THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

Materials, Management and Firm's Profitability

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Abstract:
This study examines the impact of materials management on the profitability of Nigeria brewing firms. The purpose of the study is to investigate whether there is effective and efficient materials management in Nigeria brewing firms and the extent to which it has contributed to their profitability. The population of this study is 4648 being the total staff strength of Nigeria Breweries and Guiness Nigeria PLCs, and a sample size of 368 was selected. Materials inventory, Materials procurement, materials storage and interdepartmental collaboration were adopted as sub variables of materials management while profit before tax, return on equity, earnings per share, tax paid and dividend paid was used as profit indicators to ascertain the profitability of organizations under study. Questionnaire and oral interviews were major instrument used in data collection and simple percentages were used in analyzing the data collected from the questionnaire. Four hypotheses were formulated. Z-statistics was applied for test of hypotheses and the following findings were made: that materials procurement has a significant effect on the profitability of brewing firms; that materials storage has significant effect on the profitability of brewing firms; that materials inventory has a significant contribution to the profitability of brewing firms; and that interdepartmental collaboration significantly contributed to 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. However, the study recommended that all manufacturing firms should embrace effective and efficient materials management in order to remain profitable.

Keywords: *Materials management, Materials procurement, Materials storage, Materials Inventory, Interdepartmental collaboration, Profitability.*

1. Introduction

1.1. Background Of The Study

The Nigeria brewery industry is key player and major contributor to the manufacturing sector. The sector is the second most capitalized sector in Nigeria stock exchange after Industrial goods and building materials sector led by Dangote Cement PLC. The manufacturing sector is key contributor to the growth of every economy especially developing economies. For instance, the federal government of Nigeria earned 179.5billion revenue from non oil sector in the first quarter of 2013, this receipt was driven mainly from the industrial and manufacturing sub-sector which amount to 66.9 %(Wachukwu, 2013). To achieve a vibrant and stable economy, manufacturing firms must be well positioned to make profits which will invariably lead to their growth and survival.

The manufacturing sector is noted as one of the engine of growth, an antidote for (un) employment, a creator of wealth and the threshold for sustainable development but it seems to be facing more challenges than any other sector in our economy. The high rate of mortality and ailing in the sector clearly highlights the inability of the sector to solve the problem of unprofitability. Over 750 firms in the sector have closed down in the recent past. As at 2006, a survey by MAN shows that 30 percent of the industries were classified as closed down, 60 percent were classified as ailing while only 10 percent were classified as operating at sustainable level (MAN,2006).

The high rate of ailing and shut down in the brewing sector can be clearly attributed to high manufacturing cost created by exorbitant prices of materials coupled with lack of adequate management commitment to timely funding of material procurement (Ilori et al, 2000; Oba, 2008; Adeloye, 2010). There is the need for developing better methods of managing and measuring how material resources should be utilized by various jobs or products, and therefore be able to reduce material cost as well as eliminate any wastage in the production process. Bankanjo (2000) maintains that a manufacturing firm will remain shaky if materials are under stocked, overstocked or in any way poorly managed.

Materials are indispensible to every manufacturing organization as they represent the major components of manufacturing cost. Lee and Dobler (1977) opine that materials are the lifeblood and heart of any manufacturing system while Oniwon(2000) submits that in manufacturing companies, a high proportion of operational expenditure is expended on materials. However, such a

reasonable investment that determined profitability are often overlooked by organizations, hence organizations require considerable planning and control of materials so as to minimize waste which invariably affects the profitability and survival of organizations. The process of showing emerging companies the road map to effective materials management has not been fully enhanced.

This study will improve the situation by analyzing the process of effective material in two Nigerian most flourishing brewery companies known for excellent performance, the Nigerian Breweries PLC and Guinness Nigerian PLC

Four main factors affect the effectiveness and efficiency of materials management. These factors can become constraints or enhancement tools depending on how they are handled. They include the materials procurement, materials inventory, materials storage, and interdepartmental collaboration. However five profitability indicators (Profit after tax, Tax paid, Earnings per share, Dividend paid and Return on equity) were adopted to ascertain profitability in Nigerian Breweries and Guinness for eleven years (2002 – 2012).

After review of empirical studies by (Ondiek, 2009; Adeyemi,2010; Ogbadu,2009; Unam,2012; and Egberi&Egberi,2010) on the subject under study, it was observed that previous studies did not take into cognizance the relevance of interdepartmental collaboration on materials management. All previous studies conducted in Nigeria used single organization as a case for the whole manufacturing industry which ideally should not be true test for such a large sector. Previous studies dwell also more on the variables of materials management without matching the variables with profitability indicators. The filling of these gaps justifies the need for this study.

1.2. Statement Of The Problem

In relation to enhanced organizational profitability, most companies in Nigeria especially the brewing sector do not meet the expectations of stakeholders (the owners, the government, and the employees). It is needless to say that when a company is doing badly, it pays little or no tax to government, pay little or no dividend to the shareholders, owe workers salary as a result of lack of fund and frowns at social responsibilities while the reverse is the case for profitable firms. For instance, in 2012 financial year and accounts, two leading manufacturing firms in the Brewing sub sector (NBL PLC & Guiness PLC) paid 38.5billion and 15.8 billion respectively as tax and exercise duties to government; 23.9billion and 8.2billion respectively to employees as salary and wages; 22.68billion and 14.7billion as dividend respectively, spend yet another 81 million and 139million respectively within the same period on social responsibilities. These are possible because these organizations are making profit. When firms are doing badly, the stakeholders will not receive any reward, and in the prevailing circumstance, firms liquidate throwing many back to labour market. A situation like this exposes many families to severe difficulties. Some of the firms in brewing industry in comparison to others are more profitable, also the performances of few of the firms are more desirable and lucrative.

There is the need to ascertain the causes of these disparities. It is not out of place to suspect effective and efficient materials management. Oniwon(2000) submits that in manufacturing

companies, a high proportion of operational expenditure is expended on materials. However, such reasonable investment that determines profitability is often overlooked by organizations; hence organizations require considerable planning and control of materials so as to minimize waste which invariably affects the profitability and survival of organizations. Lee and Dobler (1977) support this view by postulating that materials are the lifeblood and heart of any manufacturing system. Consequently there is the need to ascertain the impact of materials management on the profitability of brewing firms, adopt better methods of managing materials, reduce material cost as , and eliminate any wastage in the production process to enhance profitability.

1.3. Objective Of The Study

The main thrust of this study is to determine the impact of materials management on the profitability of brewing firms. Drawn from the above broad objectives are the following specific objectives:

- To determine the extent to which materials inventory affects profitability of brewing firms.
- To evaluate the impact of materials procurement on profitability of brewing firms.
- To determine the extent to which materials storage affect profitability of brewing firms
- To ascertain the extent to which interdepartmental collaboration contribute to profitability of brewing firms.

1.4. Research Questions

- What is the effect of materials inventory on profitability of brewing firms?
- To what extent does materials procurement impacts profitability of brewing firms?
- What is the effect of materials storage on profitability of brewing firms?
- To what extent does interdepartmental collaboration contributes to profitability of brewing firms?

1.5. Research Hypotheses

- Ho_1: Materials inventory does not significantly affect the profitability of brewing firms.
- Ho_2: There is no significant relationship between material procurement and profitability of brewing firms.
- Ho_3: Materials storage does not significantly affect the profitability of brewing firms.
- Ho_4: There is no significant relationship between Interdepartmental collaboration and profitability of brewing firms.

1.6. Significance Of The Study

Knowledge generated through this particular work will be very useful to subsequent researchers and practicing managers. It will add to the global pool of research on the variables of this work. It will also provide organizations with useful information for fine-tuning policies that are geared toward tackling profitability problems in manufacturing sector especially brewery sub-sector.

1.7. Scope Of The Study

This study will be limited to brewing firms in Nigerian. The firms must be quoted on the Nigeria stock exchange and must not be an ailing firm. The choice of firms quoted on the Nigeria stock exchange is for the researcher to have access to the necessary data needed for this study. However, of the three brewing firms on the stock exchange (Nigerian Breweries, International Breweries and Guinness Nigerian PLCs), two qualified for the study- The Nigerian Breweries and Guinness.

1.8. Limitation Of The Study

This study had some limitations which include the problem of diverse coverage of locations of the organizations as they are spread around the country. There was also the problem of time and uncompromising attitudes of some respondents encountered during the study as some respondents refused to fill the questionnaire while some respondents were not available to answer our questions despite several visits.

2. Review Of Related Literature

2.1. Concrptual Review

The International Federation of purchasing and Material management define material management 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 its requirement in time. Gopalakrishma et al(2006) &Ramakrishna (2005) visualize material management from integrated perspective as they postulate materials management as the function responsible for the coordination of planning, sourcing, purchasing, storing and controlling materials in an optimum manner so as to provide a predetermined service to the customer at a minimum cost. The basic priority of material management according to Jacobs et al. (2009) is to ensure that the right item is bought and make available to the manufacturing operations at the right time, at the right place and at the lowest cost.

Material management is the total of all 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, operation or sales (Lee&Dobler, 1997; Unam, 2012). It is the process by which organization is supplied with the goods and services it needs to achieve its objective of buying, storage and movement of materials. It is also that aspect of management of business activity that deals with planning for purchasing, receiving, handling, storing, and releasing of materials for use in production with effective control measure (Ogbadu, 2009).

Materials management involves materials planning, purchasing, receiving, storing, inventory control, scheduling, and production. In order to economize all costs of materials, organizations have to adopt definite method of deciding the quantity of materials to be ordered, quantity to be stored as inventory and work in progress inventory. In order to reduce the material cost, there has to be some efficient and effective material management techniques which must be dynamic to adjust with changing demand and production.

Materials to be used in manufacturing process are classified into three. According to Rumelt, (1981) and Ogbadu,(2009), materials for use in manufacture are under three headings:

- Raw materials primarily from agriculture to the various extractive industries, e.g. mineral resources, fruits and vegetables sold to processors.
- Semi-finished goods and processed materials to which some work has to be applied or value added e.g. rods, wire, paper, chemical, etc
- Component parts and assemblies that are completely finished products of one manufacturing organization, which can be used as part of more complex product by another manufacturer.

ICAN (2006) categorise materials into the following five groups:

- Raw materials which are needed to produce finished products. For example, flour and sugar for biscuit, wood for furniture.
- Work in progress, which refers to semi-produced raw materials at a particular point in time
- Components or piece parts for assembly into a finished product;
- Finished products for use or sale. For example, packaged food or bag of cement
- Indirect materials for use by one or more cost centre in an organization, such as stationery, fuel and lubricants, and cleaning materials.

Meanwhile, it is the effective and efficient management of these materials that this study refers to as material management.

As noted by Ramakrishna (2005), management has since recognized that effective materials management can provide opportunities for cost reduction.

Therefore effective materials management supports the company's operations with an uninterrupted flow of materials and services. Bankojo (2000) and Jacobs et al. (2009) maintain that without adequate planning for materials resources, the overall

performance of an organization may be crippled. The purpose of material management in any manufacturing organization is to plan for materials requirement, procurement and management for production of goods and services.

2.1.1. Materials Procurement

Procurement takes into cognizance buying wisely and competitively which entails keeping abreast the forces of supply and elements that regulate prices and availability of materials. Efficient and effective materials procurement entails constant search for better values that yield the best combination of competitive and wise buying that contributes to maximizing organization's profit. Unam (2012) postulates that cost of raw materials can be reduced by buying from the right suppliers at the right price without compromising quality. Materials manager will posses a good bargaining skill and strive for the cheapest and qualitative raw material, and in doing this, what the material procurement manager will bear in mind is to procure the right quality at the right price (i.e., best price without compromising quality). Procurement has to do with determining order quantity, work in processing, store requisition, issue of enquiries, evaluation of quotations, supply appraisal, negotiations, placing of contracts, processing of deliveries and clarifying payments. ICAN(2006) maintains that Material acquisition include but no narrowed to; purchase procedure, receipt of materials, inspection or test of the materials, Debit notes to the supplier in respect of defects and rejection.
On the receipt of material, Ogbadu (2009) maintains that the quantity, quality and the condition of items must check against what was ordered. The movement of material procured is another cost reduction factor. The movement is determine by the nature, distance and quantity of the materials and involves cranes, pipelines, trucks, forklift, waterways, railroads, airline, etc. The decision on the best and most economic means to be used will to a great extent save cost and improve profitability.

2.1.2. Materials Inventory

Managers must maintain an optimum level of stock at all time and reduce investment losses due to deterioration, obsolescence and theft to the barest minimum level. Lysons (1996) emphasis that inventory control enhances profitability by reducing cost associated with storage and handling of materials. Egberi & Egberi (2011) maintain that inventory control is the systematic way of locating, storing, and recording of goods in such a way that desired degree of service can be made to the operation shops at minimum ultimate cost. Inventory control has to do with standard control on the ordering size, ordering time, and the quantities of raw materials left in the store at a given time. Ogbadu(2009) posits that inventory control determines the extent of stock holding. It has to do with standard control on the ordering size, ordering time, and the quantity of raw materials left in the store at a given time. Inventory control entails maintaining optimal stock level so that too much stock and too little stock should be avoided.

2.1.3. Materials Storage

Materials storage is another important function of materials management(Osisioma,1996) He further posits that it is an act of carelessness to abandon the materials acquired at the factory premises without adequate taking care of them to avoid losses which may result from attack from insect, rodents, birds or theft by people, damage by fire, heat or moisture. Storage of materials entails careful handling of material and maintains accurate control over them. It shows how much materials are in the store and when to place order.
Effective handling of material is essential tool for cost saving and increase profitability. Ogbadu(2009) posits that storage goes in hand with record keeping, keeping record can detect theft and pilfering early enough. The issue of materials from store to production department must be properly authorize and recorded. Johnson (1993) maintain that profit can be achieve if managers effectively manage issues relating to stores location, layout and equipment inspection, protection of stores, issues to production, stock records and disposal of obsolete. Defective, scrap and surplus materials could be well stored and be disposed off or return to the supplier later, a very good avenue for increasing profitability in manufacturing firms if effectively done. Ogbadu(2009) observe that to achieve profitability in disposal of scrap and surplus, it involves decision in the areas of return to suppliers, selling to suppliers, selling to other firms, selling to dealers. Carter (1982) define scrap as the residue of process materials left behind during production while surplus is the materials from purchases which were not wholly consumed in the production.

2.1.4. Interdepartmental Collaboration

Inter-departmental collaboration is very necessary if effective material management must be achieved, and it is expected that materials management department plays a pivotal role in this aspect. Lemu (2007) maintains that this relationship vary from department to department, while Zanto(2008) submits that departments which are mostly involve are: Production, Engineering design, Quality control, Marketing, Finance and personnel.
The production department is responsible for production while materials management department is responsible for the procurement of all materials needed by the production department upon requisition from the production department. Rihinde (2005) maintains that it is the duty of materials management department to raise purchase order for all materials nedded in all departments for production. In the area of preparation of specification for materials, parts and components as well as production design, there should be collaboration between the Engineering and Materials management department. They should collaborate in the area of standardization of materials and substitute material that may cost less to the engineering department at the production design stage without compromising quality. On the issue of product quality, it is necessary also for quality control department and materials management department to work together. The quality control department according to Marta (2008) usually informs the materials management department on the best method to be applied to the incoming materials and also the criteria for acceptance and rejection of materials that are of sub-standard. Quality control can equally advise material management department on the condition under which some items should be stored to avoid deterioration in quality.

Ogbadu (2009) maintain that there should also be cooperation between marketing, finance, personnel departments and materials management departments. For example, the finance department is expected to release money for the procurement of materials, forestall fraud in the transaction process by paying or making direct payment to the suppliers, audit all the necessary documents for purchases made to avoid fraud before payment is made.

The marketing department can work with material management department by reporting back to materials management department on the customer's reaction on the quality of the product. This will guide the quality control, the engineering design and the materials management on the issue with respect to standard of materials for procurement. The personnel department will cooperate with material management department on matters relating to recruitment, training, motivating, promotion, personnel policies, wages, fringe benefits and development of staff in the materials management department as well as other department.

2.2. Theoritical Framework

The theory on which this study hinges is the theory of supply chain management. The term supply chain entered the public domain when Keith Oliver, a consultant at Booz Allen Hamilton propagated supply chain management theory in the interview for the financial Times in 1982. This theory gained prominence in mid 1990s when a fury of articles and books came out on the subject. In the 90s, it rose to prominence as a management buzzword and operations managers began to use it in their title with increasing regularities.

Supply chain management spans all movement and storage of raw materials, work in progress inventory, and finished goods from the point of origin to the point of consumption. According to the council of supply chain management professional, supply chain encompasses the planning and management of all activities involved in sourcing, procurement, conversion and logistic management. Hines (2004) says that supply chain require a total system view of the linkages in the chain that works together efficiently to create customer satisfaction at the end of delivery to the customer. As a consequence, cost must be lowered throughout the chain by driving out unnecessary cost and focusing attention on adding value.

2.3. Empirical Review

Previous empirical studies on the subject under study or related studies confirm a significant positive relationship existing between effective materials management and firm's profitability. Studies by Adeyemi & Salami (2010) and Egberi & Egberi(2011) deals on narrowed portion of materials management, i.e., Inventory management and profitability.

- Ondiek(2009)assess materials management in the Kenyan Manufacturing firms with the aim of determining whether long term success and survival of any organization depended entirely on how well organization are managing their material(cost). The study was a survey of medium and large manufacturing firms in Nairobi and a sample size of 55 firms were taken using descriptive statistics. The data was collected using structured questionnaire while the analysis was done using descriptive statistics. The result confirms that Kenyan firms were not practicing professionalism in material management.
- Adeyemi et al (2010) carried out a study to determine whether inventory management is a tool of optimizing resources in Manufacturing Industry, using Coca-Cola Bottling Company, Ilorin Plant as a study area. The tools used in analysis of the data collected were variance analysis, Economic order quantity model and the Chi-square method. The result confirms that there is significant positive relationship between inventory management and survival of manufacturing organization.
- Ogbadu (2009) carried out a study to determine the impact of effective management of materials on profitability of the Benue Breweries Limited. The researcher used survey method for data collection and random sampling technique for sample size determination. The research questions were analyzed using simple percentages. The hypotheses were tested using Ch-square test statistics. The result confirms a significant relationship between materials management and profitability.
- A study carried out by Unam(2012) to examine the relationship between Materials Management and success of manufacturing firms used Nigeria bottling Company as a study area. Data was collected through structured questionnaire and supported by interview. Using Chi-square test of independence, the result provided a positive relationship efficient materials management and firm success.
- Egbere et al (2010) tried to find out whether there is link between inventory management and organizational profitability. Eternit Limited was used as case point and structured questionnaire was used for data collection. The result revealed that there is significant relationship between inventory management and profitability.

2.4. Established Gaps In The Literature

After review of previous empirical studies on the subject under study, the study observed the following gaps:

- That previous studies does not take into cognizance the relevance of interdepartmental collaboration as important sub variable of materials management.
- That previous studies conducted in Nigeria used single organization in each case for the whole industry which this study thinks should not be a true test for such a large industry like manufacturing industry.
- Previous studies dwell only on the materials management variables without matching it with profitability indicators.

The filling of these gaps justifies the need for this study.

2.5. Profitability

The primary objective of every business is profit and every investor puts his money into investment with the aim of making profit. Profit represents a positive balance from revenue after deducting all cost while negative balance amounts to unprofitability. In relation to organizational profitability, most companies in Nigeria do not meet expectations of the stakeholders (the shareholders, the government, and the employees) Organizations can only fulfill these expectations of stakeholders through payment of dividend, tax, salary and bonuses. These expectations can only be fulfilled when profitability indicators like earning per share, return on equity, profit after tax and other performance indicators are positive. However five profitability indicators (Profit after tax(PAT), Tax paid, Earnings per share(EPS), Dividend declared and Return on equity (ROE)) adopted earlier in the study to ascertain profitability of Nigerian Breweries and Guiness PLC for eleven years (2002 – 2012) are shown below in Table 2.1 and 2.2.

PROFIT INDICATORS	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
PAT	7.29	7.35	5.08	8.25	10.9	18.94	25.7	27.71	27.91	30.3	38.41
TAX PAID	3.08	3.63	4.06	4.64	5.53	8.93	11.8	13.48	14.54	18.7	17.6
ROE	096	097	067	109	144	250	339	366	369	401	64
EPS	193	194	067	109	144	250	340	369	401	508	503
DIVIDEND	112	210	055	065	120	159	489	180	354	300	125

Table 2.1: Profitability Indicators Position for Nigerian Breweries PLC
Source: Annual Accounts and Reports of Guiness PLC

PAT, and Taxation are in billions of Nigeria Naira while ROE, EPS and Dividend are in kobo.

PROFIT INDICATORS	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
PAT	4.19	6.63	7.91	4.85	7.44	10.69	11.86	13.54	13.73	17.3	14.7
TAX PAID	1.92	3.11	3.71	1.41	3.99	4.19	5.23	5.45	6.25	8.24	6.4
ROE	862	562	671	415	504	725	804	918	931	1216	995
EPS	504	411	670	412	631	784	804	918	931	1216	995
DIVIDEND	300	375	475	525	300	364	450	1280	750	825	1000

Table 2.2: Profitability Indicators for Guiness PLC
Source: Annual Accounts and Reports of Guiness PLC

PAT, and Taxation are in billions of Nigeria Naira while ROE, EPS and Dividend are in kobo.

From the profitability indicators for Nigerian Breweries on table 2.1 , it shows that the profit after tax(PAT) rose continuously from 7.29 billion in 2002 to 38.41billion naira in 2012; Tax paid to government rose from 3. 08billion to 17.58billion; return on equity rose from 96k to 640k; Earning per share rose from 193k to 503k; while Dividend paid to shareholders rose from 112k to 300k. These indicators prove that Nigeria breweries is profitable throughout eleven years that this study covered.

For Guinness Nigerian Plc, the profitability indicators on table 2.2 show positive from 2002 to 2012. The profit after tax(PAT) rose continuously from 4.19 billion in 2002 to 14.67billion naira in 2012; Tax paid to government rose from 1.92billion to 6.4billion; Return on equity rose from 882k to 995k; Earning per share rose from 504k to 995k; while Dividend paid to shareholders rose from 300k to 1000k. These indicators proved that Guinness Nigerian PLC is profitable for the period covered by this study. Having ascertained that these organizations are making profit, the study will go further to test impact of materials management on profitability of the firms.

3. Research Methodology

This section includes a description of the research design, data and data source, population, sample size, data collection procedure and instrument validity and reliability. The research is a survey type which collected the opinions of respondents through questionnaire and seven oral interview questions constructed by the researcher.

3.1. Research Design

Research design according to Eheduru(1995) is the specification of method and procedure for acquiring the information needed for the research. Data for this study were collected between January and May, 2014, using questionnaire survey and in-depth interview methods. These methods have been described by researchers as methodological pluralism, and have been used in conducting research related to developing countries. (Ibeh and Young, 2001). Mixed method help to prevent some research challenges and provide rich data (Okpara and Wynn, 2008). Personal interview is the face to face contact between the researcher and the respondents as questions are being asked and answered verbally. This study adopts survey research method which involves the systematic gathering of data directly from the respondents through the use of oral interview and questionnaire or combination of both.

3.2. Data And Source Of Data

The study used both primary and secondary data. The bulk of secondary data was obtained from Textbooks, Internet, the researcher's library, Statistical bulletin from CBN, the Nigerian Industrial directory as published by Nigerian Manufacturing Association as well as Annual Accounts and Report of Guinness and Nigerian Breweries. The primary data was generated through the use of oral interviews and questionnaire designed specifically for this study. The questionnaire was carefully worded and was based on the variables and sub-variables highlighted in the literature.

3.3. The Population Of The Study

The population for the study is made up of total staff strength for the two firms selected for the study (including the executives and non executive directors of the companies). The companies are Nigerian Breweries and Guinness Nigerian Plcs.

Company	Number of Staff	Percentage
Nigerian Breweries PLC	3229	69
Guiness Nigerian PLC	1419	31

Table 3.1: Population for the Study
Source: field study, 2014

3.4 . sample size determination

Sample is the part of the population diocese for the study. The researcher used Taro Yamani formula to get the sample size for the questionnaire distribution. The population is 4648. Since the population is known and has a large number that runs into thousands, Yamani (1964) is appropriate in determining the sample size. According to Yamani (1964), the following formula was used to determine the sample size where the population is known.

$$n = \frac{N}{1 + N(e)^2}$$

Where n= sample
N= Population
e= Degree of tolerable errors
I = constant

Since the level of significant is 5%, the confidence level becomes 95%

$$n = \frac{N}{1+N(e)^2}$$

$$n = \frac{4648}{1+4648(0.05)^2}$$

$$n = \frac{4648}{1+4648(0.0025)}$$

$$n = \frac{4648}{1+11.62}$$

$$n = \frac{4648}{12.62}$$

$$n = 368$$

Nigerian Breweries PLC	254	67
Guiness Nigerian PLC	114	31
Total	368	100

Table 3.2: Sample size distribution
Source: Field Survey, 2014

3.5. Instrument For Data Collection

Primary data will be generated through the use of oral interview and questionnaire design specifically for the study. The statements in the questionnaire were phrased with possible continuum based on five-likert-style scale. The following ratings were adopted in this research to Facilitate the analysis: strongly agree-5, agree-4, undecided-3, disagree-2, strongly disagree-1. In addition to collecting data through the questionnaire survey, a qualitative data collection techniques involving one-on-one interview with selected respondents was conducted. This stage of research involved the selection of data sub sample of different levels of employees including Directors and all levels of management to enable us get balance view on the subject under study. These respondents formed part of the original group selected for this study. The actual number of respondents interviewed was 15

selected randomly from employees, executive and non executive directors of the two firms used for this study (10,and 5 respondents for Nigerian Breweries and Guinness Nigerian PLCs respectively).

3.6. Validity Of Instrument

The Instruments were submitted to seven hand picked experts in the field of material management. The experts were asked to review the items in the instrument and determine whether the items would measure the information it was designed to elicit. After some minor modifications, the experts recommended the use of modified instrument for the study.

3.7. Reliability Of The Instrument

Reliability of the research instrument is with a view to ascertaining its sustainability for the study. The concept of reliability refers to the tests about the degree to which the study instrument perfect the desired measurements when applied to the desired objectives. Akuezuilo et al(2002) opine that a test is reliable to the degree that it measures accurately and consistently, yielding comparable results when administered many times. The instruments for this research (questionnaire and oral interview) were subjected to a Test –R- Test method. The instrument was given to selected people for comments and the process was repeated after one week interval to determine if their initial response would conform with their later comments. All variables are reliable since their Cronbach's alpha is greater 0.5.

4. Presentation, Analysis, Interpretation Of Data And Discussion Of Findings

In this chapter, the researcher presents analysis and interprets the data collected for the study and discusses the findings. For the data presentation, it is presented in the table using frequencies, percentages and weighted average.

4.1. Questionnaire Returned Table

Company	Administered	Returened	Not Returned	Defect	Percentage
NB PLC	254	216	28	10	59
Guiness PLC	114	97	12	5	26
Total	368	313	40	15	85

Table 4.1 : Questionnaire returned table.
Source: Field survey, 2014

Out of the total of 368 copies of questionnaire distributed, 313 were received back. This represents 85% of the respondents which adequately represents the population of the study. 40 or 11% copies of questionnaire were not returned while 15(4%) copies have some defects and therefore was rejected

4.2. Questionnaire Analysis

- **Research questions 1**: To what extent does materials inventory affects profitability of brewing firms?

Details	SA	A	UD	D	SD	Total
Efficient materials inventory enhances Profitability through reduction in cost associated with storage and handling	140	100	25	20	28	313
Maintaing Optimal stock level enhances Profitability in brewing firms	130	110	20	25	28	313
Inventory management enhances the availability of working capital in brewing firms	150	90	30	15	28	313
Total	420	300	75	60	84	939
Average	140	100	25	20	28	313

Table 4.3.1: Employee's rating of materials inventory and profitability
Source: Field survey, 2014

- **Research question 2**: What is the effect of materials procurement on the profitability of brewing firms.

Details	SA	A	UD	D	SD	Total
Timely delivery of materials contributes to profitability in brewing firms.	120	100	40	32	21	313
Adherent to competitive bargaining of Materials supply contribute to profitability in brewing firms.	110	110	35	41	17	313

Delivery of materials in brewing firms always conform with quantity, quality and Condition ordered	130	90	45	23	25	313
Total	360	300	120	96	63	939
Average	120	100	40	32	21	313

Table 4.3.2. Employee's rating of materials procurement in relation to profitability
Source: Field survey, 2014

- **Research question 3**: To what extent does material storage affect profitability in brewing firms

Details	**SA**	**A**	**UD**	**D**	**SD**	**Total**
Accurate records keeping of stock receipt leads to profitability in brewing firms.	115	110	35	20	33	313
Effective disposal and return of defect/ Surplus materials to suppliers enhances profitability	105	120	30	18	40	313
Effective efficient storage of materials Reduces materials deterioration/damages Which will further lead to profitability	125	100	40	22	26	313
Total	345	330	105	60	99	939
Average	115	110	35	20	33	313

Table 4.3.3: Employee's rating of materials storage and profitability.
Source: Field survey, 2014

- **Research question 4:** What is the relationship between interdepartmental collaboration and profitability in brewing firm?

Details	**SA**	**A**	**UD**	**D**	**SD**	**Total**
The presence of collaboration between Departments in materials management Enhances profitability in brewing firms	125	116	45	15	12	313
Interdepartmental collaboration leads to Better co-ordination and decision making On materials management issues	115	126	55	7	10	313
Interdepartmental collaboration encourages Pulls of knowledge which will lead to better Handling of materials	135	106	35	23	14	313
Total	375	348	135	45	36	939
Average	125	116	45	15	12	313

Table 4.3.4: Employees rating of practice collaboration between departments and profitability
Source: Field survey, 2014

4.3. Test Of Hypotheses

This study applied Zscore for the purpose of testing the hypotheses postulated earlier in this study. Zscore is the standard normal distribution with mean O and Variance 1. The choice of applying Zscore was influenced by large population of this study. The Zscore Critical value at 5% level of significant for one tail is -1.645 or 1.645. (See Z-Table)

- **Decision rule: Reject Null hypothesis if the calculated value is greater than the critical value otherwise accept the Null hypothesis.**

4.3.1. Hypothesis 1

- Ho_1: Materials inventory has no significant effect on profitability of brewing firms.
- Ha_1: Materials inventory has significant effect on profitability in brewer firms.

Response	**Score(X)**	**Frequency(F)**	**FX**	**X-μ**	**$(X-\mu)^2$**	**$F(X-\mu)^2$**
SA	5	140	700	1.0288	1.0584	148.176
A	4	100	400	0.0288	0.0008	0.0829
UD	3	25	75	-0.972	0.0944	23.6196
D	2	20	40	-1.9712	3.8856	77.7125

SD	1	28	28	-2.9712	8.8280	247.1848
Total	15	313	1243			496.7756

Table 4.4.1

$$\bar{X} = \frac{15}{3} = 3$$

$$\mu = \frac{1243}{313} = 3.9712$$

$$SD = \sqrt{\frac{496.7756}{313}} = \sqrt{1.5871} = 1.2598$$

20

$$Zscore_{CAL} = \frac{X - \mu}{SD} = \frac{3 - 3.9712}{1.2598} = \frac{-0.9712}{1.2598} = -0.7709$$

$Zscore_{critical}$ = -1.645 at 5% level of significance

-0.7709> -1.645

Since the critical value is less than the calculated value, we reject the null hypothesis which said that inventory management has no significant impact on profitability of brewing firms and accept the alternate hypothesis which said that materials management has a significant impact on profitability of brewing firms.

4.3.2. Research Hypothesis 2

- Ho_2: There is no significant relationship between Materials procurement and profitability in brewing firms.
- Ha_2: There is significant relationship between Materials procurement and profitability in brewing firms.

Response	**Score(X)**	**Frequency(F)**	**FX**	**X-μ**	**$(X-\mu)^2$**	**$F(X-\mu)^2$**
SA	5	120	600	1.1534	1.3303	159.6397
A	4	100	400	0.1534	0.0235	2.3531
UD	3	40	120	-0.8466	0.7167	28.6692
D	2	32	64	-1.8466	3.4099	109.1178
SD	1	21	21	-2.8466	8.1031	170.1657
Total	15	313	1204			469.9455

Table 4.4.2

$$\bar{X} = \frac{15}{3} = 3$$

$$\mu = \frac{1204}{313} = 3.8466$$

$$SD = \sqrt{\frac{469.9455}{313}} = \sqrt{1.5014} = 1.2253$$

21

$$Zscore_{CAL} = \frac{X - \mu}{SD} = \frac{3 - 3.8466}{1.2253} = \frac{-0.8466}{1.2253} = -0.6909$$

-0.6909> -1.645

Since the critical value is less than the calculated value, we reject the Null hypothesis which said that here is no significant relationship between Materials procurement and profitability in brewing firms and accept the alternate which said that there is significant relationship between Materials procurement and profitability in brewing firms.

4.3.3. Hypothesis 3

- Ho_3: Material storage has no significant impact on profitability in brewing industry
- Ha_3: Material storage has a significant impact on profitability in brewing firms.

Response	Score(X)	Frequency(F)	FX	X-μ	$(X-\mu)^2$	$F(X-\mu)^2$
SA	5	115	575	1.1885	1.4125	162.4375
A	4	110	440	0.1885	0.0355	3.905
UD	3	35	105	-0.8115	0.6585	23.0475
D	2	20	40	-1.8115	3.2815	65.63
SD	1	33	33	-2.8115	7.9045	260.8455
Total	15	313	1193			515.8695

Table: 4.4.3

$$\bar{X} = \frac{15}{3} = 3$$

$$\mu = \frac{1193}{313} = 3.8115$$

$$SD = \sqrt{\frac{515.8695}{313}} = \sqrt{1.6481} = 1.2837$$

22

$$Zscore_{CAL} = \frac{X-\mu}{SD} = \frac{3-3.8115}{1.2837} = \frac{-0.8115}{1.2837} = -0.6321$$

$-0.6321 > -1.645$

Since the critical value is less than the calculated value, we reject the Null hypothesis which said that material storage have no significant impact on profitability of brewing firms and accept the alternate which said that materials storage has a significant impact on the profitability of brewing firms.

4.3.4. Hypothesis 4

- Ho_4: There is no significant relationship between Interdepartmental collaboration profitability of brewing firms.
- Ho_4: There is significant relationship between Interdepartmental collaboration profitability of brewing firms.

Response	Score(X)	Frequency(F)	FX	X-μ	$(X-\mu)^2$	$F(X-\mu)^2$
SA	5	125	625	0.9553	0.9125	114.0747
A	4	116	464	-0.447	0.0019	0.2317
UD	3	45	135	-1.0447	1.0913	49.1129
D	2	15	30	-2.0447	4.1807	62.7119
SD	1	12	12	-3.0447	9.2701	111.2412
Total	15	313	1266			337.3724

Table 4.4.4

$$\bar{X} = \frac{15}{3} = 3$$

$$\mu = \frac{1266}{313} = 4.0447$$

$$SD = \sqrt{\frac{337.3724}{313}} = \sqrt{1.0778} = 1.0382$$

$$Zscore_{CAL} = \frac{X-\mu}{SD} = \frac{3-4.0447}{1.0382} = \frac{-1.0447}{1.0382} = -0.0062$$

$-1.0062 > -1.645$

Since the critical value is less than the calculated value, we reject the Null hypothesis which said that there is no significant relationship between Interdepartmental collaboration and profitability of brewing firms and accept the alternate which said that there is significant relationship between interdepartmental collaboration and profitability of brewing firms.

4.4. Discussion Of Findings

The question for objective 1 was designed to determine the extent to which material inventory affect the profitability of brewing firms and 77% respondents agreed that materials inventory has significant effect on the profitability of brewing firms. To confirm the above, a Z test was conducted at 5% level of significance using the average values in table 4.3.1. The Z_{cal} of -0.7709 is greater than $Z_{critical}$ of -1.645 hence the Null hypothesis was rejected and alternate hypothesis accepted. The conclusion therefore is that materials inventory has significant positive effect on profitability of brewing firms. This conclusion is in consonance with the study by Adeyemi & salami (2010)

The question for objective 2 was designed to determine the extent to which material procurement affect the profitability of brewing firms. 70% of respondents agreed that materials inventory has significant effect on the profitability of brewing firms. To confirm the above, a Z test was conducted at 5% level of significance using the average values in table 4.3.2. The Z_{cal} of -0.6909 is greater than $Z_{critical}$ of -1.645 hence the Null hypothesis was rejected and alternate hypothesis was accepted. The conclusion therefore is that materials procurement has significant effect on profitability of brewing firms.

The question for objective 3 was designed to determine the extent to which material storage affect the profitability of brewing firms and 77% respondents agreed that materials storage has significant effect on the profitability of brewing firms. To confirm the above, a Z test was conducted at 5% level of significance using the average values in table 4.3.3. The Z_{cal} of -0.6321 is greater than $Z_{critical}$ of -1.645 hence the Null hypothesis was rejected and alternate hypothesis accepted. The conclusion therefore is that materials storage has significant effect on profitability of brewing firms. This conclusion is in agreement with Adeloye (2010) who concluded that high rate of shut down and ailing in manufacturing sector is attributed to high cost of procurement of materials which invariably affects their profitability.

The question for objective 4 was designed to determine the relationship between interdepartmental collaboration and profitability of brewing firms. 77% respondents agreed that significant relationship exits between interdepartmental collaboration and profitability of brewing firms. To confirm the above, a Z test was conducted at 5% level of significance using

the average values in table 4.3.4. The Z_{cal} of -1.0062 is greater than $Z_{critical}$ of -1.645 hence the Null hypothesis was rejected and alternate hypothesis was accepted. The conclusion therefore was that significant positive relationship exits between interdepartmental collaboration and profitability of brewing firms. This conclusion is in consonance with the study by Ogbadu(2009).

In addition to data collected through the questionnaire survey, a qualitative data collection techniques involving one-on-one interview with selected respondents was conducted. This stage of research involved the selection of data sub sample of different levels of employees including Directors and all levels of management to enable us get balance view on the subject under study. These respondents formed part of the original group selected for this study. The actual number of respondents interviewed were 15 selected randomly from employees, executive and non executive directors of the three firms used for this study(10 and 5 respondents for Nigerian Breweries and Guinness Nigerian PLCs respectively).

Overall, there were similarities between the responses to the interview questions and the survey questionnaires. Conclusion of this section captures the essence of the entire work. Materials management in brewing firms significantly contribute to their profitability

5. Summary Of Findings, Conclusion And Recommendation

5.1. Summary Of Findings

The following findings were made from the study.

- That materials inventory has significant positive effect on profitability of brewing firms.
- That there is significant positive relationship between materials procurement and profitability of brewing firms.
- That materials storage has significant positive effect on profitability of brewing firms.
- That there is significant positive relationship between interdepartmental collaboration and profitability of brewing firms.

These findings are in line with the researches of Ogbadu (2009); Adeloye (2010); Adeyemi & salami (2010) which posit that effective materials managements contribute positively to profitability of manufacturing firms.

5.2. Conclusion

The main thrust of this study is to determine the impact of materials management on profitability of brewing firms. We conclude that materials management has significant impact on the profitability of brewing firms. Since the $Zscore_{critical}$ is less than the calculated value, the alternate hypothesis which said that effective material management has significant positive impact on profitability of brewing firms was accepted and the Null hypothesis rejected. The findings from this study collaborated the results of studies by Ondiek(2009); Ogbadu(2009)and Unan(2012). These findings are in line with the result of the interview questions and objectives of this study.

5.3. Recommendations

In the light of above findings, some pertinent recommendations can be made. These recommendations are geared towards enhancing the effective and efficient materials management with a view to improving the profitability of brewing firms in Nigeria. This study recommends the following;

- Materials management should be embrace by all manufacturing firms in order to reduce production cost and improve profitability.

- Materials management department should take the responsibilities of training personnel in materials management department very serious.
- That there should be collaboration between all departments concerned with direct or indirect materials handling in an organization.
- That method of materials storage should be improved not only for good record keeping of materials inventory but to guide against pilferage and deterioration.
- Organizations should take the issue of scrap and surplus materials disposal serious as it is a good cost saving strategy.
- Organizations should endeavour to choose the most effective and efficient means of transportation most suited to the materials in question to reduce cost and damages in the process.
- That organization should endeavour to get supply from most competitive and best price without compromising the quality.

5.4. Suggestion For Further Studies

- Evaluation of Inventory Materials management on the Sustanability and survival of Nigerian Manufacturing firms

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