

LEAN ACCOUNTING PRACTICES AND FINANCIAL PERFORMANCE OF LISTED CONSUMER FOOD PRODUCTS MANUFACTURING COMPANIES IN NIGERIA

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ABSTRACT

To remain in business and improve financial performance, companies must change their structure to meet customers' demands with higher quality lower price as well as short delivery time, and also companies have to meet the expectations for instant orders, and with more variety of products. Thus, the study examined lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria. The specific objectives evaluated the relationship between just-in-time costing and return on equity of listed consumer food products manufacturing companies in Nigeria, also examined the relationship between value stream mapping and return on equity of listed consumer food products manufacturing companies in Nigeria, and determined the moderating influence of firm size in the relationship between lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria. The study adopted triangulation and correlational research design. The target population for the study is nine (9) listed consumer food products manufacturing companies on the floor of the Nigerian Stock Exchange (NSE) as at 31 August 2021. The unit of respondent of the study were three hundred and thirty-six (336) knowledgeable and competent staff within the production, marketing and finance departments of the nine (9) listed consumer goods manufacturing companies. The sample size was therefore determined by using the Taro-Yame sampling techniques to be 183. The instrument of the study is triangulation (primary data and secondary data). The formulated research questions were analyzed with descriptive statistics. The hypotheses were tested using the multiple regression analysis with the aid of E-view (10). The findings of the study were that: there is significant relationship between just-in-time costing (JITC) and return on equity (ROE) of listed consumer food products manufacturing companies in Nigeria. Meanwhile, there is an insignificant relationship between value stream mapping (VSMC) and return on equity (ROE) of listed consumer food products manufacturing companies in Nigeria. And There is significant influence of the firm size on the relationship between lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria. The study recommends that; Just-in-time costing (JITC) inventory system should be used by management in order not to run at loss and not to incurring further costs on staff training in other lean accounting knowledge. Also, that organizations should take the first step to train familiarize, inform and enhance the staff skills on how to improve the organizational performance through value stream mapping system.

Key: lean accounting practices, financial performance, Just-in-time costing (JITC), value stream mapping and return on equity (ROE)

INTRODUCTION

Knowledge about change in management accounting techniques has expanded rapidly over the last few decades (Quattrone & Hopper, 2010). This development in management accounting is clearly in response to the recognition that it is vital for an organization to take strategic initiatives in order to face the shifting winds of change in today's competitive business environment (O'Brien, 2011). To maintain their presence and improve financial performance, companies must change their structure to meet customers' demands with higher quality lower price as well as short delivery time, and also companies have to meet the expectations for instant orders, and with more variety of products. Lean accounting system has emerged under these conditions and obligations. By revealing malfunctions and presenting more effective ways of working, lean accounting provides a competitive advantage for both organizational level and countries (Tugce, 2015). Burns and Vaivio (2011) "advocated that, lean accounting is not just a manufacturing technique, it is an approach that can be applied in many areas such as; service delivery product development, public service, and commercial activities. Thus, a company which adopt lean production system, is a necessity that the accounting system changes lean accounting (Cooper & Kaplan, 2011, in Johnson & Kaplan, 2008).

The philosophy of lean accounting is based on lean thinking. Lean thinking involves the set of measures taken against wastage. Lean thinking knows that the product will not be affected if the wasteful activities are going to be removed (Komurcu, 2017). Thus, lean accounting is the controlling, measuring and managing methods that reflect lean thinking and production that make consciously decisions possible by providing precise, understandable and applicable information, deleting unnecessary stages related to traditional cost control and reduction. This type of accounting encourages optimizing activities in long-term by providing criteria's and information reporting. Lean thinking helps the company to get high income by identifying potential financial profits resulted by lean improving policies (Kumar, 2010). A traditional accounting system might show impressive numbers by virtue of the fact that you've leveraged economies of scale and made large quantities of a particular part. Roya et al (2012), lean accounting is a general term that supports required changes in managing, evaluating, controlling and accounting processes of a company that uses lean system to encourage lean thought and production.

Liargovas and Skandalis (2018), indicate financial performance as the level of performance of a business over a specified period of time, expressed in terms of overall profits and losses during that time. Evaluating the financial performance of a business allows decision-makers to judge the results of business strategies and activities in objective monetary terms. A subjective measure of how well a firm can use assets from its primary mode of business and generate revenues. Lumpkin and Dess (2019), argued that there are many different ways to measure financial performance, but all measures should be taken in aggregation. Some popular ratios or indicators of financial performance are: return on asset (ROA), return on investment (ROI), return on equity, return on sale (ROS), revenue growth, market shares, stock price, sales growth, liquidity and operational efficiency (Mainelli & Giffords, 2014).

For business to maintain its presence in the global trends and make enough profit, it must design its structure to meet customers' demands with qualitative products, cheapest price as well as short delivery time. Consequently, the entities are obliged to find the management system, which allows them to be competitive and efficient in using the resources at the lowest costs possible. Lean production system has emerged in order to

respond exactly to customers' demands with least amount of resources. Lean production are set of principles, tools as well as techniques that business organizations employ to eliminate non-value-added activities in the production process.

Statement of Problem

In recent years, the cost of doing business in Nigeria has been very expensive. This has equally affected cost of raw materials and production cost of manufacturing firms. These cost challenges have made many products manufactured in the country unpatronized by the consumers because of price of the product, and as a result of that expires in the hands of the sellers (Ine-Tonbarapa, 2017). According to Aziz, et al, (2017), some manufacturing firms end up making use of low-quality materials for production so as to reduce cost of production and maximize profit. Which Nigerians are suffering the consequences currently, by consuming substandard products flooding the market. This is the result of that many manufacturing firms not adopting or instituting better cost reduction strategies or non-adherence to set cost reduction and control strategies.

To remain in business over years, manufacturing firms have necessitated the need to focus on different management cost control and reduction techniques programme crashing, budgetary control, performance budgeting, and material management techniques in order to achieve both the primary and secondary aims of being in business, which include maximization of profit, shareholders' value (growth) and productivity which today have failed and seen as traditional methods.

Today, numerous companies have made a commitment to lean with the implied belief that their commitment will lead to improved operational and financial performance that can be objectively measured through the application of just-in-time costing and value stream mapping. Organizations understandably desire to have customers willing to pay; investors willing to invest; communities willing to support; and employees willing to commit their trust, confidence, and careers to achieve long-term business sustainability and profitability.

From webmetrix empirical analysis, lean accounting and financial performance of manufacturing companies' studies and literature are mostly dominated in Asian and America and other developed countries, enhance is scarce in Nigeria and other African countries to the best of our knowledge and as thus may not be adequately reflect or represent the actual result in Nigeria. the studies are focused on developed countries. In order to empirically cover the missing gap in scope and content, the study focused on lean accounting and consumer goods manufacturing sector. The study further filled the content gap by applying just-in-time costing and value stream mapping as dimensions and measure of return on equity. The study is also unique as the analytical scope cover 10 years' time lag (2011 - 2020) to fill the problem of obsolesce of empirical information data. Thus, it is on the above premise that cited the researcher in writing on lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria.

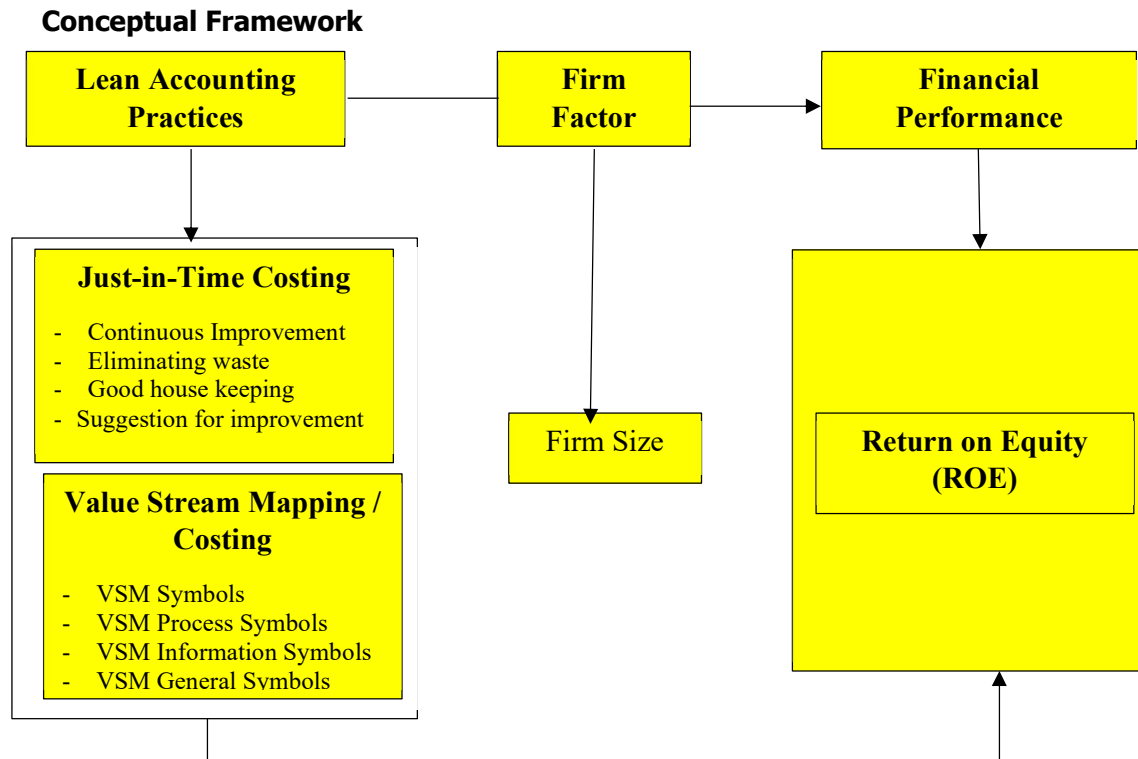


Figure 1.1. Conceptual Framework Model

Sources: Liargovas and Skandalis (2018), Sobczyk et al (2013), Cooper and Kaplan (2011), and researcher's input

Aim / Objectives of the Study

The main aim of the study is to determine the relationship between lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria, specific objectives are to:

1. evaluate the relationship between just-in-time costing and return on equity of listed consumer food products manufacturing companies in Nigeria.
2. ascertain the relationship between value stream mapping and return on equity of listed consumer food products manufacturing companies in Nigeria.
3. Determine the moderating influence of firm size in the relationship between lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria".

Research Hypotheses

In order to provide answers to the research questions raised, "the following hypotheses were stated in null form as presented below:

- HO₁: There is no relationship between just-in-time costing and return on equity of listed consumer food products manufacturing companies in Nigeria.
- HO₂: There is no relationship between value stream mapping and return on equity of listed consumer food products manufacturing companies in Nigeria.
- HO₃: There is no moderating firm size in the relationship between lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria".

Review of Related Literature

Conceptual Framework

Lean Accounting

The word lean refers to a "series of solutions to reduce waste and non-value tasks and enhance the value-added procedure. As the concept, lean is originated from Toyota production system and the main idea of TPS is to create the number of units needed, at the time needed and, in the amounts needed, in a way, that unnecessary product portfolio can be removed. The main three goals of cost reduction are superior quality control, quality assurance and humanity respect. By this, the origin of TPS is the complete elimination of waste and two important pillar are need to encourage this TPS are JIT and automation- Jidoka (Durakovic et al., 2018).

As the focus of the lean philosophy is on eliminating all of the wastages from cradle to grave and to create more customer value, the role of an accounting department can't be overemphasized. As in the words of (Maskell, et al, 2012), the accountant is expected to provide instant and meaningful feedback, use less complicated procedures and employ measures that emphasize customer value and elimination of wastages. The financial reports prepared under a lean accounting system are simple and understandable conveying the essence of the principle of continuous improvement and waste reduction as incorporated in lean philosophy becoming a strategically congruent activity (Fullerton, et al, 2014). The role of management accountant is to facilitate and report rather than become a means of bogging the system down. On the same lines, (Kennedy & Widener, 2008) reports that accounting stance towards lean advocates that firms combine strategies fashioned to eliminate waste in manufacturing activities and to support decision-making framework and control activities within a typical lean manufacturing system.

Measures of the Predictor Variables

Just-in-Time Costing

According to Akbar et al. (2013), "Just in Time is Japanese developed concept and has been put into use by many firms in Japan since early '70s. Broyles et al. (2005) opine that Just in Time has stood out for years by improving the organization's working conditions especially their procurement procedures. It has changed the competition in the global business environment from organization to organization to supply chain and supply chain. Companies and businesses affect our daily activities and lives, hence, successful businesses are a key to a nation's economic development. According to Gavrea et al. (2011), many researchers see firms and institutions as the engine room for economic, social and political development of a nation. Therefore, organizational performance achievement is an important index in measuring a firm's behaviour. Continuous performance is the objective of a firm's because it is through it that growth and survival can be sustained for a very long time (Gavrea et al., 2011).

Value Stream Mapping

Value stream costing is considered the most suited system for cost and profitability report in lean philosophy (Maskell & Kennedy, 2017). This system is characterized by collecting the value stream costs weekly, and by the reduced or non-existent imputing of overheads. It provides information that is clearly perceptible to all the members of the value stream, which is translated into good decisions, motivation to implement lean improvements along the entire value stream and clear financial reporting. The weekly report allows at the same time an excellent cost control and management, because they can be reviewed by the value stream manager while the information is still current. The purpose of the closing of the month is only to consolidate the value streams' sales and costs for the whole company. All costs included in the value stream are considered direct costs, while all costs unrelated to the value stream are not included in its costing (Maskell, 2016). All resources consumed by value stream activities, from the time the order is placed until delivery, are costs to be included in the value stream financial statements. All costs to be included are actual costs and not standard costs (Kennedy & Huntzinger, 2015; Kennedy & Brewer, 2005). These costs

include, namely, all labour costs involved in the value stream, the cost of materials to be transformed, the cost with machines and equipment, occupation and maintenance of the workplace costs, and all other costs directly associated with the value stream, with little or no imputing (Maskell, 2006). The people involved in the value stream do not include only industrial labour, but also all the other support areas. Labour costs should be as much as possible included in the value streams as direct costs. However, workers do not always perform tasks for just one of the value streams, so when that happens, the costs with these workers must be split throughout the different value streams according to the amount of work spent in each of them (Kennedy & Huntzinger, 2015). The cost of materials is calculated from the value spent by the value stream to purchase them that week. When the materials arrive at the factory, they are included in the costs of the value stream that will transform them. Total costs with value stream materials correspond to the sum of everything bought that week (Maskell, 2016). The only periodical cost imputing is the cost for the factory's square meters (m²). This cost for m² includes rent for the building, all the utilities, and the maintenance costs for the building. The sum of these costs is then divided by the total m² of the building, thus creating the cost per m².

Measurements of Financial Performance

Return on Equity (ROE)

The return on equity ratio (ROE) is considered a key ratio in equity evaluation because it addresses a question of prime importance to investors, which is what kind of return that the company is generating in relation to its equity. A company's ROE is a valuable indicator of both how effectively the organization is utilizing its equity investors. The importance of ROE in analyzing brewery companies stems from the basic fact that brewery companies must expend massive amounts of capital to bring their products to market. Therefore, how efficiently they employ the capital that equity investors provide is indeed a key indicator of the effectiveness of the company's management and of the company's ultimate profitability. ROE is calculated by dividing a company's net income by total shareholders' equity. Although a higher ROE figure is generally a better ROE figure, investors should exercise caution when a very high ROE is a result of extremely high financial leverage. This is one reason why it's also important to consider a pharma company's debt and liquidity situation.

The return on equity ratio or ROE is a profitability ratio that measures the ability of a firm to generate profits from its shareholder's investments in the company. In other words, the return on equity ratio shows how much profit each dollar of common stockholders' equity generates. So a return on 1 means that every dollar of common stockholders' equity generates 1 dollar of net income. This is an important measurement for potential investors because they went to set how efficiently a company will use their money to generate net income.

Firm size

According to Abiodun (2013), the size of a firm plays an important role in determining the kind of relationship the firm enjoys within and outside its operating environment. The larger a firm is, the greater the influence it has on its stakeholders. Again, the growing influences of conglomerates and multinational corporations in today's global economy are indicative of what role size plays within the corporate environment. The size of the firm is also one of the important variables taken in many disclosure studies. Focusing on the relation between disclosure and size Hossain (2008) argues that large firms disclose more information and companies may tend to allocate larger resources for production of this information. So many previous studies have concluded existence of positive relationship between size and disclosure like Ibrahim (2012). Beck (2005), argues that firm size has a strong association with firm's survival, profitability and productivity; though, depending on policy implementation likes legal and financial policy effects, depending on their size. Large size firms tend to diversified, benefit from economy of scale, and more capacity and resources. Boone (2007), observes that the proportion of firm size and outside director is positively related. Implying that the larger a firm size, the more should be the outside director's

representation in the quest for efficient monitoring and transparency. Similarly, Raja and Kumar (2005) posit that firm size exhibit a positive relation with the performances of listed firms.

Just-in-time and financial performance

The analysis of Just-in-time and lean system can greatly help in financial performance measurement. JIT production methods generally lead to greater operational flexibility, improved quality, and lead time reductions resulting to better financial performances. Because JIT and lean manufacturing systems focus on allowing the customer to pull material through the process, only replenishing inventories upon receipt of an order, the impact of such systems should be manifest in the inventory and asset turnover metrics Nicholas, and Soni (2005). If the reduction in assets and improved efficiency reduces overall costs, then there should be a subsequent increase in the firm's return on assets. As resources are freed by the elimination of no value-added activities, productivity is expected to rise, as should labor utilization. It is reasonable to expect that reductions in accounts receivable and inventory, along with increases in productivity, will also positively impact cash flow from operations, making the firm a more efficient converter of resources to cash. Great is the volume of studies that have been performed to assess the effect of lean systems on the financial health and productivity of various industries, and varied are both the analytical approaches taken and the results obtained (Veech, 2004). Performance is a key means of measuring firms, what they do, and how their immediate environments affect them. Though several scholars and researchers have written on the concept performance in academic literature, there have not been a consensus and acceptable definition despite many definitions from these scholars (Gavrea et al., 2011).

Value stream and financial performance

The control of production and other processes is achieved by visual performance measurements at the shop floor and value stream level. This measurement eliminates the need for the shop-floor tracking and variance reporting favoured by traditional accounting systems. The continuous improvement is motivated and tracked using value stream performance boards which is updated weekly and used by the value stream continuous improvement team to identify areas and level of improvement, initiate PDCA projects- Plan-Do-Check-Act or Plan-Do-Check-Adjust, and monitor their progress (Okpala, 2013). The lean operations report is classified into value stream costing, financial statements and transaction elimination. The value stream costing reports consists of a simple summary of direct costs of the value streams without overheads allocation to provide financial information that can be clearly understood by every worker in the value stream. This in turn leads to excellent decisions, motivate lean improvement across the entire value stream and show clearly accountability for cost and profitability. Weekly reporting pattern provides excellent control and management of current costs by the value stream manager (Stenzel, 2017).

The influence of Firm Size Lean Accounting and Financial Performance

The ideal firm size is the magnitude of a business in a specified industry at a particular time which can be measured in revenue, profits, number of employees and even the size of its facilities. The size of a business entity affects different things in the corporation, such as the goodwill, customer loyalty, patronage and its level of receptiveness to the interested party. The existence of multiple firms serving most markets is not limited by the size of the market (Becker & Murphy 1992). Synchronization outlays play a major role in controlling the size of firms before the size of the market becomes binding (Becker & Murphy 1992). According to Adam Lucas (1978) the extent of specialization is limited by the size of the market. Lucas (1978) opined that the talent for managing the market is erratically distributed among agents, with firm output increasing in this talent. A firm is identified with a manager, and the capital and labor under the manager's control. If the elasticity of substitution between capital and labor in the production function is less than one, average firm size increases with per capita wealth. An increase in per capita capital raises wages relative to

managerial rents, inducing marginal managers to become employees, and increasing the ratio of employees to managers. Thus, we expect that greater capital intensity by human capital development to be associated with larger firm (Lucas, 1978).

Theoretical Framework

Production Theory

The Production theory developed by Charles et al (1928) is the study of production, or the economic process of converting inputs into outputs. Production uses resources to create a good or service that are suitable for use, gift- giving in a gift economy, or exchange in a market economy. This can include manufacturing, storing, shipping, and packaging. The theory of production is an effort to explain the principles by which a business firm decides how much of each commodity that it sells (its "outputs" or "products") it will produce, and how much of each kind of labour, raw material, fixed capital good, that it employs (its "inputs" or "factors of production") it will use. The theory involves some of the most fundamental principles of economics. These include the relationship between the prices of commodities and the prices (or wages or rents) of the productive factors used to produce them and also the relationships between the prices of commodities and productive factors, on the one hand, and the quantities of these commodities and productive factors that are produced or used, on the other.

The various decisions a business enterprise makes about its productive activities can be classified into three layers of increasing complexity. The first layer includes decisions about methods of producing a given quantity of the output in a plant of given size and equipment. It involves the problem of what is called short-run cost minimization. The second layer, including the determination of the most profitable quantities of products to produce in any given plant, deals with what is called short- run profit maximization. The third layer, concerning the determination of the most profitable size and equipment of plant, relates to what is called long-run profit maximization.

Related Empirical Studies

Seyed and Hariprasad (2013), identify the considerations for adapting Value Stream Mapping in a product development environment and provide a "best practice" approach for VSM. The findings from a literature review and interviews were tested during a case study at Renault Trucks. According to this study, identifying key specific objectives, choosing the suitable scope and project, and noticing the information and output uncertainties are the main subjects that should be considered during the application of VSM in the product development area. Based on the findings, a step-by-step procedure is provided that helps organizations apply VSM in a product development environment.

Oluwagbemiga, et al. (2014), "investigated the relationship that exists between cost management practices and firm's performance in manufacturing organizations using data from 40 manufacturing companies listed on the Nigerian stock exchange during the period from 2003 to 2012. The study relied on secondary data extracted from the audited financial statements of the selected companies. Inventory management, budgetary control and cash management, production overhead cost, and administrative overhead cost were taken as independent cost management variables, while profitability (operating profit) was taken as a dependent variable representing the firm's performance. The result indicates that a positive, significant relationship exists between cost management practices and the firm's performance in the manufacturing organization.

Fernando et al. (2017), described some links between Just in Time (JIT) manufacturing strategy and performance financial analysis in financial statements. A rational, deductive, analytical and objective method was used; based on previous findings, a series of functions along with pre-post and linear regression analyses models are described as explicative of the relationships between JIT and financial statements analysis. Results show that the Dirac function, value transformation function, and transform kernel provide the foundations for a conceptual link between JIT and

company performance in financial statements. Besides, the JIT relationship to business performance is explained by the following three models, selected from literature: a) the pre-post model, which explains changes in inventory and asset turnover and their relationship to JIT; b) the two-stage self-selection regression analysis model, which explains how sales, inventory, company size, and JIT adoption influence ROA changes; and c) the lean manufacturing model, which includes JIT and allows for the explanation of firm financial data". The conclusion is that JIT is part of a financial sequence of analysis strongly related to the structure of financial statements and company performance.

Karanja, et al (2012), also conducted a study on adoption of modern management accounting techniques in small and medium (SMEs) in developing countries: A case study of SMEs in Kenya. Their study shows that modern costing techniques such as target costing, Activity based costing (ABC), Just in Time method (JIT) as well as other non-conventional methods were adopted as an attempt to enhance enterprise efficiency and innovation for better planning and improved product/service pricing. The findings showed that SMEs in Kenya have intuitively adopted varying management accounting techniques. From the sample, the majority of SMEs are faced with constraints on capital management.

Alaaraj and Bakri (2019), examined the effect of lean manufacturing on financial performance from the perspective of managers in the industrial sector in South Lebanon. The methodology of this study was quantitative in which 152 self-administered questionnaires were distributed randomly among managers. The data was analyzed using SPSS software. Descriptive statistics were identified and proposed hypotheses were tested using Pearson correlation and regression analysis. The results showed that lean manufacturing has a significant and positive effect on financial performance. Future studies are encouraged to expand the research to other regions in Lebanon over a longer time horizon and apply different quality improvement tools.

Nasieku and Oluyinka (2018), reviewed the literature on cost accounting techniques being practiced by manufacturing and service industries within the last decade. Virtually all techniques that are appropriate for manufacturing companies are also appropriate for service companies. However, the most common techniques in manufacturing companies include Just in Time (JIT), Activity Based Costing (ABC), Target Costing, Life Cycle Costing, Throughput Accounting, and Kaizen Costing, while Activity Based Costing is the most commonly used technique in the service sector. However, Activity Based Costing, Budgetary Control, Cost Volume Profit Analysis, and Standard Costing are common to both the manufacturing and service sectors. In contrast to the postulations of many academic authors that traditional techniques have lost relevance and should be discontinued, this review shows that traditional techniques, including the heavily criticized Standard Costing, Absorption Costing, and Marginal Costing, were still used frequently by many companies within the last decade. The Just-in-Time principle, Activity Based Costing, Target Costing, Life Cycle Costing, Kaizen Costing, and Throughput Accounting are some of the modern costing techniques that have been widely used in recent decades. The usage of the techniques depends on the situation on the ground, that is, the level of technological advancement, the size of the company, organizational culture and stage of the product.

METHODOLOGY

The study adopted triangulation and correlational research design. The target population for the study is nine (9) "listed consumer food products manufacturing companies on the floor of the Nigerian Stock Exchange (NSE) as at 31 August 2021. The unit of respondent of the study were three hundred and thirty-six (336) knowledgeable and competent staff within the production, marketing and finance departments of the nine (9) listed consumer goods manufacturing companies. The sample size was therefore determined by using the Taro-Yame sampling techniques to be 183. The instrument of the study is triangulation (primary data and secondary

data). The formulated research questions were analyzed with descriptive statistics. The hypotheses were tested using the multiple regression analysis with the aid of E-view" (10).

Model Specifications

According to Nmesirionye et al. (2019), "regression analysis is concerned with the study of how one or more variables affect changes in another variable. Thus, on the basis of the theoretical framework, the study adopted the regression formula adopted in the work of with some modifications. The model is specified as:

$$Y = f(a_0 + bX_i) + Et \dots\dots\dots 3.1$$

Where; the Lean accounting practices (LAP) components in the study are {just-in-time costing (JITC) and value stream mapping (VSMC)} defined as three components used in the study; whereas the measures are return on equity (ROE). This modification will help us investigate the impact of a lean accounting practices and financial performance (FINPER) of listed food consumer food products manufacturing companies in Nigeria".

$$FINPER = f(a_0 + LAP_1 + Et) \dots\dots\dots 3.2$$

Thus:

$$HO_1: ROE = \beta_0 + \beta_{JITC} + \psi \dots\dots\dots 3.3$$

$$HO_2: ROE = \beta_0 + \beta_{VSMC} + \psi \dots\dots\dots 3.4$$

HO₃:

Where;

- β_0 = Constant Term (y intercept)
- β = Coefficient of the independent variable
- ψ = Error term (causes of market share or profitability not explained by variables in the model)

To make the data uniform and easy to regress and analyses, Data were converted to natural logarithm (log) form as follows:

$$NLROE_{it} = \beta_0 + \beta_1(NLJITC)_t + \psi (.05) \dots\dots\dots 3.5$$

$$NLROE_{it} = \beta_0 + \beta_1(NLVSMC)_t + \psi (.05) \dots\dots\dots 3.6$$

Where;

- $NLJITC$ = Natural log of just-in-time costing
- $NLVSMC$ = Natural log of value stream mapping
- $NLROE_{it}$ = Natural log of Return on Equity

Gillette and Robert (1992), "suggested that in a linear regression equation where both the explained variable and the explanatory variables are in natural logs. Elasticity is a popular tool among empiricists because it is independent of units and thus simplifies data analysis.

Data Analyses and Results Interpretations

	JITC	VSMC	ROE	FMSZ
Mean	3.513	3.807	67.854	504.8237
Median	1.150	1.234	40.000	418.5460
Maximum	5.000	5.000	143.200	1306.9210
Minimum	1.600	1.6000	22.8000	38.90000
Std. Dev.	0.875	0.893	72.081	92.11265
Skewness	1.1850	1.4520	1.0944	20.698067
Kurtosis	3.0904	2.6513	2.9410	33.6574
Jarque-Bera	7.2643	8.7108	4.0196	3.926745
Probability	0.4590	2.0252	1 .0295	0.231454
Sum	27.040	33.597	2.3750	33.6882
Sum Sq. Dev.	1.018.7	4.6042	1.582	12.4812

Source: Statistical Computation result from Researcher's E-view (v.12), 2022

The table shows the descriptive statistics of the data collected for the criterion variable's dimensions of the study. The kaizen costing (KAC), just-in-time costing (JITC) and value stream mapping (VSMC) have a mean value of 3.513 and 3.807 respectively. The maximum and minimum values were just-in-time costing (JITC) was 5.000 and 1.600, while value stream mapping (VSMC) was 5.000 and 1.6000. Also, the standard deviation values of 0.875 and 0.893 signify that the data deviates from the mean values of the three study dimensions, which implies that there is a wide dispersion of the data from the mean because the standard deviation is close to the mean.

On the other hand, Skewness and Kurtosis calculated mean values, which is a measure of the departure of a distribution from symmetry above, for two study dimensions just-in-time costing (JITC) and value stream mapping (VSMC), show a positive skewness value that is greater than 1. This indicates that the two study dimensions are normally distributed. The Kurtosis result, which measures the extent of flatness or peakedness of a distribution in relative terms to a normal distribution, confirms that just-in-time costing (JITC) and value stream mapping (VSMC) are normally distributed and are not platykurtic (not having negative values/flattened curved) as their kurtosis coefficient is more than 3.0. Also, the p-value for the three study dimensions for Jarque-Bera statistics [(JB (PValue > 0.05) = Accept Ho (Normal Distribution) and JB (P Value 0.05) = Reject Ho (Non-Normal Distribution)]. Thus, the values of 0.4590 and 2.0252 for just-in-time costing (JITC) and value stream mapping (VSMC) respectively of Jarque-Beta and its statistical probabilities were accepted. The result strengthens the normality test of variables normally distributed.

The table also indicates the two measures of the criterion variable of the study that return on equity (ROE) have a mean value of 67.854 respectively. The maximum and minimum values of return on asset (ROE) were 143.200 and 22.8000 respectively. On the other hand, the standard deviation values of 72.081 signify that the data deviates from the mean values of the two study measures, which implies that there is a dispersion of the data from the mean because the standard deviation is close to the mean.

The table also indicates that the moderator variable of the study, firm size (FMSZ), has a mean value of 504.8237. Also, the median value of 118.5460, the maximum and minimum values of 1306.9210 and 38.90000". On the other hand, the standard deviation value of 92.11265, which signifies that the data deviates from the mean values of the two study measures because the standard deviation is close to the mean.

Regression

H0₁: The first Model: The first hypothesis test model; shows the relationship between return on equity and just-in-time costing:

$$\text{H0}_5: \text{NLROE} = f(\text{NLJITC}) \dots\dots\dots (v)$$

Dependent Variable: ROE

Method: Least Squares

Date: 09/05/21 Time: 08:30

Sample: 2000 2020

Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
JITC	-0.048418	0.029822	-1.622667	0.0146
C	17.27040	8.077037	2.138210	0.0400
R-squared	0.746044	Mean dependent var	67.85714	
Adjusted R-squared	0.738348	S.D. dependent var	72.08091	
S.E. of regression	36.87078	Akaike info criterion	10.10816	
Sum squared resid	44861.99	Schwarz criterion	4.119704	
Log likelihood	-174.8928	Hannan-Quinn criter.	3.513884	

F-statistic	9.694358	Durbin-Watson stat	1.983710
Prob(F-statistic)	0.000000		

Source: Statistical Computation result from Researcher's E-view (v.12), 2022

From the table output above, the coefficient of JITC and ROE is -0.048418. This value implies that for every unit increase in ROE is predicted to be accompanied by -0.048418-unit decrease in JITC. The T-statistics is above 1, which is sufficient statistical evidence of significant @ 1% T-stat confidence level. The Prob value of JITC is 0.0146, which means the relationship between and ROE is statistically significant at the 5 percent significant level. The result also showed that the R^2 , which measures the goodness of fit, is 0.746044, meaning that 74 percent of the variation in the consumer price index can be explained by the dimension of the independent variables. The result indicates that the model is proper and adequate for the study. The model's goodness of fit and appropriateness is also supported by the outcomes of F-statistics and probability of F-statistics of 9.694358 and 0.000001 respectively. The Durbin-Watson statistics of 1.983710 also indicate the absence of serial autocorrelation".

The second Model: The second hypothesis test model; shows the relationship between return on equity and value stream mapping:

H0₂: NLROE = f(NLVSMC)..... (vi)

Dependent Variable: NLROE

Method: Least Squares

Date: 09/05/21 Time: 08:30

Sample: 2011 2020

Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VSMC	0.600547	0.053368	11.25287	0.1000
C	9.742958	4.218649	2.309497	0.0273
R-squared	0.932260	Mean dependent var		67.85714
Adjusted R-squared	0.930207	S.D. dependent var		72.08091
S.E. of regression	19.04262	Akaike info criterion		8.786682
Sum squared resid	11966.51	Schwarz criterion		8.875559
Log likelihood	-151.7669	Hannan-Quinn criter.		8.817362
F-statistic	4.541535	Durbin-Watson stat		2.377233
Prob(F-statistic)	0.000030			

Source: Researcher's Statistical Computation from E-view (v.10), 2022.

From the table output above, the coefficient of VSMC and ROE is 0.600547. This value implies that for every unit increase in ROE is predicted to be accompanied by 0.600547-unit decrease in VSMC. The T-statistics is above 1, which is sufficient statistical evidence of significant @ 1% T-stat confidence level. The Prob value of VSMC is 0.1000, which means the relationship between VSMC and ROE is statistically insignificant at the 5 percent significant level. The result also showed that the R^2 , which measures the goodness of fit, is 0.932260, meaning that 93 percent of the variation in the consumer price index can be explained by the dimension of the independent variables. The result indicates that the model is proper and adequate for the study. The model's goodness of fit and appropriateness is also supported by the outcomes of F-statistics and probability of F-statistics of 4.541535 and 0.000030 respectively. The Durbin-Watson statistics of 2.377233 also indicate the absence of serial autocorrelation.

Analysis on the Moderating Variable

H0₃: Firm size does not have moderate influence on the relationship between lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria.

Partial Correlations Matrix**Table 4.12**

Control Variables		FINPER	LAP
FMSZ	FINPER	1.000	.648
	Correlation		
	Significance (2-tailed)	.	.016
	Df	0	10
	LAP	.648	1.000
	Correlation		
	Significance (2-tailed)	.016	.
	Df	10	0

Source: Statistical Computation result from Researcher's SPSS (v.24), 2022

From the output of the partial correlation explains that, firm size bears significant influence on the relationship between lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria. The correlation coefficient of 0.648 means that, firm size has positive interplay of lean accounting practices and financial performance as depicted by the probability level of 0.016 which is higher than the chosen alpha level of 0.05, thus leading to the rejection of the null hypothesis and accepting the alternative hypothesis. Hence, there is significant influence of firm size in the relationship between lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria".

CONCLUSION

Regarding above discussions, lean accounting can be proposed as a "new science and necessary tool in order to get better and precise results in preparation of financial performance of listed consumer goods of the manufacturing companies in Nigeria. Although lean accounting is still in its development process, there are some indications that this type of accounting is changing to a standard approach. The principles and procedures of lean accounting (just-in-time costing and value stream mapping) is easily adopted with various needs of companies and accounting standards. So, by applying lean thinking and production methods in companies, the use of traditional accounting commodious due to the advantages of lean thinking and production shown. By teaching lean accounting to managers and responsible of financial lists, a tool can be provided to integrate lean thinking and production and present related, understandable and matched with accounting standard financial lists. The study further concluded that the introduction of value stream mapping lean accounting systems should be a process starting with training the staff members, ensuring the supervisors understand that small but gradual improvement are only possible when they bridge the bureaucratic barriers and engagement of employee and relying on their views is very critical to the success of the value stream mapping. Again, there is significant relationship between just-in-time costing (JITC) and return on equity (ROE) of listed consumer food products manufacturing companies in Nigeria. And finally, there is significant influence of firm size on the relationship between lean accounting practices and financial performance of listed food product manufacturing companies in Nigeria.

RECOMMENDATIONS

In scope of the finding's recommendation were made;

1. Just-in-time costing (JITC) inventory system should be used by management in order not to run at loss and not to incurring further costs on staff training in other lean accounting knowledge.
2. The study recommends that organizations should take the first step to train familiarize, inform and enhance the staff skills on how to improve the organizational performance through value stream mapping system.
3. The study recommends that the manufacturing association of Nigeria should make regulations that promote lean accounting practices in manufacturing companies, as it statistically positive significant on the relationship between lean accounting practices and financial performance of listed consumer food products manufacturing companies in Nigeria. Thus, it will definitely contribute to financial performance in the long run".

REFERENCES

- Abiodun, C. E. (2013). The origins and evolution of lean management system. *Journal of International Studies*, 5(1), 46-51.
- Adam L. (1978). Lean manufacturing and firm performance: The incremental contribution of lean management accounting practices. *Journal of Operations Management*, 32(8), 414– 428.
- Akbar, J. K., Babu, K. N., & Talari, H. F. (2013). Just-in-time manufacturing system: from introduction to implement. Nagendra and Talari, Hamid, Just-In-Time Manufacturing System. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2253243
- Alaaraj, A. A., & Bakri, L. P. (2019). The effect of lean production on financial performance: The mediating role of inventory leanness. *International Journal of Production Economics*, 13(8), 242–253.
- Aziz, K., Awais, M., Rahat, Q., Hasnain, S. S. U., & Shahzadi, I. (2017). Impact of outsourcing on lean operations in Pakistani healthcare Industry. *International Journal of Engineering Information System*, 1(8), 116–123.
- Beck, E. (2005). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(3), 39–50.
- Becker, N. M., & Murphy, C. (1992). Applying lean six sigma in a small engineering Company: A model for change. *Journal of Manufacturing Technology Management*, 20(1), 113 -129
- Boone, A. (2007). Influence of Lean Production Practices on Performance of Large Manufacturing Firms in Kenya. *Journal of International Business, Innovation and Strategic Management*, 1(8), 145-163.

- Broyles, D., Beins, J., Franko, J., & Bergman, M. (2005). Just-In-Time Inventory Management Strategy and Lean Manufacturing. *Business Operations Management*, 5(2), 78-89.
- Burns, E., & Vaivio, P. (2011). *Learning to see: Value-stream mapping to create value and eliminate muda*. Brookline, MA: Lean Enterprise Institute.
- Charles, W., Cobb, K., & Paul, H. D. (1928). *Ethics and governance: Business as mediating institution*, Oxford University Press.
- Cooper, C. T., & Kaplan, O. (2011). *Exploring the relationships between just-in-time technique and manufacturing performance: Empirical evidence from selected Nigerian firms*. Manager (University of Bucharest, Faculty of Business and Administration) 10:165-176.
- Durakovic, M., Chakravorty, S., & Atwater, H. (2018). The lean enterprise and traditional accounting—Is the honeymoon over? *Journal of Corporate Accounting & Finance*, 17(6), 63–74.
- Fernando, W. F., Aruomoaghe, K. I., & Agbo, P. (2017). Critical success factors for lean implementation within SMEs. *Journal of Manufacturing Technology Management*, 17(4), 460-471.
- Fullerton, R. R., Kennedy, F. A., & Widener, S. K. (2014). Lean manufacturing and firm performance: The incremental contribution of lean management accounting practices. *Journal of Operations Management*, 3(2), 414-428.
- Gavrea C, Ilies, L., & Stegorean, R. (2011). Determinants of organizational performance: The case of Romania. *Management and Marketing* 6(2), 285-300.
- Gillette, F., & Robert, J. (1992). *The machine that changed the world*. Macmillan Publishing Company.
- Hossain, M. N. (2008). Relationship between lean production and operational performance in the manufacturing industry, *Materials Science and Engineering*, 3(9), 1-11.
- Ibrahim, F. S. (2012). The impact of lean management implementation on organizational operational performance. *Log Forum*, 11(4), 375-385.
- Ine-Tonbarapa, M. M. (2017). Impact of inventory management on firm performance: A case study of listed manufacturing firms in Ghana. *International Journal of Finance and Accounting*, 7(4), 83-96.
- Johnson, D., & Kaplan, U. I. (2008). The impact of lean management implementation on organizational operational performance. *Log Forum*, 11(4), 375-385.

- Karanja, S., Bellisario, A., & Pavlov, A. (2012). Lean production and business performance—international empirical results. *Competitiveness Review*, 23(3), 218-233.
- Kennedy, F., & Brewer, A. (2005). The nexus between health workers' emotional intelligence and job performance Controlling for gender, education, tenure and in-service training. *Journal of Global Responsibility*, 8(1), 1-16.
- Kennedy, F., & Huntzinger, M. (2015) Lean production and business performance—international empirical results. *Competitiveness Review*, 23(3), 218-233.
- Kennedy, F., & Widener, S. (2008). A control framework: Insights from evidence on lean accounting. *Management Accounting Research*, 19(7), 301-323.
- Komurcu, R. T. (2017). TQM and financial performance: What has empirical research discovered? *Total Quality Management & Business Excellence*, 18(4), 403- 412.
- Kumar, L. (2010). The nexus between health workers' emotional intelligence and job performance Controlling for gender, education, tenure and in-service training, *Journal of Global Responsibility*, 8(1), 1-16.
- Liargovas, E. R., & Skandalis, U. I. (2018). Lean-Based workforce management in Jordanian manufacturing firms. *International Journal of Lean Enterprise Research*, 1(4), 284-316. <https://doi.org/10.1504/IJLER.2015.071744>
- Lucas, P. (1978). Value stream mapping: A study about the problems and challenges found in the literature from the past 15 years about application of Lean tools. *International Journal of Advance Manufacturing Technology*, 7(2), 779–790.
- Lumpkin, H., & Dess, D. A. (2019). Determinants and barriers to lean implementation in food-processing SMEs – a multiple case analysis. *Production Planning Control*, 27(7), 1–23 Mainelli & Giffords, 2014).
- Maskell, F. S., & Kennedy, J. (2017). Defining lean production: Some conceptual and practical issues. *The TQM Journal*, 21(2), 127-142
- Maskell, B. C. (2016). Lean accounting: An ingenious solution for cost optimization. *International Journal of Academic Research in Business and Social Sciences*, 4(4), 2222–6990.
- Maskell, F.S., Baggaley, B. & Grasso, L. (2012). *Practical lean accounting: A proven system for measuring and managing the lean enterprise*. Productivity Press.
- Nasieku, M. N., & Oluyinka, B. S. (2018). *A literature review on value stream mapping with a case study of applying value stream mapping on research process*. Texas A&M University.
- Nicholas, J. M., & Soni, A. (2005). *The portal to lean production*. Auerbach Publications

- Nmesirionye, M., Granlund, M. & Lukka, K. (2019). Towards increasing business orientation: Finnish management accountants in a changing cultural context. *Management Accounting Research*, 8(9), 185-211.
- O'Brien, F. (2011). Assessing the impact of business uncertainty on supply chain integration. *International Journal of Logistics Management*, 27(2), 463-485
- Okpala, K. E. (2013). Lean accounting and lean business philosophy in Nigeria: Exploratory research. *International Journal of Economics, Finance and Management*, 2(7), 508–515.
- Oluwagbemiga, E., Shah, S. R., & Ganji, E. N. (2014). Lean production and supply chain innovation in baked foods supplier to improve performance. *British Food Journal*, 19(11), 2421-2447
- Quattrone, P. G. & Hopper, T. (2001). What does organizational change mean? Speculations on a taken for granted category. *Management Accounting Research* 12(4), 403-435
- Raja, G. K., & Kumar, B. (2005). Does lean healthcare improve patient satisfaction? A mixed-method investigation into primary care. *Business Management Journal*, 26(3), 95–103.
- Roya, I., Rao, D., & Battese, H. (2012). An integrative literature review on the middle management role in lean. *Total Quality Management & Business Excellence*, 31(13), 1-28.
- Seyed, M. N., & Hariprasad, S. A. (2013). Value stream mapping of rope manufacturing: A case study. *International Journal of Manufacturing Engineering*, 11(6), 120-153.
- Sobczyk, U., Dahiru, U., Banker, B., Kaplan, S. P., & Young, D. P. (2013). Determinants of organizational performance: The case of Romania. *Management and Marketing*, 6(2), 285-300.
- Stenzel, J. B. (2017). *Lean accounting: Best Practices for Sustainable Integration*. John Wiley & Sons, Inc.
- Tugce, W. T. (2015). Total quality management and the choice of information and reward systems. *Journal of Accounting Research*, 33(7), 1-34.
- Veech, E. R. (2004). A person-centered approach to sustaining a lean environment job-design for self-efficacy. *Defense Acquisition Review Journal*, 1(6), 159-171.

APPENDIXES

APPENDIX A

Please tick (✓) where applicable to you.

Response key:

Scale of Measurement

Strongly Agree	(SA)	5	
Agree	(A)	4	
Moderate Agree	(MA)		3
Disagree	(DA)	2	
Strong disagree	(SDA)	1	

Independent Variable dimensions

S/ N	JUST-IN-TIME COSTING	SA	A	MA	DA	SDA
7	Just in Time manufacturing practices has helped eliminate waste (over production, excess procurement, time waiting, and defective products).					
8	Just in Time manufacturing practices have shorter lead times and improve products quality in Nigeria environment.					
9	Just in Time achieve continuous production objectives in your company's and increase output.					
10	Just in Time manufacturing practices prepares cost report that details value-added and non-value-added costs.					
11	Just in Time lean manufacturing practice meets market demand forecasting and enhance timely delivery to customers.					
12	The company use of lean manufacturing accounting practices has improved performance measurement, control and decision-making process.					
S/ N	STREAM MAPPING	SA	A	MA	DA	SDA
13	Stream mapping manufacturing practice helped identifying items and processing steps that are no longer useful.					
14	Stream mapping manufacturing practice helped enhances timely product delivery to customers.					
15	Stream mapping lean manufacturing practice have reduced actual costs below the standards set.					
16	Stream mapping manufacturing practices have shorter lead times and improve products quality in your company.					
17	Stream mapping achieve continuous production objectives in your company's and increase output.					
18	The company use of lean manufacturing accounting practices has improved performance measurement, control and decision-making process.					

APPENDIX B

SECONDARY DATA FOR THE MEASURES OF THE DEPENDENT VARIABLES

RETURN ON ASSET

YEAR	CURD BURY ₦	DANG OTE R ₦	HONEY WELL ₦	MC NICHOL LS ₦	NASCON ₦	NESTL E ₦	UNION SALT ₦	FLOUR MILL ₦	NORTHERN FLOUR MILL ₦
2012	0.03743	0.12941	-3.5923	0.03509	0.2589	0.07485	0.0233	0.0487	-0.0338
2013	0.04630	0.15552	-1.6991	0.07290	0.2361	0.06960	-0.0138	0.0392	-7.5693
2014	0.01148	0.12240	-0.0187	0.18159	0.1469	0.20964	0.0908	-0.0483	-1.81533
2015	- 5.51768	1.18680	0.0982	0.11726	0.12922	0.19910	0.2838	0.01174	-0.053799
2016	- 5.98676	0.08070	0.0894	0.11771 6	0.09816	0.07296	-0.0607	0.04265	0.05446
2017	- 78.7239	1.92908	0.0278	0.06314	0.17739	0.22971	0.1061	0.03045	-0.02618
2018	- 0.01727	0.14469	0.1170	0.04947	0.14602	0.26493	0.1475	0.02722	-0.01103
2019	- 6.43251	0.12165	0.1046	-2.7979	0.04771	0.23624	0.0584	0.01478	-4.80241
2020	- 3.80121	0.12099	0.0739	0.02265	0.06071	0.15927	0.0257	0.22385	0.03898

Source: Nigeria Stock Exchange Commission and <https://www.proshareng.com/report/AnnualReports/Audited>

RETURN ON EQUITY

YEAR	CURDB URY ₦	DANGO TE R ₦	HONEY WELL ₦	MC NICHOLS ₦	NASC ON ₦	NESTL E ₦	UNION SALT ₦	FLOUR MILL ₦	NORTHER N FLOUR MILL ₦
2012	1.09	9.0	33.97	3.40	1.54	3.21	-	3.81	-12
2013	1.37	1.13	35.86	8.67	1.02	3.14	-	3.72	12.6
2014	7.5	9.9	42.26	38.39	7.0	28.05	-	4.37	13.1
2015	6.1	1.05	6.11	16.59	7.9	29.95	1.82	9.2	-11.2
2016	-1.6	1.18	6.29	17,12	9.1	2.76	-	3.97	-11.1
2017	1.6	3.15	2.17	10.42	2.02	42.55	4.37	3.75	-9
2018	4.4	2.15	9.10	12.50	1.67	54.26	-	3.52	-3.4
2019	5.7	2.01	8.52	6.20	7.0	57.63	-	1.13	-1.8
2020	5.0	2,58	6.72	4.95	1.02	49.47	-	2.05	-3.07

Source: Nigeria Stock Exchange Commission and <https://www.proshareng.com/report/AnnualReports/Audited>

APPENDIX C

Table (3.1) Population Distribution of Respondents in the nine (9) listed consumer food products manufacturing companies on the floor of the NSE as at 31 August 2021.

S/n	Listed companies	Sub-sector	Cities	Production Depart	Marketing Depart	Finance Depart	Total	Percentage
1	Cadbury Nigeria Plc	Consumer goods	Lagos	26	7	8	41	12
2	Dangote Sugar Plc	Consumer goods	Tunga Awe, Nasarawa St.	27	8	12	47	14
3	Menichols PLC	Consumer goods	Lagos	19	5	7	31	9
4	Northern Nigeria Plc	Consumer goods	Kano	27	6	7	40	12
5	Nestle Nigeria PLC	Consumer goods	Port Harcourt	21	7	9	37	11
6	Flour Mills NIG. PLC.	Consumer goods	Lagos	24	7	11	42	13
7	Nascon Allied PLC	Consumer goods	Port Harcourt	16	6	10	32	10
8	Union Dicon Salt Nig. PLC	Consumer goods	Lagos	17	6	8	31	9
9	Honeywell Flour Mill	Consumer goods	Lagos	19	7	9	35	10
	Total	9	4 Cities	196	59	81	336	100

Field Report", 2021