WORKING CAPITAL MANAGEMENT AND FINANCIAL PERFORMANCE OF LISTED INDUSTRIAL GOODS FIRMS IN NIGERIA

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Abstract

There is a dense of literature on working capital management but its effects on financial performance of listed industrial goods firms in Nigeria is scanty, hence, this study examines the effect of working capital management on the financial performance of industrial goods firms listed on the Nigerian Stock Exchange. The research adopted descriptive research design using secondary data of the nature of ex-post facto. The population of the study consists of all the thirteen (13) industrial goods firms listed on the Nigerian stock exchange, while the sample size was determined using purposive sampling technique to select the ten firms which constituted the sample. The data obtained from secondary sources were analyzed using both descriptive and inferential statistics. The result of the findings amongst others showed that working capital has both positive and significant effects on return on assets (F-stat = 12.072, p value = 0.000) of industrial goods firms listed on the Nigerian Stock Exchange. Based on the empirical findings of the hypotheses, this study concludes that working capital is a significant determinant of financial performance of industrial goods manufacturing companies listed on the Nigerian Stock Exchange. It is hereby recommended, amongst others, that managers of the listed industrial goods firms in Nigeria should pay attention to the average collection and payable periods of their firms since they had negative and insignificant effect on their return on assets, as per the finding of this study.

Keywords: Financial performance, Net margin, Return on capital employed, Return on assets, Return on equity, Working capital

Introduction

Profitability is the ability of firms to utilize its resources to generate profit. This implies that profitability in an organization demonstrates the effective use of resources and the ability to generate profit. Thus, the interest of stakeholders such as customers, creditors, shareholders, government, and managers are protected. This reflects on the level of return on capital invested by shareholders, sends signals to customers on the capacity of the organizations to meet their needs, shows government the capacity of organizations/individuals to pay their taxes and provides assurance to managers the results of their efforts in creating value for their organizations.

Corporate organizations including manufacturing companies have two

fundamental financing decisions to make towards ensuring the achievement of their ultimate objective of maximizing their shareholders' wealth. These financing decisions can be classified into short term and long-term financing. However, from the perspective of short-term financing needs, financial managers attempt to define the rational level of working capital, which ultimately enhances shareholders' equity investment. Working capital includes the cyclical movement of current assets and current liabilities of firms. Omolehinwa (2017) noted that the management of working capital is closely linked with the management of cash. Therefore, working capital deals primarily with inventories, receivables, short term payables, cash balances and bank overdrafts.

Similarly, Gull and Arshad (2015) emphasized that firms with good management of current assets and current liabilities can achieve higher rate of return on their investment and attain strong profitability. This implies that when a firm is able to manage its short-term resources and obligations efficiently, such firm will eliminate the inability of meeting short term obligations which will result into better profitability and financial position.

Furthermore, Lazaridis and Tryfonidis (2016) explained that working capital management of the firm is determined by production processes and technological features. This suggests that the level of working capital is determined by a firm's dependent on specific factors such as capital intensity, profitability, and size. Thus, the ultimate objective of business firms is to maximize shareholders' wealth but maintaining a desirable level of working capital is an important objective too. There should, therefore, be a good balance between increasing profitability and

maintaining an acceptable level of liquidity, which is a serious challenge for any firm. In a nutshell, the trade-off between profitability and liquidity is highly imperative. It behooves a necessity to juggle the major items of working capital to achieve the required balance. In this regard, Afza and Nazir (2017) emphasized that there is a strong negative association between account receivable turnover, inventory turnover, and cash conversion cycle (CCC) with reference to the profitability of firms.

Pandey (2011) asserted that in theory, the objective of working capital should be to maximize a shareholder's return so that the value of the investment is maximized. An important concept of working capital is working capital cycle. The working capital cycle gives the total length of time between investing cash in paying for raw materials at the start of the production process and its recovery at the end with the collection of cash from debtors. This portends that working capital is an all-important function of the financial manager if the business is to survive in the midst of intense competition and make profit. Priya and Nimalathasan (2015) classified working capital into gross and net concepts, with the gross working capital described as the firm's investment in current assets. Current assets are the assets which can be converted into cash within an accounting year, and these include cash, short-term securities, debtors, bills receivables and stocks, while the net working capital indicates the difference between current assets and current liabilities.

In addition, Mathuva (2017) emphasized that working capital entails the trade-off theory on the cost of liquidity and illiquidity needed in maintaining an optimal level of current assets. A very high level of current assets means excessive liquidity,

hence return on assets will be low as funds are tied up in idle cash and stocks earn nothing while high levels of debtors reduce profitability. Therefore, cost of liquidity through low rates of return increases with the level of current assets. Conversely, cost of illiquidity means holding insufficient current assets whereby a firm will be unable to honor its obligations forcing it to borrow on short-term at high interest rates. This adversely affects a firm's creditworthiness and may limit future access to funds and possible insolvency.

In both developed and emerging economies, Ashfaq and Huang (2018) argued that optimum working capital enhances revenue growth in Malaysian manufacturing companies. In addition, Sai, Alessandra, and Knight (2017) argued that firms characterized by high working capital display high sensitivities of investment in working capital to cash flow and low sensitivities of investment in fixed capital to cash flow. This implies that an active working capital may help firms to alleviate the effects of financing constraints on fixed investment. In the case of China, Li (2014) asserted that Chinese listed firms' working capital policy is different across industries. The study suggested that firms in China are prone to choose conservative working capital policy which is shown to be positively associated to the firms' profitability.

With respect to Nigeria, Akinlo (2013) stated that firms' profitability is reduced by increasing the number of days of accounts receivable, number of days of inventory. It can be argued that the manufacturing sector in Nigeria has witnessed a boom-and-bust cycles leading to low profitability of such firms. Specifically, the industrial goods sector is unique because the sector primarily deals with the process of creating and supplying industrial and capital goods, hence, without a well-developed industrial goods sector, the supply of capital goods which are used for manufacturing purposes sector will be greatly affected. Research in this area has focused attention generally on the consumer goods sector without focusing attention on the industrial goods sector, specifically. In order to fill this observed gap in literature, this research study seeks to examine the effects of working capital management on the financial performance of industrial goods manufacturing companies listed on the Nigerian Stock Exchange.

Literature Review
Conceptual Review
Working capital: Working capital includes current assets and current liabilities of business organizations. Omolehinwa (2017) noted that the management of working capital is linked closely with the management of cash. Following from this, working capital management deals primarily with the management of inventories, receivables, short term payables, cash balances and bank overdrafts. In the same vein, Gull and Arshad (2015) emphasized that firms with best management of current assets and liabilities can achieve higher rate of return on their investments and strong profitability position. This implies that when a firm is able to manage its short-term resources and obligations efficiently, such firms will eliminate the inability of meeting short term obligations which will result into better profitability and financial position.

Average Collection Period: This is the approximate period of time that it takes businesses to receive payments for debts owed by its customers. Konak and Guner (2016) argued that the average collection period is calculated by dividing accounts receivable by net credit sale and multiplying same by 365 (days). Furthermore, the

average collection period is used as a measure of accounts receivable policy. It represents the average number of days that a company uses to collect payments from its customers. Similar to the inventory, a low number of days is desirable to keep the cash conversion cycle short (Lantz, 2018).

Average Payment Period: This is a measure of working capital that explains the rate at which companies pay the debts owed to its suppliers. It is calculated by dividing account payable by the value of purchases and multiplying with 365 (Iman & Mehdi, 2019). The average payment period is used as a measure of account payable policy. It represents the average number of day it takes companies to pay its suppliers. While average receivable period is preferred to be kept short, more number of days for accounts payable is considered better for shorter cash conversion period (Lantz, 2018).

Inventory Turnover in days: This is a ratio that determines how many times the inventory of a company is sold and replaced over a given period of time. It is used as a proxy for the inventory policy of a firm. It is calculated by dividing inventory with cost of goods sold (CoGS) and multiplying with 365 (Konak & Guner, 2016). The inventory turnover in days represents the period that inventories are held by companies before they are sold. In order to help shorten the cash conversion cycle, a lower number of days are better.

Cash Conversion Cycle: This is a measure of working capital management which explains the time needed to convert company resources into cash flows. It is measured by adding inventory turnover in days and average collection period and subtracting average payment period from the total figure (Iman & Mehdi, 2019).

Financial performance: According to Casu, Girardone & Molyneux (2006) the strength of thefinancial position of an organization is measured through profitability. Aymen (2017) argued that profitability in an organization demonstrates the proficient use of resources and the capacity to generate profit. It is of considerable interest to stakeholders, including customers, creditors, shareholders, governments and managers since it reveals the return on capital invested by shareholders, sends signals to customers of the organization which reflects the capacity of the firm to meet the needs of customers; shows government the capacity of the organization to pay its taxes, shows managers to determine the value of their efforts and human capital invested in the organization

Return on Asset: The best indicator used to measure earning is the return on asset, which is net income after taxes to total assets of the firm. Strong earnings and profitability outline of manufacturing firms reflect the capability to sustain present and future operations. In particular, this is used to determine the capacity to take in losses, finance its debts, pay dividends to its shareholders and build up a sufficient level of capital. It can be considered a leading edge of defense against erosion of capital base from losses, the need for high earnings and profitability. Konak and Guner, 2016 explain that, although, there are various indicators used to serve this purpose, the paramount and most widely used indicator is Return on Assets (ROA). Also, return on asset measures the success of the management to use its assets to generate earnings. Alternatively, it measures the yield of companies acquired through utilization of its assets.

Net Margin: This is a profitability ratio that reflects the percentage of profit a firm produce from its operations, prior to subtracting taxes and interest charges. Net margin is the percentage of net income generated from a company's revenue. The net margin takes into account all business expenses, not merely the cost of goods sold and is therefore, a more stringent metric by which to measure profitability. It reflects the total revenue left over after accounting for all outgoing cash flow and additional income streams including cost of goods sold, other operational expenses, debt payments such as interest, investment income from secondary operations, and one-time payments for unusual events such as lawsuits and taxes (Konak & Guner, 2016).

Return on Capital Employed: Return on Capital Employed shows the efficiency of management in utilizing the resources placed at its disposal. It is a primary measure of profitability. Return on capital employed appears to be widely used by management and investors as a summary indicator of business success (Samad & Hassan, 2016).

Return on Equity: This is a profitability ratio that measures the ability of a firm to generate profit from its shareholders' investment. Therefore, return on equity shows the profitability to shareholders of the firm after all expenses and taxes. It measures the amount the firm is earning after tax for each amount invested in the firm. In other words, return on equity is net earnings per equity capital. Samad and Hassan (2016) argued that return on equity is an indicator of managerial competence. This implies that higher return on equity indicates better managerial performance; however, a higher return on equity may be due to debt (financial leverage) or higher return on assets since financial leverage always expands ROE. This will always be the case as long as the ROA (gross) is greater than interest rate on debt. However, there is higher return on equity for high growth companies.

The theory underlying this study is the pecking order theory as postulated by Myers in 1984. The pecking order theory takes into consideration the information asymmetry which indicates that managers know more about the firm's value than potential investors. Omolehinwa (2014) opined that the pecking order is based on the consideration that resources generated internally do not have transaction costs and the fact that issuing new bonds tend to send positive information about the company while issues of new stock signal negative information about the issuing company. This explains less profitable companies also prefer issuing debts before the decision to issue new equity.

Nimalathasan (2014) criticized the pecking order theory on the ground that it is hard to determine the optimal working capital that will enhance the profitability of firms based on the pecking order theory. The pecking order theory is relevant to this study as it shows how the method and level of financing affects working capital decisions and profitability of firms.

In support of the pecking order theory, Brealey, Myers and Allen (2008) posited that not only managers of less profitable companies but also managers of more profitable companies would choose a more aggressive working capital policy, pressuring for lower level of current assets and higher level of financing through suppliers, in order to source internally the needed funds to finance their companies and to avoid issuing debts and equity.

Empirical Review

Ozturk and Vergili (2018) examined the relationship between the components of working capital and profitability of listed mining firms in Istanbul Stock Exchange (ISE) for the period of 2009Q4–2015Q3 using a panel data analysis. The empirical findings of the study showed that growth (firm growth in sales) and INVP (inventory period) had a positive effect on ROA (return on assets) while size (firm size) had a negative effect on firms' profitability. On the other hand, the other independent variables which includes LEV (leverage), CCC (cash conversion cycle), and ACRP (accounts receivables period) have no statistically significant effects on profitability for mining firms in Turkey.

Kowsari and Shorvarzi (2017) investigated the relationship between working capital management, financial constraints and performance of listed companies in Tehran Stock Exchange using the multiple regression analysis and correlation analysis. The study considered one hundred and forty-eight (148) listed companies on the Tehran Stock Exchange during the period 2009-2013. The results showed that ROA has a negative impact on working capital management while financial constraints had a negative effect on working capital management. The study recommended that better management of working capital can improve companies' performance.

Zafar, Nazam, Hanif, Almas and Sana (2017) investigated the relationship between working capital management and firm's profitability in the food sector of Pakistan. Return on assets (ROA) was used as a proxy for dependent variable while current asset to total asset ratio, debt to equity ratio, current ratio and capital size of the firm were used as a proxy for independent variables. A sample size of five (5) major food companies in Pakistan was selected from the balance sheet analysis of state bank of Pakistan for a period of five years, from 2012 to 2016. The relationship between working capital management and profitability was examined using correlation and regression analyses. The results showed a strong positive significant relationship between working capital management and firm's profitability in Pakistan's food sector.

Thakur and Al-Mukit (2017) examined the impact of working capital financing policy on firm profitability from Bangladesh. The study considered eighty (80) manufacturing firms listed on the Dhaka Stock Exchange over a sample period of 2009-2014 and employed fixed effect panel data regression technique. The study found a negative impact of working capital financing policy on firm's profitability measured by return on assets. Furthermore, the study recommended a conservative working capital policy by relying more on long-term financing alternatives rather short-term ones.

Rasyid (2017) investigated the impact of the aggressive working capital management policy on firm's profitability and value of non-financial listed firms in Indonesia. The data were analysed using multiple linear regression. The findings established that aggressive working capital policy has a significant influence on the company profitability; however, it has no significant impact on the market value of the company. Moreover, the study found that aggressive investment policy has a positive relationship with the profitability. Furthermore, the finding showed that the aggressive financing policy has a negative impact on profitability. Accordingly, to increase the company's market value, the manager must increase profitability by optimizing investment on current asset and

by adding the proportion of long-term financing in working capital.

Usman, Shaikh and Khan (2017) examined the impact of working capital management (WCM) on firm's profitability of major developed Scandinavian states (that is, Denmark, Norway, and Sweden) during the period of 2003 to 2015. The study measured working capital management as receivable days (RADs), inventory days (IDs), payable days (PADs), cash conversion cycle (CCC), current ratio (CR) and firm' s profitability was proxied by return on assets (ROA). The results of the findings indicated adverse effect of inventory days (IDs), receivable days (RADs), payable days (PADs) and cash conversion cycle (CCC) on firm' s profitability (ROA).

Ejike and Agha (2018) examined the effect of operating liquidity on the profitability of pharmaceutical firms listed on the Nigerian Stock Exchange. Secondary data for a period of 10 years (2002-2011) was used and Ordinary Least Squares (OLS) multiple regression technique was employed in analizing the data. The study found that operating liquidity (account receivables collection and accounts payables management) has a significant effect on the profitability measured as return on equity and return on capital employed of listed pharmaceutical firms on the Nigerian Stock Exchange. The study therefore recommended, among others, that managers should strive to collect receivables as soon as possible because it is better to receive inflows sooner than later but delay payment.

Okoye, Erin, Modebe and Achugamonu (2017) investigated the impact of working capital management on the performance of selected companies listed on the Nigerian Stock Exchange using panel data for forty (40) firms from the consumer and industrial goods sectors of the economy. Return on assets (ROA) and Return on capital was employed as proxies for firm performance while cash conversion cycle (CCC), average payment period (APP), inventory collection period (ICP) and average collection period (ACP) were adopted as proxies for working capital management. The estimation of the impact of the exogenous variables (cash conversion cycle, average payment period, inventory conversion period and average conversion period) on firm performance (endogenous variable) was based on the econometric technique of the Ordinary Least Squares used for the analysis. The study produced evidence of significant positive effects of cash conversion cycle, average payment period and inventory conversion period on firm performance. The study also found a non-significant negative effects of average conversion period on the performance of the selected firms. The study concluded that working capital management has significant impact on the performance of firms in the consumer and industrial goods sectors of the Nigerian economy. Industry managers are, therefore, advised to employ optimal working capital strategies for managing working capital so as to optimize the firms' profit position and market value.

Methodology

The study investigated the effect of working capital management on financial performance of industrial goods firms listed on the Nigerian Stock Exchange from 2010 to 2019. The study adopted the *ex-post* facto research design. The *ex-post facto* research design fits this research study simply because it investigates whether one or more pre-existing conditions have possibly caused subsequent differences in the groups of subjects. The sample size was determined

using purposive sampling technique. The number of listed industrial goods firms were thirteen (13). However, ten (10) firms with consistent data for the period of this study were selected. The selected ten (10) firms which made up the sample size for this study are: Austin Laz & Company Plc, Berger Paints Plc, Beta Glass Plc, Cap Plc, Cutix Plc, Dangote Cement Plc, Greif Nigeria Plc, Lafarge Africa Plc, Meyer Plc and Portland Paints & Products Nigeria Plc.

The data generated for this study were analyzed using descriptive and multiple regression approach which falls under inferential analysis. Furthermore, multiple linear regression approach were utilized to investigate the relationship between working capital indicators and firm performance indicators. Random or Fixed Effect estimators were employed as the approach usually makes provision for broader set of data points and it helps in addressing heterogeneity problems that prevails in time series and cross-sectional (panel data) analysis. Also, the panel approach allows control of individual-specific effects usually unobservable which may be correlated with other explanatory variables. All the same, the panel approach started with Pooled regression estimator which served as the origin of the two panel regression estimators mentioned used.

Using this approach, Hausman and Breusch and Pagan Lagrangian multiplier tests were used to choose the models that will give valid estimates. The Hausman test was used to check whether the unique errors were correlated with the explanatory variables in the regression models. Decision rule was that Random Effect estimator would preferred if the result depicts that the null hypothesis cannot be rejected and the test statistic result is not significant. Then

again, rejection of the null hypothesis would mean that Random Effect Model is not suitable. LM will be used to choose between Random Effects and Pooled (OLS) estimators. The null hypothesis of this test is that variance across entities is zero. Using this test, Random Effect model will be considered if the null hypothesis is rejected while non-rejection of the null hypothesis will indicate the Pooled (OLS) model.

Model Specification
The empirical model in a functional form is specified as;
$$Y = f(X_i, Z_i)$$
……………………………………………………………… ……. (1)
Y = Dependent Variable (Firm Performance Indicators; FPI which are Return on Asset (ROA), Net Margin (NMG), Return on Capital Employed (ROCE) and Return on Equity (ROE))
X_i = Independent Variable (Working Capital proxies; Which are Average Collection Period (ACP), Average Payable Period (APP), Inventory Turnover in day (ITD) and Cash Conversion Cycle (CCC).
Therefore, the model is explicitly specified as;
$$ROA_{it} = \alpha + \beta_1 ACP_{it} + \beta_2 APP_{it} + \beta_3 ITD_{it} + \beta_4 CCC_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots Model\ 1$$

$$NMG_{it} = \alpha + \beta_1 ACP_{it} + \beta_2 APP_{it} + \beta_3 ITD_{it} + \beta_4 CCC_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots Model\ 2$$

$$ROCE_{it} = \alpha + \beta_1 ACP_{it} + \beta_2 APP_{it} + \beta_3 ITD_{it} + \beta_4 CCC_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots Model\ 3$$

$$ROE_{it} = \alpha + \beta_1 ACP_{it} + \beta_2 APP_{it} + \beta_3 ITD_{it} + \beta_4 CCC_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots Model\ 4$$

Discussion of Results
Summary Statistics
Descriptive Analysis

	ROA	NMG	ROCE	ROE	ACP	APP	CCC	ITD
Observations	100	100	100	100	100	100	100	100
Mean	8.477612	1.941368	15.09709	18.90281	17.21230	14.99840	5.940800	15.23445
Median	6.972550	0.145332	11.38435	16.36900	17.16000	15.56228	4.835000	15.30323
Maximum	26.51650	12.41538	67.34060	100.2754	19.09000	17.97538	20.25000	19.95413
Minimum	-7.610800	0.000244	-17.25690	-372.3443	14.39000	10.20510	-34.12000	10.21114
Std. Dev.	7.264489	3.255814	14.18120	45.11657	1.251644	2.235410	5.541684	2.001370
Skewness	0.539456	1.609980	1.084689	-6.412375	-0.260538	-0.349424	-3.410962	-0.410299
Kurtosis	2.848109	4.133957	4.871942	58.01794	2.325812	1.798181	29.01448	3.246789
Jarque-Bera	4.946346	48.55835	34.20987	13297.70	3.025211	8.053158	3013.715	3.059522
Probability	0.084317	0.000000	0.000000	0.000000	0.220335	0.017835	0.000000	0.216587

Source: Authos' Computation (2021)
Where: Return on Assets (ROA), Net Margin (NMG) Return on capital Employ (ROCE), and Return on Equity (ROE), Average Collection Period (ACP), Average Payable Period (APP), Inventory Turnover in day (ITD) and Cash Conversion Cycle (CCC).

Return on Assets (ROA): Return on Assets measures the success of the management to use its assets to generate earnings. ROA posit a mean of 8.4776 which hovers around the minimum and maximum values of -7.610 and 26.516 respectively. The minimum values posit that at one point in time, one of the selected listed on the Nigerian Stock Exchange. industrial manufacturing make a loss during the period observed. However, the ROA of the listed industrial goods vary much across the manufacturing sector as shown by the standard deviation value of 7.264.

Net Margin (NMG): Net Margin (NMG) is a profitability ratio that reflects the percentage of profit a firm produce from its operations, prior to subtracting taxes and interest charges. NMG posit a mean of 1.9413 which hovers around the minimum and maximum values of 0.00024 and 12.415 respectively. However, the NMG of the listed industrial goods vary much across the manufacturing sector as shown by the standard deviation value of 3.2558.

Return on Capital Employed (ROCE): Return on Capital Employed (ROCE) shows the efficiency of management in utilizing the resources placed at its disposal. It is a primary measure of profitability. ROCE posit a mean of 15.0970 which hovers around the minimum and maximum values of -17.2569 and 67.340 respectively. The minimum values posits that at one point in time, one

of the selected listed industrial manufacturing firm make a loss during the period observed. However, the ROCE of the listed industrial goods vary much across the manufacturing sector as shown by the standard deviation value of 14.181.

Return on Equity (ROE): Return on Equity is a profitability ratio that measures the ability of a firm to generate profit from its shareholders' investment. ROE posit a mean of 18.9028 which hovers around the minimum and maximum values of -372.344 and 100.275 respectively. The minimum values posit that at one point in time, one of the selected listed industrial manufacturing firm make a loss during the period observed. However, the ROE of the listed industrial goods vary much across the manufacturing sector as shown by the standard deviation value of 45.1165. Furthermore, in this study, the proxies for working capital management are Average Collection Period (ACP), Average Payable Period (APP), Inventory Turnover in day (ITD) and Cash Conversion Cycle (CCC).

Average Collection Period (ACP): Average Collection Period (ACP) is calculated by dividing account receivable by net credit sale and multiplying with three hundred and sixty-five (365) days. ACP posit a mean of 17.212 which hovers around the minimum and maximum values of 14.3900 and 19.090 respectively. With the standard deviation of 1.2516 shows that the ACP across listed Industrial manufacturing sector varies.

Average Payable Period (APP): Average Payable Period (APP) is calculated by dividing account payable by purchase and multiplying with three hundred and sixty-five (365) days. APP posit a mean of 14.998 which hovers around the minimum and maximum values of 10.2051 and 17.9753 respectively. With the standard deviation of 2.2354 shows that the APP across listed Industrial manufacturing sector varies.

Cash Conversion Cycle (CCC): Cash Conversion Cycle (CCC) explain the time needed to convert company resources into cash flows. CCC posit a mean of 5.94080 which hovers around the minimum and maximum values of -34.120 and 20.2500 respectively. With the standard deviation of 5.5416 shows that the APP across listed Industrial manufacturing sector varies.

Inventory Turnover in day (ITD): Inventory Turnover in day (ITD) is a ratio that determines how many times inventory of a company is sold and replaced over a given period of time. ITD posit a mean of 15.2344 which hovers around the minimum and maximum values of 10.211 and 19.9541 respectively. With the standard deviation of 2.0013 shows that the ITD across listed Industrial manufacturing sector varies.

Inferential Analysis

Test of Hypothesis One (H$_{01}$): There is no significant effect of working capital on return on asset of industrial goods manufacturing companies in Nigeria

Table 2: Lagrange Multiplier and Hausman Test for Working capital and Return on Asset

Tests	Chi2	P-Value
Breusch-Pagan Lagrange Multiplier (LM)	0.34000	0.5598
Hausman test	4.884497	0.000

Source: Authors' Computation (2021)

Interpretation of Results

From the results in Table 2, the Breusch and Pagan Lagrange multiplier (LM) [0.3400 (p –value = 0.5598)] and Hausman [4.884497 (p–value = 0.000)] tests results for the model showed that the preferred model is Fixed Effect regression model. Therefore,

the Fixed Effect regression model in column (3) of Table 3 is considered appropriate to establish the relationship that exists between working capital management and return on asset of industrial manufacturing performance Listed on the Nigerian Stock Exchange

Table 3: Working Capital and Return on Asset

Variable	Pooled Coeff. Std. Error ( ) Prob.[ ]	Random Coeff. Std. Error ( ) Prob.[ ]	Fixed Coeff. Std. Error ( ) Prob.[ ]
Constant	40.41153 (9.346198) [0.0000]	28.88395 (13.69444) [0.0376]	20.09182 (17.05483) [0.2424]
ACP	-2.079012 (0.703497) [0.0039]	1.501019 (0.123049) [0.5944]	-1.197960 (0.752554) [0.1155]
APP	-0.723964 (0.379153) [0.0592]	-0.392104 (0.424903) [0.3584]	-0.148290 (0.510495) [0.7722]
ITD	0.942501 (0.404110) [0.0218]	0.726123 (0.328499) [0.0295]	0.722066 (0.348909) [0.0419]
CCC	0.058995 (0.122346) [0.6308]	0.041831 [0.083934] 0.6194	0.038594 (0.087284) [0.6596]
Observations	100	100	100
R^2	0.185442	0.086909	0.646008
Adj. R^2	-0.151145	0.048463	0.592497
F-Statistic	5.406932	2.260544	12.07255
Prob. (F-Stat.)	0.000576	0.068295	0.000000

Source: Authors' Computation (2021) WHERE: Return on Assets (ROA), Net Margin (NMG) Return on capital Employ (ROCE), and Return on Equity (ROE), Average Collection Period (ACP), Average Payable Period (APP), Inventory Turnover in day (ITD) and Cash Conversion Cycle (CCC).

Contrary to the result in column 3 of Table 3, the F-statistics value [12.0725; p -value = 0.000) showed that the explanatory variables are jointly statistically significant in explaining the variations in the return on assets. The coefficient of determination (Adjusted R^2) value of 0.5924 indicated that the explanatory variables were able to explain about 59.24% changes that occurred in the dependent variable. The result shows that the coefficient of Average Collection

Period was negative but not statistically significant within the 1% and 10% conventional level of significance (coefficient = -1.1979; p–value = 0.1155). Alternatively, the insignificant result suggested that the influence of Average Collection Period of the selected industrial sectors in Terms of return on assets is insignificant.

Furthermore, the results revealed that there is a negative and insignificant effect of Average Payable Period on return

on assets (coefficient. = -0.1482; P – value = 0.7722). The insignificant result suggested that the influence of Average Payable Period on return on assets of the selected industrial sectors is negative. More so, the results revealed that positive and significant effect exists between Inventory Turnover in day and return on assets at 5% and 10% significance level (coefficient. = 0.7220; p–value = 0.0419). The significant result suggested that the influence of Inventory Turnover in day on return on assets of the firms is positive and significant.

Also, the result shows that there is positive and insignificant effect exists between Cash Conversion Cycle and return on assets at 1% and 10% significance level (coefficient. = 0.0385; p-value = 0.6596). The insignificant result suggested that the influence of Cash Conversion Cycle on return on assets of the firms is positive and insignificant. The F-statistics depicts the overall statistical significant of the effect of effect of working capital on the return on assets of the selected industrial manufacturing firm listed on the Nigerian Stock Exchange. Giving the F-statistics value of 12.072 with the probability value of 0.000 showed that working capital has statistical effect on return on assets in Nigeria, hence the null hypothesis of no significant effect of working capital on return on assets of industrial sectors listed on the Nigerian Stock Exchange was rejected. Therefore the study concluded that there is significant effect of working capital on return on assets of selected industrial manufacturing firm in Nigeria listed on the Nigerian Stock Exchange

Test of Hypothesis Two (H_{02}): Working capital does not have any significant effect on the net margin of industrial goods manufacturing companies listed on the Nigerian Stock Exchange.

Table 4: Lagrange Multiplier and Hausman Test for Net Interest margin and Working capital

Tests	Chi2	P-Value
Breusch-Pagan Lagrange Multiplier (LM)	0.254691	0.6138
Hausman test	3.523225	0.4744

Source: Authors' Computation (2021)

Interpretation of Results

From the results in Table 4, the Breusch and Pagan Lagrange multiplier (LM) [0.2547 (p –value = 06138)] and Hausman [3.5232 (p–value = 0.4744)] tests results for the model showed that the preferred model is Random Effect regression model. Therefore, the Random Effect regression model in column (2) of Table 5 is considered appropriate to establish the relationship that exists between working capital management and Net Margin of industrial manufacturing performance Listed on the Nigerian Stock Exchange   Nigeria.

Table 5: Working Capital and Net Margin

Variable	Pooled	Random	Fixed
	Coeff.	Coeff.	Coeff.
	Std. Error ( )	Std. Error ( )	Std. Error ( )
	Prob.[ ]	Prob.[ ]	Prob.[ ]
Constant	-32.05834	-29.18222	-27.97377
	(2.966151)	(4.654097)	(5.718233)
	[0.0000]	[0.0000]	[0.0000]
ACP	1.718243	1.641741	-27.97377

	(0.223265)	(0.230897)	(5.718233)
	[0.0000]	[0.0000]	[0.0000]
APP	0.009412	0.102830	1.604180
	(0.120330)	(0.147092)	(0.256222)
	[0.9378]	[0.4862]	[0.5871]
ITD	0.272695	0.075307	0.093539
	(0.128250)	(0.118348)	(0.171592)
	[0.0361]	[0.5261]	[0.7022]
CCC	0.021760	0.029610	0.047361
	(0.038828)	(0.031106)	(0.123456)
	[0.5765]	[0.3436]	[0.3429]
Observations	100	100	100
R^2	0.591559	0.367783	0.798218
Adj. R^2	0.574361	0.341164	0.767716
F-Statistic	34.39792	13.81624	26.16943
Prob. (F-Stat.)	0.000000	0.000000	0.000000

Source: Authors' Computation (2021) WHERE: Return on Assets (ROA), Net Margin (NMG) Return on capital Employ (ROCE), and Return on Equity (ROE), Average Collection Period (ACP), Average Payable Period (APP), Inventory Turnover in day (ITD) and Cash Conversion Cycle (CCC).

Based on the result in column 2 of Table 5, the F-statistics value [13.816; p - value = 0.000) showed that the explanatory variables are jointly statistically significant in explaining the variations in the return on assets. The coefficient of determination (Adjusted R^2) value of 0.3411 indicated that the explanatory variables were able to explain about 34.11% changes that occurred in the net margin of the industrial manufacturing firms.

The result showed that the coefficient of Average Collection Period was positive and statistically significant within the 1% and 10% conventional level of significance (coefficient = 1.6417; p–value = 0.0000). Alternatively, the significant result suggested that the influence of Average Collection Period of the selected industrial sectors on net margin of the industrial manufacturing firms is significant. The results also revealed that there is a positive and insignificant effect of Average Payable Period on net margin (coefficient. = 0.1028; P − value = 0.4862). The significant result suggested that the influence of Average Payable Period on net margin of the industrial manufacturing firms is significant.

More so, the results revealed that positive but insignificant effect exists between Inventory Turnover in day on net margin of the industrial manufacturing firms at 5% and 10% significance level (coefficient. = 0.0753; p–value = 0.5261). The insignificant result suggested that the influence of Inventory Turnover in day on net margin of the industrial manufacturing firms is insignificant. Also, the result shows that there is positive and insignificant effect exists between Cash Conversion Cycle and net margin at 1% and 10% significance level (coefficient. = 0.0296; p-value = 0.3436). The insignificant result suggested that the influence of Cash Conversion Cycle on net margin of the industrial manufacturing firms is insignificant.

The F-statistics depicts the overall statistical significant of the effect of effect of working capital on the return on assets of the selected industrial sectors listed on the Nigerian Stock Exchange. Giving the F-statistics value of 13.816 with the probability value of 0.000 showed that working capital has statistical effect on net margin of the industrial manufacturing firms in Nigeria, hence the null hypothesis of no significant effect of working capital on net margin of the industrial manufacturing firms listed on the Nigerian Stock Exchange was rejected. Therefore the study concluded that there is significant effect of working capital on net margin of the industrial manufacturing firms of selected sector listed in Nigeria.

Test of Hypothesis Three (H_{03}): There is no significant effect of working capital on return on capital employed of industrial good manufacturing companies in Nigeria**.**

Table 6: Lagrange Multiplier and Hausman Test

Tests	Chi2	P-Value
Breusch-Pagan Lagrange Multiplier (LM)	25.7362	0.0001
Hausman test	0.000000	1.000

Source: Authors' Computation (2021),
Interpretation of Results

From the results in Table 6, the Breusch and Pagan Lagrange multiplier (LM) [25.736 (p –value = 0.0001)] and Hausman [0.0000 (p–value = 1.000)] tests results for the model showed that the preferred model is Pooled regression model. Therefore, the Pooled regression model in column (1) of Table 4.8 is considered appropriate to establish the relationship that exists between working capital management and Return on capital employ financial performance of industrial manufacturing performance Listed on the Nigerian Stock Exchange.

Table 7: Working Capital and Return on Capital Employed

Variable	Pooled Coeff. Std. Error ( ) Prob.[ ]	Random Coeff. Std. Error ( ) Prob.[ ]	Fixed Coeff. Std. Error ( ) Prob.[ ]
Constant	11.30751 (0.804921) [0.0002]	18.52368 (1.285450) [1.285450]	18.99241 (1.346209) [0.0000]
ACP	-0.026831 (0.007021) [0.0002]	-0.016435 (0.006638) [0.006638]	-0.015280 (0.007506) [0.0452]
APP	0.161533 (0.050314) [0.0018]	-0.137104 (0.068390) [0.068390]	-0.189035 (0.072447) [0.0109]
ITD	0.252286 (0.052742) [0.0000]	0.063501 (0.051369) [0.051369]	0.083143 (0.053057) [0.1212]
CCC	0.007353 (0.016632) [0.6594]	0.004323 (0.012745) [0.012745]	0.003223 (0.012886) [0.8031]
Observations	**100**	**100**	**100**
R^2	0.494152	0.777224	0.804495

Adj. R²	0.472853	0.743549	0.748636
F-Statistic	23.20082	23.07987	14.40235
Prob. (F-Stat.)	0.000000	0.000000	0.000000

Source: Authors' Computation (2021) WHERE: Return on Assets (ROA), Net Margin (NMG) Return on capital Employ (ROCE), and Return on Equity (ROE), Average Collection Period (ACP), Average Payable Period (APP), Inventory Turnover in day (ITD) and Cash Conversion Cycle (CCC).

Sequence to the result in column 1 of Table 7, the F-statistics value [23.200; p - value = 0.000) showed that the explanatory variables are jointly statistically significant in explaining the variations in the return on assets. The coefficient of determination (Adjusted R^2) value of 0.4728 indicated that the explanatory variables were able to explain about 47.28% changes that occurred in the return on capital employed of industrial goods dependent variable. The result shows that the coefficient of Average Collection Period was negative and significant within the 1% and 10% conventional level of significance (coefficient = -0.0268; p–value = 0.0002). Alternatively, the significant result suggested that the influence of Average Collection Period of the selected industrial firm return on capital employed of industrial goods manufacturing companies is significant. The results also revealed that there is a positive and significant effect of Average Payable Period on return on capital employed (coefficient. = 0.1615; P – value = 0.0018). The significant result suggested that the influence of Average Payable Period on return on assets of the selected industrial sectors is positive.

More so, the results revealed that positive and significant effect exists between Inventory Turnover in day and return on capital employed of industrial goods manufacturing companies at 1% and 10% significance level (coefficient. = 0.2522; p–value = 0.0000). Again, the significant result suggested that the influence of Inventory Turnover in day on return on assets of the firms is positive and significant. Also, the result shows that there is positive and insignificant effect exists between Cash Conversion Cycle and return on capital employed of industrial goods manufacturing companies assets at 1% and 10% significance level (coefficient. = 0.0073; p-value = 0.6594). The insignificant result suggested that the influence of Cash Conversion Cycle on return on assets of the firms is significant.

The F-statistics depicts the overall statistically significant of the effect of effect of working capital on the return on capital employed of industrial goods manufacturing companies listed on the Nigerian Stock Exchange. Giving the F-statistics value of 23.2008 with the probability value of 0.000 showed that working capital has statistical effect on return on capital employed of industrial goods manufacturing companies; hence the null hypothesis of no significant effect of working capital of industrial sectors listed in Nigeria was rejected. Therefore, study concluded that there is significant effect of working capital on return on capital employed of industrial goods manufacturing companies.

Test of Hypothesis Four (H₀₄): Working capital does not have any significant effect the return on equity of industrial goods manufacturing companies listed in Nigeria

Table 8: Lagrange Multiplier and Hausman Test

Tests	Chi2	P-Value

Breusch-Pagan Lagrange Multiplier (LM)	15.8930	0.0087
Hausman test	0.000000	1.000

Source: Authors' Computation (2021)

Interpretation of Results

From the results in Table 8, the Breusch and Pagan Lagrange multiplier (LM) [15.893 (p –value = 0.0087)] and Hausman [0.0000 (p–value = 1.000)] tests results for the model showed that the preferred model is pooled regression model. Therefore, the pooled regression model in column (1) of Table 4.10 is considered appropriate to establish the relationship that exists between working capital management and return on equity of industrial manufacturing performance Listed on the Nigerian Stock Exchange.

Table 9: Working capital and Return on Equity

Variable	Pooled Coeff. Std. Error ( ) Prob.[ ]	Random Coeff. Std. Error ( ) Prob.[ ]	Fixed Coeff. Std. Error ( ) Prob.[ ]
Constant	10.62768 (0.821032) [0.0000]	15.75108 (1.223717) [0.0000]	19.19558 (1.395246) [0.0000]
ACP	-0.004304 (0.002222) [0.0557]	-0.001716 (0.001764) [0.3331]	0.000313 (0.001831) [0.8647]
APP	0.211733 (0.050480) [0.0001]	0.008129 (0.064672) [0.9002]	-0.186922 (0.074678) [0.0144]
ITD	0.227113 (0.055212) [0.0001]	0.088887 (0.052699) [0.0949]	0.052619 (0.053273) [0.3264]
CCC	0.005113 (0.017507) [0.7709]	0.002961 (0.013902) [0.8318]	0.002140 (0.013216) [0.8718]
Observations	100	100	100
R^2	0.438572	0.035478	0.794051
Adj. R^2	0.414933	-0.005133	0.735209
F-Statistic	18.55285	0.873596	13.49452
Prob. (F-Stat.)	0.000000	0.482841	0.000000

Source: Author's Computation (2021) WHERE: Return on Assets (ROA), Net Margin (NMG) Return on capital Employ (ROCE), and Return on Equity (ROE), Average Collection Period (ACP), Average Payable Period (APP), Inventory Turnover in day (ITD) and Cash Conversion Cycle (CCC).

Based on the result in column 1 of Table 9, the F-statistics value [18.5528; p -value = 0.000) showed that the explanatory variables are jointly statistically significant in explaining the variations in the return on equity. The coefficient of determination (Adjusted R^2) value of 0.415 indicated that the explanatory variables were able to explain about 41.5% changes that occurred in return on equity. The result shows that the coefficient of Average Collection Period was negative and insignificant within the 1% and 5% conventional level of significance (coefficient = -0.0043; p–value = 0.056)., the

significant result suggested that the influence of Average Collection Period of the selected industrial sectors in terms of return on equity is insignificant.

The results also revealed that there is a positive and significant effect of Average Payable Period on return on equity (coefficient. = 0.2117; P – value = 0.000). The significant result suggested that the influence of Average Payable Period on return on equity of the selected industrial sectors is positive. More so, the results revealed that positive and significant effect exists between Inventory Turnover in day and return on equity at 5% and 10% significance level (coefficient. = 0.2271; p–value = 0.000). The significant result suggested that the influence of Inventory Turnover in day on return on equity of the firms is positive and significant.

Also, the result shows that there is positive and insignificant effect exists between Cash Conversion Cycle and return on equity at 1% and 10% significance level (coefficient. = 0.0051; p-value = 0.7709). The insignificant result suggested that the influence of Cash Conversion Cycle on return on equity of the firms is insignificant. The F-statistics depicts the overall statistical significant of the effect of effect of working capital on the return on equity of the selected industrial sectors listed on the Nigerian Stock Exchange. Giving the F-statistics value of 18.552 with the probability value of 0.000 showed that working capital has statistical effect on return on equity in Nigeria, hence the null hypothesis of no significant effect of working capital on return on equity of industrial sectors listed on the Nigerian Stock Exchange was rejected. Therefore, the study concluded that there is significant effect of working capital on return on equity of selected sector listed on the Nigerian Stock Exchange.

Discussion of Findings

In relation to working capital management and financial performance of industrial manufacturing companies listed on the Nigerian Stock Exchange, the results show that Average Collection Period was negative but not statistically significant within the 1% and 10% conventional levels of significance (coefficient = -1.1979; p–value = 0.1155). Furthermore, the results also revealed that there is a negative and insignificant effect of Average Payable Period on return on assets (coefficient. = -0.1482; P – value = 0.7722). More so, the results showed that positive and significant effect exists between the return on assets at 5% and 10% level of significance (coefficient. = 0.7220; p–value = 0.0419). Finally, the result showed that there is positive and insignificant effect between Cash Conversion Cycle and return on assets at 1% and 10% levels of significance (coefficient. = 0.0385; p-value = 0.6596).

Furthermore, results on working capital and net margin showed that that the coefficient of Average Collection Period was positive and statistically significant within the 1% and 10% conventional levels of significance on net margin (coefficient = 1.6417; p–value = 0.0000). The results also revealed that there is a positive and insignificant effect of Average Payable Period on net margin (coefficient. = 0.1028; P – value = 0.4862). More so, the results revealed that there is a positive but insignificant effect exists between Inventory Turnover on net margin of the industrial manufacturing firms at 5% and 10% levels of significance (coefficient. = 0.0753; p–value = 0.5261). Also, the result showed that there is positive and insignificant effect exists between Cash Conversion Cycle and net

margin at 1% and 10% significance level (coefficient. = 0.0296; p-value = 0.3436).

Also, sequel to the study on working capital management and return on capital employed, the result showed that the coefficient of Average Collection Period was negative and significant within the 1% and 10% conventional level of significance (coefficient = -0.0268; p–value = 0.0002). The results also revealed that there is a positive and significant effect of Average Payable Period on return on capital employed (coefficient. = 0.1615; P − value = 0.0018). More so, the results revealed that positive and significant effect exists between Inventory Turnover in day and return on capital employed of industrial goods manufacturing companies at 1% and 10% significance level (coefficient. = 0.2522; p–value = 0.0000). Also, the result shows that there is positive and insignificant effect exists between Cash Conversion Cycle and return on capital employed of industrial goods manufacturing companies' assets at 1% and 10% significance level (coefficient. = 0.0073; p-value = 0.6594).

The fourth model depicting the results of working capital management and return on equity showed that the coefficient of Average Collection Period was negative and insignificant within the 1% and 5% conventional levels of significance (coefficient = -0.0043; p–value = 0.056). The results also revealed that there is a positive and significant effect of Average Payable Period on return on equity (coefficient. = 0.2117; P − value = 0.000). More so, the results revealed that positive and significant effect exists between Inventory Turnover in day and return on equity at 5% and 10% significance level (coefficient. = 0.2271; p–value = 0.000). Also, the result showed that there is positive and insignificant effect exists between Cash Conversion Cycle and

return on equity at 1% and 10% significance level (coefficient. = 0.0051; p-value = 0.7709).

Conclusions and Recommendations
Conclusions

The study reveals that working capital has statistical effect on return on assets of selected industrial manufacturing firms employed in this study, hence, the study concludes that there is significant effect of working capital on return on assets of selected industrial manufacturing firms in Nigeria listed on the Nigerian Stock Exchange. The study also showed that working capital has statistical effect on net margin of the industrial manufacturing firms in Nigeria. Therefore, the study concludes that there is significant effect of working capital on net margin of the industrial manufacturing firms of selected sector listed on the Nigerian Stock Exchange. Findings further showed that working capital has statistical effect on return on capital employed of listed industrial goods manufacturing companies. As a sequel, the study concludes that there is significant effect of working capital on return on capital employed of industrial goods manufacturing companies. Results also reveals that working capital has statistical effect on return on equity in Nigeria, hence, the null hypothesis of no significant effect of working capital on return on equity of industrial sectors listed on the Nigerian Stock Exchange was rejected. Therefore, the study concludes that there is significant effect of working capital on return on equity of listed industrial goods manufacturing companies on the Nigerian Stock Exchange.

On the overall, based on the empirical findings of the hypothesis's tests, this study concludes that working capital is a

significant determinant of financial performance of industrial goods manufacturing companies listed on Nigerian Stock Exchange.

Recommendations

The following are recommendations based on the findings of this study:

i.   The need for managers of listed industrial goods firms to lay emphasis on their average collection and average payable periods since it had negative and insignificant effect on return on assets.

ii.   Management of industrial goods firms listed on the Nigerian Stock Exchange should map out strategies that will shorten the cash conversion cycle in order to achieve higher levels of financial performance.

iii.   Management should ensure that they maintain adequate working capital as this has the capacity to boost level of profitability of such firms.

iv.   Managers of industrial manufacturing firms listed on the Nigerian Stock Exchange should institute prudent working capital management policies so as to overcome liquidity crisis and enhance their return on equity as well as financial performance.

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