IJAAR PUBLISHING®

Open Access Journal of Management Sciences Research | ISSN: 3027-1975
Vol. 2, Issue 2 (April-June, 2024) | www.ijaar.org

EFFECT OF CASH CONVERSION CYCLE ON CASH FLOW PERFORMANCE OF SELECTED MANUFACTURING FIRMS IN NIGERIA

Eze Maria N. & Ekwunife, Ebele N.
Department of Accountancy
Nnamdi Azikiwe University, Awka
Mail: mn.eze@unizik.edu.ng; ebeleekwunife@gmail.com

Abstract

The study examined the effect of cash conversion cycle on cash flow performance of selected manufacturing firms in Nigeria for the period 2011-2020. Three research questions were developed to guide the study and a corresponding three hypothesis was formulated for the study. The study adopted the Ex-Post Facto research design. The population of the study included 57 manufacturing firms quoted on the Nigerian exchange group (NXG) as at 31st December 2022. The study relied on secondary sources of data which was obtained from Nigerian exchange group (NXG) as at 31st December 2022. The multiple regression analysis was employed in validating the hypotheses of the study. Findings emanating from the study reveals that there is no significant effect of inventory turnover period on operating cash flow performance of selected manufacturing firms in Nigeria (P > 0.05); average collection period has statistically significant impact on operating cash flows performance of selected manufacturing firms in Nigeria (P < 0.05). Consequent on the findings, the study therefore recommended that stakeholders should prioritize initiatives aimed at the optimization of working capital components; enhancement of inventory management strategies and a continuous monitoring and adjustment of payment periods.

Keywords: Cash conversion, Inventory control period and average collection period

Eze, M. N. & Ekwunife, E. N. (2024). Effect of Cash Conversion Cycle on Cash Flow Performance of Selected Manufacturing Firms in Nigeria. *Open Access Journal of Management Sciences Research. 2*(2), 48-63. DOI: 10.5281/zenodo.12575132

1. INTRODUCTION

Working capital management has been a prominent topic in the field of corporate finance (Aktas, Croci, & Petmezas, 2015; Kieschnick, Laplante, & Moussawi, 2013). Recently, the focus in corporate finance literature has shifted towards working capital management (Nobanee, Abdullatif, & AlHajjar, 2011; Ganesan, 2007). In its simplest form, working capital refers to the cash available for a business's day-to-day operations (Sagner, 2010). It comprises current assets and current liabilities. Current assets include cash, short-term financial investments, inventories, accounts receivable, and other assets (Brealey, Myers, & Allen, 2006). Current liabilities include short-term loans, accounts payables to suppliers, accrued income taxes, interest payments on long-term debts, dividends, and other current liabilities (Pass & Pike, 2007). The goal of working capital management is to ensure that a firm can sustain its operations and have enough funds to meet short-term debt and upcoming expenses (Bose, 2012).

Effective working capital management is crucial for firms to weather economic downturns or turbulence (Reason, 2008) and essential for achieving the objective of maximizing shareholder wealth (Watson & Head, 2010; Ganesan, 2007; Deloof, 2003). The effectiveness of working capital management depends on the cash conversion cycle (Theodore Farris II & Hutchison, 2003), which is the length of time it takes to convert inventories back into cash (Zakari & Saidu, 2016).

The Nigerian economy faces various challenges that hinder firms from maximizing the returns on their resources (Owolabi & Alu, 2012). Globalization, technological advancements and increased global competition have also impacted companies' cash flow (Anser & Malik, 2013). At the firm level, financial managers' inadequacies, such as high bad debts and excessive inventory holdings, adversely affect operating performance (Egbide, 2009). Therefore, there is a need for proper initiative and resource management to improve companies' performance. Smid and Cooter (2013) noted that adopting an innovative approach in financing activities with a deep focus on working capital, can sustain the survival and growth of many companies. The viability of a business relies on its ability to effectively manage receivables, inventories, and payables (Filbeck & Krueger, 2005).

Studies have highlighted the importance of effective working capital management for firms in developing markets, which heavily rely on trade financing, trade credits, and inventory (Chittenden, Poutziouris, & Michaelas, 1998; Saccurato, 1994). While several studies on the cash conversion cycle have been conducted in developed economies, there are fewer references to developing economies (Yasir, Majid, & Yousaf, 2014; Majeed, Makki, Saleem, & Aziz, 2013).

In the Nigerian context, most studies have primarily focused on the relationship between the cash conversion cycle and profitability, using proxies like Return on Assets (ROA) and Return on Equity (ROE) derived from the income statement and statement of financial position. However, there are mixed findings regarding the relationship between the cash conversion cycle and profitability, with concerns that proxies computed from accrual-based income statements may be prone to aggressive accounting. The statement of cash flows, which provides a true reflection of a firm's cash flow, is often considered more reliable. Yet, little attention has been given to this line of research in corporate finance literature, providing the main impetus for the current study, which adopts an agency theory theoretical framework.

For manufacturing firms, inventory management plays a crucial role in cash flow generation, as the speed at which raw materials, work-in-progress, and finished goods are transformed can impact a firm's cash flow. Inadequate inventory management may lead to inefficiencies and increased costs. Additionally, the accounts of many manufacturing firms show both credit and cash sales, with large institutional owners known for bulk credit purchases, tying up a company's revenue and cash flow. Inadequate credit management policies may have long-term effects on a firm's growth and survival.

Manufacturing firms also purchase some of their raw materials or work-in-progress from other firms, and the decision to pay immediately in cash or on credit can affect the cash flow. Evidence suggests that mostly profitable firms wait longer to pay their bills (Oseifuah & Gyekye, 2017; Öner, 2016). However, shortening the inventory conversion period may increase shortage costs and result in the loss of good credit customers, while lengthening the payable period could damage a firm's credit reputation (Nobanee, Abdullatif, & AlHajjar, 2011). Against this backdrop, the study therefore aims to investigate the impact of CCC components on the cash flows of selected manufacturing firms in Nigeria.

The broad aim of the study is to investigate the effect of CCC on cash flow performance of selected manufacturing firms in Nigeria. Specifically, the study intends to:

1. Ascertain the effect of inventory turnover period on operating cash flow performance of selected manufacturing firms in Nigeria.
2. Determine the effect of average collection period on operating cash flow performance of selected manufacturing firms in Nigeria.

2. REVIEW OF RELATED LITERATURE

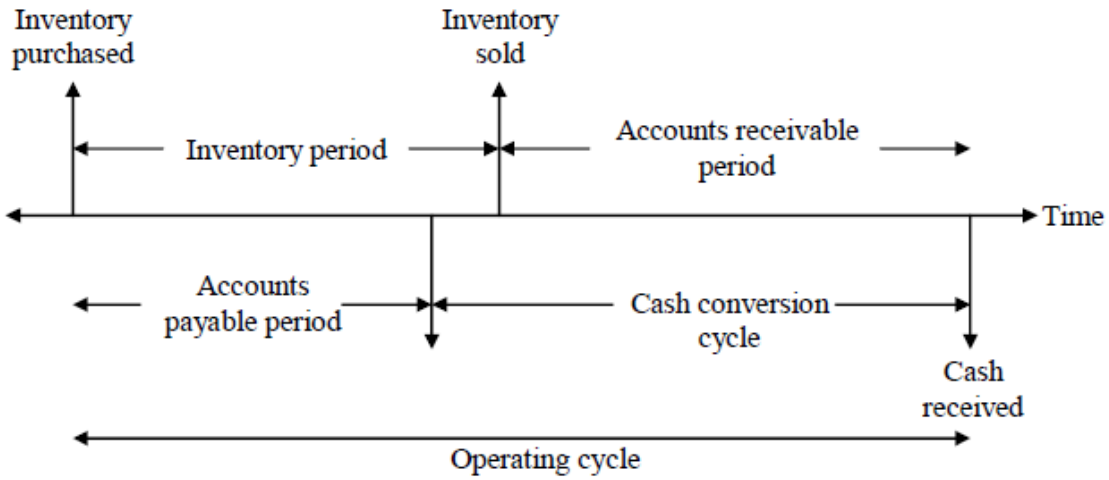
Conceptual Framework

Cash Conversion Cycle (CCC)

There are several definitions of CCC in the literature (Uyar, 2009). Padachi (2006) defined CCC as a comprehensive measure of working capital that shows the time lag between expenditure for the purchase of raw materials and the collection from sales of finished goods. According to Besley and Brigham (2005) CCC refers to “the length of time from the payment for the purchase of raw materials to manufacture a product until the collection of account receivable associated with the sale of the product”. Eljelly (2004) introduced the concept of ‘cash gap’, these measures “the length of time between actual cash expenditures on productive resources and actual cash receipts from the sale of products or services”. Keown, Martin, Petty, and Scott (2003) defined CCC as the sum of days of sales outstanding (average collection period) and days of sales in inventory less days of payables outstanding. According to Jordan (2003) the cash cycle refers to, “the number of days that pass before we collect the cash from sale, measured from when we actually pay for the inventory”. CCC is “the length of time a company’s cash is tied up in working capital before that money is finally returned when customers pay for the products sold or services rendered” (Churchill & Mullins, 2001).

Bodie and Merton (2000) defined the cash cycle time as, “the number of days between the date the firm must start to pay cash to its suppliers and the date it begins to receive cash from its customers”. The CCC has been described as a composite metric that has been described as “the average days required to turn a dollar invested in raw material into a dollar collected from a customer” (Stewart, 1995).

Figure 2.2: Diagrammatic illustration of the CCC



Source: Jordan (2003)

Inventory Turnover Period

Different types of inventories are used to satisfy different purposes (Kaen, 1995). Raw material inventories are used to make production scheduling easier, to take advantage of price changes and quantity discounts, and to hedge against supply shortages. Work-in-progress inventories serve to make the production process smoother and more efficient they provide a buffer between the various production processes. Finished goods inventories have to be held to provide immediate services to customers and to stabilise production by separating production and sales activities. Most firms cannot produce immediately when customers demand goods. Failure to supply products to customers when demanded would mean loss of sales to competitors Therefore, holding finished goods inventory helps to serve customers on a continuous basis and to meet their fluctuating demands (Scherr, 1989).

The goal of inventory management is to ensure a firm does not lose sales by having too little inventory and does not loss money by investing in too much inventory (Mathur, 2002). Excess investment in inventories are unprofitable and inadequate investments are not desirable (Fabozzi & Peterson, 2003). Hence, the firm should operate within the two danger points. Additionally, proper inventory management requires close coordination among the sales, purchasing, production, and finance departments. The sales/marketing department is generally the first to spot changes in demand. These changes must be worked into the company's purchasing and manufacturing schedules, and the financial manager must arrange any financing needed to support the inventory buildup. Lack of coordination among departments, poor sales forecasts, or both, can lead to disaster (Brigham & Houston, 2003). Inventory management helps to hold the costs of ordering and carrying inventories to the lowest possible level. The decision to hold a target level of inventory will be determined by a range of factors such as the pattern of sales, type of business (manufacturing, wholesaling or retailing), length of the production process, dependability of supply sources, seasonality of sales, predictability of sales, (Madura & Veit, 1988) economic, political, and other macroeconomic factors, the opportunity costs of finance, ordering, transport, storage, insurance, obsolescence, spoilage, theft and the opportunity cost of tying up funds in inventory (Kamath, 1989; Kallberg & Parkinson, 1984).

$$Average\ number\ of\ days\ inventory = \frac{Average\ Inventory}{Cost\ of\ goods\ sold}\ x\ 365$$

Average Collection Period

Accounts receivables arise when a firm sells its goods on credit. Depending on the payment terms, the company might receive cash in weeks or even months (Too, Kubasu, & Langat, 2016). Credit sales are often used to attract customers in that it may stimulate sales because it allows customers to assess product quality before paying (Long, Malitz, & Ravid, 1996). Like the product's price, quality and service, credit granting policy determines the product's attractiveness and affects its sales volume and profit. If credit granting is properly made it can enhance the firm's performance, sales and profitability (Moyer, Mcguigan, & Kretlow, 1998). Allowing credit increases sales but also has costs associated with its management. Account receivables (trade credit) also have opportunity cost associated with them, because company can't invest this money elsewhere until and unless it collects its receivables. Lost sales resulting from not granting credit constitute the opportunity cost which decrease when the amounts of receivables are increased (Too, Kubasu, & Langat, 2016).

Michalski (2003) in his study observed that an increase in the level of accounts receivables increases both the net working capital and the costs of holding and managing accounts receivables, which both lead to a decrease in firm value. Major risks that arise from granting credit include bad debts and debtor delinquency, because they reduce the returns from the investment in accounts receivable, and if inadequately monitored can impact severely on the business's financial performance (Brigham & Houston, 2012; Gitman, 1997; Hampton & Wagner, 1989; Scherr, 1989). Kaen (1995) suggested that before a firm grants credit to its customers, it has to establish a credit policy, first by establishing the terms of credit sale policies; second by formulating credit standards (used to evaluate individual applicant's credit worthiness); and, third to establish accounts receivable collection and control policies.

Credit selection concerns decision of whether or not to grant credit and if so, how much credit to extend. This is done by means of categorizing customers by both risk factors, common attributes, establishing standards, evaluating risks and selecting appropriate responsibilities (Schmidt, 1996; Gallinger & Healey, 1987). As credit decisions have an impact on cash flows the first stage is to establish credit control to assess creditworthiness of customers, prior to making a credit sale (Back, 1988).

$$Average\ number\ of\ days\ accounts\ recievable = \frac{Average\ accounts\ recievable}{Net\ Sales}\ x\ 365$$

Cash flows

Cash flows refer to the net amount of cash and cash-equivalents being transferred into and out of a business (Investopedia, 2018). Cash flow is an index of the money that is actually received by or paid out by a firm for certain time period (Albrecht, 2003). According to International Accounting Standard (IAS) 7, Information about the cash flows of an entity is useful in providing users of financial statements with a basis to assess the ability of the entity to generate cash and cash equivalents and the needs of the entity to utilise those cash flows. The Standard further stated that the statement of cash flow shall report cash flows during the period classified by operating, investing and financing activities. Entities therefore classify their cash flows on the nature of activities that generated the cash inflow or outflow.

Cash Conversion Cycle and Cash Flow

The CCC is associated with cash flow in several ways. A shorter CCC increases the cash available to a firm which is associated with high profitability (Nobanee, Abdullatif, & AlHajjar, 2011). A short CCC is an indication that a firm manages and processes inventory more quickly, quickly collects receivables; while slowing down cash payments to suppliers. Thus, generating positive cash flows can be achieved from shortening the length of CCC; thereby allowing managers to expand operations, replace needed assets, take advantage of market opportunities and more importantly pay dividend to its stockholders. Scholars have substantiated a positive effect of CCC on the profitability and firm value. For instance, in mid-2000, an influential Lehman Brothers Inc. bond analyst Ravi Suria issued a warning on Amazon's "poor working capital management and massive negative operating cash flow". Thereafter the company's stock which had soared to a 52-week high prior to the warning plummeted more than two-thirds. Poor working capital management was identified as one major cause (Carlton, 2000).

Cote and Latham (1999) posit that the management of accounts receivables, inventory and accounts payable have tremendous impact on cash flows. The study by Adediran, Josiah, Bosun-Fakunle, and Imuzeze (2012) on a sample of Small and Medium-sized Enterprises in Nigeria; found that shortening a firm's cash conversion cycle improve profitability, and consequently cash flows. While exploring the relationship between cash flows and performance, Rimo and Panbunyuen (2010) in Sweden; found that the CCC had a significant negative relationship with operating cash flow. The study by Jeng-Ren, Li, and Han-Wen (2006) in Taiwan; which analysed the influence of factors; such as, business indicator, company characteristics and industry effect on working capital management found that only two company characteristics leverage and operating cash flow affected working capital management. Bingilar and Oyadonghan (2014) in Nigeria showed that operating and financing cash flows had a significant positive effect; while investing cash flow had a significant negative effect. Nwanyanwu (2015) also found a significant positive relationship between cashflow and net profit of firms in the hospitality and print media sector of Nigeria.

Empirical Review

Prior studies were reviewed locally and internationally. Some of the studies reviewed are captured as follows:

Zakari and Saidu (2016) investigated the impact of cash conversion cycle on corporate profitability in Nigeria. The sample comprised eight ICT firms listed on the Nigerian Stock Exchange. Secondary data was collected from 2010 to 2014. Multiple linear regression was used to analyse the data. The study finds a significant positive relationship between cash conversion cycle and corporate profitability. Öner (2016) investigated the impact of working capital on profitability of firms in Turkey. The sample comprised 110 manufacturing firms listed on Borsa Istanbul for the period of 2005-2014. The study used a panel data methodology. The study found that cash conversion cycle has a significant negative impact on profitability. The results further revealed that average collection period and days of inventory outstanding have a significant negative relationship; and, average payment period has a significant positive relationship with profitability. Oseifuah and Gyekye (2016) investigated the impact of working capital management components on profitability. The sample comprised 75 non-financial firms listed on the Johannesburg Stock Exchange (JSE) from 2003 to 2012. They used panel data methodology to analyse financial data obtained from I-Net Bridge and BF McGregor. Profitability was proxied by return on assets. The study finds a negative relationship between working capital

management and corporate profitability; a negative relationship between inventory conversion period and profitability; a negative relationship between accounts receivables conversion period and profitability; but a positive relationship between accounts payable deferral period and profitability. Khan, Ayaz, Waseem, Abbasi, and Ijaz (2016) examined the impact of cash conversion cycle on profitability in Pakistan. The sample comprised 19 cement companies listed on the Karachi Stock Exchange, over a 6-year period, from 2008-2013. The study relied on secondary data. The study finds that gross profit is positively related to accounts receivable, but negatively related to accounts payable and inventory. The regression analysis showed that accounts payable and inventory has a negative impact on gross profit, while, accounts receivable has a positive impact. Too, Kubasu, and Langat (2016) analyzed the effect of working capital management on profitability. The study employed a correlation research design. The sample comprised all firms listed under manufacturing and agricultural sectors listed at the Nairobi Stock Exchange. Secondary data was collected from annual published financial statements for the period 2008-2013. Pearson correlation was used to test the correlation between variables, and multiple regression used to test the effect of individual variables of working capital management practices. The study revealed that there was a significant negative correlation between payables period, receivable period and inventory period with profitability. Regression results revealed that payable period had the highest coefficient. Nobanee and Haddad (2014) examined the relationship between working capital management and profitability of firms in Japan. The sample consisted of 2,123 non-financial firms listed on the Tokyo Stock Exchange for the period 1990 to 2004. Profitability was proxied as return on investment. They applied robust regression to test the relationship. The results showed that the coefficients of receivable collection period for all companies, small and service companies were negative and significant. Inventory conversion period was significant and negatively related to profitability for all companies, small, medium, general industries, service, and information technology companies. Finally, the relationship between the payable deferral period and profitability was positive and significant for service companies only. Ukaegbu (2014) examined the relationship between working capital efficiency and corporate profitability in four African countries, Egypt, Kenya, Nigeria and South Africa. Secondary data was obtained from Orbis database for the period 2005–2009. The results showed that there is a strong negative relationship between profitability, proxied as net operating profit, and CCC in firms across different industrialisation typologies. Yazdanfar and Öhman (2014) investigated the impact of cash conversion cycle on profitability of Swedish Small and Medium-sized Enterprises (SMEs).They used cross-sectional panel data covering 13,797 SMEs in four industries over the period 2008-2011. The data was analysed using seemingly unrelated regression (SUR). The study finds that cash conversion cycle significantly affects profitability.

Yasir, Majid, and Yousaf (2014) examined the relationship between cash conversion cycle and performance. They used a sample of 16 firms selected from the cement industry of Pakistan, for a six year period from 2007 to 2012. Correlation and regression was used to examine the relationship. The study finds a negative relationship between cash conversion cycle and profitability, measured via return on assets. Salawu and Alao (2014) examined the effect of working capital management on performance of in Nigeria. The sample comprised sixty purposively selected non-financial quoted companies between the periods 2000 to 2009. The study relied on secondary data which were collected from the annual report and accounts. The results showed that average collection period, average payment period, are significant and positively related to profitability; while, inventory turnover in days and cash conversion cycle are significant but negatively related to profitability. Panigrahi (2013) examined the relationship between cash conversion cycle and

profitability in India. The sample comprised top five Indian cement companies from 2001 to 2010. The regression results showed that cash conversion cycle is significantly and positively related to return on equity; but had a non-significant positive association with return on assets. Majeed, Makki, Saleem, and Aziz (2013) examined the relationship of cash conversion cycle and profitability in Pakistan. The sample comprised 32 randomly selected companies from three manufacturing sectors i.e. chemical, automobiles and construction & material for a period of five years, 2006 to 2010. Correlation and regression were used to analyse the data. The dependent variables were return on assets, return on equity and operating profit. The study found that average receivables collection period, average inventory conversion period, and cash conversion cycle have negative relationship with firm's performance (ROA, ROE, and EBIT). Average payment period had a positive relationship with ROE and EBIT. Adediran, Josiah, Bosun-Fakunle, and Imuzeze (2012) investigated the impact of working capital management on profitability. The sample comprised 30 Small and Medium-sized Enterprises (SMEs) for the period 2009. The study used secondary sources of data. The data was analysed using multiple linear regression. The results demonstrated that shortening a firm's cash conversion cycle improve profitability. Owolabi and Alu (2012) investigated the effect of working capital management on profitability of selected quoted manufacturing companies in Nigeria. The sample comprised 5 manufacturing firms purposively chosen for the study. The dependent variable was return on total asset while the independent variables are inventory conversion period, cash conversion period, debtors' collection period and creditors' payment period. The study finds that the coefficient of inventory conversion period and debtors' collection period were negative but not significant, while creditors' payment period and cash conversion period were positive but not significant. Attari and Raza (2012) examined the relationship between cash conversion cycle and firm size and profitability of firms in Pakistan. The sample comprised 31 firms selected from four manufacturing sectors (Automobile and Parts, Cement, Chemical, and Food Producers) listed at Karachi Stock Exchange. Secondary data was collected from annual reports over the period 2006 to 2010. They used one-way ANOVA and Pearson correlation to analyse the data. The study finds a significant negative correlation between cash conversion cycle and firm size measured using total assets, but a non-significant negative correlation between cash conversion cycle and firm size measured using total sales. The study also finds a significant positive correlation between cash conversion cycle and return on total assets, and, a non-significant positive correlation between cash conversion cycle and return on equity. Uwuigbe, Uwuigbe, and Ben-Caleb (2012) investigated the relationship between cash management and profitability in Nigeria. The sample comprised 15 listed manufacturing companies for the period 2005-2009. Cash conversion cycle was used as proxy for cash management. Current ratio, debt ratio and sales growth were used as control variables. The study utilized secondary data. Pearson's correlation and regression analysis were used to analyze the data. The results showed that there is a strong negative relationship between cash conversion cycle and profitability of the firms. Rathika and Nimalathasan (2012) examined the relationship between cash conversion cycle and profitability of manufacturing companies in Sri Lanka. They purposively selected a sample of 10 companies listed in Colombo Stock Exchange, for the period 2006 to 2010. Secondary data was obtained from annual financial statements of the companies. Correlation and regression analysis were performed. Correlation results showed a significant negative correlation between cash conversion cycle and return on assets. The regression results showed that cash conversion cycle has impact on profitability. Nobanee, Abdullatif, and AlHajjar (2011) investigated the relationship between cash conversion cycle and profitability. The sample comprised all non-financial firms listed in Tokyo Stock Exchange over the period 1990 to 2004. The final sample contained 34771 firm year

observations. They used a dynamic panel data analysis to test the hypotheses applied at the levels of full sample and subsets of sample by industry and size. The results showed a strong negative relationship between cash conversion cycle and profitability, measured as return on investment for the full sample and for all the sub samples, except for consumer goods and services companies.

Khawaja, Bhutto, Butt, and Abbas (2011) investigated the effect of working capital management on profitability of manufacturing firms in Asia. The sample comprised 332 manufacturing firms listed on stock exchanges in Asia (China, Japan, India, Pakistan, Bangladesh, Iran and Korea). Secondary data was obtained from financial statements of the companies from 2006-2010. Working capital management was proxied with cash conversion cycle, and profitability with gross operating profit. Pearson correlation and multiple regression was used to analyse data. The study found a negative significant relationship between receivable period, inventory period, and payment period with profitability. Pratheepkanth (2011) investigated the relationship between the cash conversion cycle and variables of firm size and profitability. Data was collected from the financial statements of companies listed on Canadian Securities Exchange for the year 2009. The study utilized ANOVA and correlation analyses. The found a significant negative correlation between cash conversion cycle, firm size and profitability. Mutuku (2011) examined the relationship between cash conversion cycle and financial performance of firms in Kenya. He used a descriptive design. Data was obtained from a sample of 30 companies drawn from agricultural, commercial and services, and industrial and allied sectors. The companies were listed on the Nairobi Stock Exchange for the period 2006 to 2010. The data was analysed using Pearson correlation coefficient and t-test to determine the significance of the relationship. The results showed that there was a negative relationship between cash conversion cycle and financial performance.

3. METHODOLOGY

Research Design

The study made use of ex post facto research design. This is premised on the fact that the researcher sought to make a systematic empirical inquiry, in which he/she has no observable/direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulated.

Population of the Study

The population of the study comprised manufacturing firms listed on the Nigerian exchange group (NGX) as at 31st December 2022. The firms listed on the NGX are classified under 5 sectors. The details are shown in the table below:

Table 1: Population of the study

Sector	No. of Firms
Agriculture	5
Consumer Goods	20
Conglomerates	6
Health Care	11
Industrial Goods	15
Total	**57**

Source: Nigerian exchange group (2022)

Sample Size of the Study

The sample size of the study comprised all forty-one (41) manufacturing firms in Nigeria. This list is verifiable through the website of Nigerian exchange group. The selected companies are shown in the table below:

Table 2: Selected consumer goods companies for the sample

Sector	No. of Firms
Population size	**57**
Less: Agriculture	1
Less: Consumer Goods	4
Less: Conglomerates	1
Less: Health Care	5
Less: Industrial Goods	5
Total	**41**

Source: Nigerian exchange group (2022)

The exclusion of other firms was consistent with prior studies; firms not publicly quoted or firms with inconsistent financial statements were mainly excluded and other financial firms because of the different regulatory environments, and it is also challenging to estimate discretionary accruals for these firms (Abid, Shaique, & Anwar-ul-Haq, 2018; Tsipouridou & Spathis, 2012). To arrive at the total sample size employed in the study, any bank whose required data are incomplete, few or unavailable was eliminated from the sample. The final sample percentage with respect to the population is approximately 71.93% of the entire population on the Nigerian exchange group.

Sources of Data

The study relied on secondary data; the data was obtained from annual financial reports and accounts of the studied companies. The data was extracted from the Income Statement, Statement of Financial Position and Statement of Cash flows.

Methods of Data Analysis

The following techniques were employed in analysing the data for the study: (1) correlation analysis - to measure the degree of relationship between the different variables. Correlation measures the direction of the linear relationship between two variables as well as the strength of association between variables (Tabachnick & Fidell, 2007). A positive correlation indicates that when one variable increase another also increases while a negative correlation shows an inverse relationship (Pallant, 2007); (2) Multiple regression - to investigate the causal relationship between the variables.

The hypotheses were tested using panel regression methods. The choice of this method is premised on the fact that panel data are most suited to the study of the dynamics of adjustment and better able to identify and measure effects that are simply not detectable in pure cross-sections or pure time-series data.

Model specification

The following equations were specified for analysis in the study:

Implicit:

$$NOC = f(ITP, Firm\ Size, Leverage, ROA, SaGr)$$

$$NOC = f(ACP, Firm\ Size, Leverage, ROA, SaGr)$$

Explicit:

$NOC_{(i,t)} = \alpha + ITP_{(i,t)} + Firm\ Size + Leverage + ROA + SaGr + \mu$.....1

$NOC_{(i,t)} = \alpha + ACP_{(i,t)} + Firm\ Size + Leverage + ROA + SaGr + \mu$.....2

Decision Rule

The decision rule relates to the sign and significance of the computed *t-statistic* from the regression output. If the p value of the *t-statistic* < *.05* (the chosen alpha level) the null hypothesis is rejected; and, the variable is postulated to have a significant effect. On the other hand, if the p value of the *t-statistic* > *0.05* (the chosen alpha level) the null hypothesis is accepted; and, the variable is postulated to have no significant effect.

4. DATA PRESENTATION AND ANALYSIS

Table 4. 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
noc	410	5.011036	2.679637	0	8.629527
inventory_~s	409	127.936	125.6656	3.76	1891.19
receivable~s	410	90627.46	1833102	.03	3.71e+07
payable_days	409	213.2433	217.118	7.15	2070.08
ebit_roa	410	9.408878	17.50859	-179.52	123.82
firmsize	410	7.194735	.8871078	5.239405	9.305878
leverage	410	-5.73222	155.3433	-3123.06	202.9
revenue_gr~h	410	14.09432	84.87979	-100	1354.26

Source: SATA 14.2/Author (2023)

Table 4.1 above reflects 410 observations from 41 manufacturing firms and 10-year period (2011-2020). On average, the net operating cashflows (NOC) for the observed entities are around 5.011, with a moderate degree of variability (standard deviation of 2.679). Moreso, the mean inventory turnover days is approximately 128, suggesting a wide inventory period of 4+ months. However, a standard deviation standing close to the mean indicates a moderate variability in inventory turnover period.

Furthermore, the mean EBIT_ROA is 9.409, indicating a positive average profit for the selected firms. However, the high standard deviation (17.509) suggests significant variability in return on assets as computed using earnings before interest and tax.

Data Analyses

Before continuing, the pooled OLS was undertaken to ascertain whether the fundamental tenets of the OLS regression were consistent with the investigation's goals. These diagnostics tests include tests for multicollinearity and tests for heteroscedasticity and these were preceded by tests for association or correlation between the dependent constructs and the independent constructs of the study. Hence, the Spearman Rank correlation analysis was conducted to test this association and relationship as shown below.

Regression Analysis

Specifically, to assess the cause-effect links between the constructs and also test the stated assumptions, the study used a panel regression analysis with either a fixed or random

effect. The "Hausman test and the Breusch and Pagan Lagrangian Multiplier test" otherwise known as LM test for random effects were utilized to confirm the choice between "fixed and random effects regression models".

Table 4.2: Combined regression result

	1	*2*	*3*	***4***
	NOC (Pool OLS)	**NOC (Fixed effect)**	**NOCF (Random effect)**	**NOCF (Random effect with Robust standard error)**
CONS.	-3.890 {0.000}***	-1.685 {0.726}	-4.118 {0.001}***	-1.685 {0.641}
ACP	0.000 {0.856}	0.002 {0.078}*	0.001 {0.495}	0.002 {0.000}***
ITP	-0.001 {0.162}	0.000 {0.862}	-0.001 {0.365}	0.000 {0.854}
FSIZE	1.172 {0.000}***	0.832 {0.217}	1.195 {0.000} ***	0.832 {0.104}
LEVERAGE	-0.000 {0.310}	-0.001 {0.410}	0.001 {0.326}	-0.001 {0.000}***
ROA	0.043 {0.000}***	-0.032 {0.001}***	0.040 {0.000}***	0.032 {0.000}***
F-Stat	**21.75 {0.000}*** **	**2.74 {0.009}*** **	**101.36 {0.000}*** **	**14.36 {0.000}*** **
R- Squared	**0.2752**	**0.2446**	**0.2736**	**0.2446**
VIF	**1.10**			
Hausman test		**14.19 {0.048}*** **		
LM test		**5.97 {0.007}*** **		
Heteroskedasticity	**13.20 {0.000}**			

Note1: *bracket {} are p-values: 2: *, **, ***, implies statistical significance levels at 10%, 5% and 1% respectively*
Source: SATA 14.2/Author (2023)

The F-Statistic

A big F-statistic (F-stat) with a small probability value (p-value) means that H_0 should be rejected, and we would assert that there is a general link between the dependent and explanatory constructs while a small F-stat, with a big p-value, would indicate that there is no relationship. The decision rule was to reject the H_0 at a significance level of p-value less than 5% (i.e., $p < 0.05$). Consequently, and judging from the records in Table 4.4, the F-Stat figures form the pooled OLS, fixed effect, random effect and random effect with robust standard error have values of 21.75, 2.74, 101.36 and 14.36 respectively. All have a p-value of 0.0000 which is less than 0.05 suggesting that we reject the H_0 and accept the alternate. This says that our OLS, fixed effect, random effect and random effect with robust standard error generally was statistically significant at a 1% significance level. The regression model is hence reliable and suitable for statistical inference.

The R-Squared (R^2) or Coefficient of Determination

Here again, from the records in Table 4.4, the R-Square figures from the pooled OLS, fixed effect, random effect and random effect with robust standard error have values of 0.2752, 0.2446, 0.2736 and 0.2446 respectively. This revealed that about 27.52%, 24.46%, 27.36% or 24.46% of systematic variations in dependent variable was jointly explainable by the explanatory and control constructs in the model. Unexplained component can be attributable to the inclusion of additional independent factors that could have an impact on noc but were instead included in the error term. To further validate the OLS regression forecasts, some post-regression tests were carried out as illustrated beneath.

Multicollinearity Test (VIF)

The degree of multicollinearity was tested using the VIF. A VIF test result of a value greater than 10 is a sign of the existence of multicollinearity and calls for concern. From the records in Table 4.4, the mean VIF value of 1.10 designates the nonexistence of multicollinearity in the models, and this suggests that no explanatory construct should be released from the models.

Test of Hypotheses

Hypothesis one

H_{01}: There is no significant effect of inventory turnover period on operating cash flow performance of selected manufacturing firms in Nigeria.

The results obtained from the random effect regression model with robust standard error as shown in Table 4.2 (column 4) revealed that inventory turnover period in selected manufacturing firms in Nigeria has a coef. of 0.000 and a p-value of 0.854 which is above the significance threshold of 0.05. The result of 0.000 is an indication of a strong insignificant positive relationship between the independent and the dependent variables at 1%, 5% and 10% significance level. This implies that an increase in inventory turnover period, will lead to a proportionate increase in the noc of the selected manufacturing firms under study. However, our decision rule is to reject the null hypothesis where the p-value is less than 0.05 (5%). Consequently, since the p-value is 0.854 which is above 0.05, our decision rule suggests that we fail to reject the null hypothesis and conclude that there is no significant effect of inventory turnover period on operating cash flow performance of selected manufacturing firms in Nigeria.

Hypothesis two

H_{02}: Average collection period has no statistically significant impact on operating cash flows performance of selected manufacturing firms in Nigeria.

The results obtained from the random effect regression model with robust standard error as shown in Table 4.2 (column 4) revealed that average collection period in selected manufacturing firms in Nigeria has a coef. of 0.002 and a p-value of 0.000 which is below the significance threshold of 0.05. The result of 0.002 is an indication of a weak significant positive relationship between the independent and the dependent variables at 1%, 5% and 10% significance level. This implies that an increase in average collection period, will lead to a proportionate increase in noc of the selected manufacturing firms under study. However, our decision rule is to reject the null hypothesis where the p-value is less than 0.05 (5%). Consequently, since the p-value is 0.000 which is above 0.05, our decision rule suggests that we reject the null hypothesis and conclude that average collection period has statistically significant impact on operating cash flows performance of selected manufacturing firms in Nigeria.

5. CONCLUSION AND RECOMMENDATION

Conclusion

The study, focused on Cash conversion cycle and cash flow performance of selected manufacturing firms in Nigeria. This study has provided valuable insights into the intricate relationship between working capital management and financial performance in the Nigerian manufacturing sector. While the study revealed a non-significant impact of inventory turnover period. These findings align with, and in some cases deviate from, prior empirical studies, reflecting the nuanced nature of this relationship. To optimize cash flow performance, manufacturing firms in Nigeria are recommended to focus on enhancing

accounts receivable management, refining inventory practices, and continuously monitoring payment periods. This study contributes to the existing body of knowledge, offering practical recommendations that can guide financial decision-makers in navigating the complexities of working capital dynamics within the Nigerian manufacturing context.

Recommendations

Based on the above findings and conclusion, the study therefore makes the following recommendations:

i. Optimization of working capital components: Given the significant impact of the average collection period on operating cash flow performance, it is recommended that manufacturing firms in Nigeria focus on optimizing their accounts receivable management. Implementing efficient credit policies, incentivizing early payments from customers, and employing advanced technologies for receivables management could help reduce the average collection period, thereby positively influencing operating cash flows.

ii. Enhanced inventory management strategies: While the study did not find a significant effect of inventory turnover period on operating cash flow performance, it is still advisable for firms to continually assess and enhance their inventory management strategies. This involves maintaining an optimal balance between carrying costs and stockouts, leveraging technology for demand forecasting, and adopting just-in-time inventory practices to ensure efficient working capital utilization.

REFERENCES

Adebayo, R. I. (2011). Zakat and poverty alleviation: A lesson for the fiscal policy makers in Nigeria. *Journal of Islamic Economics, Banking and Finance*, *7*(4), 26-41.

Adelegan, O. J. (2003). An empirical analysis of the relationship between cash flow and divided charges in Nigeria. *Journal of Research in Development and Management*, *15*, 35-49.

Aktas, N., Croci, E., & Petmezas, D. (2015). Is working capital management value-enhancing? Evidence from firm performance and investments. *Journal of Corporate Finance*, *30*, 98-113.

AlShattarat, W. K., Nobanee, H., Haddad, A. E., & AlHajjar, M. (2010). Working capital management, operating cash flow and corporate performance. *International Journal of Strategic Management*, *10*(1), 84-88.

Anser, R., & Malik, Q. A. (2013). Cash conversion cycle and firms profitability–a study of listed manufacturing companies of Pakistan. *IOSR Journal of Business and Management*, *8*(2), 83-87.

Appuhami, B. R. (2008). The impact of firms' capital expenditure on working capital management: An empirical study across industries in Thailand. *International Management Review*, *4*(1), 8.

Bingilar, P. F., & Oyadonghan, K. J. (2014). Cash flow and corporate performance: A study of selected food and beverages companies in Nigeria. *European Journal of Accounting Auditing and Finance Research*, *2*(2), 77-87.

Bodie, Z., & Merton, R. C. (2000). *Finance, International Edition*. New Jersey: Prentice-Hall.

Bose, D. C. (2012). *Principles of Management and Administration*. Delhi: Phi Learning Private Limited.

Brealey, R. A., Mayers, S. C., & Allen, F. (2006). *Corporate Finance*, 8th Edition. New York: McGraw-Hill/Irwin.

Chittenden, F., Poutziouris, P., & Michaelas, N. (1998). *Financial management and working capital practices in UK SMEs*. Manchester: Manchester Business School.

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

Egbide, B. (2009). Working capital management and profitability of listed companies in Nigeria. *Nigeria Research Journal of Accountancy (NRJA)*, 1/1, 44-53.

Ehrhardt, M., & Brigham, E. (2008). *Corporate Finance: A Focused Approach*. Cengage Learning.

Filbeck, G., & Krueger, T. M. (2005). An analysis of working capital management results across industries. *Mid-American Journal of Business*, *20*(2), 11-18.

Ganesan, V. (2007). An analysis of working capital management efficiency in telecommunication equipment industry. *Rivier Academic Journal*, *3*(2), 1-10.

Gitman, L. J. (1974). Estimating corporate liquidity requirements: a simplified approach. *Financial Review*, *9*(1), 79-88.

Hutchison, P. D., Farris II, M. T., & Anders, S. B. (2007). Cash-to-cash analysis and management. *The CPA Journal*, *77*(8), 42.

Karaduman, H. A., Akbas, H. E., Ozsozgun, A., & Durer, S. (2010). Effects of working capital management on profitability: The case of selected companies in Istanbul Stock Exchange (2005-2008). *International Journal of Economics and Finance Studies*, *2*(2), *47-54.*

Keown, A. J., Martin, J. D., Petty, J. W., & Scott, D. F. (2003). *Foundations of Finance: The Logic and Practice of Financial Management*, 4th Ed. New Jersey: Pearson Education.

Kieschnick, R., Laplante, M., & Moussawi, R. (2013). Working capital management and shareholders' wealth. *Review of Finance*, *17*(5), 1827-1852.

Libby, R., Libby, P., & Short, D. (2003). *Financial Accounting*, 3rd Ed. New York, NY: McGraw-Hill Irwin.

Majeed, S., Makki, M., Saleem, S., & Aziz, T. (2013). The relationship of cash conversion cycle and profitability of firms: An empirical investigation of Pakistani firms. *Journal of Emerging Issues in Economics, Finance and Banking*, *1*(1), 35-51.

Moss, J. D., & Stine, B. (1993). Cash conversion cycle and firm size: a study of retail firms. *Managerial Finance*, *19*(8), 25-34.

Nobanee, H., Abdullatif, M., & AlHajjar, M. (2011). Cash conversion cycle and firm's performance of Japanese firms. *Asian Review of Accounting*, *19*(2), 147-156.

Obamuyi, T. M., Edun, A. T., & Kayode, O. F. (2012). Bank lending, economic growth and the performance of the manufacturing sector in Nigeria. *European Scientific Journal, ESJ*, *8*(3), 19-34.

Öner, M. (2016). The impact of working capital management on firm profitability: Empirical evidence from Borsa Istanbul. *Research Journal of Politics, Economics & Management/Siyaset, Ekonomi ve Yönetim Arastirmalari Dergisi*, *4*(3), 63-79.

Oseifuah, E. K., & Gyekye, A. (2016). Cash conversion cycle theory and corporate profitability: Evidence from non-financial firms listed on the Johannesburg Stock Exchange. *The Journal of Accounting and Management*, *6*(3), 37 - 51.

Owolabi, S. A., & Alu, C. N. (2012). Effective working capital management and profitability: a study of selected quoted manufacturing companies in Nigeria. *Economic and Finance Review*, *6*(2057-0401), 55-67.

Pass, C. L., & Pike, R. H. (2007). An overview of working capital and corporate financing. *Managerial Finance*, *10*(3), 1-11. DOI 10.1108/eb027318

Reason, T. (2008). Preparing your company for recession. Business Wire.

Richards, V. D., & Laughlin, E. J. (1980). A cash conversion cycle approach to liquidity analysis. *Financial Management*, *9*(1), *32*-38.

Ross, S. A. (1973). The economic theory of agency: The principal's problem. *The American Economic Review*, *63*(2), 134-139.

Ross, S. A., Westerfield, R., & Jordan, B. D. (2002). *Fundamentals of Corporate Finance*, 6th Ed. McGraw-Hill.

Saccurato, F. (1994). The study of working capital. *Business Credit*, *96*(1), 36-37.

Sagner, J. (2010). *Essentials of Working Capital Management*. John Wiley & Sons.

Schmidt, D. (1996). Portfolio approach, customer groupings lift accounts receivable performance. *Corporate Cash Flow*, *17*(3), 6-9.

Theodore Farris II, M., & Hutchison, P. D., (2003). Measuring cash-to-cash performance. *The International Journal of Logistic Management, 14*(2), 83-92.

Turcas, M. (2011). The cashflow–Instrument for the company's analysis and forecast. *International Journal of Economics and Finance*, *5*(5), 148-158.

Watson, D., & Head, A. (2010). *Corporate Finance: Principles and Practice*. Pearson Education.

Yasir, M., Majid, A., & Yousaf, Z. (2014). Cash conversion cycle and its impact upon firm performance: An evidence from cement industry of Pakistan. *Global Business and Management Research*, *6*(2), 139-149.

Zakari, M., & Saidu, S. (2016). The impact of cash conversion cycle on firm profitability: Evidence from Nigerian listed telecommunication companies. *Journal of Finance and Accounting*, *4*(6), 342-350