assessment of material management on project performance of Deux Project Ltd. The study adopted a survey research design. The population of the study comprises the staff of Deux Project Ltd. The total population is sixty (60). The sample of the study comprises of the total population due to the population size. The study used a close-ended, well-structured questionnaire which was administered within the timeframe of three weeks. The study tested two hypotheses which were analysed using relevant descriptive and inferential statistics. The findings from the study revealed that material requirement planning account for majority of the improvement in project completion at agreed schedule in Deux Project Ltd. The findings also shows that the material requirement planning account for 30.6% of the improvement in automated purchasing process in Deux Project Ltd. Based on the empirical results, the study concludes that through efficient management of materials, an organisation can achieve significant completion of project at agreed schedule in construction firms, improvement in automated purchasing process, and improved the meeting of emergent demand. It is, therefore, recommended that materials management department should be established to effectively shoulder the responsibilities of sending or organising training programmes for materials management personnel as well as performing research and development in materials management.

Key Words: *Material management, Material required planning, Project completion, Project performance*

Introduction

Organization faces a dilemma in today's competitive marketplace, where on one hand, customers demand customized products and services and require that their orders are filled quickly, but on the other hand they do not want to pay a premium for this customisation and availability (Graman & Magazine, 2019). Therefore, organisations are exploring ways toward postponement strategy in response to constantly changing demands (Yang et al., 2014). Graman and Magazine (2019) argued that today, the cost of holding material, extensive product proliferation and the risk of obsolescence, especially in rapidly changing markets, make the expense of holding large inventories of finished goods

excessive and that high demand items naturally have safety stock assigned to them, but in many organisations there are so many very-low-demand items that keeping any stock of these items is unreasonably expensive, so they argue that companies must now provide good service while maintaining minimal inventories. Therefore, inventory management approaches are essential aspects of any organisation. In traditional settings, inventories of raw materials, work-in-progress components and finished goods were kept as a buffer against the possibility of running out of needed items. However, large buffer inventories consume valuable resources and generate hidden costs. Consequently, many companies have changed their approach to construction and inventory management. Since at least the early 1980s, inventory management leading to inventory reduction has become the primary target, as is often the case in just-in-time (JIT) systems, where raw materials and parts are purchased or produced just in time to be used at each stage of the construction process. This approach to inventory management brings considerable cost savings from reduced inventory levels. As a result, inventories have been decreasing in many firms (Chen *et al.*, 2015), although evidence of improved firm performance is mixed (Kolias *et al.*, 2018).

Materials are the lifeblood and heart of any construction or service firm (Lee & Doubla, 2019) They represent the major component of construction cost and profitability. 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 coordinate and schedule the construction activity in an integrative way for an industrial undertaking. The accumulation of, and need for materials in the form of inventories is a significant variable for managers to concentrate on, monitor and control. Materials are industrial goods that become part of another physical product. In construction companies, a high proportion of operational expenditure is expended on materials (Oniwon, 2017). In the cost structure of most of the products manufactured, the cost of materials exceeds 50% of the total cost (Ramakrishna, 2018). Such a large investment requires considerable planning and control of materials to minimise wastage, which invariably affects the performance of organisations. A construction firm will remain shaky if materials are under stocked, overstocked or in any way poorly managed (Banjoko,2018). This points to the need for proper budgeting and control on cost of materials. Materials Management encompasses all operations management functions from purchasing of raw materials through the construction processes to the final delivery of the end products (Ramakrishna, 2018).

Materials Management is a tool to optimise performance in meeting customer service requirements at the same time adding to profitability by minimizing costs and making the best use of available resources. The basic objective of Materials Management as explained by Jacobs *et al.* (2017) is to ensure that the right item is bought and made available to the construction operations at the right time, at the right place and at the lowest possible cost. These scholars stressed that without adequate planning for materials resources, the overall performance of an organisation may be crippled. Previous studies such as Ogbadu (2018); Ondiek (2021) have shown that materials account for more than fifty percent of the annual turnover in the construction firms. This shows clearly that priority should be given to Materials Management in construction firms in order to achieve significant cost saving, improvement in construction efficiency, and increase in profitability, reduces waste of materials (raw materials, work-in-progress and scrap) and competitiveness. Nwosu (2019)

examined the impact of materials management in the Nigerian brewing firms. The study found that materials procurement, materials storage, materials inventory, inter-departmental collaboration has a significant effect on the profitability of brewing firms. Based on the above findings, the study therefore concludes that effective materials management is indispensible to brewing firms in making profits. Akindipe (2017) conducted a study on role of raw material management in construction operations. The study discovered the relationship between raw material and Inventory management to solve the crisis. From this, the study concluded that the inefficiency was due to illiterate and non-experts' involvement in management, mishandling of materials and inability to use proper inventory model in the site. He added that, all the above said reasons are mainly due to the managers involved in the management process. However, few studies exist yet on the effect of materials management on the project performance in Deux Construction Company, especially in the area of project completion at agreed schedule and agreed budget. This study intends to fill this gap.

The overall objective of this study is to assess how material management has improved project performance. Hence, the specific objectives of this study are to:

a. examine the extent to which material requirements planning has enhanced project completion at agreed schedule delivery of service.
b. examine the extent to which material requirements planning has contributed to automated purchasing process.

The following research questions will be answered in the course of this research work.

i. To what extent does material requirement planning enhance project completion at agreed schedule?
ii. How has material requirements planning contributed to automated purchasing process?

As a result, the hypotheses below have been formulated:

H_{o1}: Material requirements planning has not significantly enhanced project completion at agreed schedule.

H_{o2}: Material requirements planning has not significantly contributed to automated purchasing process.

Literature Review

Concept of Materials Management

Materials are simply industrial goods that become part of another physical project. They represent the major component of business cost and profitability. According to Ramakrishna (2018), on an average, half the sales income in an organisation is spent on materials. This implies that to boost a firm's profit, there is the need to reduce materials cost which leads to a reduction in construction cost. In the cost structure of most of the projects construction, materials constitute 50% of the total cost, pointing to the need for the proper budgeting and control on cost of materials which is a core objective of Materials Management. The various types of materials to be managed in any organisation include purchased materials, work-in-process (WIP) materials and finished goods. Ogbadu (2021) identified basic price, purchasing costs, inventory carrying cost, transportation cost, materials handling cost, office cost, packing 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 we refer to as Materials Management. An integrated approach to Materials Management defines it as "the function responsible for the coordination of planning, sourcing, purchasing, moving, storing and controlling materials in an optimum manner so as to provide a predetermined service to the customer at a minimum cost" (Gopalakrishnan & Sundaresan, 2018; Ramakrishna, 2018). International Federation of Purchasing and Materials Management (IFPMM) defined it as a total concept having its definite organisation to plan and control all types of materials, its supply, and its flow from raw stage to finished stage so as to deliver the project to customer as per his requirements in time. These definitions provide the scope of Materials Management which includes decision on purchasing raw materials, staffing, inventories, stores and warehouse management, construction levels, and distribution of finished goods at minimum cost at due time (Ogbadu, 2017).

Functions of Material Management

According to Silas and Gakobo (2021) material management has several function which include

Materials Requirements Planning (MRP)

Planning of materials requirements in construction is a necessary function in any organisation, as inventory of materials involve about 60% of the total investment of the organisation. The profit earned depends on the utilisation of these materials and reducing the inventory of the materials. The latest technique used is called *Just in Time* (*JIT*) is referred practically to no inventory.

However, in the present situations in any of the organisation particularly construction organisation, it is not absolutely possible to keep no inventory of materials required for construction. The MRP is a technique used to plan the materials starting from the raw materials, finished parts, components, sub-assemblies and assemblies as per Bill of Materials (BoM) to procure or produce them to support a Master Construction Schedule (MPS). It is used on computers productively by any company that uses a MPS to manufacture projects that require assemblies, components and materials to produce the final projects. The MPS is exploded using the bills of materials to determine requirements of lower-level assemblies, components, finished parts and raw materials. It plans orders to meet these needs.

Purchasing

All the organisations need an efficient and economic purchasing and procurement of its various supplies of materials from the suppliers. The materials management department has to perform this function of purchasing and procurement of materials very efficiently. Since 50% to 60% of sales turnover is spent on the purchase of various materials, the amount of profit earned on these sales very much depends on how economically the materials are purchased and utilised in the organisation. The profitability depends on the efficiency by which this particular function of purchasing and procuring the requisite materials at appropriate time will be done and its availability is assured.

The function of purchasing can be stated as follows:

a) The requisition of material is necessary by proper authority to initiate its purchase.
b) To select proper supplier for the materials requisitioned, before placing an order.
c) To negotiate about the price of the material from the supplier and it will be purchased at the cheapest price.

d) The quality of material must be assured and should not be compromised with the cost of the material.
e) The material should be purchased of right quantity and right quality at proper time at the cheapest cost.
f) To set the proper purchase policy and procedure.

Inventory Planning and Control

The modern concept of inventory planning is that the materials should be purchased and brought in the stores just before it enters the construction or sold out so that inventory cost is negligible. The zero inventories are the ideal planning. There are three types of inventories.

a) Raw materials
b) Purchased goods
c) Finished parts and components

The inventory control of these various materials lies with the materials management department, construction department and sales department. Inventory at different levels is necessary to make sure about the availability of all these types of materials and goods and their proper flow from one facility to another at different levels of construction centers in a construction concern. The storing of various types of materials and parts as inventory is therefore very essential before its delivery and use at different construction centers. This involves inventory planning and control of materials in the stores department. Many a time, the supplier may not be in a position to supply the materials of the ordered quantity at the proper time. To maintain the continuity in construction and line balance in assembly work, the various types of inventories are necessary to be maintained and kept in the stores.

The raw materials before being supplied to a construction process, some of it is sent to store as inventory and rest is sent to construction facility as per its requirements and in the same way, various parts manufactured and assembled as components and assemblies are also stored as finished parts inventories at the different places in the stores. The final projects before being supplied to the customers are also stocked as inventory of the final projects of the organisation to meet the fluctuating demand and to regularize the supplies in the market. Thus, the inventory control is a very important function of the materials management department. The various types of inventory models are developed for the different materials to economize the purchase, supply, inventory control and construction control to analyze and optimise the costs involved in ordering, set-up and inventory carrying of materials required in the construction.

Ascertaining and Maintaining the Flow and Supply of Materials

Distribution of materials requisitioned by the various construction centers and other departments must be ascertained and its flow and continuity of supply must be maintained by the materials management department. Insufficient or zero inventories many times create the situations of stock-outs and leads to stoppage of construction. Failure of materials handling devices is also responsible for disruption of material supplies. Alternatives or emergency supply systems can be used for assuring construction lines to continue. Uncertainty in demand and construction quantity is the main factor. As the client's requirements as per his needs and liking, are changing very fast. The management

has to maintain continuity in construction to meet this uncertainty in demand and control the situation by proper flow of materials supply and distribution at various construction facilities and other departments as per changes in construction quantity.

Quality Control of Materials

The quality of the project constructed by the organisation depends upon the quality of the materials used to construct that project. It is a very important and necessary function of materials management to purchase the right quality of materials. The inspection, quality control, simplification, specification, and standardization are the activities which are to be followed for the measurement of quality of the materials. The quality assurance is decided by inspection and checking. The various properties of materials as per their specifications and standard. The size and dimensional measurements within tolerance limits assures the interchange ability and reliability of components and parts.

Quality is largely determined by consumer taste and liking. The market is under buyer's control. Customer decides the quality of the project. Material quality control aims at delivering project at higher and higher quality at lower cost. The project will be specified not only by its dimensional accuracy but its quality standards, durability and dependability, high performance, reliability and aesthetic value. Each of this factor aids cost to the project. In order to achieve high quality, the materials input to the project should be of high quality, which will have higher cost. The performance decides the reliability, which is obtained through high quality construction. The performance is checked by quality inspection and accuracy. This also aids cost to the project. The quality of the materials also decides the selection of vendors and the relationship between buyers and suppliers. The specifications, size and quality of materials must be referred and if possible, the standard should be followed for specifications and sizes. The types of tests required for assuring the quality should be specified and conducted to establish the standards.

Departmental Efficiency

The objective of this function is to ensure the efficiency of the system adopted. If the system and procedure adopted for materials management are inefficient or faulty, none of the objectives mentioned above can be fulfilled, howsoever the procedure may be good. In order to maintain the things in proper way as per planning an efficient control is necessary in the department over each and every process. Management Information System (MIS) and feedback control at every stage of working must be adopted to control and make the management and employee work as efficiently as possible to achieve the best results.

Secondary Functions

The various kind of secondary functions are discussed below:

(i) Standardization and Simplification

The standards and specifications of various types of materials are fixed by design and technical department of the organisation and they are followed by construction department. Standards define the quality, reduction in sizes and variety, interchangeability of parts and projects. It ensures efficient utilisation of materials and reduces wastages. Standard materials are always available at reasonable cost. It also helps purchasing department in selection of materials and vendors. If less variety of items purchased and put in the stores the types of inventories will be reduced and in this way

the cost of carrying the inventories in the stores will be reduced. The objective of this function will be to produce standard project reducing the overall cost of the project.

(ii) Design and Development of the Project

The variety in project and functionality are the important factors to promote the sales of a project. The new techniques of designing a project using Computer Aided Design (CAD) has made possible to develop variety of projects at faster rate. The new technological development in construction using Computer Aided Construction (CAM) can produce variety of projects at much faster rate with all types of flexibility in the construction as compared to conventional methods. Materials management department has to act according to use of such variety of materials to produce variety of parts and ensure the supply of such materials. It should also be decided how to purchase and produce such variety of projects with flexibility and economic cost.

(iii) Make and Buy Decisions

These types of decisions are the policy decisions of the management. The capacity of the organisation and the various facility developed by the organisation to manufacture various items is the main objective of every organisation. This is the important planning activity of every undertaking. But when a company grows fast, its sales increases at rapid rate then it becomes an important matter to decide whether the company should buy the parts and components or increase and establish its facilities to cope up with the increased demand and sales. This will be greatly concern to materials management department. It will help in selecting the suppliers to buy the items at reduced cost. The material evaluation, its availability, alternative materials selection, procurement and inventory control are the functions influence the make and buy decisions. The make and buy decisions are largely based on cost economics and cost benefit analysis made by the organisation using the existing construction capacity of labor, skill and machines available with the factory and how best they can be utilised.

(iv) Coding and Classification of Materials

This is an important function of the materials management to help the construction and purchasing department of every organisation. It uses its own methods of classification of materials used to manufacture the project or a company selling various goods. ABC analysis is one of the simple and standard method used by most of the firms for classification and storing their variety of materials. The materials are recognized to purchase and store as an inventory by its codes and nomenclatures. The various methods of coding are used by every organisation to control the variety of materials and its quantity and price rates.

(v) Forecasting and Planning

Materials requirements planning is based on correct forecasting of sales and demand of the projects in the market. The market fluctuations are to be observed to control construction of the organisation. The various methods of forecasting are available and the materials management department can choose the one which gives the best results to the company. Forecast of future demand of sales sets the planning of materials supply. Analytical methods are adopted for systematic forecasting and planning to procure the various materials required for construction. In case of fluctuating demands, there can be uncertainties in supply as well. This can be overcome by maintaining the proper quantity

in inventory of short supply materials at proper time. The different techniques available to use correct forecasting have to be utilised by materials manager to plan the procurement, purchase, supply, managing the outside and inside transport and storing of the materials to maintain the supply chain lines at every construction facility to meet the changes in construction quantity and schedule of construction to meet the fluctuating demand of sales of projects manufactured by the organisation.

To fulfill the objectives and functions of materials management and control the activities of this department, they are thoroughly studied and analyzed. The topics for this study and analysis are given as follows:

1) Materials management organisation
2) Materials requirements planning
3) Forecasting
4) Purchasing
5) Inventory control
6) Storing, warehouse planning and control
7) Value analysis
8) Materials handling
9) Just in Time

The main functions of materials management are summarized as follows:

a. Materials planning as per construction requirements for quantity and time
b. Purchasing the required materials
c. Make or Buy decisions
d. Receipts and inspections of materials
e. Storage, warehousing securities and preservation
f. Distribution of materials
g. Transportation should be expedited and must be economically done
h. Inventory control
i. Disposal of over stock, surplus, scrap and salvage of materials
j. Developing new sources of supply at competitive way
k. Ancillaries industrial development
l. Indigenous source of supply for foreign materials
m. Material cost control and cost reduction
n. Co-ordination and co-operation with the other departments
o. Research and developments in materials management and their use.

Referring to the various functions of materials management stated above the materials management co-ordinates various departments of construction concern. Since the cost involved in construction has maximum investment in the materials. It is about 55% to 65% of the sales value as has been investigated by the Directorate of Industrial Statistics during 1954-57 in India. As soon as materials are purchased and brought by the organisation, its value goes on increasing as the other costs as required for ordering the materials, carrying the materials in inventory, its maintenance and handling charges must be assigned to the cost of materials before it enters in to a project or transformed in to some other form. In order to economize all the costs of Materials Management Company has to adopt definite method of deciding the quantity of materials to be ordered, quantity to be stored as inventory and work in process inventory.

Project Performance

Project Performance is defined as the extent to which the project has been undertaken as well as performance of the delivered project from the view point of the users (Haq, Liang, Gu, & Ma, 2016). Taking the notion of project performance by Nidumolu (2016), Haq et al. (2016) suggested that the project performance should be studied from the perspective of project performance as well as process performance. The advocates of this theory have views that every project is of unique nature, so they need a different and contingent way to deal with it. But the critics of contingency theory claim that project leaders with certain leadership styles can only perform effectively in some projects. In the current study, the concept of agency theory has been used to enhance project performance through project governance and other understudy variables like project quality and project risk.

Agency theory, basically suggests that principle/project owner has difficulties to motivate his agent to act in principle/owner's best interest (Nidumolu, 2016). This may result in separation of control and ownership in many organizations. To deal with this problem, project owner needs to have strict monitoring and control mechanisms to govern agent behavior and to prevent agents' abuse of principals' interests implementing monitoring and control over the project. Seen in this way, it can be concluded that Project performance can be increased by continuous project monitoring because greater monitoring can produce good results. In the context of project management, this theory is used to highlight the relationship between project owner and project manager.

Theoretical Review

System Theory

This model reiterates that a response is attained through the cooperation of various elements in the working conditions. The claim of the system model is the focus on interdependence of the element of conflicting and cooperating parts. However, material management is an organization model that has been developed through the adoption of system model to management (Bank, 2018). In this regards, a system refers to a set or association of interdependent components that operate conjointly to realize a shared objectives (Calkins, 2009). In an attempt to apply the system as a term for material management, the researcher wants to express anything outside to the system itself by interacting with its elements. Therefore, material management become an important and coherent element of system which focuses on particular tasks and which its correlation with other are expressed. The study used system theory because, it increases organization's adaptability to environmental changes. The organisation is studied as a whole and not through its parts. This enables it to adapt to the needs of the environment. Decisions are made keeping in mind the macro as well as micro environment.

Empirical Review

Okorocha (2019) carried out a research to find out the factors affecting material management. For that he had selected a case study of selected building sites, in IMO state, Nigeria. Usage of right materials in the right place at the right time is important for effective execution of a building project. Data collected were analysed by statistical analysis through multiple regressions. The research concluded that Material management leads to effective cost control, to improve the quality and time execution of their projects and reduces failure of a project.

Ogbadu (2019) conducted research to increase the profit through proper management of materials. For that, ninety-four (94) copies of questionnaires were distributed out of which eighty-six (86) were filled and used for the research. All eighty-six respondents approved that the delivery of poor-quality raw materials is a hitch of materials management. He came to the conclusion that, the inefficiencies, breakdown and shut down of the plant decrease the profitability. Establishing good relationship with suppliers of spare parts for minimizing losses arising from frequent breakdown improves profitability.

A case study was carried Kayiranga, Nyamweya and Shkula (2020). in material management in construction site. The objective of the study was the effect of procurement on performance of construction project and examined the effect of inventory control on performance of construction projects. Both descriptive and correlational research designs were adopted where qualitative and quantitative approaches were applied. Data collection instruments that used were questionnaire, interview guide and documentary analysis. The target population was 200 contractors and 180 subcontractors. The sample size was 195 respondents. Furthermore, information was analysed using Statistical Package for Social Sciences version 21.0. Results evidenced a positive and significant correlation between material estimation cost and performance of construction project at Baraka Properties was 0.518. A positive and significant correlation of 0.884 was also obtained between procurement process and project performance. The results also indicated that the coefficient correlation between procurement process inventory control and project performance was 0.874.

In Nigeria brewing firms, Nwosu (2019) examined the impact of materials management. Among total staff strength (4648) of Nigeria Breweries and Guiness Nigeria PLCs, sample size of 368 was selected to check the profitability of the firm. Z-statistics was applied for test of hypotheses and found that materials procurement, materials storage, materials inventory, interdepartmental collaboration has a significant effect on the profitability of brewing firms. Based on the above findings, the study therefore concludes that effective materials management is indispensible to brewing firms in making profits.

Akindipe (2017) investigated the role of raw material management in construction operations. The author was conscious about the inefficiency in raw material management and the alternate solutions to overcome the problem. He found the relationship between raw material and Inventory management to solve the crisis. From this he had concluded that, the inefficiency was due to illiterate and non-experts' involvement in management, mishandling of materials and inability to use proper inventory model in the site. He added that, all the above said reasons are mainly due to the managers involved in the management process.

Boopathi (2016) executed a study on material management using a real time residential project. The author had an opinion that the cost of the project increases mainly due to the improper material management. So, in this project, planning, scheduling and budgeting were done by PRIMAVERA. Since he had followed a proper scheduling method there was no increase in cost of the project. The material cost constitutes the 50% of total cost which is normal.

Methodology

The study adopted the survey research design. The targeted population for this study consisted of all the sixty (60) staff of Deux Project Ltd currently at Lagos Island, Lagos State. The study adopted a census survey. The study considered the total elements in the population as the sample size for the study due to the sample size. A well-structured questionnaire was constructed to provide answers to the research questions raised in the study. The data were analysed using table and simple percentage through a modified 5-point Likert type rating scale of Strongly Agree (SA) = 5- points, Agree (A) = 4-points, Undecided (U) = 3 Strongly Disagree (SD) = 2-points and Disagree (D) = 1-point. The instrument was validated using the face and construct validity. The reliability of the instrument was carried out using Cronbach's Alpha. The method of data analysis and interpretation was based on simple percentage and descriptive statistics for easy understanding. In testing the relevant hypotheses, correlation, regression and coefficient of determination was used to analyse the data. Out of the sixty questionnaires administered fifty four (54) were returned and used for the analysis.

Result and Discussion

Table 1: Descriptive statistics of Respondents Bio data

Age	BELOW 25 YEARS	15	25.7%
	26-30 YEARS	23	37.7%
	31-40YEARS	13	21.8%
	41 & ABOVE	9	14.8%
Gender	MALE	42	70.5%
	FEMALE	18	29.5%
Marital status	SINGLE	22	36.6%
	MARRIED	27	44.3%
	DIVORCED	11	19.1%
Highest academic qualification	WASSCE/NECO AND BELOW	25	42.1%
	OND/NCE	16	26.2%
	HND/BSC	15	25.1%
	POSTGRADUATE	4	6.6%
Working Experience	1 – 5 years	23	37.7%
	6 – 10 years	27	44.3%
	11 years and above	10	18.0%

Source: Field Survey (2023)

Respondents Responses

Table 2: Project completion at scheduled time

	Level of Agreement					**Average**	
	SD	**D**	**U**	**A**	**SA**	**Mean**	**Std Dev**
ASPC1	13.2%	16.5%	26.4%	20.7%	23.1%	4.20	.759
ASPC2	16.4%	18.9%	23.8%	33.6%	7.4%	4.27	.610
ASPC3	9.8%	15.6%	32.0%	25.4%	17.2%	4.25	.805
ASPC4	6.6%	19.7%	33.6%	27.9%	12.3%	4.20	.818
ASPC5	8.2%	23.8%	30.3%	24.6%	13.1%	4.06	.835
ASPC6	11.5%	13.9%	33.6%	20.5%	20.5%	4.29	.710

Grand Average						4.21	0.756

Source: Field Survey (2023)

The grand mean for completion of project at agreed schedule is 4.21 which indicates that respondents agreed with most of the statements on the high scale as it relates to the agreed scheduled project completion with the overall standard deviation of 0.756 which implies that the responses were clustered around the mean.

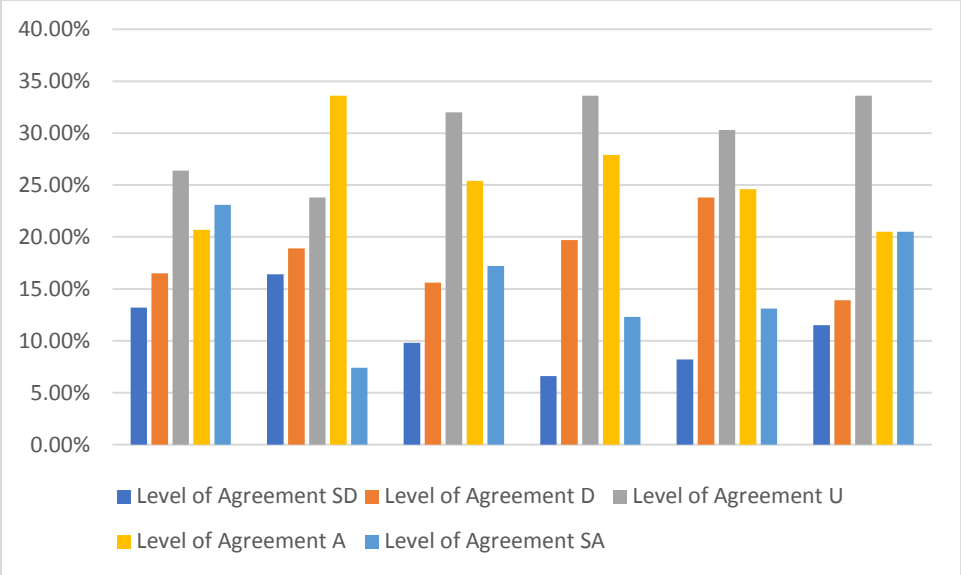

Figure 1: Frequency Distribution of Completion of Project at agreed Schedule
Source: Field Survey (2023)

Table 3: Material Requirement Planning

	Level of Agreement					**Average**	
	SA	**A**	**U**	**D**	**SD**	**Mean**	**Std Dev**
MRP1	13.9%	32.0%	25.4%	15.6%	13.1%	4.12	.889
MRP2	15.6%	25.4%	24.6%	16.4%	18.0%	4.01	.803
MRP3	18.0%	22.1%	32.8%	13.9%	13.1%	4.10	.821
MRP4	9.0%	27.0%	36.1%	18.0%	9.8%	4.27	.731
MRP5	13.1%	20.5%	27.0%	25.4%	13.9%	3.82	.789
MRP6	15.6%	23.0%	24.6%	21.3%	15.6%	4.02	.702
MRP7	13.1%	20.5%	27.0%	25.4%	13.9%	3.93	.884
Grand Average						4.04	0.803

Source: Field Survey (2023)

The grand mean for material requirement planning is 4.04 which indicates that on average, respondents agreed with most of the statements on the high scale as it relates to how material requirement planning is being affected with the overall standard deviation of 0.803 which implies that the responses were clustered around the mean.

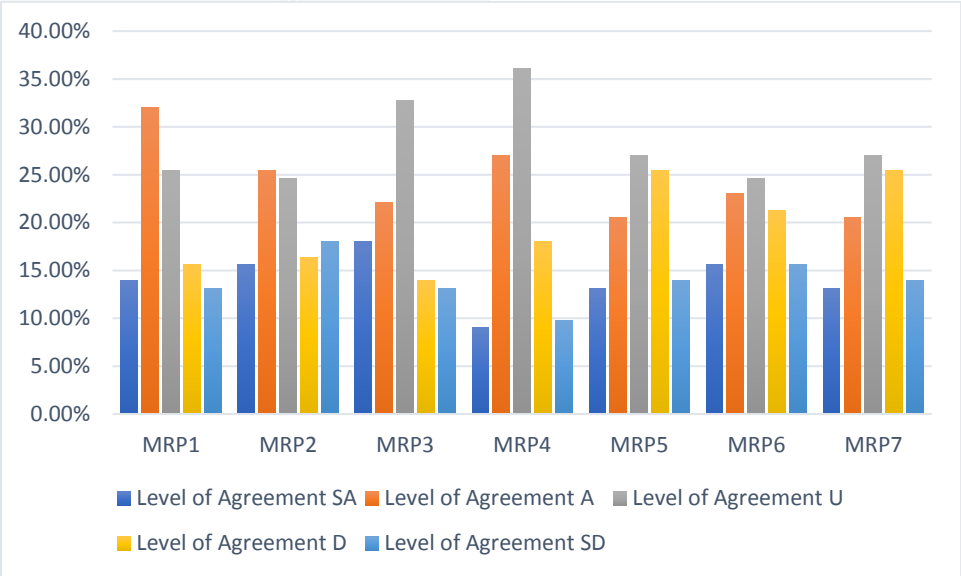

Figure 2: Frequency Distribution of Material Requirement Planning
Source: Field Survey (2023)

Table 4: Automated Purchasing Process

	Level of Agreement					**Average**	
	SA	**A**	**U**	**D**	**SD**	**Mean**	**Std Dev**
APP1	23.0%	21.3%	28.7%	14.8%	12.3%	4.20	.766
APP2	18.9%	32.8%	28.7%	11.5%	8.2%	4.22	.712
APP3	17.2%	30.3%	26.2%	18.0%	8.2%	4.36	.734
APP4	15.6%	29.5%	24.6%	17.2%	13.1%	4.07	.770
APP5	12.3%	29.5%	22.1%	28.7%	7.4%	4.01	.727
APP6	13.1%	27.0%	29.5%	23.0%	7.4%	4.12	.698
APP7	18.9%	32.8%	28.7%	11.5%	8.2%	4.24	.537
Grand Average						4.17	0.733

Source: Field Survey (2023)

The grand mean for automated purchasing process is 4.17 which indicate that on average, respondents agreed with most of the statements on the high scale as it relates to how automated purchasing process is being affected with the overall standard deviation of 0.733 which implies that the responses were clustered around the mean.

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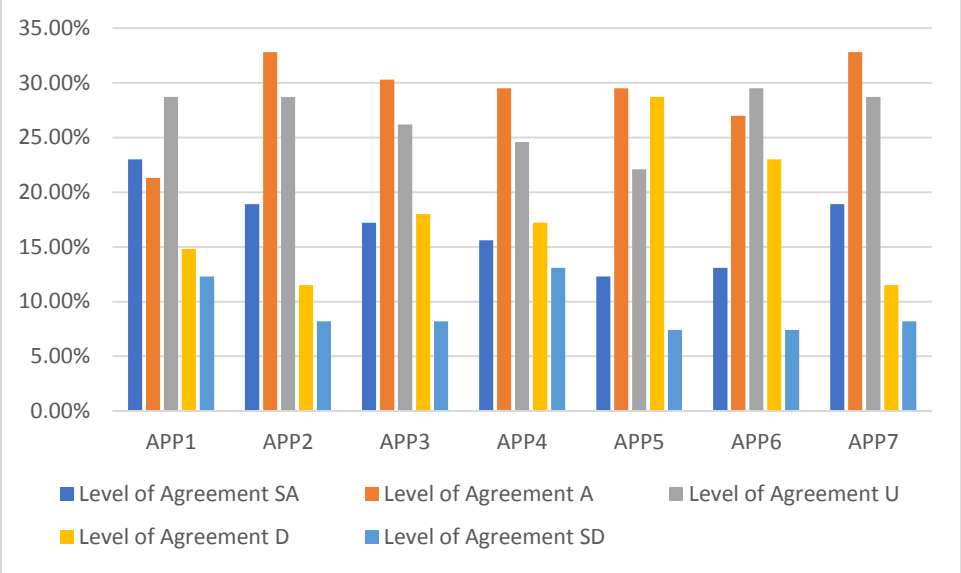

Figure 3: Frequency Distribution of Automated Purchasing Process
Source: Field Survey (2023)

Test of Hypotheses

Hypothesis One

H_{o1}: Material requirements planning has not significantly enhanced project completion at agreed schedule.

Table 5. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig.
1	.904[a]	.818	.816	3.53629	.000

a. Predictors: (Constant), Material Requirement Planning
Source: Researcher's Computation (2023)

Table 6 Coefficients[a]

Model		Unstandardised Coefficients		Standardised Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.018	1.331		3.839	.000
	Material Requirement Planning	.586	.056	.818	8.262	.000

a. Dependent Variable: Project completion at agreed schedule
Source: Researcher's Computation (2023)

The model summary table above (Table 5) shows that there is a strong positive relationship between material requirement planning and project completion at agreed schedule in Deux Project Ltd (R = 0.904). The model further indicates the extent to which the material requirement planning explains the improvement in project completion at agreed schdule in Deux Project Ltd. The coefficient of determination (Adj R^2 = 0.816) indicates that material requirement planning explains 81.6% of the improvement in project completion at agreed schedule in Deux Project Ltd.

Decision

This result is statistically significant because the p-value of the result (0.000) is less than 0.01 level of significance used for the study. Therefore, the research hypothesis was rejected. This implies that Material requirement planning does enhance significantly project completion at agreed schedule. It was also observed from the table above that an evaluation of the unstandardised coefficient of the material requirement planning in the coefficient table (Table 6), and its associated p-value shows that material requirement planning ($\beta_{PTS} = 0.586$, $p < 0.01$) is statistically significant and can be used in scheduled completion of project in Deux Project Ltd. This, therefore, further suggests that the research hypothesis is rejected. This implies that Material requirement planning does enhance agreed scheduled project completion.

Hypothesis Two

H_{o2}: Material requirements planning has not significantly contributed to automated purchasing process.

Table 7 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.853[a]	.306	.295	.303

a. Predictors: (Constant), Material Requirement Planning, Automated Purchasing Process

Source: Researcher's Computation (2023)

Table 8 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.352	.327		13.311	.000
	Material Requirement Planning	.214	.054	.411	2.137	.035
	Material Handling	.227	.064	.442	.429	.669

a. Dependent Variable: Automated Purchasing Process

Source: Researcher's Computation (2023)

The model summary table above (Table 7) shows that there is a strong positive relationship between material requirement planning and the automated purchasing process in Deux Project Ltd (R = 0.853); this implies that material requirement planning is another critical factor that affects the automated purchasing process in Deux Project Ltd. The model also shows the extent to which material requirement planning affects the automated purchasing process in Deux Project Ltd. The coefficient of determination (Adj $R^2 = 0.306$) shows that the material requirement planning account for 30.6% of the improvement in automated purchasing process in Deux Project Ltd.

Decision

This result is statistically significant because the p-value of the result (0.000) is less than 0.01 level of significance used for the study. The research hypothesis was rejected. This implies that Material Requirement Planning does contribute to the automated purchasing process.

It is also observed from the table above (Table 8) that an evaluation of the unstandardised coefficient of material requirement planning and material handling in the coefficient table, and its associated p-value shows that material requirement planning ($\beta_{mrp} = 0.214$, $\beta_{mh=} 0.227$ $p < 0.01$) is statistically significant and can be used in predicting the level of automated purchasing process in Deux Project Ltd. This, therefore, further suggests that the research hypothesis two is accepted. This implies that Material Requirement Planning does contribute to the automated purchasing process.

These findings are in line with that of Haq, Liang, Gu, & Ma, (2016), Nidumolu (2016), and Ogbadu (2009). It was also discovered that material requirement planning is another critical factor that affects the automated purchasing process in Deux Project Ltd which implies that that Material Requirement Planning and Material Handling do contribute to the automated purchasing process. The results of both findings were under the results of Banjoko (2018), Barker (2017), Boopathi (2016) and Jacobs *et al.* (2017) who discovered that the cost of the project increases mainly due to the improper material management as a result of purchase order revisions and inaccuracies, inaccurate material inventory counts, inventory adjustments and inaccurate or partial Bill of Materials listing from the project firm most of which can be overcome with more comprehensive planning, controlled procedures, and the right technology fit.

Conclusion and Recommendations

Although the study's intention is not to generalise from this study, but nonetheless, the study provides useful insight to the future prospects of Deux Project Ltd and other construction firms at large if materials management is handled as a total concept. The study shows that there is a positive and significant relationship between efficient materials management and firm's project performance. Through efficient management of materials, an organisation can achieve significantly the completion of project at agreed schedule construction activities, improvement in automated purchasing process, and improved the meeting of emergent demand. Among the factors that positively influence materials management, material requirement planning, interdepartmental coordination, staff training, and good relationship with vendors, research and development in materials management, state-of-the-art facilities/ICT, quality control, material handling, scheduling and Professionalism were found to be the key factors. Inadequate power supply and poor transport system were the most significant constraints to materials management.

It was therefore recommended that;

1. In order to boost materials management in construction industry in Nigeria, the Federal Government should provide adequate infrastructural supports particularly in the areas of power and transport. The company is encouraged to increase its resource commitment to MRP in materials management so as to develop skills, update knowledge and create indigenous source of supply for foreign materials.
2. Materials Management Department should be established to effectively shoulder the responsibilities of sending or organising training programmes for materials management personnel as well as performing research and development in Materials Management. That the company should have in place an efficient re-order to level to forestall any adverse effect on the buffer stocks

References

Akindipe, L. (2017). *Harsh operating environment claims 834 Nigerian construction companies*. Retrieved January 9, 2021, from online: http://www.jangola.com/index.php.

Banjoko, S. A. (2018). *Construction and Operations Management*. Lagos: Saban Publishers.

Bank, W. (2018). *World Bank Forecast for Rwanda*. Kigali: 153.

Boopathi,J.(2016), *Project management. A system approach to planning, scheduling and controlling*, (8ed.) New Jersey: John Wiley & Sons, Inc

Chen E., Ruch, W. A. & Wieters, C. F (2015). *Fundamentals of Construction /Operations Management* (4th ed). St Paul: West Publishing Company

Donyavi, S. & Flanagan, R.(2009). The impact of effective material management on construction site performance for small and medium sized construction enterprises. *Nottingham, Association of Researchers in Construction Management,* 11-20

Gopalakrishnan, P. & Sundaresan, M. (2018). *Materials Management: An Integrated Approach*. New Delhi: Prentice Hall.

Graman & Magazine (2019). Cconstruction materials management system design based on barcode, *Journal of Advanced Materials Research*, 860, 2825–2829.

Haq, Liang, Gu, & Ma, (2016). Understanding the determinants of project performance: empirical evidences from software houses of Pakistan. *The Fifteenth Wuhan International Conference on E-Business IT Project Management,*

Jacobs, R. F., Fred, R. B. & Aquilano, N. J. (2017). *Operations and supply management*. Boston: McGraw Hill.

Kayiranga R., Nyamweya M.N & Shukla J. (2020). Effects of Materials Management on Performance of Selected Construction Projects in Rwanda. International Journal of Scientific and Research Publications, 10(9), 568- 582

Kolias *et al.* (2018). Mmanagement for construction materials and control of construction waste in construction industry. *International Journal of Computer and Communication Technology*, 2(1), 1–10

Lee, L., & Dobler, D. W. (2016). *Purchasing and materials management*. U.S.A.: McGraw Hill Inc.)

Nidumolu, N. (2016). Assessment of materials management in the Kenyan construction firms: Exploratory survey of construction firms based in Nairobi. *Journal of Social Sciences, 22*(8), 499-515.

Nwosu (2019). Material management techniques and construction project. *Interdisciplinary Journal of Contemporary research in Business* 2 (90), 224–237

Ogbadu (2018). *Nigerian Bottling Company Plc (Initiation of Coverage), Nigeria Equity Research,* Lagos: Meristem Securities Ltd

Ogbadu, E. E. (2017). Profitability through effective management of materials. *Journal of Economics and International Finance, 11*(4): 099-105.

Okorocha, E. O. (2019). *Categories of stock costs of inventory management*. Lagos: Segun Printing Press.

Ondiek, G.O (2021). *Materials management. achieving competitive advantage (International ed).* New Jersey: Pearson Education Upper Saddle River

Oniwon, K. O. (2017). *Construction and operations management, National Open University of Nigeria (NOUN),* MBA 701 Course Book.

Ramakrishna, R. V. (2018). *Materials management: profit centre*. India: Indian Institute

of Materials Management Knowledge Bank.

Sila, N. J & r. Gakobo. J (2021). MATERIAL management and project performance of construction companies in Nairobi city county, Kenya. *International Academic Journal of Information Sciences and Project Management*, *3* (6), 368-391

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