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**WORKING CAPITAL MANAGEMENT AND FIRM'S VALUE OF LISTED PHARMACEUTICAL FIRMS IN NIGERIA**

<sup>1</sup>Abiola Bolaji Ibrahim, <sup>2</sup>Ijaiya Muhammed Olayemi, <sup>3</sup>Mojeed Lolade Mohammed

<sup>1,2</sup>Department of Accountancy Federal Polytechnic Offa, Kwara State

Corresponding email/Mobile:abiola7577@gmail.com,+2348037084362<sup>1</sup>

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**Abstract**

Working capital reflects how the company operates on a daily basis and relates to the investment of the company in short-term assets. This study examines the impact of working capital management (WCM) on the firm value of listed pharmaceutical firms in Nigeria from 2007 to 2022. Using annual financial statements as secondary data, the study analyzes key WCM indices Cash Conversion Cycle (CCC), Average Collection Period (ACP), Average Payment Period (APP), and Inventory Conversion Period (ICP) and their influence on firm value, measured by Tobin's Q. Panel regression, correlation, and descriptive statistics were employed to analyze the data. The results indicate that APP (t-stat -2.79, p-value 0.00) and CCC (t-stat -2.41, p-value 0.01) negatively affect firm value, while ICP (t-stat 4.04, p-value 0.00) has a positive impact. ACP (t-stat 1.26, p-value 0.21) was found to be insignificant. The study concludes that CCC, APP, and ICP are key indicators for improving firm value and recommends strategies to reduce CCC by speeding up receivables collection (ACP), managing inventory efficiently (ICP), and extending payment periods (APP).

*Keywords:* average collection period, average payment period, cash conversion cycle, inventory conversion period, pharmaceutical firms, tobin q,

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**1. Introduction**

The fundamentals of corporate finance revolve around how an organization can raise and distribute cash in order to maximize its financial performance, market value, and shareholder wealth. Effective finance decisions, successful investment selections, and sensible pay-out decisions are all necessary for maximizing a company's worth. Working capital is connected to financing choices that the business should manage in terms of the cash conversion cycle, receivable turnover, inventory turnover, and the tenure of current liabilities. Working capital also determines the best type of loan to fit the life of a company's assets (Basyith et al., 2021). A company needs working cash to run its daily operations.

Working capital (WC) refers to a company's current assets, including cash, receivables, inventory, and other liquid assets, while networking capital is the difference between current assets and current liabilities. WCM, acting as a bridge between liquidity and profitability, is crucial in assessing a firm's value (Aktas et al., 2015). As part of this, companies must balance short-term assets with liabilities to ensure sustainability and prevent financial difficulties. Numerous studies highlight the link between investment decisions and firm value (Burton et al., 1999). Tobin's Q, a common metric for measuring firm value, is often used to study the effects of WCM on firm performance (Himmelberg et al., 1999; Thomsen et al., 2006). Tobin's Q compares the market value of a company's equity and debt to its total assets. Previous research has shown that the relationship between working capital and firm value is concave or U-shaped: when working capital is low, it positively affects firm value, but



excessive working capital results in a negative impact.

Worldwide, companies must carefully manage their working capital to maximize value and shareholder wealth. Consistent efforts in securing the right mix of working capital are essential to ensure business continuity. Inadequate working capital management can lead to business failures, as noted by Adeoye & Olojede (2019). The study observed that some companies collapsed due to poor WCM practices. Maintaining appropriate working capital levels is crucial for liquidity and profitability, and research has extensively examined the financial effects of WCM on businesses. However, much of the existing research on WCM has focused on large, multinational firms or deposit money banks, with less attention paid to the pharmaceutical industry.

Most studies have been conducted in developed economies, leaving a gap in understanding how WCM affects firms in emerging markets like Nigeria. According to Li and Liu (2014), there is a significant gap in the literature, particularly in studies focused on Nigerian industries, including pharmaceuticals. The Nigerian pharmaceutical sector operates in a highly competitive and challenging environment, making it important to study the impact of WCM on firm value in this context.

This study aims to fill this gap by examining how WCM affects the value of listed Nigerian pharmaceutical firms over a 16-year period, from 2007 to 2022. This period is significant as it overlaps with Nigeria's efforts to diversify its economy in response to declining oil revenue. The study measures WCM using key indicators like the cash conversion cycle (CCC), average collection period (ACP), average payment period (APP), and inventory conversion period (ICP), while firm value is measured by Tobin's Q. By focusing on a sector that plays a vital role in Nigeria's economy, this research contributes to understanding the unique challenges faced by pharmaceutical firms in managing working capital and its impact on firm value.

In order to achieve this objective, this study hypothesized in its null form that:

- H<sub>01</sub>:** Cash conversion cycle has no significant effect on the value of listed pharmaceutical firms in Nigeria.
- H<sub>02</sub>:** Average collection period has no significant effect on the value of listed pharmaceutical firms in Nigeria.
- H<sub>03</sub>:** Average payment period has no significant effect on the value of listed pharmaceutical firms in Nigeria.
- H<sub>04</sub>:** Inventory conversion period has no significant effect on the value of listed pharmaceutical firms in Nigeria.

## **2. Literature Review**

### **Conceptual Review**

#### **Working Capital Management**

Working capital, reflecting daily operations and short-term asset investment, indicates a company's financial health and is tied to profitability and liquidity. Higher working capital can boost sales and profits, enhancing firm value (Deloof, 2013). However, it also requires more funding, increasing bankruptcy risk (Kieschnick et al., 2011). Thus, while working capital can improve profitability, it can also create a mismatch between assets and liabilities, raising insolvency risk.

#### **Cash Conversion Cycle (CCC)**

The cash conversion cycle (CCC) measures the interaction between working capital elements and cash flow within a business (Hutchinson, 2007). Created by Gitman in 1974, the CCC is calculated as:  $CCC = ARD + ITO - APD$ , where inventory holding days and accounts receivable days are added,



and accounts payable days are subtracted. It reflects the time needed to finance operations and is a dynamic liquidity indicator incorporating balance sheet and income statement data (Jose & Lancaster, 1996). Industry benchmarks are essential for assessing and improving CCC performance.

#### **Average Collection Period (ACP)**

Businesses use trade credit to boost sales (Panda et al., 2021), with effective receivables management attracting customers through shorter collection periods and a strong credit policy (Lazaridis & Dimitrios, 2005). However, increased receivables lead to rising costs, such as cash discounts, credit management, and collection expenses (Hansen & Mowen, 2005). While opportunity costs decrease as receivables grow, higher accounts receivable levels raise net working capital needs and management expenses, potentially lowering firm value (Michalski, 2007).

#### **Average Payment Period (APP)**

The average payment period refers to the time an entity takes to pay suppliers for goods or services purchased on credit (Panda et. al., 2021). Accounts payable arise from trade credit, a key working capital element benefiting both buyer and supplier. Sellers can promote their products and offer short-term financing to buyers, while buyers receive credit. Sellers often offer discounts to encourage early payment, such as "2/10 Net 30," meaning a 2% discount is available if payment is made within 10 days, otherwise payment is due in 30 days.

#### **Inventory Conversion Period (ICP)**

Inventories include raw materials, finished goods, and work-in-progress (Sensini & Vazquez, 2021). Proper inventory management improves business performance, historically maintaining stock as a safety net (Sensini & Vazquez, 2021). However, holding inventory incurs costs that may reduce profitability (Fullerton et. al., 2003). Just-in-time (JIT) systems, where materials are acquired as needed, have become popular for reducing inventory levels and saving costs. Consequently, many companies have seen a decline in inventory holdings (Chen et al., 2005).

#### **Firm Value**

Firm value, according to Aktas et al. (2015), is a measure of a company's overall worth, including both its equity and debt. It reflects the market's valuation of a business, incorporating assets, operations, and future earning potential. Firm value helps gauge a company's credibility and attract investors. The Price-to-Book ratio is used to measure this value by dividing market capitalization by total equity, highlighting the difference between book value and market value. Similar to this is Tobin's Q ratio, as applied by Gupta, Jatav & Prakash (2023).

#### **Working Capital Management and Firm Value**

In the literature on working capital management, there are two basic themes. According to Abuzayed (2012), Deloof (2013), Sharma & Kumar (2011), and others, 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). Utilizing Tobin's Q (Abuzayed, 2012), other measures of Enterprise Value (EV), a comparable measure of firm value using excess stock return, or Alpha, the second thread analyzes the effect of working capital management on firm value (Wang, 2019).

#### **Theoretical Review**

##### **Pecking Order Theory**

The pecking order theory, introduced by Myers and Majluf (1984), serves as a key theoretical foundation for this study. It posits that businesses prioritize funding sources in a specific order: first using retained earnings, then risk-free debt, followed by risky debt, and finally issuing new equity.



Working capital, as an internal funding source, can smooth out fixed investments. Due to flotation costs, external funding is expensive, especially for firms with limited resources (Fazzarri and Petersen, 1993). Supported by studies like Fama and French (1988), the theory suggests companies issue debt over equity when internal funds are insufficient, aligning with the view that leverage negatively correlates with profitability.

### **Empirical Studies**

Ugboduma and Ebiaghan (2023) studied the relationship between working capital management and financial performance in Nigeria, focusing on 69 non-financial firms listed on the Nigerian Stock Exchange from 2012 to 2021. The study examined cash conversion cycle, accounts receivable and payable management, current ratio, and unpaid dividends as independent variables, with return on assets (ROA) as the dependent variable. Using pooled panel Ordinary Least Square (OLS) analysis, the results showed that cash conversion cycle, accounts receivable, and payable management significantly impacted ROA, while current ratio and unpaid dividends had no significant effect. The study concluded that certain aspects of working capital management significantly influence financial performance.

Gupta et al. (2023) analyzed how working capital management efficiency impacts firm value in Indian manufacturing enterprises. The study used data from 223 BSE-listed companies between 2016 and 2022. Firm value was measured by Tobin's Q, with net trade cycle, inventory period, debtors' collection period, and creditor payment period as explanatory variables. Controlling for firm size, age, current ratio, net profit ratio, sales growth, and GDP, the two-step generalized method of moments technique was applied. The results showed that net trade cycle, inventory period, and debtors' collection period positively influenced Tobin's Q, while creditor payment period had no significant impact. Firm value was also positively affected by firm size, net profit ratio, sales growth, and GDP, but negatively by firm age.

Kundu et al. (2022) examined the effect of working capital management (WCM) on business value from year 2015–2019, a sample of 200 listed Indian companies was used in the study. Utilizing data from the OECD and the EU Industrial R&D Investment Scoreboard 2018, the companies are divided into innovative and non-innovative categories. The study reveals a favorable association between cash conversion cycle and company value using OLS and GMM-DPD estimations.

Additionally, Anusi and Nduka (2022) investigated the impact of working capital management on the value of basic materials firm in Nigeria between the years of 2014 and 2020. 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, cash conversion cycle has a favorable and significant impact on company performance in Nigeria, but account receivables and inventory conversion period have no discernible impact.

Khan et al. (2021) examined the relationship between working capital management and the market value of SMEs listed on six Gulf Cooperation Council (GCC) stock markets during 2019 and 2020. The study used data from 136 SMEs, analyzed with multiple regressions, incorporating control variables like financial assets ratio, financial debt ratio, and company size. The results revealed a statistically significant negative relationship between the cash conversion cycle (including days of accounts receivable and inventory) and profitability, measured by gross profit. However, no significant relationship was found between gross profit and days of payables.

Naumoski (2019) analyzed the effect of working capital management on corporate profitability using data from 720 companies in south-eastern Europe. The study used operating profit ratio as the dependent variable, and working capital management was represented by inventory turnover, days receivable outstanding, days payable outstanding, and the cash conversion cycle. Results indicated that



days payable outstanding and the cash conversion cycle negatively impacted profitability, while days receivable outstanding had a positive effect. The study recommended improving profitability by reducing receivables and the cash conversion cycle, and delaying payables. However, the lack of diagnostic tests may render the results biased or spurious.

Ishaku (2019) analyzed the impact of working capital management on the market value of listed industrial goods companies in Nigeria, covering 21 firms from 2009 to 2016. Using a correlation research design and OLS multiple regression, the study found that Accounts Receivable Days (ARD) had a significant positive effect on Return on Assets (ROA) at a 1% significance level. In contrast, Accounts Payable Days (APD) had an insignificant negative effect. Inventory Turnover Days (ITO) had a significant negative impact on ROA, while the Cash Conversion Cycle (CCC) had a significant positive impact at a 5% level.

### 3. Methodology

The study used a correlation research design and focused on all seven listed pharmaceutical firms on the Nigerian Exchange (NXG) as of December 31, 2023. These firms were chosen because they are legally required to file annual reports, ensuring the availability and reliability of data for research. The sample includes Fidson Healthcare Plc, Glaxo SmithKline Consumer Nigeria Plc, May & Baker Nigeria Plc, Morison Industries Plc, Neimeth International Pharmaceutical Plc, Pharma-Deko Plc, and PZ Cussons Nigeria Plc. The study spans a 16-year period, from 2007 to 2022, using data available in the NXG fact book.

#### Models Specification

The study adapts the model from the empirical work of Ishaku (2019). Thus, the model is specified as follows:  $ROA_{it} = \beta_0 + \beta_1 ITO_{it} + \beta_2 ARD_{it} + \beta_3 APD_{it} + \beta_4 CCC_{it} + \beta_5 Fsize_{it} + \varepsilon_{it}$ .....(1)

Where:  $RAO_{it}$ =Return on Asset;  $ITO_{it}$ =Inventories Turnover Days;  $ARD_{it}$ =Account Receivable Days;  $APD_{it}$ = Account Payable Days;  $CCC_{it}$  = Cash Conversion Cycle;  $Fsize_{it}$ =Firm size;  $i$ =1thterm denoting the number of firms from 1-7;  $t$ =1thterm denoting the time period ranging from 2007-2022;  $\varepsilon_{it}$ = error term of the model;  $\beta_0$ = intercept of the regression equation;  $\beta_1, \beta_4$ = are the coefficient of the parameter estimate.

Bearing the objectives of the study in mind, the model was modified to captures the key variables of this study, likewise, to suit the available dataset of the study's sample size. Thus, the model to examine the effect of working capital management and firm's value in Nigeria is specified as follows:  $Tobin's Q_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 ACP_{it} + \beta_3 APP_{it} + \beta_4 ICP_{it} + \mu_0$  -----(2)

Where: Tobin's Q = Market value/Book value; CCC = Cash Conversion Cycle; ACP = Average Collection Period; APP = Average Payment Period; ICP = Inventory Conversion Period;  $\mu_0$ = Error term;  $\beta_0$ = Constant.

**Decision rule:** Null hypothesis should be rejected if the p-value is < 5% significance level, otherwise it should be accepted.



#### 4. Results And Discussion

##### Descriptive Statistics

**Table 1**

*Descriptive Statistics*

| Variables | Obs | Mean     | Std dev  | Minimum   | Maximum  | Jarque-Bera | Prob   |
|-----------|-----|----------|----------|-----------|----------|-------------|--------|
| Tobin q   | 112 | 6.947315 | 20.13288 | 0.001099  | 109.0317 | 840.9512    | 0.0000 |
| ACP       | 112 | 93.53477 | 91.40293 | 2.701254  | 730.6067 | 3373.788    | 0.0000 |
| APP       | 112 | 148.2835 | 204.8119 | 1.557929  | 1058.430 | 312.0929    | 0.0000 |
| ICP       | 112 | 56.71617 | 76.15038 | 0.128284  | 299.1496 | 46.03455    | 0.0000 |
| CCC       | 112 | 2.772232 | 204.3926 | -784.7000 | 686.4500 | 246.9429    | 0.0000 |

**Source: Author's Computation, 2024.**

The study's Table 1 reveals that Tobin's Q, representing firm value, averages 6.947 with a large dispersion (standard deviation of 20.133), indicating a high variation in firm value across Nigeria's pharmaceutical sector. The minimum Tobin's Q was 0.0011, and the maximum was 109.032, highlighting significant firm value diversity. Account receivables collection period averaged 94 days, showing poor credit control and potential irrecoverable debt issues, while the account payable period averaged 148 days, which could imply cash flow problems or free financing but risks damaging supplier relationships. Inventory holding period averaged 57 days, which is reasonable for this sector, though longer holding periods could signal poor inventory management. The cash conversion cycle averaged 3 days, with a wide range (-785 to 687 days), indicating that on average, firms efficiently manage liquidity, although some experience significant delays between production costs and cash inflows.

**Table 2**

*Summary of Multicollinearity using Variance Inflation Factor*

| Variables | VIF  | 1/VIF  |
|-----------|------|--------|
| ACP       | 1.01 | 0.9915 |
| APP       | 1.00 | 0.9982 |
| ICP       | 1.01 | 0.9878 |
| CCC       | 1.00 | 0.9983 |
| MEAN VIF  | 4.02 |        |

**Source: Author's compilation, 2024**

Multi-collinearity exists when the predictor variables are themselves highly correlated. If the variables have VIF of above 10 and TV less than 0.10, then there is a strong indication of the existence of excess correlation, Gujarati (2004). With the above values of VIF, all of which are less than 10 and the values of TV (1/VIF) which are also more than 0.10, there is therefore absence of multi-collinearity.



**Table 3**

**Summary of the regression results of Model (Tobin's q)**

| Variables                   | Coefficient | Standard Error      | T-statistics | P-Value   |
|-----------------------------|-------------|---------------------|--------------|-----------|
| Average Collection Period   | 0.020752    | 0.016412            | 1.264473     | 0.2090    |
| Average Payables Period     | -0.049760   | 0.016743            | -2.971969    | 0.0037**  |
| Inventory Collection Period | 0.201710    | 0.049943            | 4.038826     | 0.000***1 |
| Cash Conversion Cycle       | -0.040485   | 0.016781            | -2.412590    | 0.0176**  |
| Constant                    | 1.056899    | 2.140252            | 0.493820     | 0.6225    |
| R-squared                   | 0.803666    | F- (Statistics)     | 41.34296     |           |
| Adjusted R-squared          | 0.784227    | Prob F- (statistic) | 0.000000***  |           |
| S.E. of regression          | 9.351997    | Durbin-Watson stat  | 1.045900     |           |

P value\*\*\* < 0.01, P value\*\*< 0.05 and P value\*<0.1

The results in Table 3 show an  $R^2$  value of 0.804 and an adjusted  $R^2$  of 78.4%, indicating that 80.4% of the variation in Tobin's Q (firm value) is explained by the independent variables (average collection period, average payables period, inventory collection period, and cash conversion cycle). This suggests the model is a good fit for predicting financial performance. The F-statistic of 41.343 and p-value of 0.0000 (significant at less than 0.05) confirm a positive significant relationship between the independent and dependent variables. The Durbin-Watson statistic of 1.046 suggests no autocorrelation issues, validating the model's suitability.

### Test of Hypotheses

**H<sub>01</sub>:** Cash conversion cycle has no significant effect on the value of listed pharmaceutical firms in Nigeria.

The regression results in Table 3 reveal that the t-statistic for the cash conversion cycle is -2.41259 with a p-value of 0.0176, which is below the 0.05 significance level. This indicates a significant negative effect of the cash conversion cycle on Tobin's Q, a measure of firm value for listed pharmaceutical firms in Nigeria. Consequently, the study rejects the null hypothesis and accepts the alternative hypothesis, concluding that working capital, specifically the cash conversion cycle, significantly affects the value of these firms.

**H<sub>02</sub>:** Average collection period has no significant effect on the value of listed pharmaceutical firms in Nigeria.

The regression results in Table 3 showed that the t-statistics of average collection period was 1.26 with p-value of 0.209 which is greater than 0.05 percent significant level. This indicates a positive insignificant effect of average collection period on Tobin's q as a measure of value of listed pharmaceutical firms in Nigeria. The study therefore accepts the Null hypothesis and rejects the alternative hypothesis and concludes that, working capital (average collection period) has no significant effect on the value of listed pharmaceutical firms in Nigeria.

**H<sub>03</sub>:** Average payment period has no significant effect on the value of listed pharmaceutical firms in Nigeria.

The regression results in Table 3 showed that the t-statistics of average payment period of -2.97 with p-value of 0.004 which is less than 0.05 percent significant level. This indicates a negative significant effect of average payment period on Tobin's q as a measure of value of listed pharmaceutical firms in Nigeria. The study therefore rejects the Null hypothesis and accepts the alternative hypothesis



and concludes that, working capital (average payment period) has significant effect on the value of listed pharmaceutical firms in Nigeria.

**H<sub>04</sub>:** Inventory conversion period has no significant effect on the value of listed pharmaceutical firms in Nigeria.

The regression results in Table 3 also showed that the t-statistics of inventory collection period of 4.039 with p-value of 0.000 which is less than 0.05 percent significant level. This indicates a positive significant effect of inventory conversion period on Tobin's q as a measure of value of listed pharmaceutical firms in Nigeria. The study therefore rejects the Null hypothesis and accepts the alternative hypothesis and concludes that, working capital (inventory conversion period) has significant effect on the value of listed pharmaceutical firms in Nigeria.

### **Discussion of Findings**

The findings reveal the following effects of working capital management on firm value (measured by Tobin's Q) for listed pharmaceutical firms in Nigeria:

#### **Cash Conversion Cycle (CCC)**

The regression analysis shows a significant negative effect of the CCC on Tobin's Q, with a coefficient of -0.04 and a p-value of 0.02, significant at the 5% level. This indicates that an increase in the CCC leads to a decrease in Tobin's Q, aligning with previous studies by Ugbooduma and Ebiaghan (2023), Anusi and Nduka (2022), Khan et al. (2021), and Naumoski (2019). However, it contradicts Ishaku (2019).

#### **Average Collection Period (ACP)**

The ACP has a coefficient of 0.021 with a p-value of 0.21, which is not significant at the 5% level. This suggests that the ACP does not significantly affect Tobin's Q. The finding aligns with the studies by Ugbooduma and Ebiaghan (2023) and Naumoski (2019), supporting the assumption that more restrictive credit policies could potentially improve firm value.

#### **Average Payment Period (APP)**

The APP shows a negative significant effect on Tobin's Q with a coefficient of -0.049 and a p-value of 0.004. This indicates that an increase in the APP decreases Tobin's Q, consistent with the findings of Ugbooduma and Ebiaghan (2023) and Naumoski (2019).

#### **Inventory Conversion Period (ICP)**

The ICP has a coefficient of 0.202 and a p-value of 0.000, significant at the 1% level. This positive relationship indicates that an increase in the ICP improves Tobin's Q, supporting the expectation that better inventory management enhances firm value. This result aligns with Naumoski (2019).

Overall, the study confirms the significance of CCC and ICP in influencing firm value, while ACP does not have a significant effect and APP negatively impacts firm value.

## **5. Conclusion And Recommendations**

The study analyzed how working capital management affects the firm value of listed pharmaceutical companies in Nigeria, using variables such as cash conversion cycle, average collection period, average payment period, and inventory collection period with Tobin's Q as the dependent variable. Based on the estimation results, this study concludes that the average payment period, cash conversion cycle, and inventory collection period significantly impact firm value, while the average collection period does not. Recommendations include strategies to shorten the cash conversion cycle by improving receivables collection and inventory management, and extending the



average payment period to enhance firm value. Monitoring the average collection period is also advised to potentially improve efficiency and firm value.

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