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MATERIAL MANAGEMENT AND THE EFFECTIVENESS OF SELECTED MANUFACTURING SMALL AND MEDIUM SIZE FIRMS IN ENUGU STATE

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ABSTRACT: this study focused on the effect Material Management has on the Effectiveness of Selected Manufacturing Small and Medium Size Firms in Enugu State. The paper adopted survey design, and analysis was based on primary data generated through a structured five point likert scale questionnaire administered on the respondents. The population of the study comprised of 307 members of staff and 33 selected SMEs in Enugu state. Using Taro Yamane method, a sample size of 174 was drawn from the population. The statistical tool used for data analysis was the Mann-Whitney (U) test using the 17.0 versions of statistical package for social sciences (SPSS). From the SPSS outputs above, the U values for hypothesis one and two were 0.002 and 0.015 respectively. These outputs were less than the 0.05 level of significance, hence, it was discovered from the study that material management has significant positive effect on the effectiveness of SMEs. In specifics however, the findings shows that the effect of material management is more on resource efficiency than it is on competitiveness. The study therefore concludes that there is every need for SMEs to embrace and develop strategic material management capabilities if they must exit from existential threat by making sufficient profit for sustainability. The study recommended that SMEs must ensure the use of experts in their supply chain management in order to promote efficient procurement practices, there is need for SMEs to practice integrated material management system,; this will ensure best practices at each stage of the material flow and that Developing employees capabilities through training on recent relevant material management techniques is key to obtaining results that will promote overall organizational effectiveness

KEYWORDS: Competitiveness, Material Management, Effectiveness, Resource Efficiency

INTRODUCTION

Small and medium scale enterprises across the globe are today seen as key to rapid and sustainable economic growth and development. This is manifest bin their role as manufactures of both primary and secondary products, employers of skilled and unskilled labour and significant contribution to the common purse of the nations through taxation. However, due to competition from big manufacturers from the domestic market and manufacturers at the international window, the effectiveness of most SMEs that are into manufacturing especially those in the Nigerian market has existential threat. It is therefore incumbent on SME managers to device management models that could confer cost efficiency on it while maintaining product quality, one of these functions is proper handling or management of materials. Banjoko (2004) describes materials management as a set of integrated functions whose focus is the effective coordination of activities relating to the planning, requisitioning, storage of input, materials and work-in-progress, their conversion until they are delivered to the consumers. Also Fearon (2001) opined that material management is an integrated organizational arrangement establishing a single manager with authority and responsibility for policies and actions related determining the amount of material requirements, acquiring needed materials, verifying, storing and issuing materials, maintaining inventory records, scheduling materials and disposing of materials which are in excess to the organization. Zenz (2003) defines materials management as a concept which brings together under one management the responsibility for determining the manufacturing requirement, scheduling the manufacturing process and procuring, storing and dispensing materials. As that, it is concerned with the control activities involved in the acquisition and use of material employed in the production of the finished project.

Ondiek, (2009) postulates that materials management provides an integrated system approach to the coordination of materials activities and the total material costs. They view it as something that advocates assigning to a single operating department all major activities, which contribute to the cost of materials. The objective is to optimize performance of materials systems, as opposed to sub-optimizing the performance of individual operating units that are part of the material system. Chase et al. (2009) contend that the objective of materials management is to ensure that the right item is at the right place, at the right time and at a reasonable cost. The intention of having materials management system in place is for solving materials problems from a total company view point (optimize) by coordinating performance of the various materials flow. Fearon et al. (1989) suggested that the introduction of computers was a great boost to the adoption of materials management, as materials function has many common databases. Waters (2006); Ondiek, observed that the

traditional approaches to materials management uses planned operations where managers design a detailed schedule for each distinct activity within the chain. By coordinating these schedules, managers control the flow of materials. The problem with the traditional approach is that it is based on a paper system and even when firms move to automation, they often automate the same procedures. This has fundamental weaknesses of taking too long, being expensive, relying on paperwork, and physically moving paperwork between locations, having many people doing the administration, being unreliable, introducing errors, having more people supervising and controlling administration. These problems can be overcome when firms move electronic purchasing and hence adopting materials management approach.

OBJECTIVES OF THE STUDY

The central objective of this study is to examine the effects material management has on the effectiveness of SMEs. Its specific objective is focused on;

i. To examine the effects of supply chain management on the resource efficiency of SMEs

ii. To examine the effects of strategic inventory control on the competitiveness of SMEs

HYPOTHESIS

H_{01}: To examine the effects of supply chain management on the resource efficiency of SMEs

H_{02}: To examine the effects of strategic inventory control on the competitiveness of SMEs

REVIEW OF RELATED LTERATURES

Materials are simply industrial goods that become part of another physical product. They represent the major component of business cost and profitability. According to Ramakrishna (2005), on an average, half the sales income in an organization 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 manufacturing cost. In the cost structure of most of the products manufactured, 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 organization include purchased materials, work-in-process (WIP) materials and finished goods (Banjoko, 2000). Ogbadu (2009) 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, 2006). International Federation of Purchasing and Materials Management (IFPMM) defined it as a total concept having its definite organization to plan and control all types of materials, its supply, and its flow from raw stage to finished stage so as to deliver the product to customer as per his requirements in time. These definitions provide the scope of Materials Management which includes decision on purchasing raw materials, staffing, inventories, stores and warehouse management, production levels, and distribution of finished goods at minimum cost at due time (Osotimehin, 2006).

KEY FUNCTIONAL AREAS OF MATERIALS MANAGEMENT

Barker (1989) identified five key functional areas that Materials Management cuts across which include purchasing, production and inventory control, quality control, storage and warehousing, and physical distribution. Linton et al., (2007), expanded the areas/activities to include forecasting demand and quantity of materials requirements, good supplier and customer relationship, indigenous source of supply for foreign materials, developing skills of workers in Materials Management, improved interdepartmental efficiency, and Research and Development (R&D) in Materials Management. These activities are managed by the Materials Management Department. Selection of personnel for marketing, purchasing, inventory control, stores management and materials handling and their training and placement is also to be seen by the Materials Management Department. The materials manager has to manage all these functions with proper authority and responsibility in the Materials Management Department. This indicates that it is very essential to have a Materials Management Department in any organization to support the management in the production activities. It also helps in the marketing, sales promotion and control of all the types of materials for its quantity, quality and cost.

MATERIAL MANAGEMENT PROCESSES AND TECHNIQUES

Material management consist of a series of processes that need to be integrated, coordinated and synchronized well to ensure that material are available at their point of use when needed. Material management process begins from need generated from site followed by this information conveyed to store department and material is ordered in the store, indent is generated. Usually vender selection is to be carried out for the least value and best items. Materials are received at store departments and inspection is carried out.

Planning: Material planning is the initial process that needs to be carried out accurately in order to provide guide to all the subsequent activities. According to Gulghane & Khandve (2015) material planning includes quantifying, ordering and scheduling. The materials planning process covers the

set up and maintenance of records and determines the target levels and delivery frequency. Adopting a good material management plan can increase productivity and profit.

Testing: Quality is a prime factor to measure the performance of a project. Unless a specific brand and model number is stated, it is advisable to conduct thorough study and analysis of the different material properties to check for its compatibility. Materials should only be ordered after receiving approval (Low & Ong, 2014). Proper assessment of the various materials is important to ensure quality and durability of the final product.

Procurement: Procurement according to Morris & Pinto (2007), is all about identifying and analysing user requirements and type of purchase, selecting suppliers, negotiating contracts, acting as liaison between the supplier and the user, and evaluating and forging strategic alliances with suppliers. For many organizations, materials and components purchased from outside vendors represent a substantial portion of the cost of the end product, and hence effective procurement can significantly enhance the competitive advantage of a project. Many authors have suggested that choosing best option of procurement can help to reduce the impact of uncertainties such as late deliveries, substandard raw material qualities, and resource constraints and so on.

Logistics: Logistic is defined as concept that includes movement and it may encompass planning implementing and controlling flow and storage of all goods from raw materials to the finished product to meet customer requirements (Kasim, et al., 2005). For smooth handling of materials, space need to be carefully allocated for material handling equipment, access roads, warehouses, workshop, and laydown materials in the construction site (Pellicer, et al., 2013)

Handling: Various materials posses' different features and properties, that makes the handling of materials critical. Effective material handling involves handling, storing and controlling of material. Proper protection during storage is often ignored, and this can result poor material quality or material deterioration. Moreover it is also advised that transportation, loading and unloading of material should not be conducted in the rain. It is also recommended that the storage area needs to be enclosed, clean and dry with good air circulation and for some materials need to be stacked on pallets, not more than a certain safe height to prevent dampness and so on (Low & Ong, 2014). Adopting proper material handling and storage will help to keep the material intact and in good quality. And also will reduce loss of profit due to theft, damage and wastage as well as running out of stock. Patel & Vyas (2011) summarized the material management processes into 8 main parts; they are planning, benchmarking, purchasing, receiving, inspection, storage, issuing material and inventory control. Therefore it is very evident that in various countries these processes are carried out in different ways. There can be many factors that might influence these processes such as

culture, work environment, belief and so on. Moreover different groups have learnt to deal with uncertainty in different ways, often because they find themselves faced with different levels of uncertainty.

CAUSES OF MATERIAL MANAGEMENT FAILURES

Dey (2001) emphasized that the common issues regarding material management are as follows:

- Receiving materials before they are required which may increase inventory cost and may increase the chance of deterioration in quality;
- Not receiving materials during the time of requirement causing to decrease motivation as well as productivity
- Incorrect materials take-off from design and drawing documents;
- Constant design changes
- Theft or loss of item
- Choice of type of contract for specific material procurement
- Vendor evaluation criteria
- Piling up of inventory and controlling of the same
- Management of surplus material.

In another study conducted by Sohrab (2009) states the common problems in material management are as follows:

- Failure to order on time which may cause delay in the projects;
- Delivery at the wrong time which may interrupt the work schedule;
- Over ordering;
- Wrong materials or wrong in direction of materials requiring re-work;
- Theft of materials from delivery into production;
- Double handling of materials because of inadequate material

In another research done by Gulghane & Khandve (2015), they stated that challenges of material management are often due to overstock materials because of improper planning, damaged materials due to logistics, handling or in application, loss of materials because of improper supervision, waiting of the materials to arrive in location due to improper tracking system, frequent movement of materials due to improper site layout, inflation, material changes in buying or purchasing situation starting from the prepared cost estimation.

BENEFITS OF MATERIAL MANAGEMENT

Barker (1989) listed the followings as the core benefits drivable from material management

- ❖ improvement in continuity of supplies with reduced lead times,

- reduction in inventories with reduced obsolescence and surplus,
- improvement in cooperation and communications with reduced duplication of effort,
- reduction in material costs,
- improvement in quality control,
- improvement in status control, and quicker identification of problems

METHODOLOGY

This paper adopted survey design, and analysis is based on primary data generated through a structured five point likert scale questionnaire administered on the respondents. The population of the study comprises of 307 members of staff and 33 selected SMEs in Enugu state. Using Taro Yamane, a sample size of 174 was drawn from the population. The statistical tool used for data analysis is the Mann-Whitney (U) test using the 17.0 versions of statistical package for social sciences (SPSS).

RESULTS AND DISCUSSIONS

SPSS OUTPUT FOR HYPOTHESIS ONE

NPAR TESTS/M-W= SCMandRE BY RANKS (5 1)/STATISTICS=DESCRIPTIVES QUARTILES /MISSING ANALYSIS

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
SCMandRE	30	34.8000	20.83002	.00	74.00	24.0000	32.0000	46.7500
RANKS	30	3.0000	1.43839	1.00	5.00	2.0000	3.0000	4.0000

Mann-Whitney Test

Ranks

	RANKS	N	Mean Rank	Sum of Ranks
SCMandRE	1.00	6	3.50	21.00
	5.00	6	9.50	57.00
	Total	12		

Test Statistics[b]

	SCMandRE
Mann-Whitney U	.000
Wilcoxon W	21.000
Z	-2.892
Asymp. Sig. (2-tailed)	.004
Exact Sig. [2*(1-tailed Sig.)]	.002[a]

a. Not corrected for ties.

NPAR TESTS /M-W= SICandC BY RANKS(5 1) /STATISTICS=DESCRIPTIVES QUARTILES /MISSING ANALYSIS.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
SICandC	30	34.8333	18.26828	.00	71.00	24.5000	31.5000	49.0000
RANKS	30	3.0000	1.43839	1.00	5.00	2.0000	3.0000	4.0000

Mann-Whitney Test

Ranks

	RANKS	N	Mean Rank	Sum of Ranks
SICandC	1.00	6	4.00	24.00
	5.00	6	9.00	54.00
	Total	12		

Test Statistics[b]

	SICandC
Mann-Whitney U	3.000
Wilcoxon W	24.000
Z	-2.406
Asymp. Sig. (2-tailed)	.016
Exact Sig. [2*(1-tailed Sig.)]	.015[a]

a. Not corrected for ties.

b. Grouping Variable: RANKS

FINDINGS AND CONCLUSION

From the SPSS outputs above, the U values for hypothesis one and two are 0.002 and 0.015 respectively. These outputs are less than the 0.05 level of significance, hence, it was discovered from the study that material management has significant positive effect on the effectiveness of SMEs. In specifics however, the findings shows that the effect of material management is more on resource efficiency than it is on competitiveness. The study therefore concludes that there is every need for SMEs to embrace and develop strategic material management capabilities if they must exit from existential threat by making sufficient profit for sustainability

RECOMMENDATIONS

The study recommend as follows;

i. SMEs must ensure the use of experts in their supply chain management in order to promote efficient procurement practices

ii. There is need for SMEs to practice integrated material management system,; this will ensure best practices at each stage of the material flow

iii. Developing employees capabilities through training on recent relevant material management techniques is key to obtaining results that will promote overall organizational effectiveness

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