



Assessing the Determinant factors of Inventory Management Practice on financial performance of Paint Manufacturing Companies: A Panel Evidence from Nigeria

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Abstract: The study evaluates the determinant factors of inventory management practices on the financial performance of listed Paint manufacturing companies in Nigeria. Inventory management practice remains a vital part of a manufacturing concern to be more competitive, hence its efficient and sound management cannot be under estimated. Relevant theories were reviewed in this study for a sound theoretical and empirical foundation. The study population consists of 9 (Nine) listed manufacturing companies in Lagos state of Nigeria, registered with LCCI and NSE as at 2019 for a period of 12 years (2008-2019). Data was collected through primary and secondary sources which was subjected to diagnostic tests. Both descriptive and inferential statistics were used to analyze the panel data through OLS regression method. The overall result of the study indicates that the determinant factors of inventory management are: cost of raw materials, forex rate fluctuations, staff, repair and maintenance, technology and storage costs were more pronounced and significant in the sampled firms of the study. The study therefore recommends that government should help stabilize the forex market to curb fluctuations which act as a major barrier to effective inventory management in Nigeria.

KEY WORDS: Inventory, Financial performance, Foreign exchange/forex market, Fluctuations.

1.0 INTRODUCTION

Globally, inventory management researches and studies with its influence on the industrial performance of various economies in the world, have brought series of controversy for some time, hence attracting the attention of more researchers, professional accountants and practitioners, both in the developed and developing countries in Africa like Nigeria. Inventory could be described as the goods that are stocked that have a resale value in order to gain some profit, and that the profitability of a firm is directly or indirectly affected by the inventory management (Shardeo,

2015). According to literature, inventory management involves the recording and monitoring of stock levels, forecasting future demand and deciding on when and how to order or what ordering process to follow (Adeyemi & Salami 2010; Stevenson, 2010; Nsikan, Etim, & Ime, 2015). The need to manage inventory effectively and efficiently was documented by Yator and Moronge (2018), as an important operational weapon or tool for products and service organizations. It can be used as a survival strategy in the highly competitive markets of the present turbulent environments.



The goal of a sound inventory management is to have adequate quantities of high quality items available to serve customer needs, while minimizing the costs of carrying inventory as reported by Brigham and Ehrhard (2005). According to Adeyemi and Salami (2010), inventory constitute the most significant part of current assets of majority of the Nigerian manufacturing companies. It thus becomes essential to deploy cutting edge techniques to manage inventory efficiently so as to avoid loss of sales, cost of changing production rates, overtime cost, sub-contracting, unnecessary cost of sales and back order penalties during periods of peak demands (Chen, Murray & Owen, 2005). Undoubtedly, the role of accounting standard and policies on inventory management is to be effective and efficient for better performance, a case which has not been well researched in Nigeria and even the empirical results are contradictory. However, accounting standards relating to inventory management and control have exerted some influence on ways by which inventory are recorded and reported in the books. For instance, IAS 2 acknowledges that some enterprises classify income statement expenses by nature (materials, labour, and so on) rather by function (cost of goods sold, selling expense, and so on). The objective of IAS 2 is to prescribe the accounting treatment for inventories. It provides guidance for determining the cost of inventories and subsequently recognizing it as an expense, including any write-down to net realizable value, so as to avoid wrong classification. It also provides guidance on the cost formulas that are used to assign costs to inventories. From the foregoing, an empirical evidence on how accounting standard and policies influence inventory management is expected to be provided by this current study.

As reported by Ajala (2021), in his research, the overall process of effective inventory management crosses a number of functions and as such it can be divided into the following general categories: Demand management;

Inventory planning and ordering often referred to by its acronym MRP or in a lean manufacturing environment (Koumanakos, 2008); Inventory optimization systems where inventory should be deployed to satisfy predetermined supply chain management objectives; Physical inventory control (Laugero, 2002). Assessing the firms' financial performance holistically is a subjective measure of how well a firm can use assets from its primary mode of business to generate revenues. This term is also used as a general measure of a firm's overall financial health over a given period of time and can be used to compare similar firms across the same industry or compare industries or sectors in aggregation (Ajala, 2021). There are many different ways to measure financial performance but all measures should be taken in aggregation. Line items such as revenue from operations, operating income or cash flow from operations can be used, as well as total unit sales. Furthermore, the analysts or investors may wish to look deeper into financial statements and seek out margin growth rates or any declining debt. Financial performance in a broader sense refers to the degree to which financial objective has been accomplished and it is an important aspect of finance risk management. It is the process of measuring the results of a firm's policies and operations in monetary terms.

Firms' performance could be measured by a number of ways in which we have turnover, earnings and profits. In conclusion, Prempeh (2016) stated that the need to understand the cost measures associated with inventory management to maximize profit remains unabated to the manufacturing industry in Ghana. The economic importance of Paint manufacturing sector of the Nigerian economy cannot be underestimated since it contributes maximally to the economy: employment generation, value creation and increased Gross Domestic Product (GDP). For instance, Kiwawu (2018) cited in the Vanguard News online of October 24, 2018 reported that Nigeria's paint



industry was projected to record five per cent growth rate from its present estimated \$268 million (N96.50 billion) in 2018 to \$377 million (N135.80 billion) by 2025.

1.2 Statement of the Problem

Inventory management has been a subject of debate among management accountants, researchers in accounting, practitioners and players in commerce as well as business investors for decades. However, most inventory management studies are concentrated in developed economies with view of them existing in developing economies like Nigeria which do not focus particularly on manufacturing companies like the Paint industry. The industry has made great contributions to the economic growth of Nigeria as evident from the literature. Recently, this sub sector of the economy has experienced declining contribution to GDP and employment generation in the recent time. Suffice it to say that, its contribution to total Gross Domestic Products has remained low at 0.03 percent according to the Nigerian Stock Exchange Report, (2017). Various determinants have been identified in the literature has been responsible with conflicting and confounding results as effects on inventory management practice geared towards improved performance. For example, Yator and Moronge (2018), sought to find out the determinants of inventory control systems implementation and reported that: Staff Training, Funding, Top Management Support and IT Infrastructure influences inventory management practice in the manufacturing firms. In another study, Shiau (2017) found out that documentation or store records, planning, knowledge of employees or staff skill have shown to significantly influence the effectiveness of inventory management while the funding showed slightly significant influence on inventory management in manufacturing industry. This serves as a pointer to the factors influencing effective inventory management from the perspective of Paint manufacturing companies in Nigeria.

The research methodology employed by most studies and empirical evidence are at variance since some either use qualitative research or quantitative research at different instances, making their results to be divergent and confounding. Some used descriptive while others use inferential statistics to explain the relationship between inventory management practice (Mwangi & Nyambura 2016; Bawa, Asamoah & Kissi 2018; Prempeh ,2016; Fosu 2016) while others like (Prempeh, 2016) used profitability to determine firms' performance. Mwangi and Nyambura (2016), documented the use of explanatory variables: management efficiency, profitability, cash flow, firm size and growth levels respectively thus arriving at the findings of significant positive relationship to firms' performance as empirical results obtained by the studies. From the foregoing, the need to further expand knowledge and empirical validation on inventory management and financial performance of manufacturing companies remains the focus of this study with the employment of mixed research methodology adopted with sound statistical analysis of its result.

1.3 Research Objective

The main objective is to examine the determinant factors of inventory management practice and financial performance in listed Paint manufacturing companies in Nigeria.

1.4 Research Hypothesis

The study hypothesis was stated in null form:

There is no significant effect on the determinant factors of inventory management practice and financial performance in listed Paint manufacturing companies in Nigeria.

1.5 Scope and Significance of the Study

Since it is practically impossible for the study to discuss inventory management of all companies, this current study is based on the appraisal of inventory management in the listed Paint manufacturing companies in Nigeria located in Lagos state as case study for the period covered. The study



is expected to contribute to the literature of management accounting in the area of inventory management by delving into the determinant factors for financial performance in the Nigerian Paint manufacturing companies.

2.0 LITERATURE REVIEW FOR THE RESEARCH

2.1 Conceptual Review

Inventories according to Stevenson (2010) are the current assets which are expected to be converted within a year in form of cash or accounts receivables.

2.1.1 Conceptual Framework

The study conceptualizes relationship between dependent variables and independent variables. The inventory management variables are independent variables expected to cause financial performance to grow as depicted in the diagram below.

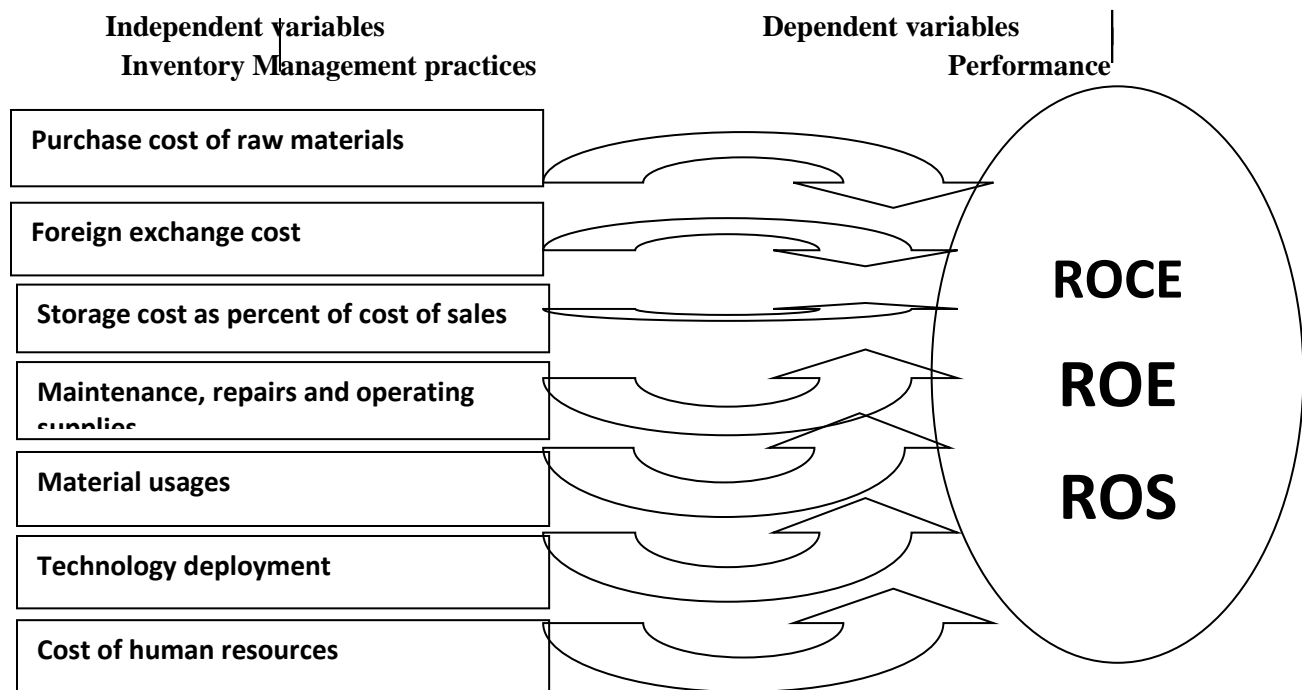


Figure 2.1: Conceptual Model of the Study

Source: Author’s compilation 2020

2.1.2 Overview of Inventory Management and Practices

Inventory management has been described as an important aspect of cost control and reduction schemes and as such

needs be approached with great attention. According to Nsikan et.al., (2015) inventories represent those items which are either accumulated for sale or they are in the process of manufacturing or in the form of materials which are yet to be utilized. Ghosh and Kumar (2003) defined inventory as a stock of goods that is maintained by a



business in anticipation of some future demand. Ogbo, Onekanma, and Ukpere (2014), Adeyemi and Salami (2010), stated that inventory constitute one of the largest and most tangible investment of any retailer or manufacturing organization. Zipkin (2000) believed that holding inventories at the lowest possible cost and giving the objectives to ensure uninterrupted supplies for on-going operations is the aim of inventory management.

2.1.3 Inventory Management and Control Techniques

Stevenson (2010) and Shardeo (2015) opined that firms should endeavour to determine the optimum level of inventory in order to achieve the objectives of good and optimal inventory management and control. However, this cannot be possible without the application of sound techniques as highlighted and discussed below:

(A) **Economic Order Quantity:** According to Piasecki (2009), the optimal quality or economic lot size for a particular item of inventory is to be determined in

consideration of the forecasted usage, ordering cost and carrying cost. At minimum cost inventory –carrying cost equals ordering cost. Certain assumptions are made in deriving the EOQ

- i. Demand for the item is assumed to be uniform throughout the year.
- ii. The entire Order Quality is received in a single lot (at the same item)
- iii. Bulk Quality Discounts are not available

The model to drive EOQ is $Q = \sqrt{\frac{2AC}{Cc}}$

Where:

A = Annual consumption or requirement of inventory in Naira

O = Ordering cost per order in Naira

C = Inventory carrying cost

Q = quantity per order in Naira

D = Annual demand

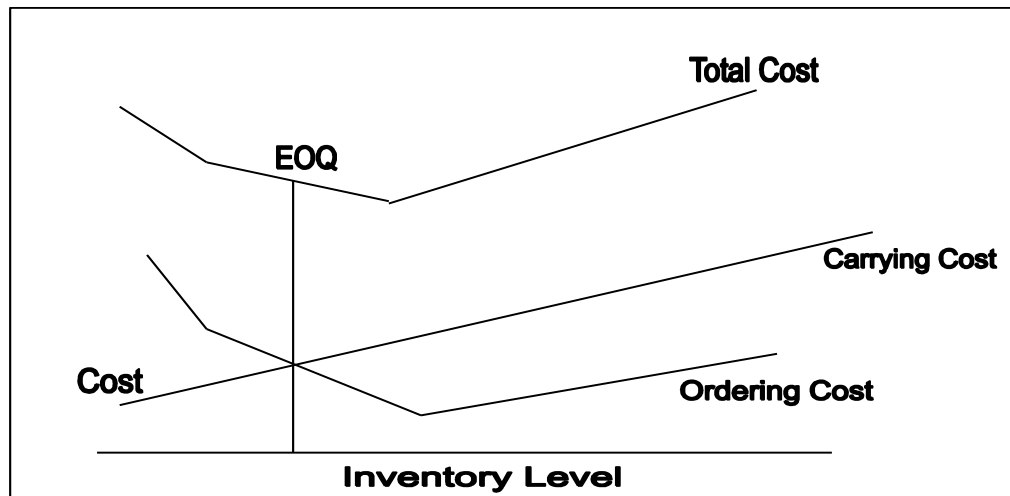


Figure 2.1 Presentation of EOQ graphically

Source: Lucey T. 1992. Quantitative Techniques, 4th Edition.

(B) **ABC Analysis Technique:** This inventory control approach is based on the doctrine that a small portion of

the items might characteristically represent the bulk of the value of money of the total inventory utilized in the process of production, whilst a comparative number of items can be from a small fraction of the financial value of stores (Monks, 1996). Flores and Whyback (2007) were of the



view that ABC analysis is a method for prioritizing inventories. Inventories are classified into 3 sub-classes, including A, B and C. Pandey (1979), equally documented the basic steps involved in implementing the ABC analysis empirically.

(C) Just in Time Techniques: This concept was established by manufacturing businesses in Japan in which inventories are acquired only when demanded in a business for the purpose of production and this focused on enhancing the return on investment of a firm through the reduction of process inventory and its associated costs Schonsleben, (2000). The goal of JIT techniques is zero inventories with 100 percent quality. Just in time purchasing recognizes high costs associated with holding high inventory level and as such it has become important in most organizations to order inventory just in time of production so as to cut costs of holding inventory like storage lighting, heating, security, insurance and staffing by Dimitrios (2008).

(D) Vendor Managed Inventory (VMI): Management of inventory supply determines the way an organization will propel itself to high performance effectiveness and competence. Many firms have resulted to VMI systems which assist the provider to monitor clientele' inventory usage. Through the VMI system customers can avoid stock outs since the supplier will already have replenished the stocks and also there will be no costs related to handling of inventory since the supplier will know the quantity that is needed and which product will be put on the shelves. The input phase here is communication which should be of good intention from the beginning of business and should bring about a positive relation between the supplier and the customer (Thogori & Gathenya, 2014).

(E) Bar-coding: Bar-coding is the most popularly used method of tracking a product for purposes of understanding the level of inventory, reorder and deliveries or sales; this enables firms to avoid issues of stock outages

or overstocking. Bar-coding helps to track a particular item at any specific time. Once items leave the store, they are instantly recorded in the system thus making it possible to understand which stock is running low and the items to be placed.

(F) Simulation: The function of simulation in inventory management usually occur for purpose of responding to the wish for a proper decision making process that would take into consideration the complexities and variances within the environment of a system. A number of researches used simulation to establish an inventory control approach associated with tracking signals to assess performance. The other established models aimed at special situations of inventory state (Eckert, 2007). In corroboration of simulation method, Mukopi and Iravo (2015), established a simulation-based decision-support system for controlling and managing of one product inventory model and by taking into consideration, the impact of changes in demand, the point of reordering, the control of the stock level, period between the reviews, as well as the lead time. Related to this research is a replica research but was expanded to integrate a generalized multi-product inventory system.

2.1.4 Financial Performance

Financial performance is an objective measure of how well a firm can use assets from its primary mode of business and generates revenue. This term is also used as a general measure of a firm's over all financial health over a given period of time, and can be used to compare industries or sectors in aggregation. There are many different ways to measure financial performance but all measures should be taken in aggregation. Line items such as revenue from operations, operating income or cash flow from operations can be used, as well as total unit sales. Furthermore, the analyst or investor may wish to look deeper into financial statements and seeks out margin growth. The firm's operational performance is calculated in opposition to



standard or prescribed indicators of effectiveness, efficiency and environmental responsibility, such as cycle time, productivity, waste reduction, and regulatory compliance as submitted by (Adeyemi & Salami, 2010). In order to improve operational efficiency, an organization has to measure both the input and the output side of the inventory management (Abdel-Maksoud, Asada & Nakagawa, 2008). Again, the major goal of organizations is to reduce the costs associated with the inventory management, which would impact positively on the overall performance of an organization. Based on extant studies, the most popular measure of financial performance is discussed below representing the dependable variable as highlighted in the conceptual framework of this study:

(A) Return on Capital Employed (ROCE): ROCE is a financial ratio that can be used to assess a company's profitability and capital efficiency or how well a company is generating profits from its invested capital. It is one of the several profitability ratios commonly used by financial managers, stakeholders, and potential investors in analyzing a company for investments. It's similar to Return on Invested Capital (ROIC). As a performance indicator, it is useful when comparing the performance of companies in capital-intensive sectors like the Paint industries, utilities and telecoms since ROCE considers debt and equity as against ROE that analyzes profitability related to a company's shareholders' equity. Succinctly put, it tells the amount of profit a company is generating per \$1 of capital employed and the more the profit per \$1 a company can generate, the better it is. So, a higher ROCE indicates stronger profitability. It is a metric that uses two components of EBIT and the Capital employed i.e. operating income without interest or taxes with the second component as Capital Employed. Therefore, Capital Employed is found by subtracting Current Assets (CLs) from Current Liabilities (CAs) which ultimately gives shareholders' equity plus long-term debts. It is otherwise

known as funds employed which represents the total amount of capital used for the acquisition of profits by the company. ROCE is an indicator of both well managed and profitable business ventures.

(B) Return on Equity (ROE): The ROE measures accounting earnings for a period per dollar of shareholder's equity invested. ROE is so popular because it is in a real sense a summary of information on the income statement both sides of the balance sheet. It provides an "accounting" measure of the "returns" to shareholder's investment. The three determinants of ROE are:

1. Profit margin = Net Income or Sales; 2. Assets Turnover = Sales or Assets; 3. Financial leverage = Assets or Shareholder's Equity. The amount of net income returned as a percentage of shareholder's equity. Return on equity measures a corporation's profitability by revealing how much profit accompanies or generates with the money shareholders have invested.

ROE is expressed as a percentage and calculated as the Net Income or Shareholder's Equity

Net Income is for the full fiscal year (before dividends paid to common stock holders but after dividends to preferred stock.) Shareholder's equity does not include preferred shares.

(C) Return on Sales (ROS)

A ratio widely used to evaluate a company's operational efficiency is ROS which is also known as a firm's "operating profit margin". Return on Sales (ROS) is a ratio widely used to evaluate an entity's operating performance. It is also known as "operating profit margin" or "operating margin". ROS indicates how much profit an entity makes after paying for variable costs of production such as wages, raw materials, etc. (but before interest and tax). It is the return achieved from standard operations and does not include unique or one-off transactions. ROS is usually expressed as a percentage of sales (revenue). Return on sales (operating margin) can be used both as a tool to



analyze a single company's performance against its past performance, and to compare similar companies' performances against one another. Calculations of ROS commonly use operating profit before deducting interest and tax (EBIT); using income after-tax is less common.

Return on sales (operating margin) = EBIT or Revenue

2.1.5 Electronic Inventory (*E-Inventory*)

This is electronic method of controlling inventories or stock to generate automatic updating and reports for users. Dramatically improved productivity, e-inventory helps in computerizing each and every process of managing the assets like record new assets, discard assets, print barcode and distributing assets. With E-inventory assets management, it is easier to maintain, compared to manual paper filing system. It has the ability to update quantity at hand in the inventory, maintains all vendor's information, keep complete history of purchase orders with supplier and cost information, keep track of maintaining history and service due for equipment, greatly reduces the amount of paper work involved. Computerized Inventory Control System is the modern technique used for controlling the inventories. It enables a company to track large items of inventories easily. It is an automatic system of counting inventories, recording withdrawals and balances. There is an in-built system of placing order as the -computer notices that the re-order point has been reached. The information system of the buyers and suppliers are linked to each other.

The inherent basic objectives of Electronic Inventory are:

- i.To tackle the traditional process of inventory and assets management.
- ii.To be able to know your inventory at a click.
- iii.To computerize the inventory and assets management in a user-friendly manner.
- iv.To cater any complex organization structure with dynamic approach.
- v.To have flexibility in integrating with other system such as "e-helpdesk system".

vi.To cater for standard governmental inventory and asset process from paperless.

2.2 Theoretical Review of the literature

The following theories are considered relevant for the study so as to provide theoretical foundation for achieving the stated research objective.

2.2.1 Resource Dependence Theory

According to Harrison (2001) resource dependence theory (RDT), firms ensure official and orderly linkages with other firms by looking for ways to minimize doubt and allow dependence with other firms. Due to that, firms become interdependence and therefore combine resources to form a resource bundle that is one of a kind and difficult to imitate. On the same note, researchers Sambharya and Banerji (2006) have supported the RDT theory for it has shown that through the firm's bond with the other firms has allowed it to create superior products, hence giving the firm competitive advantage and improved performance both financial and operational. Thus, the theory shows that firms having strategic supplier partnership are able to form resource bundles.

2.2.2 Knowledge-Based Theory

As stated by Grant, (1996) the knowledge-based (KBV) theory of the firm is an up-to-date enlargement of the RBV theory. From the research study by De Carolis, (2002), it brought out that knowledge awarded to human resources was the most important strategic resource and, affirming the point that KBV theory is an extension of the RBV theory. Being that human resources is an intangible resource, knowledge was also seen to fall in the same category and according to Barney, (2001) intangible assets are highly valued. Kontus (2014), showed that firms heterogeneous entities that constitute of knowledge and thus agree with point made earlier by Grant (1996) that the KBV theory of the firm is an extension of the RBV theory of the firm. With this human resources and knowledge resource, a firm has a competitive advantage, for this



resource is next to impossible to imitate thus the firm has got sustainable differentiation, Wiklund and Shepherd (2003). This theory is believed to be relevant based on the need to seeking innovative inventory knowledge by firms.

2.2.3 Contingency Theory

The contingency theory, developed by Joan Woodward in the 1950s, is a class of behavioural theory which claims that there is no best way to organize an organization, to lead a company or to make decisions. Instead, the optimal course of action is contingent upon the internal and external situations. Several contingency approaches were developed concurrently in the late 1960s. The authors of these theories argued that Marx Weber's bureaucracy and Fredrick Taylor's scientific management theories had failed as they neglected environmental influences and that there is not one best way to manage enterprises. These influences shape individual behavior in a certain situation while managing organizations (Hashim, Mohd Ghouse & Ismail, 2012). The contingency approach to management finds its foundation in the contingency theory of leadership effectiveness developed by management psychologist Fred Fielder. It is based on the theory that management effectiveness is contingent, or dependent, upon the interplay between the applications of administration behavior. In other words, the way you manage should change, depending on the conditions and that one size does not fit all. As argued by Dervitsiotis (2015), the contingency theory is about the need to achieve a fit between what the organization is and what it wants to become. It is all about the organization's strategy, culture, goals, technology, staff and external environment, and what it does; how it is structured and the processes, procedures and practices it puts into effect; therefore, the theory is anchored on dynamic theory of profit.

2.2.4 Related Empirical Review of the literature

The effect of inventory management on firm's performance has been researched with findings. However

less of such studies have been observed in developing countries like Nigeria especially in the Paint industry. More of such studies are concentrated in the developed countries. For example, in Greece, Koumanakos (2008), studied the effect of inventory management on firm performance in manufacturing firms operating using three industrial sectors in Greece, for food, textiles and chemicals industries covering 2013-2017 period. The hypothesis that leans inventory management leads to an improvement in a firm's financial performance was tested. The findings suggested that the higher the level of inventories preserved (departing from lean operations) by a firm, the lower the rate of return.

Prempeh (2015), evaluated the impact of efficient inventory management on the profitability of manufacturing firms in Ghana. A cross sectional data from 2004 to 2014 was gathered for the analysis from the annual reports of four manufacturing firms listed on the Ghana Stock Exchange. Measures of profitability were examined and related to proxies for efficient inventory management by manufacturers. The Ordinary Least Squares (OLS) stated in the form of a multiple regression model was applied in the analysis. The study revealed that the main variable raw materials inventory management designed to capture the effect of efficient management of raw material inventory by a company on profitability had significant and positive impact on the profitability of the manufacturing firms in Ghana. Whether the findings from Prempeh (2015) would be held from the perspectives of Nigerian Paints firms is the thrust of the current study that also used secondary data of listed Paint firms to explain the effect of the determinant factors of inventory management and firm's performance in Paint industry in Nigeria.

The study by Timothy Lwiki, Patrick Boniface Ojera, and Virginia Kirigo Wachira (2013), investigated the impact of inventory management practices on financial performance of the listed Sugar Manufacturing Firms in Kenya and used



descriptive research design and correlation analysis methodology. The findings suggested that there is generally more than average positive correlation between inventory management practices and financial performance of sugar companies. It was concluded that there are varied growth pattern for every firms, implied that whereas the sugar firms applied the same inventory management practices as determinants of their performance levels, the implementation of the practices responded too different specifically unique environment of each firm. There is generally positive correlation between each inventory management practices, specific performance indicator has been proven to depend on the level of inventory management practices. ROS has strong positive correlation with strategic supplier partnership; ROE has strong correlation with lean inventory system and strategic supplier partnership which is significant. The performance of sugar firms can therefore be stated as being the function of their inventory management practices.

The study conducted by Ogbo et.al., (2014), investigated the impact of effective stock management on organizational performance in the Seven-Up Bottling Company in Nigeria. The study was conducted basing it on four research hypothesis which were generated and tested at 10% level of significance. The results from the study revealed that, flexibility in stock management practice is a crucial approach for and organizational performance. Organization can benefit from stock control by means of reduced operational cost, improved sale effectiveness as well as simple stocking and inventory recovery. Their findings further revealed significant influence of between operational feasibility, convenience of stock control management in the customer related issues within the organization, as well as cost effectiveness techniques are implemented to improve the return on investment of the organization. Research has corroborated the effectiveness of inventory management as

a vital part in the manufacturing organization to be more competitive in the present turbulent business globally.

3.0 RESEARCH METHODOLOGY

3.1 Research Design: This study adopted a descriptive survey research design that's non-experimental which studies the relationship between non-manipulated variables in a natural setting was adopted. A descriptive research design is used when data is collected to describe persons, organizations, settings or phenomena (Mugenda & Mugenda 2003; Maxwell, 2012). Survey design also has enough provision for protection of bias and maximized reliability (Creswell, 2012). In this regard, the study objective would have been achieved through the use of descriptive design employed.

3.2 Area of Study & Population: The study area was Lagos state as the location of the sampled Paints companies and as an industrial hub where imported and local raw materials can be easily accessed for Paint industry. The population of the study was the Nine (9) registered Paint manufacturing companies registered with Lagos Chamber of Commerce and Industry as obtained from the Nigerian Stock Exchange, Lagos (2019).

3.3 Sample Size and Sampling Technique: Samples for the study were nine (9) out of the fourteen (14) selected Paint manufacturing companies in Lagos State metropolis. The study adapted purposive sampling technique. In purposive sampling the person who is selecting the sample tries to make the sample representative, depending on his opinion or purpose of the study. This was done based on their locations, year of establishment and readiness of updated financial statements as at the time of the study. Manufacturing companies chosen were those whose published financial reports and required data were available for the whole period under review. The data for the measure of the variables was collected from annual financial statement of the sampled companies. Thus, non-



quoted companies were excluded due to non-availability and non-disclosure of their financial reports respective.

Table 3.1 List of expected sampled paint manufacturing companies in Nigeria with LCCI in Lagos state as at 2019

Paint company	Product	Location
Portland Paint	Paint	Ikeja Lagos
D. Meyer Paint	Paint	Alausa, Lagos
Premier Paint	Paint	Ifo ibogun road, Ogun state
CAP Paint	Paint	Ikorodun road, Lagos.
Perfect Paint	Paint	Ikotun Lagos
Berger Paint	Paint	Ikeja Lagos
Empire Paint	Paint	Ayobo, Lagos
Doyin Paint	Paint	Victoria Island, Lagos
President Paint	Paint	Lekki, Lagos

Source: Nigeria Galleria, 2019

3.4 Method of Data Collection: Both primary and secondary data were employed in the course of this study. The secondary data were the financial record and books of account of the selected companies to obtained information about the performance of the company between 2008 and 2019 making 12 years of coverage.

3.5 Instrument of Data Collection: Primary data were collected through structured questionnaire, 200 questionnaires were distributed to nine (9) sampled firms and 160 was returned constructed on a Likert scale points on the view of professional accountants working in the sampled firms on their perceptions of barriers to inventory management in their various companies. Secondary data obtained from the Nigerian Stock Exchange financial records and books of account of the sampled companies and therefore used for data analysis to achieve the objective using a period of 2008 to 2019.

3.6 Validity and Reliability Test: To ensure better results, both validity and reliability of data were taken into consideration. The study tested for reliability and validity at the verge of validating the factors in the context proposed. Reliability was achieved because the instrument produced the same results. Validity is concerned with the extent to which the scale measures what is supposed to measure or what is believed to be capable of measuring. Measurement validity refers to the extent to which, the questions set measure aspects set in the constructs. While Content validity is about whether the measures represent meanings of the concept. It depended on the extent to which constructs items represents scale's domain. The study used the Cronbach alpha at levels between $0.8 > \alpha \geq 0.7$ as acceptable (the rule of thumb) to measure the reliability or internal consistency of the instrument (Cronbach, 1951).



3.7 Diagnostic Tests: Before conducting regression analysis, the study carried out diagnostic tests on the suitability of the dataset for regressing. The specific tests conducted in this context include multicollinearity and normality. Variance of Inflation Factor (VIF) was used to test for Multicollinearity. The F Statistic was used to determine the validity of the regression model used.

3.8 Method of Data Analysis: Data collected were sorted, collated and analyzed based on the research objective with the corresponding hypothesis using OLS to assess the determining factors of Inventory Management practice in Paint industries. The inventory management variables were represented by identified variables like cost of material, maintenance cost, cost of technology, training cost etc. As observed in the literature Adeyemi et. al., (2010) and Akinlabi (2017). Financial performance was proxy based on ROE, ROA and ROS of selected firms. The measurement of these variables was presented in **Table 3.1**.

3.9 Model Specification: Model specification refers to the determination of which independent variables should be included or excluded from a regression equation. A multiple regression model is, in fact, a theoretical statement about the casual relationship between one or more independent variables and a dependent variable. Therefore, OLS Regression was employed to analyze the identified factors determining inventory management practice as adopted. A typical OLS regression can be expressed as:

$$Y_{it} = \beta_0 + \beta_1 \chi_{1it} + \beta_2 \chi_{2it} + \beta_3 \chi_{3it} + \beta_4 \chi_{4it} + \beta_5 \chi_{5it} + \beta_6 \chi_{6it} + \epsilon_i$$

The subscripts i refers to cross-sectional dimension and time series dimension respectively.

The regression model shall take the form:

Table 4.1 Descriptive Statistics showing the determinant factors and dependent variables

$$Y_{it} = \beta_0 + \beta_1 \chi_{1it} + \beta_2 \chi_{2it} + \beta_3 \chi_{3it} + \beta_4 \chi_{4it} + \beta_5 \chi_{5it} + \beta_6 \chi_{6it} + \epsilon_i; \text{ Where:}$$

Y_{it} = inventory practice adoption in time t
 χ_{its} : are explanatory variables (Inventory management variables), cost of raw materials (CRM), foreign exchange (FREXH), staff cost and human resources (STFC), repair, maintenance and supplies (RPM), storage cost (STRGC) and technology deployment cost (TECH).

β_0 = the intercept (value of EY when $X = 0$);

$\beta_1 - \beta_n$ = the regression coefficient or change included in Y by each χ_{its}

ϵ_i = error term or stochastic term

3.10 Estimation of Panel Data Models: Basically, the static panel data models can be estimated using Pooled Data Regression (PDR), Fixed Effects (FE) and Random Effects (RE). Each of these methods has its underlying assumptions which must necessarily be satisfied to obtain unbiased and efficient estimates. The study considered in turn each of these methods with the underlying assumptions. One of the approaches used to capture specific effects in a panel data model is the fixed effects (FE) regression. More so, to confirm whether the specific effects estimated was random or fixed there is the need to carry out the Hausman test. The rejection of the null hypothesis (when the statistic is statistically significant) implies an adoption of the fixed effects model and non-rejection is considered as an adoption of the random effects model. The rejection of the null hypothesis also implies correlated specific effects are better captured with fixed effects model.

4.0 RESULTS AND DISCUSSION

Hypothesis Testing: Determinant factors of inventory management in listed Paint Manufacturing Companies in Nigeria



VARIABLES	N	Minimum	Maximum	Mean	Std. Deviation
ROCE	108	1.34e+07	9.87e+09	1.48e+09	2.19e+09
ROE	108	1.07e+07	9.55e+09	2.01e+09	2.61e+09
ROS	108	1090868	8.87e+07	6592632	8905423
CRM	108	4375606	1.27e+09	3.43e+08	3.27e+08
FREXH	108	890	95853	13474.68	21178.38
STFC	108	130700	9.79e+07	3.44e+07	3.03e+07
RPM	108	88090	1.95e+08	3.96e+07	3.31e+07
TECH	108	41900	987000	482655.9	226441.7
STRGC	108	20956	8796750	480884.8	1308393

Source: Researcher’s Computation 2021

Comments and discussion: The descriptive analysis of the determinant factors of inventory management in the sampled Paint firms was displayed in Table 4.1. The Table showed the mean, minimum, and maximum values with standard deviation of various variables used in the model during the periods of 2008–2019. The table above indicated that the average CRM (Cost of Raw Materials), FREXH (Fluctuation in Foreign Exchange), STFC (Staff Cost), RPM (Repair and Maintenance), TECH (Technology Employed) and STRGC (Storage Cost) over the periods under reviewed and for the 9 paint manufacturing firms was 3.43, 13474, 3.44, 3.96, 482655 and 480884.8 respectively. The average ROCE (Return on Capital employed), ROE (Return on Equity) and ROS (Return on Sales) for the firms over the periods and across the quoted manufacturing firms in Nigeria was 1.48, 2.01 and 6592632 with a maximum of 9.87, 9.55 and 8.87 and a minimum Return on Capital Employed, Return on Equity and Return on Sales were 1.34, 1.07 and 1090868 respectively with standard deviation of 2.19, 2.61 and 8905423. This suggests a small variation in Returned on Capital Employed and Return on Equity but a large

variation in Return on Sales across the quoted Paint manufacturing firms in Nigeria over the periods reviewed. In the overall, Cost of raw material, Foreign exchange rate, Staff cost, Repair and maintenance cost, Technology cost and storage cost indicated significant relationship and served as major determinants of inventory managements in the sampled Paint firms.

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary: This study examines the determinant factors of inventory management practice on the financial performance of listed Paint Manufacturing Companies in Nigeria. The study employed descriptive econometric analytical tools in studying Nine (9) Nigerian quoted Companies with 108 observations for the period 2008 to 2019. The analyses were performed using panel data. This study tries to fill the gap left by other studies in this field was equally filled. Also, three performance measures were employed namely the return on capital employed (ROCE), the return on equity (ROE) and the return on sales (ROS). Factor Analysis (EFA) was applied to explore the most effective factors or barriers on financial performance of Paint Manufacturing Companies in Nigeria for the study.



An interesting finding was that all the inventory management practice measures have a positive and highly significant effect on the market performance measure with return on equity (ROE) except the cost of storage which was validated by empirical literature that firms with proper inventory management practice have high growth rate and high performance. Inventory management practice measures have negative but highly significant effect on the market performance measure with return on sales (ROS). The significance of all these variables on performance indicated that inventory management practice has great impact on financial performance of Paint Manufacturing Firms in Nigeria.

5.2 Conclusion: This study concluded that Cost of Raw Materials, Fluctuation in Foreign Exchange, Staff Cost, Repair and Maintenance Technology Employed, Staff / Personnel cost and Storage Cost were the determinant factors for inventory management of listed Paint Manufacturing Firms in Nigeria. Further, all the inventory management variables have significant effect on the financial performance of Paint manufacturing firms in Nigeria. Also, price fluctuations as well as pilferage, damages and wastages contributed as major barriers to effective inventory management in the study area.

5.3 Recommendations: Based on the findings and conclusions of this study, it was recommended that management of Paint firms should:

- Design and monitor procedures for inventory control right from purchase requisition for better performance and cost control.
- Strive to maintain good suppliers' chain management to avoid pilferages as well as improve communications on inventory generally, ensure adequate security for unauthorized access to inventories with investment cost.
- Government should help stabilize foreign exchange market (fluctuations) to enhance sound

inventory management to promote national economic growth.

5.4 Areas of further Research: The literature on inventory management could be expanded in Nigeria and by extension West Africa sub region, by conducting further studies in other relevant sectors like the textile, sugar, and even petrol chemical industries.

REFERENCES

- Adeyemi, S. L. & Salami, L.O. (2010). Inventory management: A tool of optimizing resources in a manufacturing industry. *Journal of Social Science*, 23(2),135-142.
- Akinlabi, B.H (2017). inventory management practices and operational performance of selected flour mills companies in Nigeria: *A doctoral thesis submitted to the Department of Business Administration and Marketing, School of Management Sciences, Babcock University Ilishan Remo Ogun State-Nigeria.*
- Ajala, Olayimika A. (2021). Inventory management practices and financial performance of listed Paint manufacturing companies in Nigeria. *A doctoral thesis submitted to the Faculty of Management Sciences of Ladokpe Akintola University of Technology, Ogbmosho-Nigeria.*
- Bawa, S.E., G.E. Asamoah, & E. Kissi (2018). 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 DOI: 10.5923 orj. ijfa.20180704.01
- Brigham, & Ehrhard (2005). *Intermediate Financial Management. New York: Dryden Press.*
- Chen, H., Murray, F. & Owen, W. (2005). "What actually happened to the inventories of American companies between 1981 and 2000?". *Management Science*, 51(7),1015-31.
- Creswell, J. W. (2012). *Qualitative inquiry and research design: Choosing among five approaches. Sage.*



- Cronbach, L.J. (1951). Coefficient of alpha and the internal structure of tests. *Psychometrika*, 16, 297-334.
- Dimitrios (2008). Impact of inventory management on financial performance. *International Journal of Productivity and Performance Management*, 57, (5),355-369.
- Kiwawu (2018). “Nigeria’s Paint industry is projected to record 5 percent growth rate from its present estimated \$ 268 million in 2018 to \$377 million by 2025”. Vanguard Newspaper, October 24.
- Kishore, R. M. (2004). Financial Management. (5th ed.). Taxmann Allied Services Pvt Ltd. New Delhi-110005.
- Kumar, Dus, P. (2017). Impact of ROCE on company performance- An Introspection in India. *Saudi Journal of Business and Management Studies*, 2(9), 848-853.
- Koumanakos, D. P. (2008). The effect of inventory management on firm performance. *International Journal of Productivity and Performance Management*, 57 (5), 355-369.
- Laugero, J. (2002). *Financial Management and Policy*. (11th ed.). Prentice Hall L in A Simeon and Schuster Company, U.S.A.
- Mugenda, O., & Mugenda, A. (2003). Research Methods: Quantitative and Qualitative methods. *Nairobi, ACTs*.
- Mwangi, W. & Nyambura, M.T. (2015). The role of inventory management on performance of food processing companies: A case study of Crown foods Limited Kenya. *European Journal of Business and Social Sciences*, 4(04),64-78.
- Nsikan, Etim & Imme (2015). Inventory management practices and operational performance of Flour milling firms in Lagos, Nigeria; *International Journal of Supply and Operations Management*, 1(4),392-40.
- Ogbo, I, I.V. Onekanma, & W. I. Ukpere (2014). The impact of effective inventory control management on organizational performance: A study of 7up Bottling company Nile Mile Enugu, Nigeria; *Mediterranean Journal of Social Sciences*; 5(10),109.
- Prempeh, K.B. (2016). The impact of efficient inventory management on profitability: evidence from selected manufacturing firms in Ghana. *International Journal of Finance and Accounting*. 5 (1),22-26.
- Shardeo, V. (2015). Impact of inventory management on the financial performance of the firm. *IOSR Journal of Business and Management*,17,(4).
- Shiau, (2017). Factors influencing the effectiveness of inventory management in manufacturing SMEs: *Operations Research International Research and Innovation Summit, IOP Publishing; IOP Conf. Series: Materials Science and Engineering* 226.
- Stevenson, B. U. (2010). *Operations management*. (10th ed.). New York. McGraw-Hill Publishing Inc.
- Yator, V. & M. Moronge (2018). Determinants of inventory control systems implementation in the manufacturing industries in Kenya: A case study of East Africa packaging industries limited; *Strategic Journal of Business and Change Management*, 5(4),316- 337.