

WORKING CAPITAL MANAGEMENT AND FINANCIAL PERFORMANCE OF INDUSTRIAL GOODS COMPANIES IN NIGERIA

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ABSTRACT

Efficient management of working capital is crucial for the survival of any business. Holding excessive cash leads to idle funds and reduced profits, while insufficient cash hampers operational efficiency. Therefore, the purpose of this study is to examine the relationship between working capital management and the financial performance of industrial goods companies in Nigeria. The study measures working capital management (WCM) using proxies such as accounts receivable management, accounts payable management, inventory management, and the cash conversion cycle. The dependent variable, financial performance, is measured by return on assets (ROA). Data for the study were collected from the financial statements of the selected thirteen (13) companies over a seven-year period from 2016 to 2022. Stata 13 software was employed for analysis. The findings reveal that accounts payable management and the cash conversion cycle are positive and statistically related to ROA. Conversely, inventory management has a negative and significant relationship with ROA, while accounts receivable management has a negative but insignificant relationship with ROA. The study concludes that WCM is essential in enhancing the performance of industrial goods firms in Nigeria. The study recommends that industrial goods companies should actively implement policies to prevent debtors from delaying payments beyond due dates, thereby avoiding cash traps. Improving cash collections should be prioritized, and fostering closer relationships with customers and suppliers can strategically delay payments and facilitate the optimal utilization of cash within the company. Such effective management of payment terms can enhance the cash flow required for financing operational activities.

Keywords: Working capital management, financial performance, industrial goods, Nigeria.

INTRODUCTION

Industrial goods companies in Nigeria specialize in the production and distribution of goods used by other industries or for manufacturing purposes. These types of businesses typically require significant investments in fixed assets like buildings, machinery, and equipment to operate effectively. Additionally, they need sufficient working capital to support daily operations, including acquiring raw materials, compensating employees, and covering various expenses (Sarkar & Ahmad, 2021). The effective management of working capital plays a vital role in ensuring the financial performance of industrial goods companies in Nigeria. Working capital management (WCM) involves implementing strategies to handle current assets and liabilities in a way that ensures an adequate cash flow to meet short-term obligations while maximizing profitability (Goi, 2016). WCM is a core responsibility of financial managers in all corporations. It encompasses activities such as planning, organizing, controlling, and

optimizing the utilization of cash and other assets, as well as managing short-term capital and liabilities (Deloof, 2003). The primary objective of working capital management is to enhance liquidity, profitability, and shareholders' value. It is recognized as a critical component of corporate management and is essential for the survival and prosperity of organizations, regardless of their size or business nature.

Working capital is of utmost importance for maintaining the liquidity, survival, solvency, and profitability of a business (Mukhopadhyay, 2004). When all other factors are equal, a higher proportion of liquid assets reduces the risk of running out of cash. The different components of working capital, including cash, marketable securities, accounts receivable and inventory management, accounts payable management, and the cash conversion cycle, and how they interact within an organization, play a crucial role in improving the performance of any firm. The time gap between spending on raw materials and collecting payment for finished goods is referred to as the working capital policy (Simon et al., 2021). Proper management of working capital components is essential for the smooth operation of organizations. A more aggressive working capital policy is associated with higher returns and risks, while a conservative working capital policy entails lower returns and risks. Working capital management ensures that firms have sufficient and appropriate cash flow to sustain their operations and minimize the risk of being unable to meet short-term obligations. An ideal business requires adequate resources that are effectively utilized to enhance profitability and overall performance.

Despite the importance of WCM to different sectors, the industrial goods sector faces significant challenges in managing working capital effectively, thereby leading to sluggish performance and the overall operational efficiency of firms in Nigeria. According to Vanguard (2024) the persistently high inflation rate in Nigeria poses substantial challenges for firms operating in the country, impacting their financial stability, purchasing power, and overall business operations. Inflation has also had an impact on the financing options available for firms in Nigeria. The issue is that liquidity shortages experienced by firms in Nigeria have impacted their performance negatively. In view of these issues, the management of working capital, which is the cash needed to run the day-to-day operations of any business, becomes imperative, considering that it is the cheapest and most readily available source of finance, which serves as liquidity buffers for firms (Simon et al., 2021). Previous studies have primarily focused on the relationship between WCM and firm performance (Anand & Gupta, 2002; Deloof, 2003; Mohamad & Saad, 2010; Simon et al., 2021). There have been very few studies that have focused on the industrial goods sector in Nigeria, despite the sector's significant contributions to the economic development of Nigeria. Additionally, none of these studies comprehensively examined all the variables of WCM. Based on the aforementioned evidence, this study aims to contribute to the existing knowledge by comprehensively examining all the variables of WCM.

Considering the existing research limitations, the primary aim of this study is to investigate the relationship between WCM and the financial performance of industrial goods companies in Nigeria. More specifically, the study aims to:

- i. examine the relationship between accounts receivable management and the return on asset of industrial goods companies in Nigeria.
- ii. analyze the relationship between account payable management and the return on asset of industrial goods companies in Nigeria.
- iii. explore the relationship between inventory management and the return on asset of industrial goods companies in Nigeria.
- iv. determine the relationship between cash conversion cycle and the return on asset of industrial goods companies in Nigeria.

The main hypotheses are specified as follows:

HO₁: There is a significant relationship between account receivable management and the return on asset of industrial goods companies in Nigeria.

HO₂: There is a significant relationship between account payable management and the return on asset of industrial goods companies in Nigeria.

HO₃: There is a significant relationship between inventory management and the return on asset of industrial goods companies in Nigeria.

HO₄: There is a significant relationship between cash conversion circle and the return on asset of industrial goods companies in Nigeria.

REVIEW OF RELATED LITERATURE

Concept of Working Capital Management

Working capital management is recognized as a valuable tool for assessing the availability of funds to support a company's current operations. Therefore, every company should grasp the significance of maintaining an appropriate level of working capital and its contribution to business survival (Harris, 2005). The management of working capital plays a vital role in preserving the financial well-being of the firm in its day-to-day operations (Simon et al., 2018). The objective of working capital management is to minimize the cash conversion cycle, which refers to the capital tied up in the company's current assets (Gitman, 2009). It is important to avoid unnecessary investment in working capital, as excessive investment may lead to idle cash, while insufficient working capital can result in shortages and operational difficulties. The overall investment in working capital involves a trade-off. Companies consider the cost of investing in working capital in relation to the benefits it brings. Without investing in working capital, there would be no inventories and receivables, leading to limited sales and minimal profits. The decision regarding the level of investment in working capital involves a cost-benefit trade-off, weighing liquidity against profitability and cash flow against profits (Eljelly, 2015).

Components of WCM

Working capital management is the process of efficiently managing a company's short-term assets and liabilities to ensure smooth day-to-day operations and maintain optimal liquidity. It involves managing various components that make up the working capital of a company. The key components of working capital management include: accounts receivable, inventory management, accounts payable and cash management

Accounts receivable represents the money owed to a company by its customers for goods or services provided on credit. Effective management of accounts receivable involves setting appropriate credit

terms, monitoring customer payments, and implementing strategies to minimize overdue payments and bad debts. This component directly affects a company's cash flow and liquidity. Inventory management refers to the goods or raw materials held by a company for production, sale, or consumption. Efficient inventory management aims to strike a balance between having enough inventory to meet customer demand while minimizing holding costs, such as storage and obsolescence. This involves forecasting demand, optimizing order quantities, and implementing inventory control systems to avoid stock outs or excessive inventory levels. Accounts payable represents the money owed by a company to its suppliers for goods or services received on credit. Managing accounts payable involves negotiating favourable payment terms with suppliers, taking advantage of discounts for early payments, and optimizing the payment schedule to maintain good relationships with suppliers while maximizing cash flow (Deloof, 2003). Cash is the most liquid component of working capital and plays a vital role in meeting day-to-day operating expenses. Effective cash management involves forecasting cash inflows and outflows, maintaining sufficient cash reserves to cover short-term obligations, optimizing the cash conversion cycle, and utilizing techniques such as cash pooling or cash flow forecasting to ensure adequate liquidity (Simon et al. 2021).

Efficient management of these components is crucial for optimizing working capital and ensuring that a company has the necessary liquidity to meet its short-term obligations. By effectively managing accounts receivable, inventory, accounts payable, cash, and short-term financing, companies can improve cash flow, reduce financing costs, and enhance their overall financial performance.

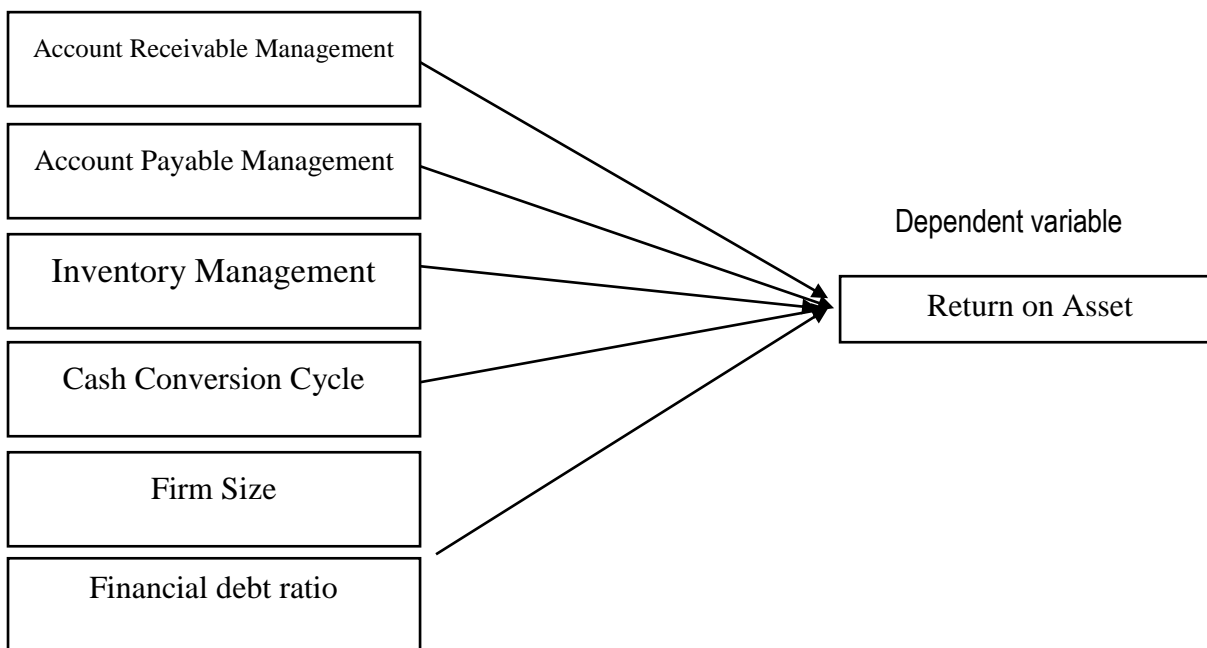
Financial Performance

Financial performance is a measure of a company's ability to generate profits and create value for its shareholders. It encompasses various financial indicators that provide insight into the company's profitability, efficiency, and overall effectiveness in utilizing its assets (Simon et al. 2018). One commonly used metric to evaluate financial performance is the return on assets (ROA). Return on assets (ROA) is a profitability ratio that measures how effectively a company utilizes its assets to generate earnings. It indicates the amount of profit generated per unit of assets employed in the business. ROA reflects the efficiency of a company in generating profits relative to its asset base. A higher ROA indicates that the company is generating more income for each naira of assets invested, which is generally considered favourable. Therefore, this study adopts ROA as an appropriate measure of firm performance.

Conceptual Framework

The conceptual framework of this study is presented in Figure 1. Working capital management (WCM) is represented by four variables: account receivable management, account payable management, inventory management, and cash conversion cycle. Additionally, two notable control variables, firm size and financial debt ratio, are introduced based on their prominence in the literature. The dependent variable, represented by return on assets (ROA), is used to measure firm performance. The hypothesis is that the combination or interaction of the WCM variables and control variables will have an impact on firm performance, as indicated by ROA.

Independent variable



Source: Adapted from: Simon et al (2021).

Theoretical Review

Pecking Order Theory

The pecking order theory, developed by Stewart Myers in 1984, is a theory of capital structure that suggests that companies have a preferred hierarchy, or "pecking order," for financing their investments (Myers & Majluf, 1984). This theory can also be extended to explain companies' behaviour regarding working capital management. According to the pecking order theory, companies prioritize internal financing sources, such as retained earnings, to fund their investments. This preference arises because internal financing does not require any external financing activities or the associated costs, such as issuing securities or negotiating with external investors. Retained earnings are considered the most favourable source of funding as they do not entail any dilution of ownership or signalling concerns. When internal financing is insufficient to meet the funding needs, companies turn to debt financing as the second choice. Debt is often seen as a less costly and less dilutive option compared to equity financing. The pecking order theory suggests that companies will prefer to issue debt rather than equity because issuing equity can signal negative information to the market and lead to a drop in stock prices.

Regarding working capital management, the pecking order theory implies that companies will first use their internally generated funds, such as cash from operations, to meet their working capital requirements. Working capital refers to the funds needed to support a company's day-to-day operations, including activities such as inventory management, accounts receivable, and accounts payable. Companies tend to maintain a certain level of working capital to ensure smooth operations and mitigate liquidity risks. By utilizing internally generated funds to finance working capital needs, companies can avoid the costs and potential signalling issues associated with external financing. This study therefore adopts the pecking order theory to evaluate the relationship between WCM and firm performance.

Empirical Review

Fekadu (2021) examined the influence of working capital management (WCM) on the performance of export firms in Ethiopia. The sample consisted of 164 exporters operating in Ethiopia, and a combination of primary and secondary data collection methods was employed. The collected data was analysed using a multiple linear regression model. The findings of the study indicate that the account receivables period, cash conversion cycle, and accounts payable period are significantly and positively correlated with firm performance, as measured by both return on assets and return on investment. However, the inventory conversion period has a statistically significant and positive impact on return on investment, but does not have a significant impact on return on assets. Based on these results, the study suggests that firms may consider extending credit terms for customers as a potential strategy.

Mardones (2022) conducted a study to explore the connection between working capital management and the performance of companies in Latin America. The study focused on 461 non-financial companies from Chile, Mexico, Peru, and Brazil. Specifically, the research selected 80 Mexican companies, 120 Chilean companies, 78 Peruvian companies, and 183 Brazilian companies from the period between 2000 and 2018. The findings of the study revealed two key insights. Firstly, there is a positive and significant relationship between working capital and firm performance. Secondly, a non-linear relationship was observed between investments in working capital and firm performance. However, the results varied across different countries and industries, which could be attributed to macroeconomic variables that influence access to financing for such investments.

Altawalbeh (2020) conducted a study to examine the influence of working capital management (WCM) on profitability. WCM was assessed using various measures, including average collection period, average age of inventory, average payable period, and cash conversion cycle, which collectively provide a comprehensive assessment of WCM. Two profitability indicators, namely return on assets and net profit margin, were utilized in the analysis. The sample consisted of 33 industrial companies listed on the Amman stock exchange (ASE) during the period from 2013 to 2017. Data was collected manually from publicly available annual reports on the ASE. Panel data methodology was employed, and the findings revealed that both the average collection period and the average age of inventory had a negative and significant impact on profitability measures. This suggests that managers can enhance profitability by maintaining the average collection period and average age of inventory at an optimal, minimal level. The study recommended that managers focus on optimizing working capital components to improve profitability, specifically by reducing the average collection period and average age of inventory to an appropriate minimum level.

Abdulazeez et al. (2018) conducted a study to assess the influence of WCM on the financial performance of conglomerate companies listed on the Nigeria stock exchange over a period of 10 years (2005-2014). The researchers gathered quantitative data from the annual reports and accounts of the companies under investigation. Descriptive statistics were utilized to describe the variables, while correlations were used to determine the relationships between the variables. The findings indicated that the debtor collection period, creditor payment period, and firm size had an insignificant and negative association with return on investment. On the other hand, the cash conversion cycle demonstrated a positive but insignificant relationship with the financial performance of the companies studied. The study recommended, among other suggestions, that conglomerate companies should either maintain their current debtor collection period or further reduce it to continually improve their financial performance.

Vicente-Ramos et al. (2020) conducted a study to explore the relationship between WCM and return on assets (ROA) in the manufacturing industry of Peru. The study selected a sample of 23 companies listed on the Lima stock exchange, focusing on the period from 2009 to 2018. The findings of the study indicate that there is a negative relationship between profitability (ROA) and the average inventory period (PPI). Similarly, a negative relationship was observed between profitability and the average collection period (PPC). Conversely, a positive relationship was identified between profitability and the average payment period (PPP). Based on these results, the study recommended that companies in Peru's industrial sector should strive to enhance their efficiency, effectiveness, and competitiveness in order to improve their working capital management.

Heba and Ahmed (2021) conducted a study to investigate the influence of inventory management on firm performance. The study measured firm performance using two indicators: return on assets and return on equity. The data for the study was collected from the Egyptian stock exchange market. The results of the regression analysis revealed a positive correlation between inventory turnover and both return on assets and return on equity. These correlations were found to be statistically significant at the 5% level, indicating that effective inventory management positively impacts firm performance.

Tarurhor and Owolabi (2020) conducted a study to determine whether accounts receivable and inventory conversion management (ICM) have an impact on corporate financial performance. The study employed an ex-post facto design and selected a sample of seventy-six (76) firms from various non-financial sectors. Panel data from the years 2011-2019 were collected and analyzed using descriptive statistics (mean, median, standard deviation, minimum and maximum values, kurtosis, skewness, and correlation matrix), diagnostic statistics (variance inflation factor and unit root tests), and inferential statistical tools (fixed and random effects models and Hausman specification). The findings of the study revealed that accounts receivable management (ARM) significantly influences return on assets, while the relationship between inventory conversion management (ICM) and return on assets was also found to be significant. Based on these findings, the study recommended that management should improve accounts receivable and ICM practices, as they play a crucial role in enhancing the financial performance of non-financial firms. Additionally, management should take necessary steps to maintain effective purchasing and sales management in order to minimize losses due to poor inventory controls and optimize resource utilization for production.

Bagh et al. (2016) conducted a study to examine the influence of working capital management (WCM) on the performance of selected manufacturing firms listed on the Karachi stock exchange (KSE). The study utilized quantitative research methods, including correlation matrix and multiple regression analysis, and collected secondary data through purposive sampling. A random sample of 50 non-financial companies listed on the Pakistani stock market was selected, covering the period from 2005 to 2014. The study considered various WCM measures as independent variables, including inventory turnover (ITO), cash conversion cycle (CCC), average collection period (ACP), and average payment period (APP). Firm performance (FP) was measured using return on assets (ROA), return on equity (ROE), and earnings per share (EPS) as dependent variables. The results of the multiple regression analysis indicated that APP, ITO, and CCC had a negative and significant impact on ROA, while ACP had a positive and significant impact on ROA. Additionally, APP had a negative and significant impact on ROE. ITO had a negative and significant impact on EPS, while ACP had a positive and statistically

significant impact. The study concluded that WCM significantly influenced the firm performance of the selected companies.

Achode and Rotich (2016) conducted a study to examine the impact of accounts payable on the financial performance of publicly listed manufacturing companies at the Nairobi securities exchange (NSE) in Kenya. The study employed the census sampling technique and collected secondary data from company report. Descriptive analysis, requisite analysis, and advanced analysis of the data were performed using SPSS. A multiple regression model was used to test the relationship between accounts payable and firm performance. The findings of the study indicated that in most of the manufacturing firms listed at the NSE, there was a direct positive relationship between accounts payable and the dependent variables of profitability and liquidity, which supported the Pecking Order Theory. Based on these results, the study recommended that finance managers and financial officers of companies should establish long-term relationships with their suppliers to facilitate easier and faster access to trade credit.

Demiraj et al. (2022) conducted a study to analyze the influence of working capital management (WCM) on firms' profitability in the European automotive industry, both before and during the COVID-19 pandemic. The study collected data from all listed firms in the European automotive industry available on the Thomson Reuters Database, covering the period from 2010 to 2021. The pre-pandemic period spanned from 2010 to 2019, while the pandemic period covered 2020 and 2021. Panel data regression analysis was employed for the study. The findings revealed that the receivables collection period, inventory conversion period, accounts payable period, and cash conversion cycle had a significant negative impact on return on assets (ROA) during both the pre-pandemic and pandemic periods. Based on these results, the study recommended that managers should exercise caution when establishing credit policies, avoiding overly generous credit terms, and making concerted efforts to promptly collect receivables.

Gap in Literature

Existing empirical evidence suggests that there is a vast body of literature examining the relationship between working capital management (WCM) and firm performance. However, there is a significant research gap when it comes to studying industrial goods companies in Nigeria, despite the sector's substantial contribution to the country's economic development. Additionally, there are discrepancies in how WCM is measured across different studies. Some researchers focus on net trade cycle, while others examine specific dimensions of the cash conversion cycle. In contrast, the current study takes a more comprehensive approach by considering all the dimensions of the cash conversion cycle. This makes the current study more inclusive and thorough compared to previous research.

METHODOLOGY

This study adopts the *ex post facto* research design to examine the relationship between WCM and financial performance of industrial goods firms in Nigeria (Asiriwa *et al.*, 2018). The main reason for choosing the industrial goods sector lies in the fact that the sector contributes greatly to the economic

development of Nigeria and its activities depend more on current assets and current liabilities than other sectors. The population of this study comprised all industrial goods companies listed on the Nigerian exchange group (NGX) from 2016 to 2022. The study uses census sampling method and considered all the thirteen (13) quoted industrial goods firms on the Nigerian exchange group (NGX). Thus, the sample for this study is thirteen (13) firms. The data set comprised 91 observations, based on the financial statements of the industrial goods companies listed on the Nigerian exchange group (NGX) for a seven-year period extracted from the annual report of the companies. The data collected from the financial statements of the industrial goods companies was analyzed using descriptive statistics, a correlation matrix and panel regression model.

The dependent variable is financial performance and it is measured using return on assets (ROA) while the independent variable is WCM. The metrics for WCM, which included account receivable management, account payable management, inventory management and cash conversion cycle were used as independent variables. The control variables in this study were firm size and financial debt ratio. Firm size is the logarithm of the total assets of any given firm. The financial debt ratio is a financial metric used to assess a company's leverage or level of indebtedness. It provides insight into the proportion of a company's financing that comes from debt compared to equity. It is calculated as financial debt divided by total assets. The variables are defined in Table 1.

Table 1: Variable Measurement

S/N	Variable	Acronym	Definition	Source
1	Return on asset	ROA	Net income after tax/total asset	Azam and Haider (2011), Simon <i>et al.</i> (2018)
2	Account Receivable Management	ARM	Account receivable x 365days/ cost of sales	Deloof (2003), Simon <i>et al.</i> (2018)
3	Account Payable Management	APM	Account payable x 365days/ purchase	Deloof (2003), Simon <i>et al.</i> (2018)
4.	Inventory Management	INVM	Inventory x 365days/ cost of sales	Deloof (2003), Simon <i>et al.</i> (2018)
5.	Cash Conversion Cycle	CCC	Account receivable management- inventory management	Deloof (2003)
6.	Firm Size	FIRMSIZE	Natural log of total asset	Deloof (2003)
7.	Financial Debt ratio	FDR	Financial debt/total asset	Deloof (2003)

Source: Researchers own compilation.

Model Specification

The model used to test the relationship between WCM and financial performance are as follows:

$$ROA_{it} = \beta_0 + \beta_1ARM_{it} + \beta_2APM_{it} + \beta_3IVM_{it} + \beta_4CCC_{it} + \beta_5FIRMSIZE_{it} + \beta_6FDR_{it} + e_{it} \text{-----Model (I)}$$

Where: ARM = account receivable management, APM= account payable management, IVM= inventory management, CCC= cash conversion cycle, FIRMSIZE= firm size and FDR= financial debt ratio.

DATA ANALYSIS AND DISCUSSION OF FINDINGS

Descriptive Analysis

Before the descriptive statistics, various basic diagnostic tests, such as normality, heteroscedasticity, or autocorrelation, were performed. Furthermore, there was no violation of the assumptions of normality,

heteroscedasticity, or autocorrelation. Table 2 presents a summary of descriptive statistics for the variables' measures of central tendency, such as the mean, median, standard deviation, and minimum and maximum values, for the sample of industrial goods firms under consideration.

Table 2: Summary of descriptive statistics

Variables	Mean	Median	Min	Max	SD
ROA	0.0793	0.0744	-0.1412	0.2857	0.1063
ARM	215.5994	187.1878	36.0644	590.9445	112.9373
APM	193.9914	192.8640	-170.7160	464.1415	165.7344
INVM	147.7845	131.3843	48.1132	415.1250	85.8608
CCC	227.3573	151.2315	-500.5130	4997.8390	556.3593
FIRMSIZE	22.1492	21.9237	19.2748	25.1902	1.6152
FDR	0.5625	0.5072	0.0768	1.1182	0.2166

Legend: ROA = return on asset, ARM = account receivable management, APM = account payable management, INVM = inventory management, and CCC = cash conversion cycle. FIRMSIZE = firm size while FDR = financial debt ratio.

Results from Table 2 show that the mean of ROA is 0.0793 suggesting that the companies reported high profit during the period under review. As expected, the means of all the variables lie between their respective minimum and maximum values, which indicate that the series is evenly spread. Table 2 further shows that ARM has a mean of 215.5994 with minimum and maximum values of 36.06436 and 590.9445 respectively. The minimum value implies that it will take the least firm 36 days to receive amount owned them by customers while the maximum value implies that it will take 216 days for some companies to collect amount owned by the customers. APM has a mean of 193.9914 with minimum and maximum values of 170.7156 and 464.1415 respectively. However, INVM has a mean of 147.7845 with minimum and maximum values of 48.11323 and 415 respectively. Table 2 similarly revealed that the CCC has mean values of 227.3573 with corresponding minimum and maximum values of 500.5193 and 4997.839 respectively.

Correlation matrix of variables

The Pearson correlation matrix of the variables are presented in Table 3. From the Table, all the correlation between the dependent and independent variables are below 0.8 which means that there is no issue of multicollinearity amongst the variables considered in this study (Hair *et al.*, 2010). Despite this revelation, the study went further to test the variables for Variance Inflation Factor (VIF) to fulfil the pre-test requirements (Hair *et al.*, 2010). According to Hair *et al.* (2010), multicollinearity becomes a problem when the VIF is above 0.80, while Eshleman and Guo (2014) suggest a value above 10 to indicate the presence of multicollinearity. The result of the Variance Inflation Factor (though, not tabulated) conducted amongst the variables revealed that all figures are below the threshold values of 8 or 10 and suggest that there is no presence of multicollinearity

Table 3: Pearson Correlation Matrix between Variables

Variables	ROA	ARM	APM	INVM	CCC	FIRMSI~W	FDR
ROA	1.0000						
ARM	-0.1463	1.0000					
APM	0.0586	0.2242*	1.0000				

INVM	-0.2982*	0.5856*	0.0076	1.0000		
CCC	0.0815	0.1868*	-0.4727*	0.4989*	1.0000	
FIRMSIZE	0.5011*	-0.2317*	0.1599	-0.3411*	-0.1594	1.0000
FDR	-0.4841*	-0.003	0.1266	0.2105*	-0.0168	-0.3209*
						1.0000

Legend: Legend: ROA = return on asset, ARM = account receivable management, APM = account payable management, INVM = inventory management, and CCC = cash conversion cycle. FIRMSIZE = firm size while FDR = financial debt ratio.

Empirical findings

First, the study estimated a panel regression using the OLS model and subsequently with fixed and random effects models. Next, it performed a Hausman test, which supported the null hypothesis that assumes the appropriateness of the fixed effects model. Consequently, the final estimation of the model is presented in Table 4.

Table 4: Regression result of the relationship between WCM and financial performance

ROA	Coefficient	Std. Error	t-statistics	P-value
ARM	-0.00003	0.00010	-0.28	0.780
APM	0.00016	0.00007	2.23	0.029**
INVM	-0.00035	0.00015	-2.30	0.024**
CCC	0.00007	0.00002	3.35	0.001***
FIRMSIZE	0.02015	0.00675	2.99	0.004***
FDR	-0.16602	0.04473	-3.71	0.000***
_cons	-0.26820	0.15874	-1.69	0.095*
R-sq				0.4842
F-Value				(10.33)***

Legend: The definition of the variables remains the same. *, **, *** represent significant level at 1%, 5% and 10% respectively.

The regression results between WCM and firm performance is presented in Table 4 wherein firm performance is measured by ROA and WCM is proxied by ARM, APM, INVM, and CCC. Table 4 further shows that the R² is 0.4842 while the F-value is 10.33 and it is statistically significant at 1% level.

Test of Hypotheses

Hypothesis One (HO₁)

Table 4 revealed that ARM has a negative but insignificant relationship with ROA ($\beta = -0.0000287$, P-value >0.10). This implies a negative relationship between ARM and ROA and suggests that a decrease in receivable period by one day will result in 0.0000287 increase in ROA. However, the result is statistically not significant, and failed to support the hypothesis one. Thus, hypothesis one (HO₁) is not supported. This finding is also in line with the findings of Khan *et al.* (2019) and Douglas *et al.* (2018). However, the finding is not in agreement with the findings of Adebowale and Dada (2022), Demiraj *et al.* (2022), Fekadu (2021), and Tarurhor and Owolabi (2020) who found that ARM had a significant influence on return on assets.

Hypothesis Two (HO₂)

Hypothesis two examines the relationship between APM and ROA. Table 4 reveals that APM is positive and statistically related to ROA ($\beta = 0.0001614$, P-value <0.10). This indicates a positive and significant relationship between APM and ROA. The result suggests that an increase in payable period by one day will result in 0.0001614 increases in ROA for firms. This result is statistically significant at 5% level and thus supports the second hypothesis which states that there is a significant relationship between APM and ROA. Thus, hypothesis two (HO_2) is supported. This finding is in consonance with the findings of Demiraj *et al.* (2022), and Fekadu (2021). However, the finding is not in agreement with the findings of Ogunlade *et al.* (2021) and Douglas *et al.* (2018) who found that APM had an insignificant effect on profitability.

Hypothesis Three (HO_3)

Hypothesis three proposed that there is a significant relationship between INVM and ROA. The results in Table 4 show that INVM has a negative and significant relationship with ROA ($\beta = -0.0003524$, P-value <0.10). The result suggests that a negative relationship exist between INVM and ROA. This implies that a decrease in inventory conversion period by one-day will led to 0.003526 increase in ROA. The result is statistically significant at 1% level and therefore support hypothesis three. This means that hypothesis three (HO_3) is supported. This finding is also in line with the findings of Demiraj *et al.* (2022), Fekadu (2021) and Tarurhor and Owolabi (2020). However, the finding is not in agreement with the finding of Ogunlade *et al.* (2021) who found that INVM had an insignificant impact on financial performance.

Hypothesis Four (HO_4)

In the earlier section, the study hypothesized a significant relationship between CCC and ROA. The results in Table 4 revealed that the relationship between CCC and ROA is positive and statistically significant ($\beta = 0.000744$, P-value <0.10). This suggests that the relationship between CCC and ROA is positive and significant. The result further indicates that an increase in CCC by one-day will lead to an increase in ROA by 0.000744. The findings in Table 4 uphold hypothesis four of this study. This means that hypothesis four (HO_4) is supported. This finding is also in line with the findings of Demiraj *et al.* (2022), and Fekadu (2021). However, the finding is not in agreement with the finding of Ogunlade *et al.* (2021) who found that CCC had an insignificant impact on financial performance.

This study also reveals that firm size has a significant positive effect on ROA of quoted industrial goods firms in Nigeria. This study also reveals that financial debt ratio has a significant negative effect on ROA of quoted industrial goods firms in Nigeria.

CONCLUSION AND RECOMMENDATIONS

This study examines the relationship between WCM and the financial performance of industrial goods companies in Nigeria. The study notes that WCM is essential in enhancing the performance of industrial goods firms in Nigeria. Specifically, the findings show that APM, INVM and CCC are statistically associated with ROA while ARM is statistically insignificant. These findings advance the argument of Deloof (2003) that WCM is important at all times and at all seasons.

The findings of this study provide important practical and managerial implications for corporate sectors, especially industrial goods companies. Based on the findings, it can be inferred that working capital management significantly contributes to the profitability of firms in Nigeria. Therefore, the study recommends that industrial goods companies in Nigeria should be proactive and efficient in managing

their working capital components. Key policy initiatives that industrial goods companies can adopt to enhance their working capital components include:

- i. As the findings of this study imply, industrial goods companies should strive hard and implement policies that can prevent debtors from delaying payment beyond the due dates in order to avoid a cash trap. Therefore, improvements in cash collections should be implemented consistently.
- ii. On the other hand, the management of industrial goods companies should build closer relationships with their customers and suppliers to enable them to strategically delay payments and utilize the available cash within the company. Such effective management of payment terms can enhance the cash flow that companies need to finance their operational activities.
- iii. In view of the identified role of working capital in enhancing firm performance, industry managers are advised to innovate efficient ways to manage working capital in order to optimize its potential.
- iv. The industrial goods companies in Nigeria should not rely heavily on debt as a major source of business financing due to the cost implications of paying interest to creditors.

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