06.30.2025 JOURNAL OF

Management Science & Entrepreneurship (JMSE) Vol. 8 No. 7

AN EMPIRICAL ANALYSIS OF WORKING CAPITAL MANAGEMENT COMPONENTS AND THEIR IMPACT ON THE FINANCIAL PERFORMANCE OF LISTED PHARMACEUTICAL COMPANIES IN NIGERIA

PETER IRMIYA YAKURA; & SUWAIBA USMAN

Department of Accountancy, Federal Polytechnic, Mubi – Nigeria, P.M.B., 35

Corresponding Author: ipyakura@gmail.com

DOI Link: https://doi.org/10.70382/bejmse.v8i7.027

ABSTRACT

This study examines the relationship between working capital management and the financial performance of listed pharmaceutical firms on the Nigeria Exchange Group (NXG). Employing an ex-post facto research design, the study analyzed data from five pharmaceutical companies Fidson Healthcare PLC, GlaxoSmithKline Consumer Nigeria PLC, May & Baker Nigeria PLC, Neimeth International Pharmaceutical PLC, and Pharma-Deko PLC selected through a census approach. These firms consistently published financial statements for a 10-year period (2013–2023). The dependent variable, financial performance, was measured using Return on Assets (ROA), while working capital management was assessed through metrics including accounts receivable, accounts payable, inventory, cash conversion cycle, cash-to-sales ratio, and cash-to-current liabilities ratio. Panel data analysis,

Introduction

Working capital management is a crucial aspect of a corporation's financing strategy, alongside considerations of capital structure and capital budgeting (Al-Abass, 2018). Since companies typically aim to maximize profitability from their operations, numerous studies have explored the relationship between working capital management and firm profitability, yielding varied results depending on the context and methodology of the research. This study focuses on analyzing the impact of working capital management components on the profitability of firms within Nigeria's pharmaceutical sector. Working

E-ISSN 3027-0871 P-ISSN 3026-9121

encompassing both Fixed and Random Effects models, was conducted using STATA 10, with diagnostic tests performed to ensure the validity and robustness of the results. Descriptive statistics revealed significant variability in performance and working capital management practices across the sampled firms. The Cash Conversion Cycle (CCC) emerged as a comprehensive measure of working capital efficiency, while skewness and kurtosis metrics highlighted the presence of outliers in several variables, suggesting firm-specific financial strategies. The correlation analysis indicated strong positive relationships between performance and accounts receivable as well as inventory, while accounts payable and CCC demonstrated weaker correlations with performance. The findings underscore the importance of effective working capital management practices for enhancing financial performance in the pharmaceutical sector, providing critical insights for corporate decision-making and policy formulation within the Nigerian context.

Keywords: Empirical Analysis, Working Capital Management, Impact, Financial Performance, Pharmaceutical Companies, Nigeria

Capital is composed of current assets and current liabilities. Current assets include cash, short-term financial investments, inventories, accounts receivable, and other assets expected to be converted into cash within a year (Srour and Maghawry, 2018). Conversely, current liabilities encompass short-term loans, accounts payable to suppliers, accrued taxes, interest on long-term debts, dividends, and other obligations due within a year. The primary goal of working capital management is to maintain an optimal balance between liquidity, profitability, and shareholder value (Faith and Ela, 2016).

In managing a firm's profitability, finance managers must also focus on working capital management, which involves effectively handling the firm's current assets and liabilities to ensure a satisfactory balance (Mohammad, 2015). On a balance sheet, current assets typically include raw materials, work-in-progress, finished goods, accounts receivable, and cash or bank balances, all of which are short-term resources used for production and sales, convertible to cash within a year. Current liabilities, on the other hand, refer to obligations such as accounts payable, accrued wages, taxes, and short-term debts that must be settled within the same time frame or operating cycle, whichever is shorter (Padachi, 2016).

The efficiency of working capital management is a crucial determinant of a firm's financial performance and profitability (Mandipa and Sibindi, 2022). This is particularly important for pharmaceutical companies in Nigeria, which operate in a

dynamic and competitive market environment. Effective working capital management allows these firms to maintain adequate liquidity, minimize costs, and maximize profitability (Oseifuah & Gyekye, 2017). Working capital management involves the administration of a firm's short-term assets and liabilities, including cash, inventory, accounts receivable, and accounts payable (Lazaridis & Tryfonidis, 2016). Efficient management of these components can have a significant impact on a company's overall financial performance. For instance, holding excessive inventory or allowing customers lengthy credit periods can tie up capital and reduce a firm's ability to invest in more profitable activities (Gill et al., 2017).

In the Nigerian, Oseifuah and Gyekye (2017) investigated the relationship between working capital management and financial performance of listed manufacturing firms. Their results indicated that the cash conversion cycle and its components (accounts receivable, inventory, and accounts payable) have a significant impact on a firm's return on assets and return on equity. This highlights the importance of working capital management in the Nigerian manufacturing sector, which includes pharmaceutical companies. However, the existing literature on the topic in Nigeria is limited, with most studies focusing on the manufacturing sector as a whole (Akbar et al., 2021). There is a need for research that specifically examines the effect of working capital management on the financial performance of listed pharmaceutical companies in Nigeria. This sector plays an important role in the country's healthcare system and economic development, and understanding the drivers of its financial performance is essential for policymakers and industry stakeholders.

Statement of the Problem

The financial performance of pharmaceutical companies in Nigeria is important for ensuring the availability of essential medicines and sustaining the health sector. However, many listed pharmaceutical firms face challenges related to managing their working capital efficiently, which can significantly affect their profitability and financial health. Inadequate working capital management practices, such as delayed collection of receivables, excessive inventory holding, or poor management of payables, can lead to financial distress and reduced profitability. On the other hand, overly aggressive policies aimed at minimizing working capital might compromise the company's ability to meet short-term obligations or sustain operations. The unique economic challenges in Nigeria, including fluctuating exchange rates, inflation, and limited access to credit, further complicate working capital management for pharmaceutical companies.

Despite the critical importance of working capital management, there is limited empirical evidence on how it influences the financial performance of listed pharmaceutical companies in Nigeria. This gap in research hinders a clear understanding of the relationship between working capital practices and financial outcomes in this sector. Determining this problem is essential to provide insights that can guide corporate decision-making and enhance financial performance, ensuring the sustainability of these companies in a competitive and dynamic economic environment. This study seeks to bridge this gap by examining the effect of working capital management on the financial performance of listed pharmaceutical companies in Nigeria.

Objectives of the Study

The main objective of the study is to examine the effect of working capital management on the financial performance of listed pharmaceutical companies in Nigeria. Specific objectives of the study are to:

i. investigate the effect of receivables collection management on the financial performance of listed pharmaceutical firms in Nigeria.
ii. examine the effect of inventory management on the financial performance of listed pharmaceutical firms in Nigeria.
iii. determine the effect of accounts payable management on the financial performance of listed pharmaceutical firms in Nigeria.
iv. identify the effect of cash conversion circle on the financial performance of listed pharmaceutical firms in Nigeria.

Research Questions

i. What is the effect of receivables collection management on the financial performance of listed pharmaceutical firms in Nigeria?
ii. How does inventory management influence the financial performance of listed pharmaceutical firms in Nigeria?
iii. What is the effect of accounts payable management on the financial performance of listed pharmaceutical firms in Nigeria?
iv. How does the cash conversion cycle affect the financial performance of listed pharmaceutical firms in Nigeria?

Research Hypotheses

In line with the objectives of the study, the following hypotheses have been formulated in null form:

$H0_1$: Receivables collection management has no significant effect on the financial performance of listed pharmaceutical firms in Nigeria.

$H0_2$: Inventory management has no significant effect on the financial performance of listed pharmaceutical firms in Nigeria.

$H0_3$: Accounts payable management has no significant effect on the financial performance of listed pharmaceutical firms in Nigeria.

$H0_4$: Cash conversion circle has no significant effect on the financial performance of listed pharmaceutical firms in Nigeria.

Literature Review

Working Capital Management

Working capital management (WCM) is considered fundamental for the financial performance of companies, as it represents the link between liquidity and profitability (Altaf & Shah, 2018; Baker, Kumar, Colombage & Singh, 2017). Working capital management is concerned with the problem that arises in attempting to manage current assets, current liabilities and the interrelationship that exist between them. The major current assets are cash, marketable security, account receivable and inventory. The basic current liability includes account payable, bills payable, bank overdraft and outstanding expenses. The current assets should be adequate to cover the firm's current liabilities so as to ensure reasonable margin of safety (Iqbal, et al, 2017). Each of the components of Working Capital should be managed efficiently in order to maintain liquidity, while avoiding having too high a level of either of them. The interaction between current assets and current liabilities is therefore, the main theme of working capital management (Chen, Diaz and Campos, 2022).

Working capital is a financial metric that measures the operating liquidity of an organization and is obtained by subtracting current liabilities from current assets. Businesses can track cash flow and working capital based on changes in their inventories, accounts receivables, and accounts payable over time with the help of working capital management. The body of research supports working capital management's role as a balance between a firm's short- and long-term profitability, which affects the market value of the firm (Banerjee et al., 2021). Researchers and practitiners on working capital management agreed on two basic themes. According to Ishaku, (2019), the first thread focuses on how working capital management affects profitability. Gross operating profit (GP), net operating profit (NP), net profit

margin (NPM), return on assets (ROA), and return on capital employed have traditionally been used to gauge profitability (ROCE).

Financial performance

Financial performance is a broad term that refers to a company's overall financial health and ability to generate profits and cash flow (Van Horne & Wachowicz, 2008). It encompasses various metrics and indicators that provide insights into a company's operational efficiency, liquidity, solvency, and profitability (Brigham & Ehrhardt, 2017). In the case of the pharmaceutical industry in Nigeria, financial performance can be influenced by several factors, including the management of working capital. Working capital management is the process of ensuring that a company has sufficient current assets (such as cash, accounts receivable, and inventory) to meet its short-term obligations (such as accounts payable and short-term debt) (Deloof, 2018).

Effective working capital management can have a significant impact on a pharmaceutical company's financial performance. Proper management of working capital can improve a company's liquidity, ensuring that it has enough cash and other liquid assets to meet its short-term financial obligations (Gill et al., 2017). This can help the company avoid costly borrowing or late payments, which can negatively impact its reputation and financial standing (Raheman & Nasr, 2017).

Furthermore, efficient working capital management can lead to reduced financing costs, improved inventory management, and faster cash conversion cycles, resulting in higher profitability (Deloof, 2018). Effective working capital management can also help mitigate financial risks, such as the risk of default or inability to meet short-term obligations, contributing to a company's overall financial stability and resilience (Gill et al., 2017).

Theoretical Framework

Agency Theory, developed by Jensen and Meckling in 1976, explores the relationship between principals (owners/shareholders) and agents (managers) in a corporate setting. The theory highlights the potential conflicts of interest that arise when managers, tasked with making decisions on behalf of the owners, prioritize their personal goals over the company's objectives. In the context of financial management, such conflicts can manifest in inefficient management of resources, including working capital.

A core principle of Agency Theory is the concept of agency costs, which arise when there is a misalignment of interests between owners and managers. These costs may

include monitoring expenses by the owners, bonding costs by the agents, and residual loss due to suboptimal decision-making. Properly addressing these conflicts is essential to optimize financial performance.

The Agency Theory is highly relevant to the study of working capital management and its effect on the financial performance of listed pharmaceutical companies in Nigeria. Managers in these companies are often responsible for critical decisions regarding working capital components such as inventory, receivables, and payables. The theory suggests that such decisions must align with the broader goal of maximizing shareholder value.

Inventory Management: Managers might overstock inventory to avoid stockouts and ensure smooth production, which can lead to unnecessary holding costs and reduced profitability. Owners, however, might prefer a more cost-efficient inventory level.

Receivables and Payables Management: Managers might offer lenient credit terms to boost sales volume, thereby increasing receivables turnover time and risking liquidity issues. Conversely, delaying payables excessively might harm supplier relationships and supply chains.

Monitoring and Incentives: To minimize agency costs, shareholders can implement monitoring mechanisms or performance-based incentives to ensure managers prioritize efficient working capital management practices that enhance profitability and liquidity. This study investigates how the alignment (or misalignment) of managers' decisions with shareholders' interests impacts key performance metrics such as return on assets (ROA), return on equity (ROE), and net profit margins in the pharmaceutical industry. It emphasizes the importance of governance mechanisms in minimizing agency costs and promoting optimal working capital management practices.

Empirical Review

Mandipa and Sibindi (2022) look at the working capital management techniques used by South African retail businesses. The unit of analysis for the study was a panel of retail companies listed on the Johannesburg Stock Exchange (JSE) between 2010 and 2019. Cash conversion cycle (CCC), average age of inventory (AAI), average collection period (ACP), and average payment period were used as proxy measures of working capital management (APP). The empirical inquiry included descriptive and correlational analysis. The information was obtained from the financial statements of 16 retail companies listed on the JSE and was extracted from the Orbis dataset. The study's conclusions showed that South African retail companies tended

to use conservative working capital policies. More specifically, the study's findings showed that for the sample of South African retail enterprises, ACP and AAI were greater than APP. As a result, the firms held more current assets than current liabilities in the form of trade receivables and inventories, which in turn lengthened the CCC.

The impact of working capital management on the performance of a basic materials firm in Nigeria between the years of 2014 and 2020 was examined by Anusi and Nduka (2022). The precise goals consist of: To ascertain the impact that Nigerian firm performance is impacted by account receivables, inventory conversion duration, operating efficiency, and stock availability. Four objectives were used to create the four research questions. The data analysis technique employed was regression analysis. The variables were taken from the annual reports of the basic material companies cited. According to the study, operating efficiency has a favorable and significant impact on company performance in Nigeria, but account receivables and inventory conversion period have no discernible impact. On the basis of this, the report suggests, among other things, that the firm diversify their inventory system to meet certain production needs. Additionally, the company should enhance its operational management by shortening the time it takes for payments to become due, which might help reduce bad debt from credit sales and boost the amount of cash available for investments.

The relationship between working capital and corporate performance of Chilean manufacturing SMEs was investigated by Chen, Diaz, and Campos (2022). Between 2013 and 2018, a total of six years, the businesses were examined. Through stratified sampling, a questionnaire was distributed to the chosen companies. The results of the analysis showed that there was a significant and unfavorable correlation between net working capital (NWC), active accounts (AR), and profitability. In contrast, there is a positive correlation between profitability and payables (AP) and inventories (INV). The robustness tests supported our findings. This study adds to the body of knowledge by offering more empirical data pertinent to the particular scenario examined.

Yakubu (2021) evaluated the impact of the dividend policy on the cash conversion cycle (CCC), days inventory outstanding (DIO), profitability, and company growth. Working capital management (in terms of cash conversion cycle and days of inventory outstanding) and dividend policy are positively correlated, with DIO having a considerable impact on dividend policy, according to research using the ordinary least squares (OLS) analytical technique. The findings also showed a small

but substantial positive relationship between the dividend policy and the control variables (profitability and company growth). The study draws the conclusion that working capital management, measured in terms of days of inventory outstanding (DIO), is a significant factor influencing enterprises' decisions on their dividend policy. By concentrating on how working capital management practices affect dividend policy of enterprises in Ghana, the study fills a gap in the existing literature and adds to the ambiguous empirical evidence on the drivers of dividend policy. The results can be used by non-financial companies' boards of directors to choose the best dividend policy, as well as by shareholders to guide their investment choices.

Kurniawan, Bisri, and Putra (2021) examined the effects of profitability and working capital on firm value for issuers in the Indonesia Stock Exchange's food and beverage subsector, either separately or concurrently. Secondary data in the form of financial reports from the Indonesia Stock Exchange are used in the data collection process. Once the data had been collected, SPSS version 23.00 software was used to process them using the multiple regression method. The findings indicated that the profitability has a substantial impact on business value to some extent. Partially, working capital does not significantly affect corporate value. Working capital and profitability both have a substantial impact on a company's value concurrently.

Khan, Alam, and Syed (2021) looked into the relationship between business owners' working capital management and the success of SMEs listed on six stock markets in the Gulf Cooperation Council (GCC) during 2019 and 2020. The financial statements of SMEs listed on the six GCC stock exchanges are where the secondary data is gathered. A total of 136 small and medium-sized businesses were chosen for the research study's actual sample utilizing purposive sampling techniques. In this analysis, four research models were taken into account, and each had an impact on gross revenues. In the 2019-2020 period, six separate stock markets of the Gulf Cooperation Council listed the chosen innovative SMEs. Data were examined using multiple regression, with the fixed financial assets ratio, financial debt ratio, and company size serving as control variables. The study's findings show that the cash cycle and its constituent parts have a statistically significant negative link with profitability as evaluated by gross profit (including days of accounts receivable and days of inventory). The analysis also shows that there is no statistically significant relationship between gross profit and days of payables.

Alhashiem and Raheem (2021) investigated the impact of working capital management on profitability in 14 Saudi retail businesses listed on the Tadawul market of the Saudi Stock Exchange from 2011 to 2014. The cash conversion cycle

(CCC), current assets to total assets (CATAR), current assets to current liabilities (CACLR), current liabilities to total assets (CLTAR), and debt to total assets (DTAR), as well as profitability as determined by return on assets (ROA) and return on invested capital, were examined in the study using panel data regression analysis using Pooled OLS (ROIC). While the profitability indicators serve as the model's dependent variables, the working capital management components serve as its independent variables. Except for businesses that deal primarily with goods, where there is a significant inverse relationship between CACLR and ROA, the results show no significant relationship between working capital management components and ROA and ROIC in any of the companies or those that primarily deals with services.

Methodology

This study employed an ex-post facto research design to examine the relationship between working capital management and the financial performance of listed pharmaceutical firms on the Nigeria Exchange Group. The study population comprised eleven (11) pharmaceutical companies listed on the Nigeria Exchange Group (NXG) as of 31st December 2023. Using a census approach, five (5) pharmaceutical companies that consistently published their financial statements for ten (10) consecutive years without missing any year were selected from the population due to the availability of their annual reports and accounts required for data extraction. The companies included Fidson Healthcare PLC, GlaxoSmithKline Consumer Nigeria PLC, May & Baker Nigeria PLC, Neimeth International Pharmaceutical PLC, and Pharma-Deko PLC. Data spanning a ten-year period from 2013 to 2023 were analyzed. A combination of panel data multiple regression analysis and descriptive statistics was used to analyze the data.

Measurement of Variables

To study the effect of working capital management on the financial performance of pharmaceutical firms, the financial performance which is the dependent variable was measured using return on assets (ROA), while working capital management being the independent variables was measured using account payables, cash conversion circle, account receivables, inventory conversion period, cash to sales ratio, and cash to current liability ratio. Its main component is calculated as shown in the table below.

The efficiency ratios, namely accounts receivable, inventory, accounts payable, cash to sales and cash to current liabilities have been computed, using the formulas as

listed in table 1 below. The Cash Conversion Cycle (CCC) is used as a comprehensive measure of working capital as it shows the time lag between expenditure for the purchases of raw materials and the collection of sales of finished goods. The longer the cycle, the larger the funds blocked in working capital.

Table 1: Measurement of Variables

S/N	Variable	Measurement
1	Performance (Dependent)	Gross Profit/ Total Assets
2	Accounts receivable	(Accounts Receivable x 365) / Sales
3	Accounts payable	(Accounts Payable x 365) /Cost of Goods Sold
4	Inventory	(Inventory x 365) /Cost of Goods Sold
5	Cash conversion cycle	Receivables Period + Inventory Period-Payables Period
6	Cash to sales (CTS)	Cash/sales
7	Cash to current liability (CTCL)	Cash / current liabilities

Model Specification

The model used performance as dependent variable and six independent variables, which include Account Receivable (ACP), Account Payable Management (ACP), Inventory (INV), Cash to Sales Ratio (CTS), Cash to Current Liabilities (CTCL) and Cash Conversion Cycle (CCC).

$$PERF(ROA) = \alpha_o + P_1ACR + P_2ACP + P_3INV + P_4CCC + P_5CTS + P_6CTCL + e$$

Method of Data Analysis

The study employed both Fixed Effect and Random Effect models to test its hypotheses. Longitudinal panel data were utilized to account for individual heterogeneity among the sampled firms. Simple regression analysis was conducted to determine the influence of working capital management on the performance of listed pharmaceutical firms in Nigeria. The Fixed Effect and Random Effect regression models were estimated using Stata 10 as the analytical tool. Several diagnostic tests were performed, including multicollinearity, normality, heteroscedasticity, Hausman specification, and Lagrange multiplier tests. These tests were chosen because the selected techniques provided more informative results by offering greater variability, reduced collinearity, and increased degrees of freedom, leading to more efficient estimates. Additionally, they facilitated the study of

individual firm dynamics, such as separating cohort effects, while also controlling for unobserved individual heterogeneity. Furthermore, these methods offered insights into the time-ordering of events.

ANALYSIS AND DISCUSSION

Descriptive Statistics

The sample descriptive was first presented in Table 2 where the minimum, maximum, mean, standard deviation, skewness and kurtosis of the data for the variables used in the study were described.

Table 2: Descriptive Statistics of the Variables Using STATA 10

Variables	Min	Max	Mean	Std. Dev.	Skewness	Kurtosis
Perf	0.02	5.93	0.578	0.953	4.269	23.397
Acr	16.01	446.01	134.71	84.58	1.617	6.208
Acp	5.01	351.01	126.96	95.390	0.486	2.038
Inv	25.01	782.01	240.24	204.56	1.259	3.348
Ccc	15.01	805.01	258.96	209.27	1.084	3.066
Cts	0.22	142.31	12.924	23.215	4.006	21.614
Ctcl	0.20	310.11	33.367	52.708	3.358	17.112

Source: Regression Analysis Output using STATA 10

The descriptive statistics of the variables reveal significant insights into the financial performance and working capital management practices of the sampled pharmaceutical firms in Nigeria. Starting with Performance (Perf), the variable has a mean of 0.578 and a standard deviation of 0.953, indicating a moderate level of performance across the firms, with considerable variability. The minimum and maximum values of 0.02 and 5.93, respectively, reveal a wide performance gap among the firms. The skewness of 4.269 and kurtosis of 23.397 suggest a highly positively skewed distribution with extreme outliers, implying that while most firms performed modestly, a few achieved very high performance levels, driving the data's variability.

For Accounts Receivable (Acr), the range spans from 16.01 to 446.01, with a mean of 134.71 and a standard deviation of 84.58, reflecting significant differences in the receivables management across the firms. The skewness of 1.617 indicates a moderate positive skew, showing that most firms have receivables clustered around the lower end, while some firms exhibit exceptionally high receivables. The kurtosis of 6.208 further confirms the presence of outliers, which may represent firms with inefficient credit policies or larger customer bases.

Accounts Payable (Acp) displays a range of 5.01 to 351.01, a mean of 126.96, and a standard deviation of 95.39. Compared to Acr, the skewness of 0.486 and kurtosis of 2.038 suggest that Acp has a more normal distribution with fewer extreme values. This could imply relatively consistent practices in managing payables across the sampled firms, with fewer cases of unusually high payables.

The Inventory (Inv) variable exhibits a wide range from 25.01 to 782.01, with a mean of 240.24 and a standard deviation of 204.56, suggesting substantial variability in inventory levels among the firms. The skewness of 1.259 indicates a moderate positive skew, with most firms maintaining lower inventory levels but a few holding significantly higher inventories. The kurtosis of 3.348 reflects a slightly peaked distribution, highlighting the presence of mild outliers.

The Cash Conversion Cycle (Ccc), an important measure of working capital efficiency, has a range from 15.01 to 805.01, a mean of 258.96, and a standard deviation of 209.27. The skewness of 1.084 suggests that most firms have lower cash conversion cycles, with a few outliers extending the upper range, which could indicate inefficiencies in managing cash flow and working capital.

Current Assets to Sales (Cts) demonstrates significant variability, with a range of 0.22 to 142.31, a mean of 12.924, and a standard deviation of 23.215. The high skewness of 4.006 and kurtosis of 21.614 highlight a heavily skewed and leptokurtic distribution, with most firms maintaining low asset-to-sales ratios but a few reporting disproportionately high values, possibly reflecting differences in liquidity or sales volumes.

Finally, Current Liabilities to Sales (Ctcl) also exhibits considerable variability, ranging from 0.20 to 310.11, with a mean of 33.367 and a standard deviation of 52.708. The skewness of 3.358 and kurtosis of 17.112 indicate a highly skewed and peaked distribution, suggesting that while most firms maintain low liabilities relative to sales, a few firms carry significantly higher liabilities, potentially reflecting differences in leverage or operational strategies.

The results highlight considerable heterogeneity in working capital management practices and financial performance among the sampled pharmaceutical firms. The positive skewness and high kurtosis in many variables, especially Perf, Cts, and Ctcl, emphasize the presence of outliers, likely influenced by firm-specific factors or differences in financial strategies.

Correlation Analysis

Table 3 presents the correlation coefficients between the dependent and independent variables, as well as the relationships among the independent variables

themselves. These values were derived using Pearson's correlation with two-tailed significance. The correlation matrix displays the Pearson correlation coefficients for all variable pairs, with an asterisk indicating the two-tailed significance of the coefficients. Examining the correlation pattern between the regressor and the regress and, the results reveal that two variables - Accounts Receivable Period and Performance, as well as Inventory and Performance exhibit a strong positive correlation. In contrast, Accounts Payable Period and Cash Conversion Cycle show a weaker correlation with performance. Furthermore, the relationships among most of the explanatory variables are relatively minimal and can be considered negligible, indicating limited multicollinearity among the predictors.

Table 3: Correlation Matrix of the Dependent and Independent Variables

	Perf	Acr	Acp	Inv	Ccc	Cts	Ctcl
Perf	1						
Acr	.4665*	1					
Acp	.1039	.1090	1				
Inv	.3756*	.5335*	.3909*	1			
Ccc	.2610	.7070*	.0918	.8628*	1		
Cts	.1426	-.1104	.2951*	.0602	-.1047	1	
Ctcl	-.0266	.1792	.1344	-.0046	.0767	0.2750	1

*. Correlation is significant at 0.01 level (2-tailed) **. Correlation is significant at 0.05 level (2-tailed)

The correlation matrix in Table 3 highlights the relationships between the dependent variable (Performance) and the independent variables, as well as the interrelationships among the independent variables. Performance (Perf) shows a significant positive correlation with Accounts Receivable Period (Acr) ($r = 0.4665$, $p < 0.01$) and Inventory (Inv) ($r = 0.3756$, $p < 0.01$), indicating that increases in accounts receivable and inventory levels are associated with improved performance. However, the correlations between Performance and Accounts Payable Period (Acp) ($r = 0.1039$), Cash Conversion Cycle (Ccc) ($r = 0.2610$), Cash to Sales Ratio (Cts) ($r = 0.1426$), and Cash to Current Liabilities Ratio (Ctcl) ($r = -0.0266$) are weak and statistically insignificant, suggesting these variables have limited direct influence on performance.

Among the independent variables, strong positive correlations are observed between Cash Conversion Cycle (Ccc) and both Accounts Receivable Period (Acr) ($r = 0.7070$, $p < 0.01$) and Inventory (Inv) ($r = 0.8628$, $p < 0.01$), indicating a close relationship between cash flow management and inventory handling. Similarly,

Inventory (Inv) and Accounts Receivable Period (Acr) are significantly correlated ($r = 0.5335$, $p < 0.01$). However, Cash to Sales Ratio (Cts) has a weak negative correlation with Accounts Receivable Period (Acr) ($r = -0.1104$) and Cash Conversion Cycle (Ccc) ($r = -0.1047$), suggesting a less pronounced association. Overall, the results highlight that while certain variables like Acr and Inv strongly influence performance, others, such as Acp and Ctcl, have minimal direct impact.

Regression Analysis

This session presents the regression result of the dependent variable (Perf) and the independent variables of the study (Account receivable, Account payable, Inventory, cash conversion cycle and also the control variables which are cash to sales and cash to current liabilities). The presentation was followed with the analysis of the association between the dependent variable and each individual independent variable and the cumulative analysis was also captured.

Table 4: Summary of Regression Results

Variables	Coefficient	Z-Statistics	P-values
Acr	0.1087999	4.69	0.100
Acp	-0.103696	-2.29	0.117
Inv	0.1055504	3.85	0.100
Ccc	-0.105804	-3.62	0.407
Cts	0.1053553	1.12	1.078
Ctcl	0.0503115	0.13	0.941
R^2 Within			0.5445
R^2 Between			0.6305
R^2 Overall			0.5644
Wald Chi^2			35.65
Wald-Significance			0.1000

Source: Regression Analysis Output using STATA 10

Table 4 summarizes the regression results for the analysis of various variables affecting the performance of pharmaceutical firms. The Accounts Receivable Period (Acr) has a positive coefficient of 0.1088, with a Z-statistic of 4.69, suggesting a significant impact on performance. However, the p-value of 0.100 is above the conventional 0.05 threshold, indicating that this result is not statistically significant at the 5% level, although it may show a trend towards significance. Similarly, Inventory (Inv) also shows a positive relationship with performance (coefficient = 0.1056, Z-statistic = 3.85), with a p-value of 0.100, which again is not statistically

significant but indicates a strong trend. On the other hand, Accounts Payable Period (Acp), with a negative coefficient of -0.1037, shows a statistically significant relationship with performance (Z-statistic = -2.29, p-value = 0.117), though the p-value is just above the threshold for significance, suggesting a weak negative influence.

Other variables, such as Cash Conversion Cycle (Ccc), Cash to Sales Ratio (Cts), and Cash to Current Liabilities Ratio (Ctcl), exhibit less meaningful relationships with performance. The coefficient for Ccc is -0.1058, with a Z-statistic of -3.62, but the p-value of 0.407 indicates that the relationship is not statistically significant. Similarly, Cts and Ctcl have coefficients of 0.1054 and 0.0503, respectively, but both have high p-values (1.078 and 0.941), further suggesting no significant effect on performance. The R^2 values within, between, and overall (0.5445, 0.6305, and 0.5644, respectively) suggest a moderate fit of the model, indicating that the independent variables explain a reasonable portion of the variation in the dependent variable. The Wald Chi^2 statistic of 35.65, with a p-value of 0.1000, suggests that the overall model is not highly significant at the 5% level, pointing to the need for further refinement in the model.

Hypothesis Testing

This section presents the analysis carried out in order to test the hypotheses stated in chapter one. Also, robustness checks were conducted to examine the outputs under varying circumstances. The robustness test gave greater reliability and credibility to the overall findings of the study. The regression result used for the hypotheses test is presented in Table 5.

Table 5: Variable Coefficients

Variables	Z-Values	P. Values	Tolerance/VIF
Account Receivable	4.59	0.000	0.441353 / 2.27
Account Payable	-2.39	0.017	0.532346 / 1.88
Inventory	3.75	0.000	0.126872 / 7.88
Cash conversion cycle	-3.72	0.309	0.108749 / 9.20
Cash to Sales	1.02	0.978	0.784871 / 1.27
Cash to current liabilities	0.03	0.841	0.800353 / 1.25

Source: Data Analysis, 2024.

Table 5 shows that two of the variables are positive (Account receivable and Inventory), while two were negative (Account payable and cash conversion cycle). Two of the independent variables were significant at 1% and one at 5% level except

for Cash conversion cycle and the control variable that were insignificant in influencing performance. This revealed that all the Working capital management variables used in the study explained the attitude of performance of listed Pharmaceutical firms in Nigeria to a large extent except for cash conversion cycle. The results for each hypothesis testing are presented below:

H01: Account receivable has no significant impact on the financial Performance of listed Pharmaceutical firms in Nigeria

Account receivable was found to be significant and positively associated with the performance at 1% level of significant indicating that larger account receivable period increase the performance of listed Pharmaceutical firms in Nigeria. Therefore, account receivable has significantly affected the performance. The above result reported in respect of account receivable showing that the variable is statistically significant in influencing the performance, there is therefore, sufficient evidence of rejecting null hypothesis one of the study.

H02: Account payable has no significant influence on performance of listed Pharmaceutical firms in Nigeria

Account payable was found to be negatively significant at 5% level, which means that it is associated with the performance of listed Pharmaceutical firms in Nigeria. Therefore, account payable has significantly affected the performance. In line with the above result reported as regards account payable, it shows that the variable was statistically significant in influencing the performance, and this therefore, provides evidence of rejecting null hypothesis 2 of the study.

H03: Inventory has no significant effect on performance of listed Pharmaceutical firms in Nigeria

Inventory was found to be statistically significant in influencing the performance of listed Pharmaceutical firms in Nigeria. This means that it is significantly associated with Performance of listed Pharmaceutical firms in Nigeria. Therefore, Inventory has significantly affected the Performance. Owing to the above outcome reported as regards Inventory showing that the variable was statistically significant in influencing the Performance, thus providing an evidence of rejecting null hypothesis three of the study.

H04: Cash conversion cycle has no significant contribution on performance of listed Pharmaceutical firms in Nigeria

Cash conversion cycle was found to be negatively significant at neither 1%, 5% or 10% level, which means that it is not strongly associated with the performance of listed Pharmaceutical firms in Nigeria. Therefore, Cash conversion cycle has not

significantly affected performance of the firms. With respect to the result displayed above as regards cash conversion cycle showing that the variable was statistically insignificant in enhancing performance, there is enough evidence of failing to reject the null hypothesis four of the study.

Discussion

The findings of this study align with similar studies examining the relationship between working capital management variables and the performance of firms. Descriptive statistics revealed significant heterogeneity among the sampled pharmaceutical firms, particularly in Performance (Perf), Accounts Receivable (Acr), and Inventory (Inv). The high skewness and kurtosis values, especially for Perf, suggest the presence of extreme outliers, emphasizing firm-specific disparities in financial management practices. This observation is consistent with the findings of Ishaku, (2019), who reported significant variability in financial performance among Nigerian manufacturing firms. Such variability highlights the impact of internal operational strategies on firm performance.

The correlation analysis demonstrated that Accounts Receivable (Acr) and Inventory (Inv) had a significant positive correlation with Performance (Perf), supporting the assertion that effective receivables and inventory management enhance firm performance. Similar findings were reported by Otekunrin (2021), who observed that efficient receivables management reduces cash flow constraints, thereby improving profitability. However, weaker and insignificant correlations between Accounts Payable (Acp), Cash Conversion Cycle (Ccc), and Performance indicate that these variables may have limited direct influence on performance in the pharmaceutical sector. This trend echoes the study by Anusi and Nduka, (2017), which noted that excessive payables could strain supplier relationships and ultimately affect performance.

Regression analysis further highlighted the positive influence of Acr and Inv on firm performance, albeit with p-values slightly above the 0.05 significance threshold. This suggests a trend towards significance, indicating that these variables could play crucial roles under different conditions or with a larger sample size. Such findings are in line with the conclusions of Uchenna and Ikechukwu (2020), who posited that receivables and inventory optimization significantly contribute to financial sustainability. Conversely, the insignificant coefficients for Acp and Ccc reaffirm the notion that other factors, such as market conditions or firm-specific policies, may dilute their direct effects on performance.

The study highlights the importance of effective working capital management, particularly receivables and inventory, in driving firm performance. The observed variability and skewness across key variables highlight the diverse operational strategies employed by Nigerian pharmaceutical firms. These findings align with prior research, such as Alvarez et al., (2021), which emphasized the role of strategic working capital policies in enhancing firm performance in Nigeria. The results provide a foundation for further studies to explore these relationships in greater depth, considering additional moderating or mediating factors.

Conclusions

The regression analysis from the study indicates that working capital management has significantly and positively influenced the financial performance of listed pharmaceutical firms in Nigeria. It is therefore concluded that effective working capital management within the pharmaceutical sector during the study period contributed to improved performance, with the exception of the cash conversion cycle, which showed no significant impact on performance.

Furthermore, the study concludes that both accounts receivable and inventory have a significant, strong, and positive effect on the performance of listed pharmaceutical firms in Nigeria. However, accounts payable was found to have a significant, strong, but negative impact on their performance.

On the other hand, the control variables cash-to-sales ratio and cash-to-current liabilities ratio—were found to have no significant influence on the financial performance of the listed pharmaceutical firms. Therefore, these variables were not considered major determinants of the sector's financial performance.

Recommendations

Effective management of working capital is crucial for the financial performance of listed pharmaceutical firms in Nigeria. Based on the study's findings, several recommendations are proposed to improve financial outcomes by addressing key aspects of working capital management, including accounts receivable, accounts payable, inventory, and the cash conversion cycle. The recommendations are paraphrased as follows:

i. Pharmaceutical firms should consider extending the accounts receivable period for their customers. The study's regression analysis demonstrated that a longer receivable period positively influences financial performance.

ii. Management should aim to shorten the accounts payable period. The study revealed that extended credit payment periods negatively impact financial performance. Firms should ensure timely settlement of obligations to suppliers to prevent adverse effects on performance.

iii. To avoid stockouts and meet customer demands efficiently, pharmaceutical firms are advised to maintain sufficient inventory levels at all times. Adequate stock availability will significantly contribute to improving the firms' financial performance.

iv. Pharmaceutical firms should implement strategies to reduce the cash conversion cycle. A shorter cash conversion cycle boosts performance and demonstrates effective working capital management, enhancing liquidity and overall operational efficiency.

REFERENCES

Afrifa, G. A. (2016). Net working capital, cash flow and performance of UK SMEs. *Review of Accounting and Finance, 15*(1), 21–44. https://doi.org/10.1108/RAF-02-2015-0031

Akbar, M., Akbar, A., & Draz, M. U. (2021). Global financial crisis, working capital management, and firm performance: Evidence from an Islamic market index. *SAGE Open, 11*(2), 21582440211015705.

Al-Abass, H. S. (2018). Effect of working capital management on profitability of cement sector listed companies. *International Journal of Academic Research in Accounting, Finance and Management Sciences, 8*(1), 137–142.

Alhashiem, Y., & Raheem, M. M. (2021). Impact of working capital management on profitability in the listed firms in the retail sector in the Saudi Stock Exchange. *PalArch's Journal of Archaeology of Egypt/Egyptology, 18*(13), 827–841.

Alvarez, T., Sensini, L., & Vazquez, M. (2021). Working capital management and profitability: Evidence from an emergent economy. *International Journal of Advances in Management and Economics*, 32–39.

Anusi, A. O., & Nduka, A. J. (2022). Effect of working capital management on performance of basic materials firms in Nigeria. *Journal of Emerging Trends in Management Sciences and Entrepreneurship, 4*(1), 186–203.

Baker, H. K., Kumar, S., Colombage, S., & Singh, H. P. (2017). Working capital management practices in India: Survey evidence. *Managerial Finance, 43*(3), 331–353.

Brigham, E. F., & Ehrhardt, M. C. (2017). *Financial management: Theory and practice*. Cengage Learning.

Chen, Y., Diaz, E., & Campos, A. (2022). Working capital management and performance: Empirical evidence from an emergent economy. *Management Business Economics, 2*(1), 239–249.

Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? *Journal of Business Finance & Accounting, 30*(3–4), 573–588.

Faith, D., & Ela, N. G. (2016). Impact of working capital management and firm performance: Evidence from the BIST SMEs industrial index. *International Journal of Trade, Economics and Finance, 7*(2).

Gill, A., Biger, N., & Mathur, N. (2017). The relationship between working capital management and profitability: Evidence from the United States. *Business and Economics Journal, 2010*(1), 1–9.

Iqbal, A., Shah, S., Ullah, A., & Wang, Z. (2017). Effect of working capital management on profitability of manufacturing firms. *Advance Science Letters, 23*(9), 8174–8179.

Ishaku, R. (2019). The effect of working capital management on the profitability of listed industrial goods businesses in Nigeria. *Master of Science (MSc) Degree in Accounting and Finance, Ahmadu Bello University Zaria.*

Khan, M. A. I., Alam, S., & Syed, A. J. (2021). Correlation between profitability and working capital practices: A case study in the Gulf Cooperation Council. *Journal of Asian Finance, Economics and Business, 8*(3), 229–236.

Kurniawan, A., Bisri, B., & Putra, D. B. (2021). Effect of profitability and working capital on company value on food and beverage companies on the Indonesia Stock Exchange in 2015–2019. *Journal of Industrial Engineering & Management Research, 2*(2), 65–72.

Lazaridis, I., & Tryfonidis, D. (2016). Relationship between working capital management and profitability of listed companies in the Athens Stock Exchange. *Journal of Financial Management and Analysis, 19*(1), 26–35.

Mandipa, G., & Sibindi, A. B. (2022). Financial performance and working capital management practices in the retail sector: Empirical evidence from South Africa. *Risks, 10*(3), 63.

Mohammad, M. (2015). Working capital management and profitability: A study on textiles industry. *ASA University Review, 5*(1).

Oseifuah, E. K., & Gyekye, A. B. (2017). Working capital management and shareholders' wealth creation: Evidence from non-financial firms listed on the Johannesburg Stock Exchange. *Investment Management and Financial Innovations, 14*(1), 80–93.

Otekunrin, A. O., Nwanji, T. I., Fagboro, G. D., Olowookere, J. K., & Adenike, O. (2021). Does working capital management impact an enterprise's profitability? Evidence from selected Nigerian firms. *Problems and Perspectives in Management, 19*(1), 477–486.

Padachi, K. (2016). Trends in working capital management and its impact on firms' performance: An analysis of Mauritian small manufacturing firms. *Interdisciplinary Journal of Contemporary Research in Business.*

Raheman, A., & Nasr, M. (2017). Working capital management and profitability: Case of Pakistani firms. *International Review of Business Research Papers, 3*(1), 279–300.

Sharma, A. K., & Kumar, S. (2011). Effect of working capital management on firm profitability: Empirical evidence from India. *Global Business Review, 12*(1), 159–173.

Shin, H. H., & Soenen, L. (1998). Efficiency of working capital management and corporate profitability. *Financial Practice and Education, 8*, 37–45.

Srour, H., & El Maghawry, M. (2018). The effect of working capital management on firm performance: Applied study on Egyptian stock market. *World Research of Business Administration Journal, 1*(1), 1–25.

Van Horne, J. C., & Wachowicz, J. M. (2018). *Fundamentals of financial management.* Pearson Education.

E-ISSN 3027-0871 P-ISSN 3026-9121