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# EFFECT OF WORKING CAPITAL MANAGEMENT ON THE PROFITABILITY OF LISTED INDUSTRIAL GOODS COMPANIES IN NIGERIA

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**Abstract**

*There has been a debate as to whether Working Capital Management plays an integral role in the profitability of firms. Some has argued in favour of while others are of the opinion that it has no relationship with profitability. This research work attempts to investigate the effects of working capital management on the profitability of listed industrial goods companies in Nigeria. The research adopted the use of secondary data spanning a period of 11 years from 2010 to 2020. Descriptive statistics technique and Stata 14 were employed to analyze the secondary data collected from the financial statement of the 10 sampled companies. The researcher proxied Profitability by Return on Assets (ROA) which was regressed against the independent variable Working Capital Management proxied by Inventory Turnover Ratio (ITR) using the ordinary least square technique and Cash Conversion Ratio as control variable respectively. The study adopted the ex-post factor research design. Ten firms were sampled out of sixteen (16) industrial goods companies using convenient random sampling techniques, panel data analysis was used to analyze the research hypothesis to facilitate decision making based on the outcomes of the research findings. The result showed that inventory turnover ratio has a negative and significant relationship with return on asset. Based on the result of the hypothesis the researcher recommended that management of industrial good firms in Nigeria should maintain a very strict policy as regards working capital management for a better performance.*

***Keywords: Working Capital, Return on Assets, Cash Conversion Ratio, Inventory Turnover Ratio.***

## INTRODUCTION

On a global scale, firms all over the world want to achieve superior performance regardless of which industry they belong. The desired cutting-edge performance is not a product of wishful thinking neither is it rocket science but it is a function of strategic corporate planning censored by effective utilization of entity's resources guided by efficiency and economy in line with best global practices. The goal of every business is to maximize profit (financial performance) within the available resources in order that the going concern concept of business is not threatened. Ani, Okwo and Ugwunta, (2008), postulated that the profit maximization objective for any firm depends on efficient management of cost and processes of production as well as increases in sales revenue resulting from firms' market domination.

A starting point is to identify variables that drive revenue and profitability while servicing liabilities to promote organization's welfare

and financial health or well-being. Hence placing things in perspective financially, corporate profitability is a function of the efficient management of working capital. Charitou, Elfani and Loise (2010) postulated that efficient utilization of a company's resources leads to increased profitability and dilutes the risk of volatility which subsequently promotes a firm's value by reducing the risk of default. A well-organized management of working capital is vital for a business existence. It is based on this evidence that Owolabi and Alu (2012) opined that the management of working capital has a pivotal role to play in the achievement of profitability and overall performance of business entities. It provides a means for measuring a business' liquidity or its response ability to short term obligations when they fall due (Emery & Stowe 2004).

Facts revealed that most methods managers use in practice in taking decisions regarding working capital are completely void of principles of finance. They are mostly based on the rules of the thumb or poorly constructed models (Emery & Stowe 2004). This situation has made many managers not to be able to manage working capital effectively; thereby not been able to determine the right mix of the various working capital components consequently leading to either over capitalization or under capitalization of the business and in some extreme cases liquidation of the business.

Empirical study carried out by Smith (1973) showed that a large number of businesses' failures are attributable to the inability of those businesses' financial managers to plan and control effectively the working capital of the firms concerned. This crude way and inefficient approach is still adopted today by both SMEs and even large corporations alike in Nigeria. Owolabi and Alu (2012) observed that a substantial number of mangers disregard organizations' operating cycle thereby having longer receivables collection period and shorter payable payment period. This scenario creates a huge liquidity problem forcing most firms to incur additional cost in the form of overdraft in a bid to financing the deficit created in cash inflow arising from longer receivable collection period. Besides, there is a scarcity of literature on aggregation working capital management as it relates to the industrial goods sector in Nigeria. All these compelled the researcher to embark on this research effort which is to examine the effect of working capital management on profitability of industrial goods sector in Nigeria.

Studies abound in this area but they have not only resulted in mixed findings and in consistence results but also focus on just a single firm in most cases. Among these are the works of: Musa and Adamu (2020), Thu-Tian and Thi-Doan (2019), Olaoye, and Adeboye, (2019), Sardar (2018). These studies though they examine the relationship between working capital and financial performance, to the best of the researcher's knowledge are not aggregative studies. Musa and Adamu (2020), focused on bottling companies in Nigeria, Thu-Tian and Thi-Doan (2019, focused on fishery business in Vietnam while Olaoye, and Adeboye, (2019) and Sardar (2018) focused on cement companies respectively. Apart from Sardar, (2018), who used return on equity all others used return on assets as proxies for financial performance which they measured against inventory turnover ratio, cash ratio, receivable ratio and payable ratio. It is against this background that this research effort seeks to carry out an aggregation examination of the effect of working capital management on the profitability of industrial sector goods firms in Nigeria to investigate the relationship between working capital management and profitability of industrial goods sector in Nigeria. The study will employ return on asset as proxy for profitability while inventory ratio will be measured as proxy for working capital. Cash conversion cycle will be used as the control variable for the study. To achieve the above-mentioned objective, the under listed hypothesis will be tested.

**Ho:** There is no significant relationship between inventory turnover management and return on assets of industrial goods sector in Nigeria.

## LITERATURE REVIEW

### Conceptual Framework.

#### Working Capital

As stated by Pandy (2005), working capital is defined as the amount of capital, which is readily available to an organization, that is, the difference between resources in cash or readily convertible into cash (current assets) and the organizational commitments for which cash will soon be required (current liabilities). Working capital therefore simply refers to the resources which a firm has at hand to pilot the affairs of the organization on a daily basis. It provides a means for measuring a business' liquidity or its response ability to short term obligations when they fall due (Emery & Stowe 2004).

Working capital, also known as net working capital, is the difference between a company's current assets, such as cash, accounts receivable (customers' unpaid bills), and inventories of raw materials and finished goods, and its current liabilities, such as accounts payable. Net working capital is a measure of a company's liquidity and refers to the difference between operating current assets and operating current liabilities. In many cases, these calculations are the same and are derived from company's cash plus accounts receivable plus inventories, less accounts payable, and less accrued expenses.

Working capital is a measure of a company's liquidity, operational efficiency, and short-term financial health. If a company has substantial positive working capital, then it should have the potential to invest and grow. If a company's current assets do not exceed its current liabilities, then it may have trouble growing or paying back creditors, or even go bankrupt. To calculate working capital, compare a company's current assets to its current liabilities. Current assets listed on a company's balance sheet include cash, accounts receivable, inventory, and other assets that are expected to be liquidated or turned into cash in less than one year. Current liabilities include accounts payable, wages, and taxes payable and current portion of long-term debt. Current assets are available within 12 months. Current liabilities are due within 12 months. Working capital that is in line with or higher than the industry average for a company of comparable size is generally considered acceptable. Low working capital may indicate a risk of distress or default. Most major new projects, such as an expansion in production or into new markets, require an investment in working capital. That reduces cash flow. But cash will also fall if money is collected too slowly, or if sales volumes are decreasing—which will lead to a fall in accounts receivable. Companies that are using working capital inefficiently can boost cash flow by squeezing suppliers and customers. The concept of working capital has been broadly classified into gross working capital, net working capital, positive working capital, negative working capital and zero working capital.

#### Working Capital Management

Working capital management is one of the major decision areas of financial management that profit-oriented organizations have to deal with in order to achieve business growth (Pandey, 2005). Functionally, the decision on working capital management is based on several components of an entity's financial management that have a great deal to do with liquidity and compliance with the fundamental issues of effective and efficient operation of a firm that relate to sustainability. are safe if it should be a concern (Enei, 2006). Thus, the ongoing concern of any business unit without an effective and efficient working capital management is a major threat. Ben Caleb (2008) conceptualized working capital management as the management of an entity's

current assets and its current liabilities. Profitability has been viewed as a function of working capital management, largely because the profits an organization makes are directly related to effective and efficient management of working capital and the value of shareholders' money (Bain, 2008). It is based on the fact that no firm can survive in business without having sufficient liquidity to meet its obligations on time. A firm's inability to promptly respond to its obligations would mean a poor credit rating which could unintentionally lead to lack of goodwill and consequent liquidation (Bhavate, 2011). Consequently, a proactive business will seek to develop a sound financial management policy that is deliberately motivated to maintain a healthy working capital that effectively and efficiently meets its short-term maturing obligations without jeopardizing the profitability of the enterprise in the long run.

**Profitability**

Within corporate governance managing risk and increasing a firm's profitability is the main focus of managers and is a product of informed decision making. Faizan and Farooq (2016) conceptualized profitability as reflecting the results and outcomes of the business sector, which reflects the overall financial health of the sector over a specific period. It indicates how well an organization is deploying its resources to maximize optimum shareholders' wealth and profitability. Thus profitability is a deliberately in-depth analysis that aims to create a measure of certainty that allows for the risk appetite of the investment (Sharma and Kumar 2003). Its main objective is to provide a comprehensive and relevant information to all the stakeholders for taking informed decisions.

Profitability is a combination of an organization's financial health, its ability and willingness to meet its long-term financial obligations, and commitment to providing services in the near future (Adenzi, 2008). In the broadest sense, profitability refers to the degree to which financial objectives are being met or have been met. It is the process of measuring the results of a firm's policies and operations in monetary terms. Profitability is broadly seen as the ability of a firm to meet its financial objectives. The two key indicators of profitability are investor return and accounting return. Investors' return is measured from the shareholders' point of view, whereas accounting return focuses on how the firm's earnings react to various managerial policies (Sharma and Kumar 2003).

**Return on Asset**

Keon, (2003) pointed out that return on assets is one of the most important profitability ratios and indicates the performance of the management with respect to the resources and assets of the firm, calculated by dividing net profit by total assets. Return on Assets, Almajri (2013) evaluates the profit making ability of firms according to the total investment in assets. Brealey and Meyers (2002) views return on assets as the product of net profit margin and total asset turnover. He argued that maximizing return on assets is a common corporate goal and that the attainment of return on assets was influenced by both profitability and efficiency, leading to the development of a system of planning and control for all operational decisions within a firm. . The long-term trajectory of return on assets is the best financial metric of a company's health and an indicator of how its decisions play out (Hagel, Brown, & Davison, 2010). So understanding this trajectory plays a major role for companies that take a long-term perspective that helps them build a winning strategy in their operations. This flows from the fact that the returns reflect the true and most reliable stance and outlook of the financial health of companies by covering the two key financial stability metrics which cover assets and profits (Yuli, 2018).

**Inventory Turnover Ratio Management**

Brown and Howard (1975) were of the view that raw materials are the largest element of cost in a product, with the resulting large stock (inventory) often required. Often insufficient

attention is paid to the level of carried inventory; Adoption of maximum and minimum inventory level, reorder level and reorder quantity can prove very useful in effecting reduction. According to David, Christine and Peter (2000), the inventory turnover ratio measures the average number of periods a firm's inventory remains in the warehouse prior to sale. The level of inventory held by a firm will largely depend on the increasing market demand which forces most businesses to maintain a large inventory so as to meet the production needs and to meet the requirement of the customers. Carrying finished goods inventory (Brown & Howard 1975). The Inventory Turnover Ratio is usually calculated as: $\text{ITRM} = \frac{Cost of Sales}{Average Inventory}$

**Cash Conversion Ratio**

Sinha (2012) argued that the sales ratio measures the cash generated from the regular operations of a firm per unit of cash in sales. Cash flows can be ascertained from the cash flow statement and revenue from the income statement. An increase in this ratio may mean that the firm adopts effective policies to convert sales into cash, and may also refer to a higher quality of profits. Hasan, Halil, Arzoo and Salih (2010) concluded that accounts receivable, payable amounts and inventory levels significantly affect the liquidity position of a firm. The current and liquidity ratios have traditionally proven to be stable. Therefore the level of their suitability for liquidity analysis is highly subjective and therefore leaves much to be desired. It is against this background that Hager (1976) popularized the cash conversion cycle as a dynamic liquidity measure to measure efficient working capital management. Brigham and Houston (2011) clarified that the cash conversion cycle is the length of time when funds in working capital are exhausted or the length between the payment of working capital and the collection of cash from the sale of working capital. Briley, on behalf of Myers and Allen (2001), asserted that the longer the production process, the more cash the firm has to keep in inventory. Conversely, the longer it takes customers to pay their bills, the higher the value of accounts receivables.

**Empirical Review**

Moses and Adamu (2020) examined the impact of working capital management on the profitability of cited bottling companies in Nigeria for the period 2001 to 2014, covering a period of 13 years. The study covered all sixteen consumer goods sectors as of 2014. They assessed the impact of inventory turnover days, accounts receivable days, accounts payable days and cash conversion cycles on the profitability of seventeen consumer goods. Corrective research design was adopted and data were analyzed using the OLS multiple regression technique relying on 98 firm-year observations. The data analyzed was secondary data extracted from audited annual reports of sample companies. The findings showed that inventory turnover days have a positive and strong impact on the profitability of the companies under review at a significant 1%. On the other hand, accounts receivable days have a negative and significant impact on the profitability of bottling companies quoted at the 5% significance level. However, accounts payable days were found to have a positive but insignificant effect on the profitability of companies, while the cash conversion cycle had a positive and significant impact on the profitability of companies. It is said that an increase in the cash conversion cycle will lead to greater profits. The study therefore concluded that efficient management of working capital affects the performance of cited companies in Nigeria. Relying on the above study, it was recommended that managers should focus on working capital management and lay emphasis on an optimum working capital level in their respective companies, due to the positive impact of cash conversion circle and accounts payable which on profitability. Can attract more customers and subsequently lead to more profits. As can be seen the study is based on the consumer goods sector hence the related work but there is a demand to fill the gap

in the literature in the industrial goods sector. This is what informed this current study.

Thu-Trang and Doan (2019) analyzed secondary data collected from 20 listed fisheries enterprises in Vietnam using the Generalized Method of Moment (GMM) on the Impact of Working Capital Management and Profitability of Fisheries Enterprises in Vietnam carried out an empirical study. Stock Market, for a period of nine (9) years spanning 2010-2018. The study used return on assets as dependent variables, while accounts receivable, accounts payable, inventory period and cash conversion circle were the independent variables used for working capital components. An analysis of the relationship between predictive and predictive variables revealed that the returns on assets of fisheries enterprises were negatively correlated with the accounts receivable period (ARP), inventory period (INV), accounts payable period (APP) and cash conversion circle (CCC). was influenced by. Additionally, the study found significant effects of enterprise size (SIZE), leverage (LEV), economic growth (GDP) and inflation (INF) on enterprise profitability (ROA). The study therefore recommended that managers in the fisheries business in Vietnam should focus on efficient working capital management, especially in the role of supply chain finance to effectively improve profitability and sustainability. Since this study is geographically foreign to Nigeria, there is a need for a prototype of such study in Nigeria especially in the industrial goods sector. This difference is what the present study seeks to address empirically.

Olaoy, Clement and Adboy, (2019), conducted a comparative study of working capital management and performance of industrial and consumer goods firms in Nigeria, focusing on the average collection period and payback period on selected industrial goods and return on consumer's capital. Is. goods firm. A sample of twenty (20) firms was selected at random over ten (10) years during the period 2005–2015. Static data analysis was used to analyze the data collected in the study. Empirical evidence shows that average collection period and average payment period had negligible positive effect on return on capital of industrial goods firms, while both average collection period and average payment had negligible negative effect on return on capital of consumer goods firms . The independent t-test results clearly demonstrated that there is a significant mean difference between the coefficients of the effect of working capital management on the performance of industrial goods firms and consumer goods firms when performance is measured in terms of return on capital employed. The study recommended that based on the finding that firms in both the sub-sectors should be strategic when managing working capital, setting higher average payout periods in a way that does not reduce their creditworthiness. Since this study is an inter-sectoral comparison, there is a need to independently examine the sensitivity of working capital management metrics to the sectoral performance of the industrial goods sector with respect to working capital management in order to examine the sensitivity of the return performance metrics to assets. can be done. Return on equity which is the goal of this research.

Sardar and Ibrahim (2018) examined the impact of working capital management on the profitability of industrial sector goods in Iraq. Sample sizes of five companies were considered for the study. The randomly selected tufted carpets for the study were Iraqi date processing, Iraqi carton manufacturing, Baghdad soft drinks and Iraqi and analyzed data collected covering a time period of nine (9) years in the period 2007 to 2016. was done. Secondary data were extracted from the annual reports of these companies, subjected to sensitivity analysis and significant ratios were calculated. The variables identified in working capital management were the current ratio and the quick ratio while the performance metric of return on equity was represented as an

independent variable or a predictive variable for profitability. The Simple Least Squares (OLS) model was adopted to examine the effect of working capital metrics (current ratio and quick ratio) on the profitability metric (ROE). The results indicated that ROE is positively related to the working capital variables that were tested. Based on this finding, the researcher recommended that management should plan an appropriate working capital mix that optimizes profitability without risking the business in the long run. A task of this nature should include other working capital management variables such as trade receivable period, trade payable period, cash conversion cycle and inventory turnover ratio, so this study is intended to examine the impact of working capital management on the performance of the industrial goods sector in Nigeria. was designed for. Taking cognizance of relevant working capital variables of inventory turnover in days, periods payable in days, cash receivable in days conversion cycle actual sales (cash management) and so on.

Uguru, Chukwu and Elom, (2018) explored the impact of working capital management on the profitability of brewery firms in Nigeria. They adopted a pre-post factor research design and employed the simple Least Squares (OLS) regression technique in the analysis of the secondary data collected. To measure the impact of working capital management in quantitative terms, the days accounts receivable are outstanding, the number of days the list is kept, and the cash conversion cycle were used as a proxy for working capital management, while on asset Return was used as a financial metric. profitability. The study used samples from Nigerian Breweries plc and Guinness Nigeria plc, covering a period of eight (8) years, from 2006 to 2014. Based on the results of the analyzed data, the study found that managing the number of days accounts receivable, the number of days inventory is held and the cash conversion cycle serve the profitability objective of brewery firms in Nigeria. are important factors. . The study therefore recommended that brewery firms in Nigeria should reduce investments in current assets to avoid high inventory costs and excess cash holdings and account receivables. Although this work is recent in the literature of working capital management, work focused on consumer goods therefore a work on the industrial goods sector in Nigeria has become a clear call to which this study answers.

Hassan, Helen and Wiley (2017) in their research on the impact of working capital management on the financial performance of firms in Put-Land Somalia, analyzed the return on assets (ROA) on the four independent variables of the cash conversion cycle (CCC). Linear regression was used. ), Stock Turnover Ratio (STR), Receivables Turnover Ratio (RTR) and Payable Turnover Ratio (PTR). The study confirmed that CCC and STR have a positive effect on the return on assets of water companies in Garoway. Thus the study found that there is a significant positive association between CCC and STR on ROA while RTR and PTR are negative. The researcher recommended that there should be no major changes in the dues management policy as the payables turnover ratio does not affect the financial performance of water companies in put-land Somalia. Although this research appears to be a recent study, it suffers from geographic and regional gaps, which this work seeks to address in the Nigerian context.

Godfrey (2017) explored the impact of working capital management on the corporate profitability of construction firms in Nigeria using Dangote Cement Plc. The study covered a period of ten (10) years spanning from 2007-2017. Simple least squares regression method was employed to establish the relationship between the components of working capital management and corporate profitability (ROA). The research found that efficient working capital management has a positively significant impact on the return on assets and that efficient working capital management has a positively significant impact on a firm's net

profit margin. The study recommended that firms should improve their working capital policies to enhance corporate performance and that there should be periodic assessment of investment in working capital based on capital investment model to determine ahead of time the feasibility of such investments. Although this study is recent and focused on a single firm in the industrial sector, the sample size taken for the study was too small to make any generalizations. It is this gap that this research work seeks to address.

Raji, Adebayo and Folarin (2017) examined the effect of working capital on the performance of firms in Nigeria. The study focused on listed agricultural firms in Nigeria. Secondary data was drawn from the audited financial reports of agricultural firms and banks, respectively, for a period of thirteen (13) years spanning 2002 – 2014. The collected data were analyzed with the use of the panel method. The research findings showed that there is no significant relationship between working capital and the performance of firms as measured by the current ratio. The study therefore recommended that firms should focus on their ability to meet their short-term obligation to ensure the survival of the business in the long run. Since mono-variable regression was used in the study, this research will use multivariate regression analysis to study the relationship between working capital metrics in relation to profitability of the industrial goods sector in Nigeria.

**Theoretical Framework**

**Agency Theory**

The identity of agency theory is based on the legal paradigm of the relationship that exists between an agent and principal Shapiro (2005). The principle is sacred in accounting because of the entity concept of accounting which is based on the fact that ownership is distinct from management and control, especially in modern business. Therefore there is an imposed duty on the shareholders (principals) to appoint agents (managers) whose responsibility is to provide for the assets of the shareholders committed in their hands to the shareholders through the financial reports prepared by the agent. Manage and report. Agency theory was championed by Jensen and Meckling in 1976. Agency theory describes the authority assigned to the owners (principals) to the manager (agents) to run the firm on their behalf in accordance with the owner's welfare with the owner's welfare (Jensen and Meckling, 1976).

Agency theory seeks to address potential conflicts of interest between owners and managers, as managers' interests can lead to opportunistic use of firm resources to satisfy their individual interests. Agent(s) may have more relevant information than shareholders, information asymmetry occurs, and this increases the likelihood that the agent(s) may behave in ways that put their own interests first because insider information is available to them. The pass rests on the shareholders. This research work examines the impact of working capital management on the profitability of industrial goods sector firms in Nigeria. The primary objective of a firm is to maximize the wealth of the shareholders (principal). It rests entirely on the shoulders of the managers (agents). Therefore, efficient working capital management by managers to enhance performance is fulfilling the agency's obligation, due to the managers to their respective owners or principals.

**Stakeholders' Theory**

This theory is a move away from Milton Friedman's shareholders' theory, where he propagated the idea that the only stakeholders organization should be worried about is the shareholders. The stakeholders' theory is accredited to Dr. Edward Freeman who perceived stakeholders as "those group without whose support the organization would cease to exist." In his view the corporate environment as an ecosystem of related groups, all of whom need to be considered and satisfied to keep the company healthy and successful in the long

term. Thus the theory was adopted to fill the observed gap created by omission found in the agency theory which identifies shareholders as the only interest group of a corporate entity. Within the framework of the stakeholders' theory the problem of agency has been widened to include multiple principals (Sand, Garba & Mikailu 2011). The stakeholders' theory attempts to address the questions of which group of stakeholders deserve the attention of management. The stakeholders' theory proposes that companies have a social responsibility that requires them to consider the interest of all parties affected by their actions. The original proponents of the stakeholders' theory suggested a restructuring of the theoretical perspectives that extends beyond the owner Manage-employee position and recognizes the numerous interest groups. Freeman, Wicks & Farmer (2004), suggested that: "if organizations want to be effective, they will pay attention to all and only those relationships that can affect or be affected by the achievement of the organization's purpose". Therefore, an audit report is not just a pilot document for shareholders only but a compass that all stakeholders can rely on in decision making.

This research work is anchored on the stakeholders' theory discussed above. The choice of the stakeholders theory becomes necessary owing to the fact that determining an appropriate working capital mix will mean factoring in the interest of all stakeholders into the working capital management policy of the firm. Thus an effective and efficient working capital mix is one that reflects the interest of stakeholders. This is because any working capital management policy that neglect the interest of stakeholders will result in poor financial performance of industrial goods sector in the long run which consequently could lead to business failure.

## METHODOLOGY

The research design employed in this study is the ex-post factor designbecause it is appropriate for the estimation of the relationship between the dependent variable and the independent variables. It is always convinient to be used as it provides quantitative measure for estimating the numeric coeficients of models owing to the linearity of the econometric relationship between the variables under study.The study used secondary data which were collected via annual financial reports and bulletins of Nigeria Stock Exchange of the various firms. Convinence sampling techniqiues was used to select ten (10) out of the sixtten (16) listed industrial good firms on the Nigeria stock exchange based on availability of data. Data collected were analyzed using both discriptive and Panel regression analysis with the aid of STATA 14 package

The model that will be used in testing the hypothesis of the study is hereby presented as follows:

$ROA = \beta_0 + \beta_1 ITRM + \beta_2 CCC + \varepsilon$ ---------- (i)

Where ROA = Return on Assets

CCC = Cash Conversion Cycle

ITRM = Inventory Turnover Ratio Management

## RESULT AND DISCUSSION OF FINDINGS

This section presents and analyses the results of the study.
The results of descriptive statistics are reported in Table 1.

**Table 1**
**Descriptive Results**

| Variables | Mean | SD | Min | Max | Skewness | Kurtosis | N |
|---|---|---|---|---|---|---|---|
| ROA | 4.268 | 28.516 | -179.917 | 53.959 | -4.091 | 25.019 | 110 |
| ITRM | 4.650 | 3.461 | 1.617 | 32.258 | 5.104 | 38.817 | 110 |
| CCC | -52.119 | 239.569 | -1345.76 | 230.998 | -3.214 | 16.770 | 110 |

**Source: STATA 14 OUTPUTS**

Table 1 above contains a descriptive description of the panel data for all variables included in the study. The panel has 110 observations for three (3) variables for ten selected industrial commodities in Nigeria. The researcher covers a period of 11 years (2010-2020). The dependent variable (return on assets) has an average value of 4.26%, the standard deviation that measures dispersion, indicating that the return on assets (ROA) of the industrial goods companies in the panel deviate from its mean by approximately 28.52%. The minimum value for return on asset is -179.9% while the maximum is around 54%.

Also for the independent variable, the average value of inventory turnover ratio is around 5 while the standard deviation is 3, indicating that there is no major difference in the number of days of inventory turnover between industrial goods companies in Nigeria. Furthermore, this was supported by a minimum ratio value of 2 and a maximum ratio value of 32 for inventory turnover as shown in the table above.

The result of the normality test (Shipro-Swilk) is shown in Table 2.

**Table 2**
**Normality Test**

| Variables | W | V | Z | P-Values | N |
|---|---|---|---|---|---|
| NPTM | 0.6045 | 35.366 | 7.951 | 0.0000 | 110 |
| STDA | 0.5764 | 37.873 | 8.104 | 0.0000 | 110 |
| FSIZE | 0.6967 | 27.122 | 7.359 | 0.0000 | 110 |

**Source: STATA 14 OUTPUTS**

The Shapiro-Wilk (W) test was conducted to check the normality of the data. Table 2 discovered that data for the variables of the models are not normally distributed because the P-values of all the variables are significant at the level of 1% (p-values of 0.0000). Hence, spearman's rank correlation will be adopted.

**Table 3: Correlation Matrix**

| | ROA | ITRM | CCC |
|---|---|---|---|
| ROA | 1.0000 | | |
| ITRM | -0.2203 | 1.0000 | |
| CCC | 0.3259 | -0.5421 | 1.0000 |

**Source: STATA 14 OUTPUTS**

The above table shows the correlation between the dependent variable (performance) proxies by return on assets, independent variable (inventory turnover) and the control variable (cash conversion cycle). The table shows that the independent variable is negatively (-0.2203) associated with return on assets of industrial goods companies in Nigeria.

**Hypotheses Testing**

**Decision rule:** *Accept null hypothesis if the p-value of the data is less than 0.05 and reject the null hypothesis when the p-value is greater than 0.05*

The hypotheses formulated for the study are tested and analyzed from the results in table 4.

**Table 4**

| *Variable* | Aprori Sign | Random Effects | Fixed Effects |
|---|---|---|---|
| *C* | | 35.5936***<br>(5.2696)<br>{0.000} | 35.7661***<br>(2.4828)<br>{0.000} |
| *ITRM* | + | -6.7998***<br>(0.4555)<br>(0.000) | -6.8397***<br>(0.4674)<br>(0.0000) |
| *CCC* | + | 0.0057<br>(-0.0075)<br>{0.443} | -0.0060<br>(0.0078)<br>{0.445} |
| *Model Parameters* | | | |
| *Wald Chi2* | | 226.64 | - |
| *Prob. Chi2* | | 0.0000 | - |
| *F-statistic* | | - | 108.55 |
| *Prob(F-stat)* | | - | 0.0000 |
| *R square* | | 0.5973 | |
| *Adjusted $R^2$* | | 0.5897 | |
| *F statistics* | | 79.34 | |
| *Prob.* | | 0.0000 | |
| *Hausman* | | 0.9245 | |

Source: **STATA 14 OUTPUTS**

*** Sig @1%, ** Sig @5%, * sig @10%) standard error ( ) p-value { }

Table 4 shows the regression results of the Random effects (RE) and fixed effects (FE) models. To determine which model is better, this researcher carried out the Hausman test for choosing the FE model versus the RE model. Meanwhile, the Hausman p-value is 0.9245 which indicates that the FE method may give bias and inconsistent estimators when compared to RE model and hence the RE is the preferred model. Hence the RE estimation results forms the basis for the analysis of the results for the study. As shown in the result at under model parameters both the probability for value for Wald test and F test was significant at 1%, this shows that the model is of a good fit and suggests that the hypothesis of a significant linear relationship between the dependent and independent variable cannot be rejected. It is also indicative of the joint statistical significance of the model.

As shown in the results, the $R^2$ for the model is 0.5973 which implies that the model explains about 60% of the systematic variations in the dependent variable with a degree of freedom adjusted the $R^2$ of 59%. The F-stat is 79.34 (p-value = 0.0000) is significant at 5% and suggests that the hypothesis of a significant

linear relationship between the dependent and independent variables cannot be rejected. It is also indicative of the joint statistical significance of the model.

**Table 5: Standard Error corrected for Fixed Effect Model**

| Variables | Model | | |
|---|---|---|---|
| | **Coefficients** | **P-Value** | **standard error** |
| ITRM | -6.799 | 0.000 | 8.892 |
| CCC | -0.005 | 0.293 | 0.005 |
| CONS | 35.559 | 0.000 | 5.123 |

**Sources: STATA 14 OUTPUTS**

The Robust Standard Error for random effect was employed to correct for potential serial correlation in the estimation and hence the estimation results are free from serial correlation. The above table shows the result after correction of serial correlation in the model.

The analysis of coefficients reveals that inventory turnover have a negative (-6.7998) and highly significant (p= 0.000) at 1% and 5% level of significance. Based on the decision rule stated above the p-value is less than 0.05 therefore, the null hypothesis is rejected inventory turnover has no significant effect on return on assets of listed industrial goods firms in Nigeria and accept the alternative hypothesis that, inventory turnover has significant effect on return on assets of listed industrial goods firms in Nigeria Although the control variable does not have any significant, CCC (0.293)..

**Table 6**: Panel Regression Diagnostics **(Post estimation test)**

| | |
|---|---|
| ***Multicollonniarity: VIF Vif*** | 1.08 |
| ***Cross sectional independence: Pesaran's test*** | 0.2704 |
| ***Serial Correlation: Wooldridge test*** | |
| ***F stat*** | 10.727 |
| ***Prob.*** | 0.0096 |
| ***Heteroskedasticity Test: Breush-Pagan*** | |
| ***Chi2*** | 28.68 |
| *Prob. Chi-Square* | 0.000 |

**Source: STATA 14 OUTPUTS**

The panel regression diagnostics is presented in the table above. Variance inflation factor was employed to test for multicolinearity; the result shows that there is no multicolinearity because the value (1.08) is less than 10. Also, Wooldridge test was used to test for serial correlation, the value for p was not significant (0.0096) this confirm that there is presence of serial correlation in which it has been corrected with robust standard error. Finally, the Breush-Pagan test was employed for heteroskedasticity; the probability value of chi (0.0000) confirms that there was heteroskedasticity in which the robust standard error model has been used to correct this. Also the cross sectional dependence result (0.2704) showed that the residual is free from cross sectional dependence

## DISCUSSION OF FINDINGS

From the above result, it was discovered that inventory turnover has a negative and significant relationship on return on asset; this means that improper management of inventory turnover ratio can reduce the return on asset of industrial goods companies and this call for proper inventory management. It also means that if the time taking in converting finished

goods to sales is longer than necessary, it can affect what is expected to generate in relation to the assets used in production of such product, also on the part of inventory to finished goods. Therefore, company's management should make sure there is proper monitoring of inventory turnover. This result aligns with the work of Thu-Triang and Doan (2019) who examine the effect of working capital management and profitability of fishery enterprises in Vietnam. Inventory turnover was found to have a negative but significant relationship with return on assets. On the other hand the result of this work is in contrast to the work of (Hassan, Hellen & Willy 2017), who examined the effect of working capital management on firms' performance in Portland Somalia. Inventory turnover was found to have a positive but insignificant relationship with profitability of firms.

## CONCLUSION AND RECOMMENDATIONS

In Conclusions we established that inventory turnover ratio management has a negative and significant effect on return on asset. This means that working capital has a significant effect on performance of industrial goods companies in Nigeria. The study concludes that the ratio of inventory turnover should be appropriately managed to avoid an adverse performance. This means that if the inventory turnover is not well managed, it will reduce the income and this income may not be commensurate with the value of asset utilization and it can lead to adverse performance.

### Recommendations

The following recommendations were proffered from the findings of this study:

i. The management of listed industrial goods firms in Nigeria should take the issues on working capital management with great concern, with particular attention on inventory turnover as a very serious matter that needs proper attention to increase their performance.

ii. The management of listed industrial goods firms in Nigeria should work diligently in having a good policy on working capital management.

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**Appendix A**

| Fiscal Year | Companies | ITRM | CCC | ROA |
|---|---|---|---|---|
| 2010 | Berger Paints Nig | 2.8205 | 33.5 | 16.9822 |
| 2011 | Berger Paints Nig | 2.791 | 62.4667 | 8.5164 |
| 2012 | Berger Paints Nig | 2.8569 | 32.7213 | 6.606 |
| 2013 | Berger Paints Nig | 3.2016 | 27.7984 | 7.1069 |
| 2014 | Berger Paints Nig | 3.3136 | 82.5768 | 4.088 |
| 2015 | Berger Paints Nig | 3.5769 | 34.794 | 8.4786 |
| 2016 | Berger Paints Nig | 2.6185 | 26.5871 | 5.4606 |
| 2017 | Berger Paints Nig | 3.1642 | 24.2311 | 5.7122 |
| 2018 | Berger Paints Nig | 3.1265 | 17.6045 | 7.067 |
| 2019 | Berger Paints Nig | 2.365 | 35.0729 | 8.857 |
| 2020 | Berger Paints Nig | 2.23 | 20.622 | 7.25 |
| 2010 | Beta Glass Company | 3.4956 | 139.2594 | 9.105 |
| 2011 | Beta Glass Company | 3.2094 | 131.7697 | 9.8474 |
| 2012 | Beta Glass Company | 3.7038 | 186.6064 | 5.9162 |
| 2013 | Beta Glass Company | 3.293 | 165.7475 | 5.4013 |
| 2014 | Beta Glass Company | 5.3069 | 142.7081 | 8.8762 |
| 2015 | Beta Glass Company | 3.5195 | 156.3403 | 7.3281 |
| 2016 | Beta Glass Company | 3.5969 | 171.3013 | 11.4494 |
| 2017 | Beta Glass Company | 3.3707 | 230.9986 | 10.7693 |
| 2018 | Beta Glass Company | 3.1957 | 88.2708 | 10.9654 |
| 2019 | Beta Glass Company | 3.3005 | 127.4361 | 10.7146 |
| 2020 | Beta Glass Company | 3.012 | 100.542 | 10.432 |
| 2010 | Chemical & Allied Product | 7.2159 | -41.6431 | 37.2466 |
| 2011 | Chemical & Allied Product | 5.1979 | 5.5643 | 34.1813 |
| 2012 | Chemical & Allied Product | 2.699 | 18.3353 | 38.7911 |
| 2013 | Chemical & Allied Product | 5.2621 | 14.8017 | 46.6817 |
| 2014 | Chemical & Allied Product | 5.8416 | 31.5507 | 53.9594 |
| 2015 | Chemical & Allied Product | 5.1074 | 20.3033 | 51.0239 |
| 2016 | Chemical & Allied Product | 3.7494 | 8.3676 | 32.6151 |
| 2017 | Chemical & Allied Product | 3.2541 | 11.0236 | 29.891 |
| 2018 | Chemical & Allied Product | 4.5634 | -52.9487 | 32.1544 |
| 2019 | Chemical & Allied Product | 4.226 | -45.6761 | 25.7669 |
| 2020 | Chemical & Allied Product | 4.016 | -30.324 | 24.564 |
| 2010 | Cutix | 3.0443 | 108.8421 | 13.014 |
| 2011 | Cutix | 2.9377 | 110.7522 | 9.0146 |
| 2012 | Cutix | 3.5256 | 113.3134 | 8.3914 |
| 2013 | Cutix | 4.905 | 67.7872 | 14.1007 |
| 2014 | Cutix | 3.6229 | 154.3547 | 11.8714 |
| 2015 | Cutix | 2.7912 | 181.1228 | 7.5786 |
| 2016 | Cutix | 4.3088 | 117.8008 | 10.0729 |
| 2017 | Cutix | 2.4204 | 139.8256 | 11.0524 |
| 2018 | Cutix | 2.6835 | 122.3832 | 15.5238 |
| 2019 | Cutix | 2.3988 | 154.873 | 16.673 |

| | | | | |
|---|---|---|---|---|
| 2020 | Cutix | 2.045 | 130.456 | 15.342 |
| 2010 | Dangote Cement | 5.7125 | -96.295 | 26.5162 |
| 2011 | Dangote Cement | 6.8087 | -84.2674 | 23.0616 |
| 2012 | Dangote Cement | 3.6426 | -42.2698 | 22.5532 |
| 2013 | Dangote Cement | 5.1511 | -128.845 | 23.8612 |
| 2014 | Dangote Cement | 3.3513 | -134.024 | 16.1976 |
| 2015 | Dangote Cement | 3.7992 | -126.138 | 16.3215 |
| 2016 | Dangote Cement | 3.906 | -194.133 | 12.2143 |
| 2017 | Dangote Cement | 3.7137 | -169.338 | 12.2606 |
| 2018 | Dangote Cement | 3.5824 | -100.04 | 23.0353 |
| 2019 | Dangote Cement | 3.3098 | -150.949 | 11.5153 |
| 2020 | Dangote Cement | 3.2156 | -130.345 | 11.235 |
| 2010 | Greif Nig | 3.8191 | 109.5172 | 6.4633 |
| 2011 | Greif Nig | 5.6113 | 118.4312 | 6.166 |
| 2012 | Greif Nig | 4.6403 | 153.5493 | 5.0974 |
| 2013 | Greif Nig | 4.0739 | 9.401 | 4.4879 |
| 2014 | Greif Nig | 5.6435 | 44.6254 | 6.5449 |
| 2015 | Greif Nig | 5.8264 | -23.8273 | 3.4405 |
| 2016 | Greif Nig | 6.5608 | -6.3768 | 3.7517 |
| 2017 | Greif Nig | 6.3137 | -0.1499 | 6.2827 |
| 2018 | Greif Nig | 10.1651 | -60.6263 | -55.1969 |
| 2019 | Greif Nig | 32.2586 | -102.373 | -179.9173 |
| 2020 | Greif Nig | 15.231 | -90.653 | -150.236 |
| 2010 | Lafarge Cement Wapco Nig | 3.2749 | 20.5214 | 4.12 |
| 2011 | Lafarge Cement Wapco Nig | 4.1861 | -123.178 | 5.6649 |
| 2012 | Lafarge Cement Wapco Nig | 4.2963 | -70.665 | 9.682 |
| 2013 | Lafarge Cement Wapco Nig | 5.1097 | -69.1891 | 17.5484 |
| 2014 | Lafarge Cement Wapco Nig | 5.6615 | -40.9008 | 11.3315 |
| 2015 | Lafarge Cement Wapco Nig | 5.5924 | -54.5307 | 5.9597 |
| 2016 | Lafarge Cement Wapco Nig | 4.0209 | -71.8597 | 3.363 |
| 2017 | Lafarge Cement Wapco Nig | 4.2631 | -49.7909 | -5.9892 |
| 2018 | Lafarge Cement Wapco Nig | 5.0628 | -25.9887 | -1.6277 |
| 2019 | Lafarge Cement Wapco Nig | 4.841 | -72.5978 | 3.1213 |
| 2020 | Lafarge Cement Wapco Nig | 4.941 | -70.567 | 3.423 |
| 2010 | Meyer Plc | 1.7169 | -557.189 | -8.7031 |
| 2011 | Meyer Plc | 2.4112 | -121.159 | -1.9823 |
| 2012 | Meyer Plc | 2.784 | -50.8971 | -1.0439 |
| 2013 | Meyer Plc | 4.8452 | -74.7029 | 1.7913 |
| 2014 | Meyer Plc | 3.7677 | -113.995 | -1.4852 |
| 2015 | Meyer Plc | 3.4733 | -86.6897 | 2.2703 |
| 2016 | Meyer Plc | 4.2328 | -112.336 | -9.9385 |
| 2017 | Meyer Plc | 6.6683 | -194.689 | -13.9664 |
| 2018 | Meyer Plc | 4.461 | -300.431 | 17.1434 |
| 2019 | Meyer Plc | 6.5822 | -1340.79 | -0.3629 |
| 2020 | Meyer Plc | 5.961 | -1345.76 | 1.897 |
| 2010 | Portland Paint Nig | 1.6231 | -51.6843 | 8.4715 |
| 2011 | Portland Paint Nig | 1.8377 | 92.7344 | 6.8627 |

| | | | | |
|---|---|---|---|---|
| 2012 | Portland Paint Nig | 2.058 | 42.1053 | -9.5708 |
| 2013 | Portland Paint Nig | 2.1265 | 89.4511 | 4.927 |
| 2014 | Portland Paint Nig | 1.9726 | 72.8312 | 6.5264 |
| 2015 | Portland Paint Nig | 2.0621 | 1.4893 | -12.267 |
| 2016 | Portland Paint Nig | 1.6173 | 45.5232 | 0.49 |
| 2017 | Portland Paint Nig | 1.7994 | 154.8165 | 2.86 |
| 2018 | Portland Paint Nig | 2.4091 | 108.4741 | 9.1804 |
| 2019 | Portland Paint Nig | 2.5342 | 109.484 | 8.678 |
| 2020 | Portland Paint Nig | 2.243 | 108.437 | 7.564 |
| 2010 | Premier Paints | 13.1929 | -231.113 | -70.3448 |
| 2011 | Premier Paints | 7.7697 | -276.789 | -22.3254 |
| 2012 | Premier Paints | 9.9728 | -245.542 | -10.3606 |
| 2013 | Premier Paints | 7.887 | -297.617 | -8.3908 |
| 2014 | Premier Paints | 5.4872 | -117.554 | 2.7998 |
| 2015 | Premier Paints | 7.4344 | -239.658 | -8.6428 |
| 2016 | Premier Paints | 7.696 | -232.755 | -12.0939 |
| 2017 | Premier Paints | 6.9244 | -355.547 | -18.9743 |
| 2018 | Premier Paints | 6.8576 | -473.823 | -26.3705 |
| 2019 | Premier Paints | 7.3933 | -637.22 | -6.9372 |
| 2020 | Premier Paints | 7.325 | -646.45 | -6.843 |