Cash Conversion Cycle and Firm Performance in Nigeria: A Sectoral Analysis

NWOKOYE, Gladys Anwuli (Ph.D)
University of Benin, Edo State, Nigeria

Abstract: **This paper sought to investigate the effect of cash conversion cycle proxied as: days inventory turnover (DIO), days payables outstanding (DPO) and days sales outstanding (DSO), on the performance of quoted firms in two sectors in Nigeria. This was done within a multivariate framework, using pooled OLS and multivariate panel regression technique and with data that covered the 2010 to 2020 reference period. The results obtained were generally well behaved in that they largely conform to presumptive expectations. The empirical evidence show, for example, that days inventory turnover (DPO) and days sales outstanding (DSO) affect movements in firm performance negatively among firms in the consumer goods sector, though only the DSO variable show significant impact. The same variables affect the sampled firms in the manufacturing sector differently. Results show that the days payable outstanding (DPO) and the days sales outstanding (DSO) variables affect performance of the sampled manufacturing firms positively but insignificant and significantly negative impact respectively. The days inventory turnover variable on the other hand, was found to show positive and significant effect on performance of firms in the consumer goods sector, whereas, it affects the sampled firms in the manufacturing sector negatively but in a significant manner. The outcomes therefore suggest the need for optimal cash conversion cycle policy such that has growth tendencies as options. Strategies recommended to abate or minimize the risk of losing sales and customer loyalty include: optimal working capital, improved liquidity, offer of trade credits, proper monitoring of inventory and repayment periods to guarantee enhanced firm performance.**

Keywords: **Cash Conversion Cycle, Days Inventory Outstanding, Days Payable Outstanding, Days Receivable outstanding and Firm Performance**

I. INTRODUCTION

Working capital management decision is core to financial management as it is essential to the survival of any organization; it impacts on the firm's profitability and liquidity risk, and consequently its value (Hossain, 2020). Working capital management is a simple mechanism for ensuring the ability of the firm to fund the difference between short-term assets and short-term liabilities. However, liquidity and profitability are two sides of the same coin because they work in opposite directions. Increasing the liquidity of the firm will reduce the profitability of the firm and vice versa (Hoang, 2015). The cash conversion cycle is a popular measure of working capital management that reflects the net time interval between actual cash expenditures on a firm's purchase of productive resources and the ultimate recovery of cash receipts from product sales (Richards & Laughlin, 1980). A longer cash conversion cycle might increase firm profitability given that it leads to higher sales, primarily as a result of generous trade credit policy that allows customers to assess product quality before paying, as well as a result of a reduction in risk of stock-out, which essentially reduces the jeopardy of business operations interruption.

Notwithstanding the possible increase in profitability as a result of a generous trade credit policy and/or reduction in risk of stock-out, it is not unthinkable that corporate profitability may decrease as the cash conversion cycle (CCC) elongates, particularly if the costs of higher investment in working capital rise faster than the benefits of holding more inventory and/or granting more trade credit to customers. In the net ccc criterion, we consider the length and the time we receive the receivable accounts and payable accounts period, and also the length of storage and the amount of those are not be noted. Specifically, companies finance their working capital as much as possible for short-term assets and short-term loan firms perform poorly through times of the financial crisis (Cheng, Chiao, Fang, Wang, & Yao, 2019). The cash conversion cycle points out how the firms are performing and supports, thus, it helps managers to understand the capacities where the company has room for improvement (Muscettola, 2014). The cash conversion cycle period varies depending on the firm's industry and operations. The cash conversion cycle as such helps provides a clear view of a firm's ability to pay off its current liabilities.

Managers, investors, and other stakeholders are interested in the cash conversion cycle of manufacturing and consumer goods firms as an increasing trend in days inventory turnover (DIO), could mean decreasing demand for a company's goods or services. Also, a decreasing days sales outstanding (DSO), could signify an increasingly competitive product, which allows a company to tighten its customer's payment terms. As such, this study is of importance to the efficiency, effectiveness, and hence, profitability of firms. Recently, studies focuses on how a firm can efficiently use its short-term funds in a way to result in a high surplus of revenues or performance and particularly liquidity in receivables, inventories, and payables which constitutes the cash conversion cycle. There is limited literature in the study of the cash conversion cycle; also, most of the few studies in the cash conversion cycle are drawn from developed markets. Little has been done in less developed markets like sub-Saharan Africa countries like Nigeria, and few have considered a comparative study of different industries.

Furthermore, controversies have trailed these studies as they have reported varying relationships with firm performance; For example, Napompech (2012) found a significant negative relationship between cash conversion and performance while Muhammed (2015) found that the cash conversion cycle has no meaningful relationship with firm's performance. This study tries to clarify this controversy and fill the gaps identified.

Research Objectives

The main objective of this study is to examine the effect of the components of the cash conversion cycle on firm performance while the specific objectives include to:

1) Determine the effect of payable days on firm performance.
2) Ascertain the effect of inventory days on firm performance.
3) Evaluate the effect of receivable days on firm performance.

Research Hypotheses

The hypotheses to be tested in this study are stated in the null forms as follows

Ho_1: The effect of payable days on firm performance is not significant

Ho_2: The effect of inventory days on firm performance is not significant

Ho_3: The effect of receivable days on firm performance is not significant

II. LITERATURE REVIEW

2.1 Conceptual Issues

Firm Performance

Performance ratios allow us to measure the ability of the firm to earn an adequate return on sales, total assets, and invested capital. There are many performance measures of which we will consider a few. According to Nyaga (2007), one of the most important requirements of liquidity is profitability. Return on Assets (ROA) implies the ability of a business to utilize its assets and skills of its people to generate returns for its owners. This ratio, quantifies the success of that effort with respect to total assets by stating net income as a percentage of total assets. A high percentage rate signifies that the company is well run and management is efficient in using assets to generate earnings. On the other hand, Return on Equity (ROE), is the most fundamental profitability ratio (Nyaga, 2007). It shows net income as a percentage of equity. The ROE measures the firm's ability to earn a return on the owner's capital. It, therefore, considers matters more specifically from the shareholders' viewpoint and the profit figure is that which the shareholders earn after all charges to debt holders have been taking care of. This metric is mostly used to compare the performance of firms in the same industry. Net profit margin: this shows the relationship between a firm's net income and sales. It indicates what is left of sales revenue after all the expenses of running the business for the period have been accounted for.

Cash Conversion Cycle

Cash conversion cycle (CCC) by definition is not constant, for example; Stewart (1995) argues that the cash conversion cycle is a composite metric describing the average dollar investment in inventory into a dollar collected from a customer. While Besley and Brigham (2005) describe cash conversion cycle as the period from the payment for the purchase of raw materials to manufacture a product up-to the collection of account receivables (debtors) associated with high profitability. This, they believe improves the efficiency of using the working capital. The length of the cash conversion cycle therefore, is an important measure of the efficiency of working capital management (WCM). For Richards and Laughlin (1980), cash conversion cycle is a powerful performance metric for ascertaining how well a company is managing its working capital. They stressed that a short cash conversion cycle indicates that the firm is collecting its receivables as quickly as possible and delaying the payments of its payables (to suppliers) as slowly as possible. This consequently leads to a high net present value of cash flow and high firm value. They also argue that CCC measures the period (in days) from purchasing the raw materials into the warehouse (store) to the moment cash is received from sales. This concept is also referred to as the cash to cash (C2C) cycle (Farris & Hutchison, 2002). The cash conversion cycle presents the length of the time in days a firm has its funds tied up in working capital. Some autors also argue that the CCC consists of three different components namely: days inventories, sales receivables, and accounts payables. (Lind, Pirttilä, Viskari, Schupp & Kärri, 2012).

The CCC provides for liquidity and profitability creation (Hossain, 2020). Additionally, inventory stock management surely requires liquidity from management to maximize profitability. He stressed that the effect of the CCC decision on gross profit (GP) is a measure of firm performance, since it emanates from an optimistic relationship between the CCC and the operating profit. Numerous investigations, however, have suggested an adverse link between the CCC and firm monetary performance (Doan & Bui, 2020).

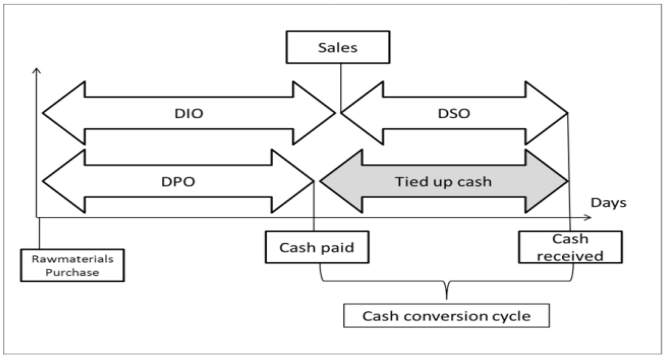

Figure 1: Cash Conversion Cycle (Rehn, 2012)

Figure 1 above, shows diagrammatically how Cash Conversion Cycle is calculated (Berk & Demarzo, 2014). It also shows how each part of the cycle time components forms the CCC. Here, Cash Conversion Cycle is days' inventory outstanding (DIO) + days sales outstanding (DSO) - days payables outstanding (DPO). In other words, it is "an additive measure of the number of days' funds are committed to inventories and receivables less the number of days' payments are deferred" (Shin & Soenen, 1998).

Figure 2 below visualizes a company with a positive cash conversion cycle (CCC). There is evidence that a firm can operate even with negative CCC or when CCC is zero days. In these cases, the company receives advance payments from the product (DSO) before the company gets to pay its payables to suppliers (DPO), and inventory turnover (DIO) is smaller than the difference between DSO and DPO as shown in equation (2).

That is when:

$$DIO + DSO \leq DPO \qquad (2)$$

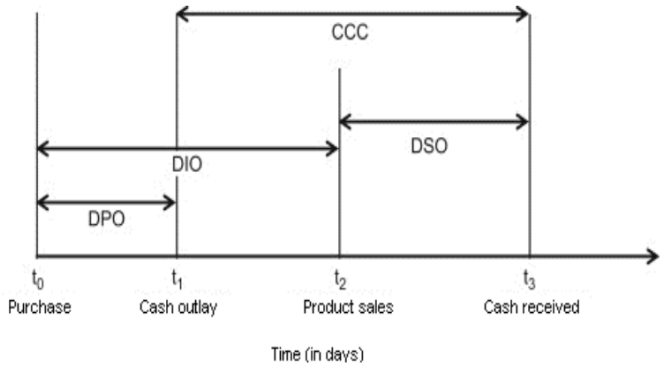

Figure 2: Cash Conversion Process, (Rehn, 2012)

From the above Figure 2, a positive CCC shows that the firm has to pay payables to suppliers (DPO) before it gets payment from the customers (DSO). A fast CCC indicates that the company manages working capital effectively and the need for additional financing is reduced. (Hutchison, Farris & Anders, 2007). The cash conversion cycle is usually calculated at the company level, but it can also be calculated on a business unit, a customer, or even on the level of orders (Lind et al., 2012). An increasing cash cycle can be an indication of obsolete inventory or difficulties in collecting from customers (Firer, Ross, Westerfield & Jordan, 2012). A long cash cycle reduces the Total Asset Turnover (TAT), because the firm would be taking longer to turn over its current assets to generate sales; the reduction in TAT may also lead to a decrease in profitability as measured by return on equity (ROE). The decline in both tat and roe may also cause a drop in the firm's sustainable growth rate (SGR) of the firm. Where sustainable growth rate (SGR) = Return on equity × bo. Here, *bo* is the retention ratio (the proportion of the firm's profits that is plowed back), and *roe* measures the return on ordinary equity funds in an accounting period. The goal of every firm should be to minimize its CCC because it indicates efficiency in managing its cash flows and reduces the amount of working capital investment needed. This requires analyzing and taking steps to improve each element of the CCC. However, improving the CCC should be undertaken with caution to ensure that it is not achieved at the expense of operational efficiency, depressing sales and damaging the firm's reputation with suppliers. Delaying payables to suppliers beyond the agreed terms may lead to a decline in the firm's credit rating with suppliers, while strict credit terms may cause customers to purchase such goods from where they consider credit terms to be more favorable.

Components of Cash Conversion Cycle

The studies have concluded that companies can increase their profitability by shortening the Cash Conversion Cycle (Deloof, 2003; Lazaridis & Tryfonidis, 2006; Raheman & Nasr, 2007). Firms can shorten their ccc by focusing on its three components; DIO, DSO, and DPO. It was noted in research that in an average company, decreasing working capital by 30 percent led to a 16 percent increase in after-tax returns on invested capital (Seifert & Seifert, 2011). By shortening the cycle times of inventories (DIO) with good inventory management and by minimizing inventory levels, firms can reduce the number of resources that are bound to inventories. It should be noted that exceedingly low inventory levels make the company more vulnerable to production problems, due to delivery interruptions, price fluctuations, and losses due to the scarcity of products (Wang, 2002). Secondly, the company can shorten periods from the receivables and get money faster from the sales, but there is a risk of losing business/sales due to customer's need for credit (Wang, 2002). The third way to shorten CCC and increase working capital is to increase the duration of the payables cycle (DPO). However, (Raheman & Nasr, 2007; Deloof, 2003) had links of shortened payables cycle (DPO) to better profitability, against the theories of increased working capital due to faster cash conversion cycle to improve profitability. This could be explained in another way, meaning that highly profitable companies are also more likely to liquidate their payables faster in favour of their suppliers. When a company shortens CCC, it has direct effects on the other companies in the supply chain. A decrease in DSO will decrease the customer's DPO, and an increase in DPO will consequently mean an increase in the supplier's DSO. When one company reduces its CCC, the other companies' CCC will increase, because it is a "zero-sum game" (Hofmann, Maucher, Piesker, & Richter, 2011).

Days Inventory Outstanding

Days inventory outstanding (DIO) measures cycle times of inventories (in days) and shows how long cash is tied – up to inventories. Companies wish to limit how much resources are tied up especially such that has the tendencies to cause direct or indirect costs in the form of maintaining storages, insurances, loss of interests, and risks of spillage or obsolesce, etc. (Scherr, 1989). However, there are some

positive reasons to maintain higher inventory levels like price speculations, expected increase in demand, and to secure production against delivery interruptions or scarcity of required materials (Wang, 2002). Deloof (2003) found a significant negative relationship between gross operating income and the number of day's inventories outstanding. This explains that an increase in the inventories resulting from a decrease in sales could lead to lower profit for the organization.

Days Sales Outstanding

Days sales outstanding (DSO) is another component for calculating cash conversion cycle. It is used to calculate how long on average (days) it takes for a company's receivable investments to be converted into cash (Richards & Laughlin, 1980). The DSO can be improved by optimizing the collection terms and processes in an organization. Also, credit policies in an organization can be harmonized which leaves less room for sales to give out slack payment schedules. Deloof (2003) found a significant negative relationship between the average number of days' accounts receivable and gross operating income as a measure of profitability. Boisjoly, Conine, & McDonald (2020) provided evidence that companies have focused on improving the management of accounts receivable as their accounts receivable turnover increase over the 15 years for 1990-2004

Days Payable Outstanding

Days payable outstanding (DPO) is a measurement of how many days on average it takes for the company to pay for their payables to the companies they have bought services and/or materials. The study of Deloof (2003) shows a negative relationship between an average number of day's accounts payable and profitability which indicates that profitability has an effect on accounts payable policy as a company with less profit takes longer payment periods.

2.1 Empirical Review

Lin and Lin (2020) found the association between managerial talent and Cash Conversion Cycle to be strongly positive. The results indicate that talented managers have a higher cash conversion cycle. Le (2019) reveals a significantly negative relationship between net working capital and firm valuation, profitability, and risk. Samiloglue and Demirnes (2008) study the relationship between profitability and working capital management of a sample of Turkish listed firms. Their study involved a period between 1998 to 2007, and they find that the average collection period, inventory turnover, leverage, and profitability have significant inverse relationships. However, it was found that growth and profitability have a positive relationship. Rimo and Panbunyuen (2010) investigate the effect of a firm's characteristics on the working capital management in Swedish listed companies by employing the quantitative method. The sampled 40 companies in the large capital investment segment listed on Nasdaq Omx Stockholm Exchange with 2007 and 2008 financial data using regression analysis, their results showed a significant positive association between profitability and the cash conversion cycle. Considering the composition of the cash conversion cycle, the regression result point out a significant positive relationship between a number of days' inventory and profitability which is opposed to the studies of (Raheman & Nasr, 2007; Samiloglu & Demirgunes, 2008). In Nigeria, Abdulrasheed, Khadijat, Sulu, and Olanrewaju (2011) assesses the impact of inventory management on selected small businesses in Kwara state, Nigeria. The study revealed that a naira change in stock would cause almost a naira (92 kobo) change in the profitability of selected businesses. This result further indicated a strong positive relationship between the inventory and profitability of small businesses in the Kwara state of Nigeria. They, therefore, concluded that small businesses are likely to generate higher profits if effective inventory management is put in place. Ebben and Johnson (2011) study the relationship between working capital management (WCM) on return on invested capital and net balance position in around 1,700 small us firms from 2002 through 2004. They found evidence that firms with shorter cash conversion cycles (CCC) are both more liquid and more profitable, requiring less invested capital. They further suggested a decline in CCC was associated with higher subsequent profitability and liquidity.

Runyora (2012) investigates the impact of working capital management (WCM) on the profitability of the oil industry in Kenya. Data were obtained from 30 oil marketing companies, correlation and regression analysis were used to measure the effect of working capital management on net operating profitability. The study concluded that the coefficient of CCC, day receivables period, days payable outstanding, and average payment period vary from positive to negative. Napompech (2012) analyzes the effects of working capital management (WCM) on profitability using regression analysis based on a panel sample of 255 firms listed on the stock exchange of Thailand from 2007 through 2009. The results showed a negative relationship between the gross operating profits and inventory conversion period and receivables collection period. Majeed, Makki, Saleem, and Aziz (2013) also examine the impact of the cash conversion cycle on the performance of Pakistani manufacturing firms. The study utilized a sample of 32 companies selected randomly from three manufacturing sectors i.e. Chemical, automobiles, and construction and material for a period of five years ranging from 2006 to 2010. The study revealed that the average collection period of accounts receivables, inventory conversion period, and cash conversion cycle (CCC) have a negative relationship with the firm's performance.

Muhammed (2015) examines the effects of working capital management on firms' profitability: a comparative study of the middle east and west European companies. The result of the regression analysis showed that debtors' collection periods have a negative and insignificant relationship with firms' profitability. The cash conversion

cycle has no significant relationship with firms' profitability. However, the creditors' payment period has a significant positive relationship with firms' profitability. Also, Shadrack, Jane, and William (2015) examine the effects of working capital management and the financial performance of tourist hotels in Mombasa country, Kenya. While return on investment (ROI) was used as a measure of profitability, the debtors' collection period, creditors' payment period, and cash conversion cycle were used to measure working capital management. The correlation matrixes showed that the debtors' collection period and cash conversion cycle have a significant negative relationship with return on investment. However, the creditors' payment period has a significant positive relationship with financial performance. These positions align with the study of Vincent (2012) who also found a significant negative relationship between debtors' collection period, cash conversion cycle, and financial performance of manufacturing companies in Kenya. In another study in Nigeria, Samuel and Abdulateef (2016) studied the relationship between cash conversion cycle and earning per share the sample comprised of 10 firms and used panel data over 10 years from 2004 to 2013. The study revealed that the cash conversion cycle (CCC) of the sampled firms during the study period has an insignificant negative impact on earnings per sh are. Adamu (2016) also examines the effects of working capital management on the financial performance of pharmaceutical firms in Nigeria. The regression results indicated that the cash conversion cycle and return on investment are significantly and inversely related. Furthermore, Faith and Ela (2016) reported a significant negative relationship between the cash conversion cycle, debtors' collection period, and profitability of companies. Tanveer, Muhammad, Muhammad, Muhammad, and Sadat (2016) studied the impact of working capital management on the financial performance of 50 listed non-financial companies in Pakistan. The study employed cash conversion cycle, debtors' collection period, creditors' payment period, and firm size as proxies for working capital management and control variable respectively. Financial performance was measured by return on asset and return on investment. The regression result revealed that the cash conversion cycle, and creditors' payment period, as well as firm size, have a significant positive relationship with financial performance while the debtors' collection period has a significant negative relationship with financial performance.

2.2 Theoretical Reviews

Transaction Cost Economics Theory

This theory states that the optimum level of inventory should be determined based on a trade-off between costs and benefits associated with the levels of inventory. Costs of holding inventory include ordering and carrying costs. Ordering costs are connected with the acquisition of inventory which includes the costs of preparing a purchase order or requisition form, receiving, inspecting, and recording the goods received. However, carrying costs are involved in maintaining inventory level and will arise due to the storing of inventory and opportunity costs incurred. Several motives exist for lower or higher levels of inventories and highly depend on what business a firm is in. The most widely and simple motive of managing inventories is the cost motive, which is often based on the transaction cost economics (TCE) theory (Emery & Marques, 2011). To be competitive, firms have to decrease their costs and this can be achieved by keeping the costs of stocking inventory to a reasonable minimum (Emery & Marques, 2011).

Theories of Cash Conversion Cycle

Gentry, James, Vaidyanathan, and Lee (1990) presented a weighted cash conversion cycle (WCCC) that took into consideration capital that was bound in the different components of CCC. The WCCC scales the timing by the number of funds in each step of the cycle and therefore includes both the number of days and the number of funds that are tied up at each stage of the cash cycle (Shin & Soenen, 1998). Viskari, Ruokola, Pirttilä, and Kärri (2012) developed the 'adjusted cash conversion cycle' model (ACCC) refining it from WCCC. The ACCC is based on the same principles, but it is focused more on operational use than on the company level. It is used to evaluate the efficiency of WCM on the level of customers, products, or orders (Talonpoika, Monto, Pirttilä, & Kärri, 2014). Viskari et al. (2012) included the advantages of their model (compared to WCCC) as taking a value chain approach, eliminating negative operating margin from the calculation, simplifying the calculation of account payables, and extending the metrics of calculating the cost of working capital. Another version of the CCC is called the modified cash conversion cycle (MCCC). The MCCC was created in 2014 by researchers Talonpoika et al., (2014) and they modify CCC measurement in the way that it takes into account advance payments as a component of operating working capital. Advance payments may be paid in one payment or by several payments since a part of the price is usually paid after the product has been delivered with the traditional trade credit terms.

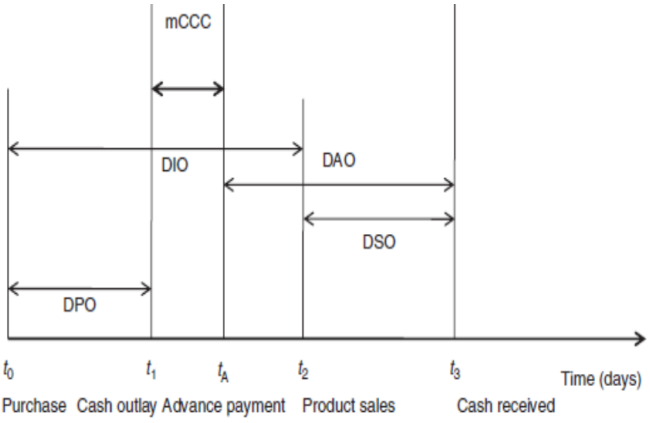

Figure 3: Modified Cash Conversion Cycle (Talonpoika, Monto, Pirttilä & Kärri, 2014)

Talonpoika et al., (2014) conclude that on their empirical tests, the advance payments can have a remarkable effect on the cycle times of working capital and it should give a more realistic picture of the efficiency of Working Capital Management.

III. METHODOLOGY

The research design used in this study is the causal research design. This method entails the use of historical data to gain knowledge about some phenomenon over a period of time, as well as quantitative, statistical, or regression techniques in evaluating the research issues or problem. The population of this study is all the consumer goods and manufacturing sector companies quoted in the Nigeria stock exchange (NSE) as of December 31st, 2020. Consumer goods and manufacturing sector firms were chosen because of their high investment in working capital. This is because any country that engages in only trading (buying and selling) and not producing goods may face doom in the future. Our decision to use the sectors could also be explained by the nature of their asset mix as it involves inventories, working progress among others, unlike some other sectors of the economy that are more of service oriented. The sample size, however, consists of 10 firms from each sector which was arrived at through purposive sampling technique. The sample size was selected by way of data filtering based on set criteria mostly due to the availability of data as some had missing data problems for the period of study.

Model Specification

In this study, the independent and dependent variables are used in an equation called multiple regressions. To express the model of multiple regressions in equation modified to suit the respective hypotheses. This study is a time-series study that covers 2010 – 2020. A model was used to ascertain the relationship between the determinants of the cash conversion cycle (DIO, DSO, DPO) and the firm's performance for each sector. The econometric forms of the models for the consumer and manufacturing goods sectors respectively are stated below as thus:

Model 1:

This model equation (3.1) below, shows the relationship between the components of the cash conversion cycle and firms performance in the consumer sector

$$ROA_{cit} = \beta_0 + \beta_1 DIO_{it} + \beta_2 DPO_{it} + \beta_3 DSO_{it} + \beta_4 Fsize_{it} + \mu_t \quad (3.1)$$

Model 2:

This model equation (3.2) below, shows the relationship between inventory days, payable days, receivable days, firm sizes, and firm performance in the manufacturing sector.

$$ROA_{mit} = \alpha_0 + \alpha_1 DIO_{it} + \alpha_2 DPO_{it} + \alpha_3 DSO_{it} + \alpha_4 Fsize_{it} + \mu_t \quad (3.2)$$

Where,

ROA_{cit} , ROA_{mit}= represent Return on Asset for consumer and manufacturing goods sector respectively

DIO_{it}= days inventory turnover for company i at corresponding time t.

DPO_{it}= days' payable outstanding for company i at corresponding time t.

DSO_{it}= days sales outstanding for company i at corresponding time t.

$Fsize_{it}$= firm size for company i at corresponding time t.

$\beta_1, \beta_2, \beta_3 \text{ and } \beta_4 =$ coefficients on each respective explanatory variable in equation (3.1)

β_0 , α_0 = the intercept of the regression line of the models respectively,

μ_t = the error term for company i at corresponding time t.

apriori expectation $\beta_1, \beta_2, \beta_3, \beta_4 > 0$

$\alpha_1, \alpha_2, \alpha_3 \text{ and } \alpha_4 =$ coefficients on each respective explanatory variable in equation (3.2)

apriori expectation $\alpha_1, \alpha_2, \alpha_3, \alpha_4 > 0$

Method of Data Analysis

The data collected using the techniques described above was analyzed using the Stata 13.0 statistical package and Eviews 9. The study employed three main methods to analyze the data; correlation analysis, descriptive analysis, and regression analysis. Correlation analysis is conducted using the Pearson correlation matrix.

Operationalization of Variables

Dependent variable

The dependent variable for this study is firm performance, which is measured by return on asset (ROA).

Independent variable

Days inventory outstanding (DIO): DIO refers to the average number of days inventory is kept by a firm. It is calculated as the average inventory divided by the cost of goods sold multiplied by 365 days. A negative relationship is expected with ROA. (Deloof, 2003)

Days payable outstanding (DPO): DPO is the average number of days it takes for a firm to pay their suppliers for materials bought. Its easily calculated as payables divided by the cost of goods sold multiplied by 365 days. A positive relationship is expected with ROA. (Deloof, 2003)

Days sales outstanding (DSO): DSO refers to the average number of days taken for a firm to collect payments from its

clients for goods sold. It is calculated as average receivables divided by sales multiplied by 365 days.

The control variable for this study is firm size. It is calculated as the natural logarithm of sales. A positive relationship is expected with ROA. (Dong & Su, 2009)

IV. EMPIRICAL RESULTS AND DISCUSSION OF FINDINGS

Table 1 (see Appendix 1), presents the summary statistics on the performance measure and independent variables used for the two sectors. Descriptive statistics show that the mean (average) of ROA variable for the consumer goods sector is 10.4%, with a median value of 11.2%. Thus, there appear to be wide dissimilarities in the performance measure across the sampled. Some of the firms have relatively high ROA which tends to offset the lower ROA of others. This heterogeneity in the performance measure across the consumer goods firms is further buttressed by the pronounced divergence between the maximum and minim values of 142.3 and 0.46, respectively. Standard deviation of 14.02 is quite higher and suggests high variability in performance among the cross-sectional firms in the consumer goods sector. The mean value of day inventory outstanding (i.e average number of days the stock is kept by the firm to minimize the risk of insufficiency of stock level) is 17.03, with a median value of 16.03. Thus, most of the firms in the consumer goods sector have higher inventory/ stock than others. The corresponding average values for days payable outstanding, days' sales outstanding and firm size is 21.24, 28.2, and 25.2, respectively. Thus, on average, it takes 21 days for invoices goods and services that have been processed to be paid for, while 28 days is required for a firm to collect payments from its clients to manage its debtors (i.e. sales and collection of payment from clients). The kurtosis value for the consumer goods sector is high while the J-B value of 251.4 passes the significance test and shows that the ROA for the consumer goods sector is not normally distributed (i.e a non-symmetric distribution).

For the manufacturing sector firms, the mean ROA is 11.02 %, a value that is relatively higher than that of the consumer goods sector. Invariably, manufacturing sector firms tend to require larger working capital than the consumer goods sector since they are more capital intensive. The standard deviation value of 16.22 is higher than that of the consumer goods sector, implying a greater level of variability in the performance (ROA) of manufacturing sector firms. The skewness value of 7.82 is positively high, and it indicates that more manufacturing sector firms reported lower ROA values than the average across the firms. The J-B value of 1160.3 for the ROA of the manufacturing sector firms is high and passes that significance test at the 1% level and indicates that the ROA across the manufacturing sector firms is not asymmetrically distributed. This implies that there is heterogeneity among the firms in terms of performance. Overall, the variables exhibit high variability, positive skewness, leptokurtic, and highly significant J-B values. The individual firm's characteristics are significant in explaining variation in ROA over the sampled period. The endogeneity problem is therefore expected in the models if the OLS technique is employed; this is a clear justification for the adoption of the panel data analysis technique for the estimation of the relationships.

Correlation analysis results reported in Table 2 (see Appendix 2). In the correlation matrix, a positive association is observed between ROA and days inventory outstanding; an implication that a higher level of stock or inventory tends to reduce the risk of insufficiency of output, leading to higher financial performance. On the other hand, a negative relationship is observed between days payable outstanding and ROA and days sales outstanding and ROA. Firm size is positively correlated with financial performance. This implies a positive co-movement between firm size and firm performance. Apparently, a higher level of assets that can be deployed to performance-enhancing activities tends to enhance the financial position of firms, both in the goods and manufacturing sectors. The correlation results also show a positive correlation between days inventory outstanding, days payable outstanding, and firm size. Thus, larger firms tend to have higher inventory or stock to minimize the risk of sales, with a possible co-movement with delay in receiving payments for sales made.

The OLS estimates are not quite amenable for policy directions since the estimates inherently possess endogeneity issues. To avoid this challenge, the panel data analysis technique is employed in re-estimating the relationships. As stated in the previous section, the standard test for the method of panel analysis to adopt is the Hausman test for random effects. The test results for the ROA models for the two sectors are reported in Table 3 (see Appendix 3). The results of the tests for the Hausman test are reported in Table 3 below. In the result, the Hausman test (Chi-Square statistic) for the two ROA models are 9.86 and 11.22, with probability values of 0.01 and 0.02 respectively are greater than the chi-square statistic and are respectively significant at the 5% level. Thus, we reject the null hypothesis that unobserved firm-specific heterogeneity is uncorrelated with regressors, making us concentrate our analysis on estimates provided by the fixed effect model, as the random effect estimates are likely to be biased and inconsistent. Thus, a fixed effect exists among the cross-sectional firms for the consumer goods sector and the manufacturing sector in terms of the behavior of return on assets.

The result of the fixed-effect model for the consumer goods sector is presented in Table 4 (see Appendix 4). In the result, the goodness of fit statistics has improved significantly, compared to the OLS estimates. The adjusted R^2 of 0.791 shows that over 79 percent of the net systematic variations in the financial performance of the consumer goods sector are explained by cash conversion variables and firm size. Thus, the relevant explanatory variables have a strong influence on the determination of the financial performance of firms in the

consumer goods sector in Nigeria. The F-value of 23.21 is significant at the 1 percent level; validating the hypothesis of a significant linear relationship between performance variable (ROA) and independent variables. The Durbin Watson statistic of 1.72 shows that there is no serial correlation in the model, implying that the model can be used for structural and policy analysis. The coefficient of days inventory outstanding is positive and significant at the 5 percent level. Thus, the greater the inventory or stock of consumer goods the greater the ability to meet consumers' needs in terms of higher deliveries and sales. This has the effect of enhancing performance and minimizing the risk of a possible default in sales, as greater sales brought about by high inventory or stocks implies higher revenues and profit. The finding is in line with the results of Capkun, Hameri, and Weiss (2009) and at variance with those of Deloof (2003), Falope and Ajilore (2009), Dong and Su (2010), and (Dong & Su, 2010).

The coefficients of days payable outstanding and days sales outstanding are both negative but only that of day sales outstanding passes the significance at the 5 percent level. Thus, the greater the number of days it takes a firm to pay its suppliers for materials bought and the greater the number of days taken for a firm to collect payments from its clients for goods sold, the lower the performance in terms of return on asset. This is because delays in paying for supplies for materials bought and for goods sold tend to reduce credit credibility on the part of the credit-giving supplier, which eventually translates to lower supplies and sales. As firms tend to delay in making payment for deliveries, the ability to receive further credit tends to diminish. The direct effect is deteriorating performance and a lo wer level of profitability. The findings support the results of Deloof (2003); Falope and Ajilore (2009), Lazaridis & Tryfonidis, 2006. The coefficient of firm size is appropriately positive in line with apriori expectation and passes the significance test at the 1 percent level. Thus, that larger firms tend to have better economies of scale in terms of financial, cost, and non-pecuniary advantages that give them an edge over smaller firms particularly in terms of better growth opportunities and enhanced performance. In particular, larger firms have a better financial and economic competitive advantage which gives them superior performance over smaller firms. The findings corroborate those of Dong and Su, (2010), while it contrasts those of Lazaridis and Tryfonidis, (2006).

The result of the ROA model for the manufacturing sector is reported in Table 5 below. The adjusted coefficient of determination of the model is 0.813, suggesting that over 81 percent of the systematic variations of the financial performance of manufacturing sector firms is explained by the independent variables. The F-value of 27.4 passes the significance test at 1 percent, confirming the existence of a significant linear relationship between the ROA and explanatory variables. The Durbin Watson statistic of 1.75 shows that there is no autocorrelation in the model, implying that the model can be used for structural and policy analysis.

The coefficient of days inventory is negative and statistically significant at the 5 percent level. This is in contrast to the case of the consumer goods sector, where high stock or inventory implies greater performance since consumer goods have a high sales turnover, compared to manufacturing goods whose sales rapidity is not as high as fast-moving consumer goods (FMCG). Apparently, higher levels of unsold stock tend to result in capital been tied down, thereby reducing the working capital and liquidity of the firms. This has the effect of reducing performance. The results as before corroborate the findings of Falope and Ajilore (2009); Dong and Su (2010). The coefficients of days payable outstanding, and days sales outstanding are separately negative and positive and pass the significance test at the 10 and 1 percent level, respectively. Thus, firms usually regard the amount owed to creditors as a source of free credit to carry out other transactions. The higher the value of DPO, the longer firms take to settle their payment obligation to their suppliers. This tends to confer some grace period, allowing a discretionary period for payment to be made. The effect of days payable outstanding as can be observed is however stronger in the case of manufacturing firms when compared with the consumer goods sector, as indicated by the weak t-ratio of the latter. This is attributable to the high capital requirement nature of manufacturing sector firms, which substantially depends on trade credit to induce performance. Thus, unlike the consumer goods sector, the manufacturing sector depends more on trade credit and long payment periods to effectuate the business transaction. Empirical evidence buttresses the findings of Dong and Su (2010), where coefficient of days sales outstanding was found to be negative and statistically significant at the 5 percent level, while that of firm size is positive and significant at the 5 percent level. Thus, the higher the delay in collecting payments from clients, the lower the financial performance of firms (manufacturing firms –in this context), thereby corroborating the findings of Falope and Ajilore, (2009), while larger firm size (indicated by sales) enhances performance, supporting the earlier findings of Dong and Su, (2009). The results are presented in Table 1, 2, 3, 4 & 5 as attached appendices.

V. CONCLUDING REMARKS AND RECOMMENDATIONS

The importance of a good cash conversion cycle as a standard measure of working capital in the performance of firms cannot be over-emphasized in modern business architecture. Proper and judicious deployment of working capital and other trade credits as short-term financing source minimizes risks, loss of sales and thus enhances performance. The experience of past bank financial crises resulting largely from the high incidence of non-performing loans and pronounced illiquidity has taught the management of every financial institution a bitter lesson. Clearly, the ability of firms to succeed depends significantly on their cash conversion cycle and liquidity position and trade credits, reflected in working capital, particularly in the case of resource constraint.

Without a doubt, strong working capital and greater ability to convert sales to resources will strengthen the liquidity position of firms, ensure their sustenance, virility, and performance. Excellent cash conversion cycle is thus critical to enhancing firms' performance in Nigeria.

In light of this, the Nigerian government, the regulatory authorities, and the wider public both have great roles to play in the efficiency, supervision, control, management, and transmission of working capital resources for firms. Strong policy measures will need to be defined based on an in-depth sectoral analysis. In particular, proper and efficient financial management policies in terms of lower illiquidity and greater ease to financially liquid resources are essential on the part of firms' management. The key to optimal cash conversion cycle is to determine the relationship between the ideal liquidity to be maintained by the firms and the degree of dealings with suppliers and customers, which may contribute to increased profitability, in terms of inventory, collection period, and the repayment period. A balanced policy cash conversion cycle is therefore important to the performance of firms in Nigeria.

Policy Recommendations

Base on the empirical findings of this study, the following policy recommendations are suggested:

(i) Optimal cash conversion cycle with respect to working capital, liquidity, and trade credits for firms based on sectorial analysis should be developed to enhance their performance of firms in Nigeria.

(ii) Appropriate investment and inventory planning strategic planning should be designed by firms' management to minimize the risk of losing sales which will enhance firm performance in Nigeria.

(iii) Repayment and receivable periods should be designed to attract greater sales, firms patronage, and consequently, higher performance in Nigeria

(iv) Strong financial, investment, and managerial decision capacity should be put in place by firms' management to enhance the asset performance efficiency of firms in Nigeria.

(v) Policies to increase the firm size that will stimulate performance such as greater asset holding, larger sales, and re-investment should be put in place. Caution is however necessary as arbitrary and unmanageable large size may create potential diseconomies of scale.

REFERENCES

[1] Abdulrasheed, A., Khadijat, A., Sulu, I., & Olanrewaju, A. (2011). Inventory management in small business finance: empirical evidence from kwara state, nigeria. British journal of economics, finance and management sciences, 2(1), 49–57

[2] Adamu, Y. (2016). Effects of working capital management and the financial performance of the pharmaceutical firms in Nigeria. Journal of economics, commerce and management,10(4).

[3] Boisjoly, R.P., Conine, T.E., & McDonald, M.B. (2020). Working capital management: Financial and valuation impacts. Journal of Business Research, 108(November 2018), 1–8. https://doi.org/10.1016/j.jbusres.2019.09.025

[4] Cheng, F., Chiao, C., Fang, Z., Wang, C., & Yao, S. (2019). Raising short-term debt for long-term investment and stock price crash risk: Evidence from China. Finance Research Letters, 33, 101200. https://doi.org/10.1016/j.frl.2019.05.018

[5] Doan, T., & Bui, T. (2020). Nonlinear impact of supply chain finance on the performance of seafood firms: A case study from Vietnam. Uncertain Supply Chain Management, 8(2), 267−272. https://doi.org/10.5267/j.uscm.2020.1.001

[6] Deloof, M. (2003). Does working capital management affect profitability of belgian firms? Journal of business and finance accounting, 30, 573-587.

[7] Ebben, J., & Johnson, A. (2011). Cash conversion cycle management in small firms: relationships with liquidity, invested capital, and firm performance. Journal of small business & entrepreneurship, 24(3), 381-396.

[8] Emery, G., & Marques, A. (2011). The effect of transaction costs, payment terms and power on the level of raw materials inventories. Journal of operations management, 29(1), 236-249.

[9] Faith, D. & Ela, G. (2016). Impact of working capital management and firm performance: evidence from the Bist SMEs. Industrial index. International journal of trade, economics and finance, 7(2).

[10] Farris, M., & Hutchison, D. (2002). Cash-to-cash: the new supply chain management metric. International journal of physical distribution and logistics management, 32(4), 288-298.

[11] Gentry, J., Vaidyanathan, R., Lee, R., & Wai, H. (1990). A weighted cash conversion cycle. The journal of the financial management association, spring, 19(1), 90

[12] Hofmann, E., Maucher, D., Piesker, S. & Richter, P. (2011). Ways out of the working capital trap: empowering self-financing growth through modern supply chain management. Berlin: springer-verlag.

[13] Hossain, T. (2020). The effect of working capital management on profitability. International Journal of Research in Business and Social Science (2147−4478), 9(6), 114−122. https://doi.org/10.20525/ijrbs.v9i6.872

[14] Hutchison, P., Farris, M., & Anders, B. (2007). Cash-to-cash analysis and management. The CPA Journal, 77(8), 42-47.

[15] Lazaridis, D., & Tryfonidis, D. (2006). The relationship between working capital management and profitability of listed companies in the athens stock exchange. Retrieved from http://ssrn.com/abstract=931591

[16] Le, B. (2019). Working capital management and firm's valuation, profitability and risk: Evidence from a developing market. International Journal of Managerial Finance, 15(2), 191–204. https://doi.org/10.1108/IJMF-01-2018-0012

[17] Lind, L., Pirttilä, M., Viskari, S., Schupp, F., & Kärri, T. (2012). Working capital management in the automotive industry: financial value chain analysis. Journal of purchasing and supply management, 18(2), 92-100.

[18] Lin, Q., & Lin, X. (2020). Cash conversion cycle and aggregate stock returns. Journal of Financial Markets, 52, 100560. https://doi.org/10.1016/j.finmar.2020.100560

[19] 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 (JEIEFB), 1(1), 35-51

[20] Mohammad, M. (2015). Working capital management and profitability: a study on textiles industry. Asa University Review, 5(1).

[21] Muscettola, M. (2014). Structure of assets and capital structure. What are the relations with each other? An empirical analysis of a sample of Italy. European journal of business and social sciences, 2(11), 55–69.

[22] Napompeh, K. (2012). Effects of working capital management on the profitability of thai listed firms. International journal of trade, economics and finance, 3(3).

[23] Nyaga, A. (2007). Corporate governance and performance of manufacturing firms listed in Nairobi Securities Exchange

(unpublished MBA project). School of Business, University of Nairobi.
[24] Raheman, A., & Nasr, M. (2007). Working capital management and profitability: case of Pakistani firms. International review of business research papers, 3(1), 279-300.
[25] Rimo, A., & Panbunyuen, P. (2010). The effect of company characteristics on working capital management: a quantitative study of Swedish Listed Companies (Master's Thesis). Umeå school of business.
[26] Richards, V., & Laughlin, E. (1980), a cash conversion cycle approach to liquidity analysis. Journal of Financial Management, 9 (1), 32-38.
[27] Runyora, E. (2012). The impact of working capital management on the profitability of the oil industry in Kenya (Unpublished Mba Project). School of business, university of Nairobi.
[28] Samuel, T., & Abdulateef, Y. (2016). Liquidity management and profitability of listed food and beverages companies in Nigeria. Iosr journal of business and management, 18, 167-176.
[29] Seifert, R., & Seifert, D. (2011). Financing the chain. International commerce review, 10(1), 32-44.
[30] Shadrack, M., Jane, M., & William, K. (2015). Effect of working capital management practices on the financial performance of tourist hotels in Mombasa County, Kenya. International Journal Of Management And Commerce Innovations, 3(1)
[31] Shin, H., & Soenen, L. (1998). Efficiency of working capital management and corporate profitability. Financial practice and education, 8, 37-45.
[32] Stewart, G. (1995). Supply chain performance benchmarking study reveals to supply chain excellence. Logistics Information Management, 8(2), 38-45.
[33] Talonpoika, M., Monto, S., Pirttilä, M., & Kärri, T. (2014). Modifying the cash conversion cycle: revealing concealed advance payments. International journal of productivity and performance management, 63(3). 341-353.
[34] Tanveer, B., Muhammed, K., Muhammed, I., & Sadaf, R. (2016). Impact of working capital management on firm's financial performance. International journal of economics and financial issues, 6.
[35] Vincent, O. (2012). Effect of working capital management on financial performance of manufacturing firms in Kenya (Master's Thesis). School of Business, University Of Nairobi.
[36] Viskari, S., Ruokola, A., Pirttilä, M., & Kärri, T. (2012). Advanced model for working capital management: bridging theory and practice. International journal of applied management science. 4(1), 1-17.

APPENDICES

Table 1: Descriptive Statistics (Appendix 1)

	Mean	Median	Max.	Min.	Std. Dev.	Skew	Kurt.	J-B
ROA-CGS	10.14	11.21	142.3	0.46	41.02	2.75	9.30	251.41
ROA-MS	11.02	12.20	150.6	0.52	16.22	7.78	5.62	1160.31
DIO	17.03	16.86	21.24	0.05	1.62	1.84	3.22	24.21
DPO	21.24	19.67	30.76	0.06	4.71	1.62	3.36	16.34
DSO	28.20	30.18	60.02	0.82	9.10	4.20	9.53	34.46
Fsize	25.20	21.00	110.00	12.26	27.30	1.40	3.17	32.30

Source: Author's computation

Table 2: Correlation Results (Appendix 2)

	ROA-CGS	ROA-MS	DIO	DPO	DSO	Fsize
ROA-MS	0.036					
DIO	0.143	-0.140				
DPO	-0.211	-0.225	0.035			
DSO	-0.302	-0.225	0.153	0.025		
Fsize	-0.261	0.064	0.191	0.254	0.306	

Source: Author's computation

Table 3: Summary of Hausman Test for Cross-Section Random Effects (Appendix 3)

Test cross-section random effects			
Model	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Return on Asset-Consumer Goods Sector (ROA-CGS)	9.862	5	0.028
Return on Asset- Manufacturing Sector (ROA-MS)	11.221	5	0.014

Source: Author's computation

Table 4: Fixed-Effects Results for ROA-CGS (Appendix 4)

Variable	Coefficient	T-Ratio	Prob
Constant	-3.241	-1.104	0.23
DIO	0.281	2.051	0.04
DPO	-0.204	-1.422	0.15
DSO	-0.132	-2.107	0.03
Fsize	0.171	2.759	0.00
	R^2 = 0.81 2 Adjusted R^2 =0.794 F = 23.21 D.W = 1.72		

Source: Author's computation

Table 5: Fixed Effects Results for ROA-MS (Appendix 5)

Variable	Coefficient	T-Ratio	Prob
Constant	-0.132	-1.627	0.10
DIO	-0.261	-2.270	0.02
DPO	0.182	1.734	0.08
DSO	-0.066	-2.427	0.01
FSIZE	0.23	-2.501	0.01
	R^2 = 0.842 Adjusted R^2 =0.813 F = 27.41 D.W = 1.75		

Source: Author's computation