

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

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ABSTRACT

Business organizations try to maintain financial sustainability in the long run and ultimately try to maximize shareholders' wealth. It has been argued that financial constraints in short term are a major barrier to the firms' long term financial success. Working capital has been seen as the basic factor that affect firm's ability to continue their day-to-day business operations with financial stability. To that end, this study determine the effect of working capital management on financial performance of listed industrial goods manufacturing firms in Nigeria. The ex-post facto research design was adopted and seven firms were purposively selected out of thirteen (13) listed industrial goods manufacturing firms in Nigeria for the period 2014-2023. Data was collected from the annual reports and accounts of the sampled firms and tested by means of descriptive statistics, unit root test and Ordinary Least Square (OLS) multiple regression with the aid of Microsoft Excel and E-View 12. Findings indicated that average collection period had an insignificant effect on return on assets. Also, inventory conversion period had an insignificant effect on return on assets. Furthermore, cash conversion cycle had an insignificant effect on return on assets of listed industrial goods manufacturing firms in Nigeria. Given the findings, it was concluded that working capital management insignificantly influenced financial performance of listed industrial goods manufacturing firms in Nigeria. The study therefore recommends that managers in industrial goods firms should devise different aspects of working capital to maintain a trade-off between the current obligation that is short term and long term liquidities, because this finding indicated average collection period, inventory conversion period and cash conversion cycle has insignificant effect on financial performance measures.

Keyword: Average Collection Period, Inventory Conversion Period and Cash Conversion Cycle

INTRODUCTION

The business environment in Nigeria has witnessed a structural shift from importation and consumption of consumer goods to manufacturing of same in our time. Working capital management is a corporate financial technique which deals with managing short-term financing and investment decisions of a firm. Working capital strategies is one of the theories that stands out when considering working capital management on firm performance. This entails how to manage the firm's current assets and liabilities in such a manner that a satisfactory level of working capital is maintained. Umenzekwe et al. (2021) stated that working capital is the life blood and nerve center of a business firm. It refers to firms' investment in short-term assets or current assets. Mbella (2018) averred that working capital is used to measure a firm's solvency as well as its short-term economic wealth. Further, it meets the short-term needs of the firm (Song et al., 2020). When working capital is wrongly managed it may cause liquidity crisis which may culminate into reduction in profitability (Raza & UIHaq, 2020). Another, theory which explain working capital management on firm performance is the cash conversion cycle (CCC) theory. Cash conversion cycle (CCC) theory has three components of managing efficiency, namely; production, inventory management, and supply chain management. (Kosgey & Njiru, 2016). Companies with the right amount of working capital are prone to be more profitable and likely to attract more

investors. Working capital management is an important aspect of corporate financial decision making, it involves working capital and short-term obligations and unknown future financial contingencies (Uguru et al., 2018). Efficient working capital management is a veritable way of maximizing business growth and increasing shareholders worth. It also aids in improving financial performance and also achieving short-term liquidity (Wassie, 2021). Furthermore, it ensures that the company has sufficient cash flow to meet its short-term debts and operating expenses. Liquidity is an offshoot of working capital, since cash flow is a component of current assets. Working capital management affect the financial performance of firms especially the consumer goods manufacturers. It is an integral part of corporate finance and shows the strength and degree of firm's solvency. Current ratio shows the extent which creditors can be settled. A low ratio signifies that too much capital is held in stock.

Statement of Problem

Different scenarios has been painted over working capital management, however, this study tend to determine working capital as a corporate tool to enhance firm performance. When organizational performance is dissected into size, growth and leverage, it has effect on profitability. Bagh et al. (2016) evaluated relationship between firm performance and working capital management using the manufacturing sector as a reference point and found that inventory, turnover, cash conversion cycle (CCC) and average payment period has negative and insignificant effect on firm performance. However, average collection period, significantly and positively affected firm performance. Proper management of working capital is one of the crucial factors for maintaining liquidity, solvency, survival and profitability of a firm (Uguru, et al 2018). Dwommor (2017) determined that poor working capital management is the primary cause of business failure. In order to improve organizational performance of consumer goods manufacturing companies, this study tend to attempt to show how working capital performance can be optimally enhanced for profitability and increase of shareholders wealth.

Due to these problems there are review of empirical studies on working capital management and financial performance such as Hassouni (2022), Waweru and Atheru (2022), Okoror et al (2022), Wassie (2022), Tjandra et al (2022), Okphiabhele et al (2022), AL-Zararee et al (2022), Urhoghide and Korolo (2022), Umenzekwe et al (2021), Almomani et al. (2021), Maad et al (2021), Thenuwara and Ekanayake (2021), Kabir et al (2021), Shivakumar and Thimmaiah (2021), Fekadu (2021), Othuon et al (2021), Ogunlade et al (2021) study concluded that working capital management parameters contribute to financial performance are in tandem. It was also discovered that the inventory conversion period (ICP) and cash conversion cycle (CCC) have a positive but insignificant impact on financial performance. Based on the above problems and findings there is a missing gap in the literature. This study is therefore filling the gap by using a period of 2014 to 2023 to determine the effect of working capital management and financial performance of listed industrial goods manufacturing firms in Nigeria.

Conceptual Framework

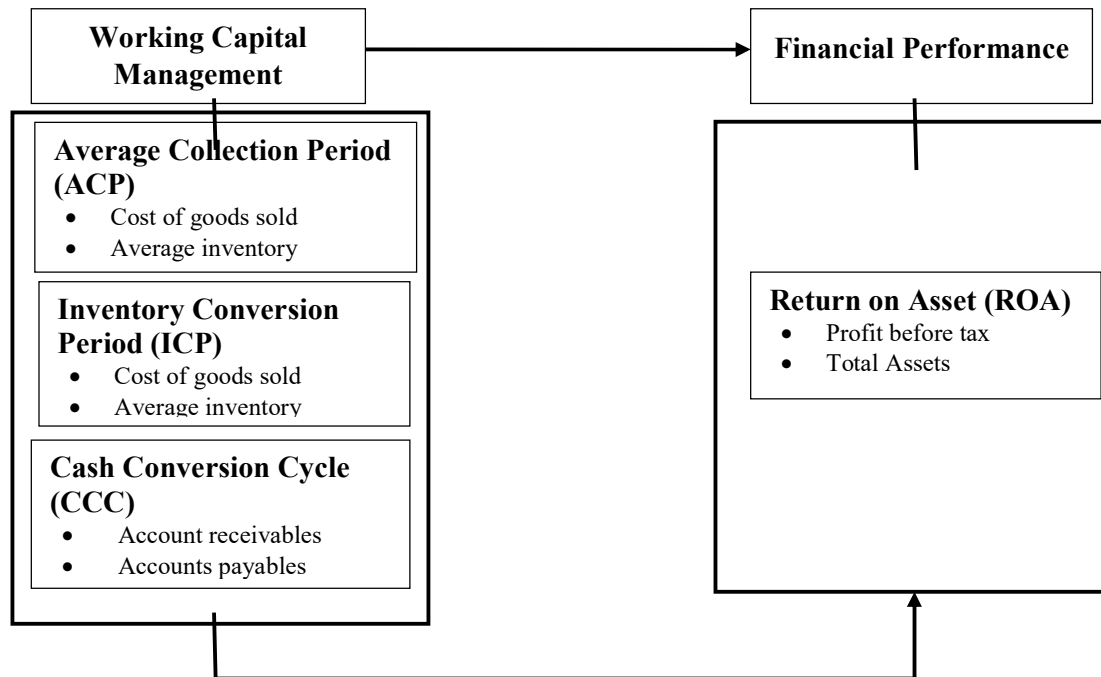


Fig. 1 Conceptual Framework showing the dimensions of working capital management and measures of financial performance.

Sources: Adhikari (2020), Ngari and Kamau (2021), Umenzekwe et al (2021), Major et al (2022), Hassouni (2022), Newstyle and Opuene (2022), Oladimeji and Aladejebi (2020); Golas (2020).

Aim and Objectives of the study

The main aim of this study was to determine the effect of working capital management on financial performance of listed industrial goods manufacturing firms in Nigeria between 2014-2023, however the specific objectives are to;

- i. determine the effect of average collection period on return on assets of listed industrial goods manufacturing firms in Nigeria;
- ii. determine the effect of inventory conversion period on return on assets of listed industrial goods manufacturing firms in Nigeria;
- iii. determine the effect of cash conversion cycle on return on assets of listed industrial goods manufacturing firms in Nigeria.

Research Question

The following research questions were stated for the study

- i. What is the effect of average collection period on return on assets of listed industrial goods manufacturing firms in Nigeria?
- ii. What is the effect of inventory conversion period on return on assets of listed industrial goods manufacturing firms in Nigeria?
- iv. What is the effect of cash conversion cycle on return on assets of listed industrial goods manufacturing firms in Nigeria?

Hypotheses

Based on the research questions above, the following hypotheses are formulated.

- H₀₁ Average collection period does not have any significant effect on return on assets of listed industrial goods manufacturing firms in Nigeria;

- H₀₂ Inventory conversion period does not have any significant effect on return on assets of listed industrial goods manufacturing firms in Nigeria;
- H₀₃ Cash conversion cycle does not have any significant effect on return on assets of listed industrial goods manufacturing firms in Nigeria;

Significance of Study

The result of this study would be highly useful to the manufacturing sector, as it further enhance Business community, government, the management of consumer goods manufacturing companies and future researchers. The investing public would appreciate the need for human capital assets to sustain business growth and expansion. Also, it keeps them updated or informed of various companies which are abreast of the recent developments in understanding the contribution of working capital development as a new paradigm in assessing business growth. Regulator of companies, government can use the result of this study to strengthen the implementation of accounting standards and policies/guidelines of various companies. The study would also be useful to the management of various industrial goods manufacturing companies. The management would identify the relevance of corporate governance dynamics in enhancing profitability of industrial goods manufacturing companies. Finally, the findings of this study could function as a basis for more future researches and as a reference in the academia.

REVIEW OF RELATED LITERATURE

Conceptual Review

1. Working Capital Management

Various authors have defined the phrase working capital several times. The term working capital was coined by an old American peddler who would load his wagon with goods and then rush out to exchange them. The goods were referred to as working capital since they were what he had sold or turned over to make money. Working capital refers to a firm's current assets used to support daily business activities and finance short-term operational needs. According to Mbella (2018), Working capital is utilized to measure a company's potency as well as its short-term economic health. It meets the short-term financial needs of a company (Song et al., 2020). According to Kosgey and Njiru (2016), working capital management deals with choices describing the financing of short-term and the relationship management between short-term assets and liabilities of a firm. Also it is a major feature of every firm's activities since it has to do with maximising of profits and good running of firm. Sabo (2016) viewed working capital management as a vital tool which is considered as part of the main aspects of any business management. It is the action which is aimed at managing a firm's working capital levels which deals with the problems of short-term financing (Qian, 2016). Working capital is the amount of funds which a company needs to fund its day to day operations (Urhoghide & Korolo, 2022). They include bank balance, cash, marketable securities, inventories and accounts receivables. A business must maintain an appropriate level of current assets. Current assets is not a permanent investment, it is continually in use, being turned over many times in a year. It is used to finance production, to invest in stock and to provide credit for customers. Current liabilities are organization's commitments for which cash will soon be required. They include bank overdraft, accounts payables and unpaid bills. Working capital management implies the application of strategies and policies in the implementation of a firm's current assets and liabilities in such a way that an optimal level of working capital level is maintained to foster a satisfactory level of profitability and maximize shareholders' wealth (Olaoye & Ogundipe, 2020).

Dimensions of Working Capital Management

a. Average Payment Period

This the period it takes to pay creditors in a given cycle of business, for example thirty days or three months as the case may be, depending on the agreement with suppliers. Account receivable

and payable is central in the decision making of working capital management. If a firm's convertible cash instruments is deficient, it may be difficult to pay its suppliers and other expenses as it occurs. According to Shah, et al (2018) found that inventory turnover and account payable has negative and insignificant impact on firm performance in Chemical and Pharmaceutical companies in Pakistan. Sharif and Islam (2018) studied working capital management on firm profitability and found account payable and receivable has positive and significant effect on firm performance. Account receivable refers to the firm's credit collection policy, account receivable days represent the number of days it takes a firm to collect payment from customers. Account payable days refer to the days it takes to pay suppliers who supplied on credit otherwise known as creditors.

b. Inventory Conversion Period (ICP)

The term inventory refers to the goods for sale as well as the raw materials utilized to make those goods. Inventory is one of a company's most valuable assets because inventory turnover is one of the key sources of revenue, production and, as a result, earnings for the company's shareholders (Joshua & Nurudeen, 2022). Inventory is a yardstick of production efficiency. Excess level of inventories decreases cash flow while on the other side too small level of inventories may decrease sales. Inventory Conversion Period (ICP) which is also referred to as Inventory Turnover in Days (ITID) is the average length of time required for conversion of raw materials into finished goods and in selling those goods. A company's inventory is its collection of finished items or goods utilized in production. On a company's balance sheet, inventory is categorized as a current asset, and it serves as a buffer between manufacturing and order fulfillment. When an inventory item is sold, its carrying cost is transferred to the income statement's cost of goods sold (COGS) category. Inventory Conversion Period Inventory conversion period reports about the average time to convert total inventory into sales (Ogbo et al., 2014). The inventory conversion period is the time required to obtain materials for a product, manufacture it, and sell it (Newstyle & Opuene, 2022). The inventory conversion period is essentially the time, or period during which a company must invest cash while it converts material into a sale (Ogbodo et al., 2017).

c. Cash Conversion Cycle (CCC)

Cash Conversion Cycle (CCC) is the interval of time (i.e. days) required to convert money invested in current assets into cash. It is calculated by adding the average period to collect debts, to the average inventory period and subtracting the average period of payment; i.e., $(\text{Days inventory outstanding} + \text{Days receivables outstanding}) - \text{Days payables outstanding}$. The three-part formula expresses the length of time that a company uses to sell inventory, collect receivables, and pay its creditors. Further, the shorter the cash conversion cycle the more liquid the firm's working capital position will be. Investors and analysts are interested in a firm's ability to generate cash and to have enough cash available to meet everyday demands, and also creditor are interested in whether a firm will regularly have cash available to pay for purchased goods. Cash Conversion Cycle (CCC) also refers to time-period between buying raw materials, convert them into finished goods, sales of the products, and collection of account receivables. Firms with shorter cash conversion cycle have fewer investment in working capital and as a result the cost of financing are less for these firms. Cash conversion cycle integrates three components of management efficiency, namely; production, inventory management, as well as supply chain management (Ebrahim, 2012).

2. Financial Performance

Financial performance generally examines the entire financial well-being of a business over a given period of time. It is defined as a measure of the extent to which a firm makes use of its assets to run business activities to earn revenues. The main source of data for determining corporate performance especially financial performance is the financial statements, which consists

of the statement of financial position which shows the assets, liabilities and equity of a business, the income statement that records the revenues, expenses and profits in a particular period, the cash flow statement which showcases the sources and uses of cash in a period, and the statement of changes in the owners' equity that represents the changes in owner's wealth (Urhoghide & Korolo, 2022). Performance is the result of an organization in effectively managing its resources to develop competitive advantage (Ironkwe, 2017). There are two types of performance measures, financial and non-financial performance measures. In this study, organizational performance is measured in terms of financial profitability measures, proxies such as Return on Assets (ROA), Return on Equity (ROE), Return on Investments (ROI) and Return on Sales (ROS).

3. Measure of Financial Performance

Return on Asset

The research article published by Newstyle and Opuene (2022) expressed that return on asset is a financial ratio that discloses the percentage of the company's earnings in relation to total assets. Magara et al. (2021) canvassed that return on asset measures the company's ability to generate net income based on asset levels. Mayndarto and Agustine (2021) advanced that return on asset is the ratio of profit before interest and taxes to assets. It is a very important ratio for natural resource firms to decide whether to invest on a new project or not. Olasupo and Akinselure (2019) acknowledged that firms invest on projects they expect to earn adequate return on asset. The return on assets is very important and provides a standard to evaluate how efficient the management employs the average amount invested in the firm's assets, whether the amount comes from investor or creditors. Mukah (2021) affirmed that return on assets is a financial ratio used to measure the degree to which the assets have been used to generate profits. Che-Ahmad et al. (2019) illustrated that return on assets is a financial tool used to measure the rate of return on total assets after interest expense and taxes.

Theoretical Framework

Resource-Based Theory

This theory emerged in 1984 and was developed by Birger Wernerfelt, and it deals with strategic management. The analysis of a firm's resources with the goal of achieving a sustained competitive edge over other firms in the industry is the central concept of this theory. In other words, when the resources of a firm are put into productive use with efficient and effective management, there is long-term viability. Resource based theory examines how those in control of resources use their power to achieve the goals of the organization and ensure that the company's existing assets are managed properly (Raza & UIHaq, 2020). Working Capital Management is an element of managing company resources, therefore, it is critical that resource based theory be used in this study.

Miller-Orr Cash Management Model

This model was developed by Merton Miller and Daniel Orr in the year 1966. This model's approach implies that the manager's underlying goal is to retain enough cash on hand to meet daily transaction demand while reducing the opportunity cost of not retaining a return-generating asset. Because the model assumes that the daily net cash flow distribution is roughly regular, the distribution of net cash flow predicted on a daily basis is either much lower or much greater than the typical distribution amount. The Miller-Orr model is employed to manage cash balances by imposing upper and lower limits of the regular cash level. When the cash level hits the defined upper limit, it indicates that there is excess cash available, initiating a buy action of short-term marketable securities to restore the cash level to its optimal level. When the cash level falls below the predetermined lower limit, it indicates a cash shortage, initiating a sell action in short-term marketable securities to restore the cash level to its optimal level. This theory is important for working capital management in organizations because it demonstrates to managers the most effective way to manage working capital in order to achieve desired organizational objectives and goals, as well as strong performance of the firms under consideration.

Empirical Review

Previous researchers have studied the effect of working capital management and financial performance in the context of different countries, sectors and environments. Some of the useful and gist review of previous literature are mentioned below.

Okoror et al. (2022) investigated the impact of working capital policy on firm profitability using publicly traded manufacturing/industrial firms in Nigeria. The ex-post facto research design was used. A sample of 31 manufacturing/industrial firms listed on the Nigerian Exchange Group was used in the study (NEX). The information was obtained from corporate annual reports of companies listed on the Nigeria Stock Exchange for the fiscal years 2010-2019. The study employed descriptive statistical methods, dynamic panel estimator and fixed effects (FE) estimators. The findings show that the cash conversion cycle has a positive and significant impact on financial performance, that the creditor's payment period (CPP) has a positive impact on firm financial performance. Furthermore, cash flow margin (CFM) has a positive impact on financial performance. Nonetheless, the study recommends that firms do not rely so heavily on debt, particularly in light of macroeconomic insecurity and rate volatility, but rather consider how to develop strategies to reduce their cash conversion cycles. Second, the study suggests that businesses seek long-term financing arrangements with longer payback periods, which will allow them to properly utilize these funds with more convenient investment timelines.

Joshua and Nurudeen (2022) examined the relationship between working capital management and organizational performance of selected food and beverages manufacturing firms in Nigeria. The study adopts Ex-post facto research design. The population of study comprised the 18 food and beverage firms listed on the Nigerian Securities Exchange as at November 2020. Purposive and convenience sampling techniques were used to select seventeen companies (which have complete data till at least 2019 in the Nigeria Stock Exchange Fact book) out of the 18 quoted companies. Time series data were collected using secondary source from the published financial statements of the companies and Nigerian Stock Exchange from 2015 to 2019. Data were analyzed quantitatively using descriptive and inferential statistics. Findings revealed that average collection period had positive and significant effect on the return on assets of the selected firms. Inventory Turnover in days influenced return on equity of the selected firms in Nigeria. Average payment period had significant effect on return on investment of the selected firms. Lastly, cash conversion cycle had significant effect on return on sales of the selected firms. The study concluded that working capital management has significant effect on organizational performance of selected food and beverages manufacturing firms in Nigeria. It was therefore recommended that management should pay attention to sound management of the companies' working capital components as they significantly influenced their profitability.

Waweru and Atheru (2022) investigated the effect of working capital management on financial performance of supermarkets in Nairobi, Kenya. The population of the study consists of 206 supermarkets in Kenya (Nairobi) with a timeframe from 2014 to 2018. Panel regression models were applied for the analysis of the study. The study found that quick ratio had significant positive effect on Nairobi's supermarkets financial performance in Kenya. The study further established that creditor turnover had insignificant effect on Nairobi's supermarkets performance in Kenya. The study also found that inventory turnover had insignificant effect on Nairobi's supermarkets financial performance in Kenya. The investigation suggests that firms should endeavour to maintain adequate levels of quick ratio. Additional research can be carried out on other aspects of financial performance such as return on equity as this will facilitate comparisons as well as effective formulation and implementation of policies.

Hassouni (2022) determined the impact of working capital on the profitability of public shareholding companies on the Palestine Stock Exchange. The study population is represented by the 13 industrial companies operating in Palestine. 7 sample companies were used and secondary data were collected from the financial reports of the study sample company and analyzed using the SPSS program. The results of the study showed the interpretation of all independent variables with the presence of a statistically significant relationship on the profitability of Palestinian industrial companies; among the most prominent recommendations is the need for industrial companies to increase the payment period, which will lead to an increase in the return on assets and return on ownership directly, and to increase the interest of Palestinian industrial companies in following up the management of working capital with all its components represented by the average storage period, the average collection period, and the average payment period. The cash transfer cycle when carrying out the various operations of the company.

Tjandra et al (2022) studied the determinants of working capital management in Indonesia and the Philippines. The study employed panel data, with the final sample for Indonesia was 630 years of observation, while for the Philippines, the sample used was 210 years of observation. The sample of the study was manufacturing firms listed on Indonesia and the Philippines Stock Exchanges. The study results in the Indonesian sample show that profitability and growth opportunities have a significant positive effect on working capital. Asset tangibility, firm age, and leverage have a significant negative effect on working capital. While operating cash flow and firm size have no effect on working capital. In comparison, the results in the Philippines sample show that profitability has a significant positive effect on working capital. Asset tangibility and leverage have a significant negative effect on working capital. While operating cash flow, growth opportunities, age, and firm size have no effect on working capital.

AL-Zararee et al. (2022) investigated the impact of working capital management (WCM) and credit management policy (CMP) on the Financial Performance (FP) of Jordanian banks (JB). The study data were obtained from 16 Jordanian banks listed on the Amman Stock Exchange (ASE) between 2017 and 2020. The study used panel data to investigate the relationship between the two independent variables, WCM and CMP, and the dependent variable FP; 64 financial reports to Jordanian banks were analyzed to measure this relationship. Multiple regression was used. The study found a statistically significant relationship between WCM and FP. In addition, the outcome approved that there is a statistically significant relationship between CMP and FP. The findings of the study indicate support for the banks' performance; a bank may need to lengthen client credit terms, prolong the cash transfer cycle, and require a more extended payment period when judging on WCM.

Rahmat and Adinda (2021) examined the existence of excess working capital in Indonesian firms and its effect on the firms' performance and risk. The sample includes 425 firm-year observations of Indonesian manufacturing firms for the period 2010 – 2014. To account for the potential asymmetric relation between excess Net Working Capital (NWC) and firm performance, an asymmetric regression model is employed, allowing the slope coefficient of the excess NWC to be different for positive and negative excess NWC. The results indicate (i) the existence of an optimal level of working capital, (ii) higher excess working capital leads to lower performance and risk, (iii) additional investment in working capital reduces firms' performance for those with positive excess working capital. It is also documented that (iv) additional investment in working capital reduces firms' risk for those that have working capital deficiencies. The findings have important implications for corporate managers in determining the optimal level of working capital.

Thenuwara and Ekanayake (2021) investigated the impact of working capital management on profitability with special reference to the consumer staples sector firms in Sri Lanka. Data were drawn from a sample of 46 consumer staple sector firms listed in the Colombo Stock Exchange (CSE) for a period of five years commencing from 2014/2015 to 2018/2019. To test the hypothesized relationships between the constructs, the panel data analysis is performed using STATA. The study found that the Inventory Conversion Period has an insignificant negative impact on Profitability. Receivables Collection Period negatively and significantly impact the Profitability. Further, the study observed that the Payables Settlement Period has an insignificant positive impact on Profitability and observed a significant positive impact of the Current Assets Ratio on Profitability. The findings are useful to investors, managers and shareholders when making decisions regarding the firm's profitability under aforementioned sector.

Ngari and Kamau (2021) examined the working capital management cycle in relation to profitability of household supermarket in Kenya. The objectives of the study were to evaluate the receivable conversion period, payable Deferral period, and inventory conversion period on the profitability of Household supermarket in Kenya. The study was guided by Operating Cycle Theory. The study used literature review methodology. The research concluded that firms that manage working capital efficiently enjoy the benefit of long survival in business, and that shareholders' value can be raised by reducing account receivable days, by hiking stocks to a sensible level, by taking long to pay suppliers yet ensuring good terms and by minimizing the CCC days.

Kabir et al (2021) investigated the impact of working capital management on firm performance. The study employs a qualitative research design, and data for the study were gathered through the secondary method from the body of existing empirical studies. The regression results of the empirical studies reviewed were used to analyze the study's data. The study concludes that the longer the cash conversion cycle and debtors' collection period, the worse the business performance, implying that the cash conversion cycle and debtors' collection period are important in determining business performance because they can lead to an increase or decrease in business profitability. The study, on the other hand, concludes that the longer the payment period for creditors, the better the business performance because it helps to improve profitability.

Knowledge Gap

Empirical reviews of the numerous studies that related to working capital management and financial performance. From the review, it is shown that research in the area of working capital management has been done in so many sectors like banks and manufacturing firms but not in a comprehensive approach in sub-sector of manufacturing firms which is industrial firms in Nigeria. Also most of the empirical reviewed from the previous studies are from other countries only few in Nigeria and they concentrated on more on other sectors. To the best of my knowledge, one or two of the previous studies has conducted study on working capital management and financial performance of listed industrial good firms in Nigeria. Also, to the best of my knowledge, none of the previous researchers have used the time frame of 2014– 2023 sources of secondary data for data analysis. Therefore, this study is designed to bridge this knowledge gap that exist in the literature of working capital management and financial performance of listed industrial good firms in Nigeria

METHODOLOGY

Research Design

This research adopts ex-post facto designs. This design is adopted because it attempts to explore causes or factors that are associated with certain behavior or events by analyzing the past and present occurrences. The researcher makes use of secondary data. This is because, according to Osuala (2009), it involves historical events that have already taken place in the past.

Population of the Study

The targeted population of this study consists of all the thirteen (13) industrial goods manufacturing firms in Nigeria as listed by Nigerian Exchange Group (NGX). The study covers from 2012-2021 a period of ten years.

Sample Size and Sampling Techniques

In statistics, a sample is a group of individuals, items or objects selected from a population for measurement or experimentation. Sample sizes of seven (7) listed industrial goods manufacturing firms were selected using judgmental sampling technique, which is one of the types of the non-probabilistic sampling method. They are; Dangote Cement Company, LaFarge Wapco Plc, Berger Paint Plc, Portland Paint and Product Nigeria Plc, Premier Paint Plc, Meyer Plc and Beta Glass Plc. These companies were chosen on the basis of their large company size, economic relevance, profitability and data availability.

Methodology Data Collection

The study was based on secondary data. The financial data of individual firms in the industrial goods sector were sourced from the annual reports and accounts listed in the Nigerian Exchange Group (NGX) Fact book. Data obtained includes average collection period, inventory conversion period, and cash conversion cycle, return on asset, return on equity and leverage for the years 2014-2023 were all retrieved from the financial statements. Other sources include articles, journals, past research work and periodicals.

Measurement of Variable

The choice of research variables is primarily guided by previous empirical studies along this line. Thus, the variables are defined to be consistent with those of prior studies.

Table 1 Measurement of Variables

Variable	Variable Type	Unit of Measurement	Sources
Average Collection Period	Independent	$\frac{\text{Average Account Recievable} \times 365}{\text{Cost of goods sold}}$	Umenzekwe et al (2021)
Inventory Conversion period (ICP)	Independent	$\frac{\text{Average Inventory} \times 365}{\text{Cost of goods sold}}$	Newstyle and Opuene (2022), AryawanandIndriani (2020)
Cash Conversion Cycle (CCC)	Independent	DSO+ DSI - DPO	Major et al (2022), Mache and Omodero (2020)
Return on Assets (ROA)	Dependent	$\frac{\text{Profit After Tax}}{\text{Total Assets}}$	AryawanandIndriani (2020)
Leverage (LEV)	Control Variable	$\frac{\text{Total Debt}}{\text{Total Assets}}$	Aryawan andIndriani (2020)

Note: Cash Conversion Cycle = DSO + DSI - DPO.

Days of Sales Outstanding (DSO) = $\frac{\text{Accounts receivables}}{\{\text{Sales} / 365\}}$.

Days of Sales in Inventory (DSI) = $\frac{\text{Inventories}}{\{\text{Cost of goods sold} / 365\}}$.

Days of Payables Outstanding (DPO) = $\frac{\text{Accounts payables}}{\{\text{Cost of goods sold} / 365\}}$.

Method of Data Analysis

The statistical models adopted for this research are correlation analysis, unit root test, ordinary least square regression method (OLS) fixed effect regression. The effect of working capital management on the financial performance of listed industrial goods manufacturing firms is

examined. The data gathered from the annual reports of the selected listed industrial goods manufacturing firms for the period 2014-2023 will be analyzed using the E-Views 10 statistical software in this study. Other tests of significance which were used in the study are

- R² – coefficient of determination was used to test the explanatory power of the independent variable;
- T-test was used to test for the significance of the coefficient of the variables;
- F-Ratio was used to test for the significance of the overall models;
- Durbin-Watson (DW) test was used to test whether auto-correlation exist or not in error term (u);

Model Specification

The study employs Return on Assets and Return on Equity as the proxy for measuring financial performance, while average collection period, inventory conversion period and cash conversion cycle is used in measuring working capital management. Whereas leverage was also used as control variable. The regression equation can be computed as;

$$Y_{1it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \mu_{it} \dots \dots \dots 1$$

Where, Y = Financial performance (dependent variables)

X = Working capital management (independent variable)

B = Coefficient

μ_{it} = Error term

The above model can be specifically applied to this study as;

$$ROA_{it} = \beta_0 + \beta_1 ACP_{it} + \beta_2 ICP_{it} + \beta_3 CCC_{it} + \beta_4 LEV_{it} + \mu_{it} \dots \dots \dots 2$$

Where;

ROA = Return on Assets

ACP = Average Collection Period

ICP = Inventory Conversion Period

CCC = Cash Conversion Cycle

β_0 = Coefficient of the parameter estimate

β_1 - β_4 = intercept

μ_{it} = Error term

t = year or period

i = firm

RESULT ANALYSIS AND DISCUSSION OF FINDINGS

Univariate Analysis (Descriptive Statistics of the variables)

The descriptive findings of the interaction of working capital management (ACP = Average Collection Period, ICP = Inventory Conversion Period and CCC = Cash Conversion Cycle) and financial performance (ROA = Return on asset are reported in Table 2 The effect of working capital management dimensions and financial performance measures was investigated by testing the significance of their Mean differences. The result in Table 2 shows that the Mean differences between components of working capital management and financial performance are high and significant, thus providing a clue of a positive association between components of working capital management and financial performance.

Table 2 Descriptive Statistics of the Variables

	ACP	ICP	CCC	ROA	LEV
Mean	118.5388	132.2824	71.87213	0.20034	0.484571
Median	49.77095	110.3881	17.82878	0.10367	0.401522
Maximum	2429.117	727.7989	1964.288	1.79515	2.229649
Minimum	0.000000	0.000000	-374.3960	0.00000	0.000000
Std. Dev.	296.0973	118.0765	279.1741	0.28671	0.309854
Skewness	6.959318	2.813240	4.723498	3.51072	2.665429
Kurtosis	54.56002	13.66404	31.85327	17.3179	15.73575
Jarque-Bera	8318.811	424.0224	2688.457	741.721	555.9674
Probability	0.000000	0.000000	0.000000	0.00000	0.000000
Sum	8297.719	9259.768	5031.049	14.0241	33.91996
Sum Sq. Dev.	6049478.	962002.5	5377733.	5.67208	6.624638
Observations	70	70	70	70	70

Source E-View Output, Version 12

The results in table 2 had shown descriptive statistics of average collection period (ACP). The results had a positive growth rate between the Minimum (0.000) to Maximum (2429.17). The average Mean score of 118.53 indicates that average collection period (ACP) contributes largely to working capital management with a Standard Deviation value of 296.09. The skewness and kurtosis statistics values provides the useful information about the symmetry of the probability distribution of average collection period (ACP) and the result shows a positive skewness value (6.95) shown the data set have a long right tail. Finally, the result shows a positive kurtosis value of (54.56) implying that, the extent of flatness of the distribution is normally distributed.

The results in table 4.1 had shown descriptive statistics of inventory collection period (ICP). The results had a positive growth rate between the Minimum (0.000) to Maximum (727.79). The average Mean score of 132.28 indicates that inventory collection period (ICP) contributes largely to working capital management with a Standard Deviation value of 118.07. The skewness and kurtosis statistics values provides the useful information about the symmetry of the probability distribution of inventory collection period (ICP) and the result shows a positive skewness value (2.81) shown the data set have a long right tail. Finally, the result shows a positive kurtosis value of (13.66) implying that, the extent of flatness of the distribution is normally distributed. The results in table 2 had shown descriptive statistics of cash conversion cycle (ICC). The results had a negative growth rate to positive growth rate between the Minimum (-374.39) to Maximum (1964.28). The average Mean score of 71.87 indicates that cash conversion cycle (ICC) contributes largely to working capital management with a Standard Deviation value of 279.17. The skewness and kurtosis statistics values provides the useful information about the symmetry of the probability distribution of cash conversion cycle (ICC) and the result shows a positive skewness value (4.72) shown the data set have a long right tail. Finally, the result shows a positive kurtosis value of (31.85) implying that, the extent of flatness of the distribution is normally distributed.

The results in table 2 further showed a descriptive statistics of return on assets (ROA). The results had a positive growth rate between the Minimum (0.00) to Maximum (1.79). The average Mean score of 0.20 indicates that return on assets (ROA) had low financial performance rate with a Standard Deviation value of 0.286. The skewness and kurtosis statistics values provides the useful information about the symmetry of the probability distribution of return on assets (ROA) and the result shows a positive skewness value (3.51) shown the data set have a long right tail.

Finally, the result shows a positive kurtosis value of (17.31) implying that, the extent of flatness of the distribution is normally distributed. Finally, the results in table 4.1 had shown descriptive

statistics of leverage (LEV). The results had a positive growth rate between the Minimum (0.00) to Maximum (2.22). The average Mean score of 0.484 indicates that leverage (LEV) contributes largely in controlling working capital management and financial performance with a Standard Deviation value of 0.66. The skewness and kurtosis statistics values provides the useful information about the symmetry of the probability distribution of leverage (LEV) and the result shows a positive skewness value (2.66) shown the data set have a long right tail. Finally, the result shows a positive kurtosis value of (15.73) implying that, the extent of flatness of the distribution is normally distributed.

Unit Root Test

Table 3 Result for Normality Checking of data

Variable	ADF FISHERS At Level	I ADF FISHERS At 1 st Difference	ORDER OF INTEGRATION	REMARK
ACP	0.0234	0.0001	I(0)	Stationary
ICP	0.0321	0.0003	I(0)	Stationary
CCC	0.0030	0.0000	I(0)	Stationary
ROA	0.0041	0.0000	I(0)	Stationary
LEV	0.0041	0.0000	I(0)	Stationary

Source E-View Output, Version 12

The empirical results of the unit root test at 5 percent critical levels in table 3 above shows that all the variables of interest are I(0), that is, stationary at levels. Their p-values are less than 5% with respect to ADF Fisher.

Multivariate Analysis (Regression Analysis)

Table 4 Regression Analysis of Model one (ROA)

Dependent Variable: ROA
Method: Panel Least Squares
Date: 10/05/24 Time: 18:35
Sample (adjusted): 2014 2023
Periods included: 10
Cross-sections included: 7
Total panel (balanced) observations: 70
Convergence achieved after 10 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.023106	0.088045	0.262436	0.7939
ACP	0.000228	0.000243	0.937162	0.3526
ICP	4.63E-05	0.000281	0.164786	0.8697
CCC	-0.000302	0.000296	-1.020547	0.3118
LEV	0.420865	0.095933	4.387095	0.0001

R-squared	0.671078	Mean dependent var	0.213727
Adjusted R-squared	0.642226	S.D. dependent var	0.298931
S.E. of regression	0.178803	Akaike info criterion	-0.514667
Sum squared resid	1.822327	Schwarz criterion	-0.310559
Log likelihood	22.21203	Hannan-Quinn criter.	-0.434391
F-statistic	23.25870	Durbin-Watson stat	1.170274
Prob(F-statistic)	0.000000		

Inverted AR Roots	.68
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Source E-View Output, Version 12

Results in table 4 above showed that $R^2 = 0.671$ and adjusted $R^2 = 0.642$ that measured the proportion of the variations in return on assets (ROA) of dependent variable attributed to average collection period (ACP), inventory conversion period (ICP) and cash conversion cycle (CCC) of independent variables implied that, the dependent variable explained 64.2% (percent) of the variations in to average collection period (ACP), inventory conversion period (ICP) and cash conversion cycle (CCC) of independent variables. The remaining variation of 35.8% is the error term that attributed to other factors not included in the model. The F-statistic, 23.25 with a Prob(F-statistic) value of 0.0000 showed that the model satisfies the overall goodness-of-fit statistical test. This means that return on assets (ROA) measures of financial performance were able to explain average collection period (ACP), inventory conversion period (ICP) and cash conversion cycle (CCC) of working capital management in sample. The Durbin-Watson Statistic of 1.170 explained that the model does not contain serial correlation which affirmed that the unit root test runned in table 4 is adequately tested.

Statistical Test of Hypotheses

Statement of Hypotheses

Ho₁ Average collection period does not have any significant effect on return on assets of listed industrial goods manufacturing firms in Nigeria.

Decision Rule Accept Ho if $P > 0.05$. Otherwise reject

Decision: The result in table 4.4 discovered a significant level between average collection period (ACP) and return on assets (ROA). The probability value $P = 0.352 > 0.05$ revealed that the

significant effect of average collection period (ACP) on return on assets (ROA) is statistically insignificant at 0.05 alpha level. Thus the null hypothesis one is accepted which implied that average collection period does not have any significant effect on return on assets of listed industrial goods manufacturing firms in Nigeria. This finding empirically supports the result of Mandipa and Sibindi (2022) who findings discovered a negative relationship between average collection period and financial performance. Ibrahim et al (2021) also found ACP to be negatively related to business performance of listed companies in Nigeria. Umenzekwe et al (2021) result indicated that average collection period had an insignificant negative relationship with return on investments. Other empirical studies that demonstrated similar findings are Abdullahiet. al (2021), Abdulazeez et al (2018), Takon and Atseye (2015), Osundina (2014). However, showed results that were inconsistent with other findings, Joshua and Nurudeen (2022) findings revealed that average collection period had positive and significant effect on the return on assets of the selected firms. Micheal et al (2017) study revealed a positive relationship between ACP and performance, although the relationship was not significant. Similar to this, is the studies by Wanguu and Kipkirui (2015), Muscettola (2014) and Duru (2014) that showed a positive and significant relationship between average collections period and performance. ACP can be better enhanced by optimizing the collection process and methods in a company.

Ho₂ Inventory conversion period does not have any significant effect on return on assets of listed industrial goods manufacturing firms in Nigeria.

Decision Rule Accept Ho if $P > 0.05$. Otherwise reject

Decision: The result in table 4 discovered a significant level between inventory conversion period (ICP) and return on assets (ROA). The probability value $P = 0.869 > 0.05$ revealed that the significant effect of inventory conversion period (ICP) on return on assets (ROA) is statistically insignificant at 0.05 alpha level. Thus the null hypothesis three is accepted which implied that inventory conversion period does not have any significant effect on return on assets of listed industrial goods manufacturing firms in Nigeria. This finding empirically supports the result of the following, Newstyle and Opuene (2022) study indicated that there is a negative and insignificant between inventory conversion period and financial performance in term of profit after tax. Mandipa and Sibindi (2022) found that ICP negatively impacts on performance. Then uwara and Ekanayake (2021) study found that the Inventory Conversion Period has an insignificant negative impact on Profitability. Abdullahi et.al (2021) found no relationship between ICP and firm performance when measured by return on equity. Douglas et al (2018) result indicated that Inventory management had a negative but significant effect on the profit made by SMEs. On the contrary, Wanguu and Kipkirui (2015) result revealed a positive relationship between ICP and firm performance. Joshua and Nurudeen (2022) result showed that inventory turnover in days influenced return on equity of the selected firms in Nigeria. Fekadu (2021) study found that inventory conversion period has a statistically significant and favorable influence on return on investment and it has no effect on the performance of Ethiopian export enterprises evaluated by return on assets. Okoye et al (2020) study produced evidence of significant positive impact of inventory conversion period on firm performance.

Ho₃ Cash conversion cycle does not have any significant effect on return on assets of listed industrial goods manufacturing firms in Nigeria.

Decision Rule Accept Ho if $P > 0.05$. Otherwise reject

Decision: The result in table 4.4 discovered a significant level between cash conversion cycle (CCC) and return on assets (ROA). The probability value $P = 0.311 > 0.05$ revealed that the significant effect of cash conversion cycle (CCC) on return on assets (ROA) is statistically insignificant at 0.05 alpha level. Thus the null hypothesis five is accepted which implied that cash

conversion cycle does not have any significant effect on return on assets of listed industrial goods manufacturing firms in Nigeria. This finding empirically supports the result of the following, Jaworski and Czerwinka (2022) finding revealed significant non-linear relationship between WC, CR and profitability, there is a linear negative relationship between CCC and profitability. Mandipa and Sibindi (2022) found that CCC is negatively related to corporate performance which was as well consistent with Ibrahim et al (2021). Ogundipe et al (2012) results also showed that CCC is negatively related to corporate performance. Mache and Omodero (2021) findings of the research demonstrate that the cash conversion cycle (CCC) has no effect on profitability. Other studies that revealed negative relationships are those done by Jarworski and Czerwinka (2022), Urhoghide and Korolo (2022), Bavelde (2012), and Rehn (2012). On the contrary, Okoror et al (2022) findings show that the cash conversion cycle has a positive and significant impact on financial performance. Abdulazeez et al (2018) found that a positive relation exists between CCC and profitability. Abubakar et al (2020) study revealed that Cash Conversion Cycle showed a positive significant impact on financial performance of selected quoted firms in Nigeria.

CONCLUSIONS, RECOMMENDATIONS AND CONTRIBUTION TO SCHOLARSHIP

Conclusion(s)

This study established empirical evidence that assessed the effect of working capital management on financial performance of listed industrial goods manufacturing firms in Nigeria. Based on the data obtained from the annual financial reports of the listed industrial goods manufacturing firms' from Nigeria stock exchange group; the data were presented and analyzed, findings were discussed accordingly and summary of findings as presented above. Therefore, the study concluded that;

1. Average collection period has very weak negative effect on return on assets of listed industrial goods manufacturing firms in Nigeria.
2. Inventory conversion period has very weak negative effect on return on assets of listed industrial goods manufacturing firms in Nigeria.
3. Cash conversion cycle has weak negative effect on return on assets of listed industrial goods manufacturing firms in Nigeria.

Recommendation(s)

Based on the findings and conclusion of the study, the following recommendations were made

1. The researcher recommends that managers in industrial goods firms should devise different aspects of working capital to maintain a trade-off between the current obligation in short term and long term because this finding indicated average collection period, inventory conversion period and cash conversion cycle has insignificant effect on financial performance measures.
2. Managers in industrial good manufacturing firms should strive to reduce the time it takes for debtors to pay their bills since this will enhance cash flow, working capital, and profitability.
3. Industrial good manufacturing firms should ensure that there are set controls and limits to monitor cash conversion cycle more appropriately because failure to monitor cash may decrease financial performance.

Implications/Contribution to Scholarship

The empirical findings of this research investigation established implications for the ongoing policy and debate in working capital management and financial performance of firms in Nigeria. The industrial goods manufacturing firms should know that working capital management go beyond credit payment period and cash conversion cycle. It also covers inventory conversion period. Also, researchers should know that controlling variable go beyond firm size. It covers financial leverage as controlling variable. Therefore, the inventory conversion period and financial leverage should be considered when measuring working capital management and controlling variable in carrying out research. For this reason, researchers, in the above investigated listed industrial goods

manufacturing and other related firms should be concerned about the inter-relationships between working capital management and financial performance.

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