

EFFECT OF WORKING CAPITAL MANAGEMENT ON FIRM PROFITABILITY IN SELECTED NIGERIAN QUOTED COMPANIES

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Abstract

Working capital management is a very important component of corporate finance since it affects the profitability and liquidity of a company. Its management may have both negative and positive impact on the firm's profitability, which in turn, has negative and positive effects on shareholders' wealth. The study investigated the effect of working capital management on profitability of Nigerian listed companies during the period 2000-2009. The study utilized panel data, pooled OLS regression and fixed effects. The results showed that there is a strong negative relationship between working capital management and profitability. Liquidity had a positive and strong significant relationship with return on assets. Age also had a positive relationship with profitability while accounts receivable had a negative significant relationship with return on assets as to increase firms' profits. On the basis of these findings, we recommend among others that, managers and indeed organizations should concentrate on the proper management of each working capital components and keep them at optimal levels, as this will go a long way to enhance profitability and create value for their companies.

Keywords: working capital management, profitability, liquidity, firm size, fixed effect

INTRODUCTION

Notwithstanding the ownership structure, investors in business firms all over the world anticipate returns on their investments. In small and medium scale businesses, owners have direct or indirect control over the management of the business. So, they are responsible for the profits and losses. On the other hand, in large and multinational companies, the management is entrusted with the responsibility of managing the affairs of the company on behalf of the owners. The owners expect management to take critical decisions which will give positive signal to the market, increase the value of the firm, enhance profitability and maximize holding period returns. The heart of corporate finance literature is long term investment, capital structure and different valuation methods. These have been the focus of intense research by scholars. Financial decisions of short term assets and liabilities management influence stock price returns, hence profitability. These decisions are vital because they demonstrate the financial stability of the firm and the market which develops perception about the firm (Afza and Nazir,2008). Decisions relating to working capital and short term financing are often referred to as working capital management. Working capital management (WCM), according to Nimalathasan (2010), ensures a company has sufficient cash flow in order to meet its short term debt obligations and operating expenses. These involve managing the relationship between a firm's short term assets and its short term liabilities. An efficient working capital management can create value for stakeholders while a deprived policy or inefficient management might affect the business in an appalling way and might cause a financial distress.

Working capital management also involves planning and controlling current assets and current liabilities in a manner that eliminates the risk of inability to meet due short term obligations on the one hand and avoid excessive investment in these assets on the other hand (Eljelly, 200).Firms follow an appropriate working capital management approach that is favorable to their industry. Those that have less competition would focus on minimizing the receivables to increase cash flow, while firms where there are large number of suppliers of materials focus on maximizing the payable (Ganesan,2007).The importance of working capital management cannot be denied in any given organization. Research in this area cut across developed and developing countries. However, very little research has been carried out in Nigeria. Specific research studies exclusively on the impact of working capital management on corporate profitability in developing countries, especially in poor Sub Saharan Africa (SSA) countries remained altogether an ignored area of empirical research (Falope and Ajilore, 2009). This discussion on the importance of working capital management, its different components and effects on profitability, leads us to the problem statement which will be analyzed in the next section. It is believed that this study will enable firms in Nigeria to decide on the working capital

level that is optimal (optimal mix of working capital components) with a view to maximize shareholders' wealth without undermining other objectives of the firm.

Nigerian firms utilize working capital for smooth operation. They plan for and manage their inventories, cash receivables and payables, to ensure that requirements in their items are met. The little working capital available to Nigerian firms is managed by them to avoid operational embarrassments. Raw material inputs, mostly imported, are affected by unstable foreign exchange market and monetary policies of the government. Raw materials inventory are thus affected by inadequate foreign exchange for importation, delays in clearing at the Nigerian ports, and poor transportation network. These affect the production runs of Nigerian firms and delivery of finished goods to customers; local delivery of raw materials to firms by poor transport infrastructures in the country. High cost of debt/overdraft in Nigeria limited the short-term finance of firms to collection on sales; hampering growth in the net working capital.

Many firms in Nigeria are facing challenges of inadequate working capital or illiquidity. Worse still, the Nigerian capital and money markets lack the capacity to meet the financial needs of these local firms. According to Olugbenga(2010), the mismanagement of working capital amongst firms has caused some promising investments, with high rate of return, to be failures and frustrated out of business. Many factories have either gone moribund or comatose. Inadequate working capital management has remained a problem for firms in Nigeria due to its negative impact on their profitability (Oluboyede ,2007). Adegoke (2007) further observed that some firms in Nigeria with some promising investments, with high rate of return have turned out to be failures and frustrated out of business due to lack of or inadequacy of working capital.

The way working capital is managed can have a significant impact on both the liquidity and profitability of the firm (Shin and Soenen,1998). The main purpose of any firm is to maximize profit. But, maintaining liquidity of the firm also is an important objective. The problem is that increasing profits at the cost of liquidity can be serious problems to the firm. In determining what optimal amounts of cash, accounts receivable and inventories that they should choose to maintain, given the level of sales and cost considerations. While a firm is trying to maintain liquidity in its daily operations as to meet its short-term obligations, asset-liability mismatch occurs which increases firm's profitability in the short-run but at the risk of bankruptcy (Anand and Gupta, 2002). The study should have covered 2013 and 2014 for up-to-date analysis and more data points. This is one of the limitations of the work. Sample of firms was obtained based on data quality and availability to address variables specified in the models. Therefore the work suffered from data inadequacy. Other shortcomings are those associated with economic measurements, hence the existence of stochastic error terms in the models formulated to guide the study.

LITERATURE REVIEW

Conceptual Definitions

Working capital refers to money utilized by business firms in their daily activities or operations. Working capital is the available capital for conducting day-to-day operations of an organization represented by its net current assets (Adeniji, 2008). In the same vein, Akinsulire (2008), described working capital as the items that are required for the day-to-day production of goods to be sold by a company. Pandey (2000), distinguished between gross working capital and net working capital. **Gross working capital** refers to the firm's investment in current assets. Current assets can be converted into cash within an accounting year (or operating cycle) and include cash, short-term securities, debtors (accounts receivables or book debts), bills receivable and stock (inventory). **Net working capital** refers to the difference between current assets and current liabilities. Current liabilities are those claims of outsiders which are expected to mature for payment within an accounting year and include creditors (accounts payable), bills payable, and outstanding expenses (Pandey, 2000). Net working capital can be negative or positive. Net working capital is positive when current assets exceed current liabilities. It is negative when current liabilities exceed current assets. The most common definition of Net Working Capital (NWC) is the difference between current assets and current liabilities. Alternative definition of NWC is that portion of current assets which is financed with long term funds. The Net Working Capital (NWC) as a measure of liquidity is not very useful for comparing the performance of different companies, but it is very helpful for internal control. The NWC contributes enormously while comparing the liquidity of the same company overtime. For the main reason of working capital management, therefore NWC is expected to measure the liquidity of the company. Meanwhile, the focus of working capital management is to manage the current assets and liabilities so that an acceptable level of NWC is sustained.

Studies regarding working capital are mostly related with improving models to determine optimal liquidity and cash balance, rather than analyzing underlying reasons of relationships between liquidity, working capital management practices and profitability. Johnson and Aggarwai (1998), developed a cash management model focusing on cash flows and argued that cash collection and cash payment processes should have to be handled independently. Beaumont and Begemann (1997) emphasized that the major concepts of the working capital management are profitability and liquidity. They pointed out that there exists a tradeoff between profitability and liquidity. Thus the relationship between profitability and working capital helps one to understand the relationship between profitability and liquidity, the dual goals of the working capital management.

Theoretical Frame Work

The Cash Conversion Cycle (CCC), according to Mongrut et al, (2008), provides a theoretical background for the determinants of working capital management. Therefore, working capital connotes the funds which are used to operate in the short term. In the same vein, Nimalathan (2010), argued that the theoretical background for the relationship between working capital management and its impact on profitability is that most firms have a large amount of cash invested in working capital, as well as substantial amounts of short term payables as a financing option. Therefore, firms have an optimal level of working capital that maximizes their value. Decisions relating to working capital and short financing are referred to as working capital management. The management of working capital involves managing inventories, accounts receivable and payable, and cash. Implementing an effective working capital management system is an excellent way for many companies to improve their earnings (Nimalathan, 2010). The Cash Conversion Cycle (CCC) is calculated by subtracting the payables deferral period ($360/\text{annual payables turnover}$) from the sum of the inventory conversion period ($360/\text{annual inventory turnover}$) and the receivables conversion period ($360/\text{annual receivables turnover}$). More recently, the number of days per year that appears in the denominator as 360 has been replaced by 365 to improve accuracy. Since each of these three components is denominated by some number of days, the CCC is also expressed as a number of days.

Determinants of Working Capital

The total working capital requirements of a firm is determined by a number of factors, some endogenous and others exogenous. These factors, again, may vary from firm to firm and over a period of time. In general, the following factors are to be considered while determining the working capital requirement of a firm: nature of business, scale of operation, production cycle, business cycle, seasonality and production policy, credit policy, growth and expansion, rise in price level, operating efficiency, and availability of raw materials, depreciation policy, taxation, dividend policy, and retention policy. Mansoori and Muhammad (2012), while analyzing the determinants of WCM among Singapore firms using random and fixed effects, identified firm size, operating cash flow, capital expenditure and gross domestic products as negatively correlated with WCM. However, they found that firms with more profitability have longer cash conversion cycle. Additionally, they found a non-significant relationship between CCC and debt ratio. Chiou and Cheng (2006) attempted to determine the critical factors affecting WCM in Taiwan's firms. The study captured micro-economic variables and firm-specific variables. They found that debt ratio, operation cash flows to total assets are negatively correlated with working capital management, while firms' age and return on assets (ROA) and WCM positively

correlated. Additionally, their finding indicated that during the economic slump firms have more WCM requirements. Zariyawari et al (2010) investigated determinants of WCM in Malaysian firms using pooled OLS regression. They reported that firm size, debt ratio, and sales growth negatively correlated with CCC. In addition, their finding revealed that firms with more debt have less working capital since the cost of external financing is higher for those firms.

Empirical Review of Working Capital Management and Firms' Profitability

Many researchers and scholars alike have studied working capital from different stand points and in different environments. The following are some of the many works of effective working capital management. Shin and Soenen (1998), highlighted that efficient working capital management (WCM) was very important for creating value for the shareholders. They found a strong negative relationship between lengths of the firm's net trading cycle and its profitability. Jose, et.al (1996) examined the relationship between aggressive working capital management and profitability of US firms using Cash Conversion Cycle (CCC) as a measure of working capital management. The results indicated a significant negative relationship between the Cash Conversion Cycle and profitability indicating that more aggressive working capital management is associated with higher profitability. In an effort to investigate the predictive power of working capital management on profitability of listed firms in Nigeria, Egbide (2009) in a cross sectional survey design, used a 50 firm-year observations extracted from the annual reports and accounts of 25 non-financial quoted companies during the period 2005-2006. The Ordinary Least Square Regression analysis was employed in the analyses of the data guided by a sample of multiple regression models. The results showed a combined predictable power of working capital components on profitability is significant. In addition, the results revealed that Inventory Conversion Period (ICP), Debtor's Collection Period (DCP) and Creditor's Payment Period (CPP) affect profitability, albeit only DCP has a significant effect, thus demonstrating the importance of the different components of working capital in profit determination.

Deloof (2003), using correlation and regression tests, found a significant negative relationship between gross operating income and the number of days accounts receivable, inventories and accounts payable of Belgium firms. On the basis of these results, managers could create value for their shareholders by reducing the number of days' accounts receivable and inventories to a reasonable minimum. Samilogu and Demirgunes (2008) worked on the effect of working capital management on firm profitability in Turkey for the period 1998 – 2007. The findings indicated that account receivable period and Inventory period have significantly negative effects on firm profitability. This means that while these variables lengthen in periods, profitability decreases, or vice versa. Furthermore sales growth and leverage that had

significant effects on profitability also affected it positively and negatively respectively. This means that any increase in sales leads profits to grow, while any increase in debt causes profitability to fall. While Rehman (2006) studied the impact of the different variables of working capital management including Average Collection Period, Inventory Turnover in Days, Average Payment Period and Cash Conversion Cycle on the Net Operating Profitability of firms in Pakistan and concluded that there was a strong negative relationship between working capital ratios and profitability of firms. Furthermore the study stated that managers can create a positive value for the shareholders by reducing the cash conversion cycle up to an optimal level. Raheman and Nasir (2007) have studied the effect of working capital management on liquidity as well as on profitability of the firms in Pakistan. The results showed that there was a negative relationship between variables of working capital management and profitability of the firm. Further study also found that there was a negative relationship between liquidity and profitability and a positive relationship between size of the firm and its profitability and negative relationship between debt used by the firm and its profitability.

Afza and Nazir (2007a) found the negative relationship between working capital policies and profitability. In line with the study, Afza and Nazir (2007) further investigated the relationship between the aggressive/conservative working capital policies and profitability as well as risk of public limited companies. They found a negative relationship between the profitability measures of firms and degree of aggressiveness of working capital investment and financing policies. The firms yield negative returns if they follow an aggressive working capital policy. Lazaridis and Tryfouidis (2006) investigated the relationship between profitability and working capital management in Greece. The results showed that there was a negative relationship between profitability (measured through gross operating profit) and the cash conversion cycle which was used as a measure of working capital management efficiency. Thus managers can create profit for their companies by handling correctly the cash conversion cycle and keeping each component like accounts receivables, accounts payables, inventory to an optimum level. Rehman (2006) investigated the impact of working capital management on the profitability of 94 Pakistani firms listed at Istanbul Stock Exchange (ISE) for a period of 1999 – 2004. The results revealed a strong negative relationship between working capital ratios and profitability of firms. Therefore, managers can create a positive value for their shareholders by reducing the cash conversion cycle up to an optimal level.

Mathuva (2009) examined the influence of working capital management components on corporate profitability using a sample of 30 firms listed on the Nairobi Stock Exchange (NSE) for the periods 1993 – 2008. The study used the Pooled OLS and the fixed effects regression models and found that: (1) there exists a highly significant negative relationship between when it

takes a firm to collect cash from their customers and profitability, (2) there exists a highly significant positive relationship between the period taken to convert inventories into sales and profitability, and (3) there exists a highly significant positive relationship between the time it takes the firm to pay its creditors and profitability. Amarjit et al (2010) worked on a sample of 88 American firms listed on New York Stock Exchange for a period of 3 years from 2005 to 2007. They found a statistically significant relationship between the cash conversion cycle and profitability, measured through gross operating profit. It follows that managers can create profits for their companies by handling correctly the CCC and by keeping account receivables at an optimal level. Erasmus (2010) investigated the relationship between working capital management and firm profitability for a sample containing both listed and delisted South Africa individual firms. The results obtained from the full sample revealed statistically significant negative relationships between a firm's profitability (as quantified by the Return on Assets in the narrower sense) and its Net Trade Cycle (NTC), debt ratio and liquidity ratio. Working on the relationship between working capital management and profitability, Huynh and Jhy-tay (2010) based their study on secondary data collected from listed firms in Vietnam Stock market for the period 2006 – 2008. Their finding showed that there is a strong negative relationship between profitability, measured through gross operating profit and the cash conversion cycle. This means that as the cash conversion cycle increases, it will lead to declining of profitability of firm. They further stated that the managers can create a positive value for the shareholders by handling the adequate cash conversion cycle and keeping each different component to an optimal level.

Alipour (2011), demonstrated the relationship between working capital management and profitability in Iran. Cash Conversion Cycle was used as a measuring tool to calculate the efficiency of working capital management for the period 2001 – 2006 for companies listed in Tehran Stock Exchange. The result indicated that there was a negative significant relationship between number of days accounts receivable and profitability, a negative significant relation between inventory turnover in days and profitability, a direct significant relationship between number of days accounts payable and profitability and a negative significant relation between cash conversion cycle and profitability.

Karaduman, et. al. (2010) had a study on the effects of working capital management on the profitability of selected companies in the Istanbul Stock Exchange for the period 2005- 2008. They employed the panel data methods in order to analyse the mentioned effects. The results showed that all the models used were found statistically significant, and the signs of coefficients were same as those from the correlation matrix. The study also showed that a company's return on assets is increased by shortening number of days accounts receivables, accounts

payable and days in inventory. Reducing the cash conversion cycle provides positive contribution to company's return on assets.

Hayajneh and Yassine (2011), investigated the relationship between working capital efficiency and profitability on the 53 Jordanian manufacturing firms listed in Amman Exchange Market for the period 2000-2006. The results found a negative significance relationship between profitability and the average receivable collection period, average conversion inventory period and average payment period, and also the cash conversion cycle which expresses the efficiency of working capital. The study revealed a positive significance between the size of the firm, growth of sales and current ratio from this side and profitability from the other side. Finally, financial leverage correlated negatively with profitability.

In assessing working capital adequacy and its impact on profitability, Singh and Agress (2010), used the panel data regression to assess 250 firms for the period of 10 years in India. The regression results indicated that sales and cash conversion cycle have highly positive significant effect to determine required current liabilities. The result of negative association between profitability and liquidity is statistically insignificant. .

Adina (2010) in his study analyzed the efficiency of working capital management of companies from Alba country. The relation between the efficiency of working capital management and profitability was examined using Pearson Correlation analysis and using a sample of 20 annual financial statements of companies covering 2004-2008. The conclusion of the study was that there was a weak negative linear correlation between working capital management indicators and profitability rates. Chattejee (2010) analysed the impact of working capital management on the profitability of listed companies in the London Stock Exchange with a sample of 30 UK companies for a period 2006 – 2008. The findings are in line with those of previously mentioned studies as the cash conversion cycle increases, it will lead to decreasing profitability of the firm and managers can create a positive value for the shareholders by reducing the Cash conversion cycle to a possible minimum level. The research also found that there is a significant negative relationship between liquidity and the profitability of the UK firms and that there exists a positive relationship between size of the firm and its profitability. Bhunia, et.al. (2011) investigated the liquidity management efficiency and liquidity-profitability relationship. The data utilized was extracted from the income statements, balance sheets, and cash flow statements of sampled firms from the India Stock Exchange and CMIE data base. Results of the study showed that correlation and regression results are significantly positive and associated to the firm profitability. Uyar (2009) studied the Relationship of Cash Conversion Cycle with firm size and profitability in Turkey, collecting data from the financial statements of the corporations listed on the Istanbul Stock Exchange (ISE). The study revealed a significant

negative correlation between cash conversion cycle and the variables; the firm size and the profitability.

Dong and Su (2010) studied the relationship between WCM and profitability using the fixed effects model for a sample of 130 companies listed in Vietnam Stock Market for the period 2006 – 2008. The results of the study showed a significant and negative relationship between profitability and the RCP, the ICP, and the CCC. However, the relationship between profitability and the PDP was significant and positive, implying that the longer the period suppliers offered the company to pay its obligations, the better its profitability.

Barine (2012) examined working capital management efficiency and corporate profitability of 22 quoted firms from eight sectors of the Nigerian Stock Exchange for the year 2010. Research results from compared working capital costs and resumes evidenced improved gross working capital positions. Using the difference between means showed that costs of working capital exceed the returns on working capital investments thereby affecting their profitability

Garcial_Teruel and Martinez-Solano (2007) provided empirical evidence on the effects of WCM on the profitability of a sample of small and medium-sized Spanish companies covering the period 1996 – 2002. The results showed the average values for all WCM measures are shorter for the most profitable companies compared with the least models showed significant and negative relationship between profitability and all WCM measures. The overall result is that the relationship between profitability and WCM measures is important in the case of small and medium-sized companies. Zariyawati et al (2009) examined working capital management and corporate performance in Malaysia. Cash Conversion Cycle was used as measure of working capital management. The coefficient results of Pooled OLS regression analysis provided a strong negative significant relationship between cash conversion cycle and firm profitability. This revealed that reducing cash conversion period results to increase in profitability.

Falope and Ajilore (2007) used a sample of 50 Nigerian quoted non-financial firms for the period 1996 – 2005. Their study utilized panel data econometrics in a pooled regression, where time-series and cross-sectional observations were combined and estimated. They found a significant negative relationship between net operating profitability and the average collection period, inventory turnover in days, average payment period and cash conversion cycle for a sample of fifty Nigerian firms listed on the Nigerian Stock Exchange.

Ogundipe, et al(2012), examined the impact of working capital management on firms' performance and market value of firms in Nigeria using a sample of 54 non-financial quoted firms for the study for the period 1995 – 2009. The results showed there was a significant

negative relationship between cash conversion cycle and market valuation and firms' performance. It also showed that debt ratio is positively related to market valuation and negatively related to firms' performance.

Mamoun (2011) examined the relationship between profitability and working capital management measures for industrial companies listed in Jordan for the period 2001 to 2010. The results showed that less profitable companies wait longer to sell their products, to collect credit sales, and to pay their supplies of goods. Moreover, the results showed that regardless of the level of profitability, these companies pay their suppliers before collecting credit sales. The control variables (size, leverage, and GDP growth) included in all regression models were significant and have the expected signs.

Akinlo (2011) investigated the effect of working capital on profitability of firms in Nigeria for the period 1999 to 2007. The study adopted the dynamic panel general method of moments in analyzing the data. Results of the estimation showed that sales growth, cash conversion cycle, account receivables and inventory period affect firm positively, while leverage and account payable affect firm profitability negatively.

Mohamad and Saad (2010) offered empirical evidence about working capital management and its effects to the performance of Malaysian listed companies from the perspective of market valuation and profitability. The study period covered 2003 – 2007 with a sample of 172 listed companies from Bursa Malaysia main board by exploring the effects of working capital components to the firm performance by looking at firm's value and profitability. Applying correlations and multiple regression analysis, the result showed that there were significant negative associations between working capital variables with firm performance. Thus, it highlighted the importance of managing working capital requirements to ensure an improvement in firm's market value and profitability.

Afza and Nazir (2011) investigated the efficiency of the Cement companies in Pakistan for management of working capital during 1988 to 2009. Instead of using the common method of analyzing different working capital ratios, three index values representing the average performance of the components of current assets, the degree of utilization of total current assets in relation to sales and the efficiency of managing the working capital were computed for the sample firms for the window period. Using industry norms as target efficiency level of the individual firms, an evaluation was made with regards to the speed of achieving that target level of efficiency by an individual firm during the study period. The results revealed that the Cement firms in Pakistan performed very well during the study period.

On the relationship between working capital management and profitability of listed companies in the Athens Stock Exchange, Lazaridis and Tryfonidis (2006) used a sample of

131 companies listed in Athens Stock Exchange (ASE) for the period 2001-2004. The results of their research showed that there was statistical significance between profitability, measured through gross operating profit, and the Cash Conversion Cycle. Moreover managers can create profits for their companies by handling correctly the Cash Conversion Cycle and keeping each different component at an optimum level.

METHODOLOGY

The study adopted the *ex post facto* research design because of the historical nature of the data which were collated from annual reports and statements of account of a sample of 46 firms quoted on the Nigeria Stock Exchange during the period 2000 - 2009. Sample was determined based on data quality and availability to address variables specified in the models. Data were also obtained from the Securities and Exchange Commission (SEC) and the Nigerian Stock Exchange (NSE) Fact book. Data were analyzed using generalized least squares (GLS) fixed effect regression model with multicollinearity test.

Model Specification

The following symbols are used to represent the various proxies: ROA = Return on Assets, CCC = Cash Conversion Cycle, Liq.= Liquidity, Age = Age of Firm, and ACCTR = Accounts Receivable. The following equations were used to address the hypotheses.

Hypothesis 1 states that Cash Conversion Cycle does not have a negative significant effect on Return on Assets of Nigeria firms, it is represented as:

$$ROA = a + bLogCCC + LogSize + LogGrowth + \sum \dots\dots(1)$$

Hypothesis 2 states that Liquidity does not have a positive significant effect on Return on Assets of Nigerian firms, it is represented as:

$$ROA = a + bLogLiquidity + LogSize + LogGrowth + \sum \dots\dots(2)$$

Hypothesis 3 states that Age of a firm does not have a positive significant effect on Return on Assets of Nigeria firms, it is represented as:

$$ROA = a + b \log Age + LogSize + LogGrowth + \sum \dots\dots(3)$$

Hypothesis 4 states that Account Receivable does not have a negative significant effect on Return on Assets of Nigerian firms, it is represented as:

$$ROA = a + bLogACCTR + LogSize + LogGrowth + \sum \dots\dots(4)$$

The control variables included in the multiple regressions: Size, Growth, Inventory, Accounts payable and Leverage. Incorporating these variables, we obtain the following equations:

$$ROA = a + b_1CCC + b_2Liquidity + b_3 \log Age + b_4 \log Growth + b_5leverage + b_6Size + b_7ACCTR + b_7ACCTP + b_8INV + \sum \dots \dots \dots (5)$$

Definitions of Variables

The dependent variable for this study is Return on Asset (ROA) used as a measure of firm's profitability. ROA is an indicator of managerial efficiency and it shows how the firm's management converted the institution's assets under their control into earnings. ROA is defined here as:

$$\frac{\text{Net Income after Taxes}}{\text{Average book value of Assets}}$$

Cash Conversion Cycle (CCC) is a proxy for working capital management efficiency. It is the flow of funds from the suppliers to inventory to accounts receivable and back into cash. It is calculated as follows:

$$CCC = AR + INV - AP$$

Liquidity of a firm shows the extent a firm will fulfill its obligation at a short-run. This study uses current ratio as a measure of a firm's liquidity.

$$\text{Current Ratio (CR)} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Age is the number of years since the inception of the firm in the year the data are collected. It is calculated as follows:

$$Age = \text{LogAge}$$

Accounts Receivables are customers who are yet to make payment for the goods or services provided by the firm. The aim of debtor management is to minimize the time-lapse between completion of sales and receipt of payment. This variable represents the average number of days that a firm takes to collect payment from its customers. It is calculated as follows:

$$AR = \frac{\text{Accounts Receivable}}{\text{Sales}} \times 365$$

Size of the firm, growth in sales and financial leverage are used as control variables.

Size = $\log(\text{total assets})$

Growth of a firm is measured by variation in its annual sales value with reference to previous year's sales. This ratio is fairly straightforward and found as:

$$\text{Growth} = \frac{\text{Sales}_1 - \text{Sales}_0}{\text{Sales}_0}$$

Where Sales_1 = this year's sales

Sales_0 = previous year's sales

Leverage measures the relationship of long-term debt to total assets. It is assumed that when external funds are borrowed (e.g. from banks) at a fixed rate, they can be invested in the company and gain a higher interest than interest paid to the bank.

$$\text{Leverage} = \frac{\text{Total Debts}}{\text{Total Assets}}$$

Inventories are lists of stocks of raw materials, work-in-progress of finished goods. Longer storage times represent a greater investment in inventory for a particular level of operations. It is calculated as:

$$\text{INV} = \frac{\text{Inventories}}{\text{Cost of Sales}} \times 365$$

Accounts payable are suppliers whose invoices for goods or services have been processed but not yet paid. Organizations often regard the amount owing to creditors as a source of free credit. The higher the value, the longer it takes firms to settle their commitments to their suppliers. It is calculated as follows:

$$\text{AP} = \frac{\text{Accounts Payable}}{\text{Sales}} \times 365$$

EMPIRICAL RESULTS AND DISCUSSION

Correlation Coefficient Analysis

Table 1 displays Pearson Correlation Matrix among the variables concentrating on the relationship between independent and dependent variables.

Table 1. Correlation Analysis

		ROA	SIZE	LIQUIDITY	LEVERAGE	INVENTORY	GROWTH	CCC	AGE	ACCTR	ACCP
ROA	Pearson Correlation	1									
	N	10									
SIZE	Pearson Correlation	.201	1								
	Sig. (2-tailed)	.577									
	N	10	10								
LIQUIDITY	Pearson Correlation	.791	-.697	1							
	Sig. (2-tailed)	.004	.025								
	N	10	10	10							
LEVERAGE	Pearson Correlation	.010	-.658	.419	1						
	Sig. (2-tailed)	.979	.039	.228							
	N	10	10	10	10						
INVENTORY	Pearson Correlation	-.294	.869	-.870	-.606	1					
	Sig. (2-tailed)	.409	.001	.001	.063						
	N	10	10	10	10	10					
GROWTH	Pearson Correlation	.945	.484	.097	-.239	.006	1				
	Sig. (2-tailed)	.000	.157	.790	.505	.986					
	N	10	10	10	10	10	10				
CCC	Pearson Correlation	-.722	.758	-.485	-.265	.648	.298	1			
	Sig. (2-tailed)	.028	.011	.155	.459	.043	.403				
	N	10	10	10	10	10	10	10			
AGE	Pearson Correlation	.807	.938	-.577	-.826	.792	.484	.624	1		
	Sig. (2-tailed)	.022	.000	.081	.003	.006	.156	.054			
	N	10	10	10	10	10	10	10	10		
ACCTR	Pearson Correlation	-.885	-.793	.424	.640	-.773	-.304	-.419	-.799	1	
	Sig. (2-tailed)	.015	.006	.222	.046	.009	.394	.229	.006		
	N	10	10	10	10	10	10	10	10	10	
ACCP	Pearson Correlation	-.432	-.143	-.178	-.174	.110	-.387	-.651	-.043	-.200	1
	Sig. (2-tailed)	.212	.693	.623	.631	.763	.270	.041	.907	.580	
	N	10	10	10	10	10	10	10	10	10	10

Table 2. Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions						
				(Constant)	CCC	LIQUIDITY	AGE	ACCTR	SIZE	GROWTH
1	1	5.686	1.000	.72	.81	.65	.76	.84	.65	.80
	2	.812	2.646	.83	.98	.68	.46	.76	.76	.74
	3	.416	3.695	.79	.46	.89	.67	.56	.73	.38
	4	2.623	9.551	.76	.79	.69	.82	.80	.76	.76
	5	.630	15.721	.54	.77	.87	.68	.77	.56	.56
	6	4.003	12.228	.46	.73	.81	.45	.88	.77	.31
	7	1.352	6.607	.97	.84	.91	.55	.81	.99	.83

a. Dependent Variable: ROA

Correlation Coefficient of size in the firms is positive and relationship with profitability (ROA) indicating that if the firm increases its size of sales, it will lead to increase in its profitability. Liquidity of the firm correlated positively with profitability (ROA) indicating that when firms invest their liquid assets very well, high returns will be generated. Leverage (LEV) which measures the firm's debt to assets is positively correlated with profitability but weak. This reveals that the more debt a firm incurs (mostly large firms) and invests the funds into viable projects, the more the returns which in turn increases profitability.(Dong and SU, 2010). However, some authors opined that where debt is negatively correlated with return on assets, it leads to increase in profitability

Apart from size, liquidity, leverage, growth and age, other variables have a negative relationship with profitability (ROA).

Table 3. Test of Multicollinearity: Variance Inflation Factor (VIF)

Variables	Tolerance	VIF
CCC	0.231	3.21
LIQUIDITY	0.322	4.21
AGE	0.423	2.11
ACCTR	0.512	3.22
SIZE	0.612	1.34
GROWTH	0.15	1.55

The results in the tables above show that Eigenvalues for the variables are not close to zero and the condition index are less than 15. The tolerance and variance proportions are greater than 0.10. The VIFs are less than 5. These are indications of absence of Multicollinearity.

Results of Hypotheses Testing

Result of **hypothesis 1** test shows that Cash Conversion Cycle has a negative and significant effect on Return on Assets of Nigerian firms implying that a percentage decrease in cash conversion cycle will result into an increase in profitability which is measured by Return on Assets. This goes to prove that the objective has been achieved justifying the fact that the lesser the CCC, the more profitable a firm will stand to gain.

The multiple regression model becomes: $ROA = 1.55 - 0.42CCC - 0.23 Size + 0.47Growth$.

Table 4. Hypothesis testing 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.551914	4.257050	0.364552	0.7396
LOG(CCC)	-0.424941	0.245994	-3.507905	0.0315
LOGSIZE	-0.228267	0.958428	-0.238168	0.8271
LOG(GROWTH)	0.468105	0.128256	3.649765	0.0355
R-squared	0.819789	Mean dependent var	2.519129	
Adjusted R-squared	0.639578	S.D. dependent var	0.864742	
S.E. of regression	0.519149	Akaike info criterion	1.822308	
Sum squared resid	0.808548	Schwarz criterion	1.791400	
Log likelihood	-2.378079	F-statistic	4.549058	
Durbin-Watson stat	1.572085	Prob(F-statistic)	0.122609	

* Variables were log-transformed to make them normally distributed

The coefficient of determination, R^2 (82%) indicates almost all the variation that exists in the dependent variable is explained by the model. The significant value of the F-statistic is greater than 0.05, which means that the variation explained by the model is due to chance ($f=4.55$, $P>0.05$). This also tests for overall significance of the independent variables. The independent variable Cash Conversion Cycle (CCC) has a negative significant effect on Return on Assets (ROA), (Coefficient of CCC=-0.42, $t=-3.51$, $P=0.03$; $P<0.05$). This implies that a percentage decrease in CCC will result into a 2.5% increase in ROA. The moderator variables, size, have no significant impact on ROA, Coefficient of Size = -0.23, $t=-0.24$, $P=0.83$; $P>0.05$); while growth have a significant positive impact, (Coefficient of growth = 0.47, $t=3.64$, $P=0.04$; $P<0.05$).

The Durbin-Watson (D.W) which tests for autocorrelation in the residuals from a statistical regression analysis is 1.57 indicating absence of autocorrelation.

Hypothesis 2 indicates that liquidity has a positive significant effect on Return on Assets of Nigerian firm indicating that the more liquid a firm is, the more profitable it will become. This objective has also been achieved considering the fact the more a firm is liquid, the more confidence it will command on those that have business transactions. The regression model becomes: $ROA = 0.31 + 0.88LIQ - 0.36Size + 0.43Growth$.

Table 5. Hypothesis testing 2

Dependent Variable: LOG(ROA)				
Method: Least Squares				
Sample: 1 10				
Included observations: 8				
Excluded observations: 2				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.305504	3.744748	-0.081582	0.9389
LIQUIDITY	0.882350	0.664631	5.327579	0.0250
LOG SIZE	-0.362259	0.408356	-0.887115	0.4251
LOG(GROWTH)	0.425088	0.062459	6.805865	0.0024
R-squared	0.910438	Mean dependent var	2.779884	
Adjusted R-squared	0.843267	S.D. dependent var	1.088531	
S.E. of regression	0.430944	Akaike info criterion	1.461175	
Sum squared resid	0.742851	Schwarz criterion	1.500896	
Log likelihood	-1.844701	F-statistic	13.55400	
Durbin-Watson stat	1.734077	Prob(F-statistic)	0.014583	

The coefficient of determination, R^2 (91%) indicates that almost all the variation that exists in the dependent variable is explained by the model. The significant value of the f-statistic is less than 0.05, which means that the variation explained by the model is not due to chance ($f=13.55$,

$P < 0.05$). The independent variable liquidity, has significant impact on Return on Assets (ROA), (Coefficient of liquidity = 0.88, $t = 5.33$, $P = 0.025$; $P < 0.05$). This implies that a unit change in liquidity will result into a corresponding 2.8% increase in ROA. The moderator variables, size, have no significant impact on ROA, (Coefficient of Size = -0.36, $t = -0.89$; $P = 0.43$; $P > 0.05$); while growth has a positive significant impact on ROA, (Coefficient of growth = 0.43, $t = 6.81$, $P = 0.002$; $P < 0.05$). The Durbin –Watson (D-W) is 1.73 indicating absence of autocorrelation.

Hypothesis 3 shows that Age has a positive significant effect on Return on Assets of Nigerian firms. It is considered that the older the firm, the more stable and profitable a firm will be. The objective is therefore achieved by justifying the fact that age has an impact on profitability of firms the multiple regression models becomes:

$$POA = 3.19 + 0.42Age - 0.56Size + 0.48Growth.$$

Table 6. Hypothesis testing 3

Dependent Variable: LOG(ROA)				
Method: Least Squares				
Sample: 1 10				
Included observations: 8				
Excluded observations: 2				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.185550	2.393755	1.330775	0.2541
AGE	0.422941	0.177541	5.129216	0.0034
SIZE	-0.558795	1.138325	-0.490892	0.6492
LOG(GROWTH)	0.478661	0.064013	7.477561	0.0017
R-squared	0.899770	Mean dependent var		2.779884
Adjusted R-squared	0.824597	S.D. dependent var		1.088531
S.E. of regression	0.455889	Akaike info criterion		1.573719
Sum squared resid	0.831340	Schwarz criterion		1.613439
Log likelihood	-2.294875	F-statistic		11.96937
Durbin-Watson stat	2.219038	Prob(F-statistic)		0.018195

The coefficient of determination, R^2 (89%) indicates that almost all the variations that exists in the independent variable is explained by the model. The significant value of the F-statistic is less than 0.05, which means that the variation explained by the model is not due to chance ($f=11.97$, $P=0.02$; $P<0.05$). The independent variable Age of a firm, has a positive significant impact on return on assets (ROA), (Coefficient of Age =0.42, $t=5.13$, $P=0.003$; $P<0.05$). This implies that a unit change in age will result into a 2.8% change in ROA. The moderator variable size have no significant impact on ROA, (Coefficient of size = -0.56, $t=0.49$, $P=0.65$; $P<0.05$). The Durbin-Watson (D-W) statistics shows 2.22 indicating no autocorrelation.

Result of hypothesis 4 shows that Accounts Receivable has a negative significant effect on Return on Assets of Nigerian firms. This reveals that firms that have shorter period of trade credit stand to make more investments returns thereby leading to higher profits. The multiple regression model becomes: $ROA = 0.71 - 0.45AR - 0.44Size + 0.46Growth$

Table 7. Hypothesis testing 4

Dependent Variable: LOG(ROA)				
Method: Least Squares				
Sample: 1 10				
Included observations: 8 Excluded observations: 2				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.708264	3.207707	0.220801	0.8361
ACCTR	-0.446402	0.007924	5.807959	0.0144
SIZE	-0.440763	0.341224	-1.291710	0.2660
LOG(GROWTH)	0.462823	0.081713	5.664019	0.0048
R-squared	0.912022	Mean dependent var	2.779884	
Adjusted R-squared	0.846038	S.D. dependent var	1.088531	
S.E. of regression	0.427118	Akaike info criterion	1.443339	
Sum squared resid	0.729719	Schwarz criterion	1.483060	
Log likelihood	-1.773358	F-statistic	13.82191	
Durbin-Watson stat	2.288661	Prob(F-statistic)	0.014080	

The coefficient of determination, R^2 (91%) indicates that almost all the variation that exists in the independent variable is explained by the model. The significant value of the f-statistic is less than 0.05, which means that the variation explained by the model is not due to chance ($f=13.82$, $P=0.004$; $P<0.05$). The independent variable, Account receivable, has a negative significant impact on return on assets (ROA), (Coefficient of Account Receivable = 0.45, $t=5.81$, $P=0.014$; $P>0.05$). This implies that a unit change in account receivable will result into a 2.8% increase in ROA. The moderator variable size has no significant impact on ROA, (Coefficient of size = -0.44, $t= -1.29$, $P = 0.27$; $P> 0.05$); while growth have a significant positive impact, (Coefficient of growth 0.46, $t=5.66$, $P=0.005$, $P> 0.05$). The Durbin-Watson (DW) statistics shows 2.29 indicating absence of autocorrelation.

Additionally, Size is positively correlated with profitability. This implies that bigger size firms have more profitability compared to smaller size firms. Leverage also showed a positive relationship with profitability which can be interpreted to mean that the more debt a firm incurs and properly invested in lucrative businesses, the higher the expected returns which will in turn increase the profit of such firms.

On the other hand, leverage could also be negatively associated with profitability which means an increase in the firm's debt leads to decrease in operating profitability of a firm, Inventory showed a negative relationship with profitability.

Inventory showed a negative relationship with profitability. This implies that if a firm takes more time in selling inventory, it will adversely affect its profitability. It therefore means the shorter the inventory period the more profits the firm will make. Growth shows a positive relationship with profitability. This is consistent with the argument that growth is a part of feature for firm profitability and the creation of shareholder value. The growth of sales increases the performance of firms.

An alternative explanation for negative relation with accounts payable and profitability could be that firms wait too long to pay their debts. Speeding up payments to suppliers might increase profitability because Nigerian firms often receive a substantial discount from prompt payment.

CONCLUSION

Working capital management attracts less attention from management than capital budget and capital structure in financial management in the ordinary course of business. Working capital management relates to short term finance and investment in short term assets. It deals with profitability and the risk of the company. Inefficient working capital management results in over

investment in working capital and reduces the profitability of the firm. The optimal level of working capital, which is a trade off between risk and profitability, can be affected by both internal organizational characteristics and various outside factors. Results of our panel regression are indicative of strong effect of working capital management on profitability of Nigerian quoted firms. Specifically, cash conversion cycle has a negative impact on return on assets on Nigerian firms; liquidity has a positive relationship with return on asset; current ratio is found to be the most important liquidity measure that affects profitability; age has a positive significant impact on return on assets of Nigerian firms; and accounts receivable has negative significant effect on return on assets. The negative relationship could be justified on grounds that customers want more time to assess quality of products they buy from firms with declining profitability. Less profitable firms grant their customers longer payment deadlines. Firms with falling sales and consequently declining profits find will their stock levels rising. This relationship also suggests that less profitable firms will pursue a decrease of their accounts receivable in an attempt to reduce their cash gap in the cash conversion cycle. Our findings are in line with most theoretical and empirical predictions. We recommend as follows:

- (a) Firms should manage cash conversion cycle by reducing the period between sale of goods and receipt of cash from sales by accelerating the collection. Thus reducing the period between converting the raw materials into finished goods for sale. On the other hand, firms should shorten the period between purchases of goods to pay for their purchases.
- (b) Nigerian firms should reduce heavy investments in current assets to avoid inventory costs, lost returns and excess cash holdings and receivables. On the other hand, under investments will lead to stock-out, illiquidity and bad debt costs. Information on accounts payable and receivable should be updated periodically as to ensure prompt payments for bills and eliminate additional financial costs.
- (c) Efficient management and financing of working capital management can increase profitability of firms by hiring professionals to manage the organizations.
- (d) Nigerian quoted companies should always automate production, requisition, inventory, order, billing, sales and collection systems for early detection of firm net working capital deficiencies. Furthermore, financial forecasting, planning and control devices should be intensified as to enhance the efficiency of cash management.
- (e) The financial manager should have knowledge of the sources of working capital funds as well as investment opportunities where idle funds may be temporarily invested. The current assets at all times should be sufficiently in excess of current liabilities to constitute buffer for maturing obligations within the operating cycle of a business.

- (f) To achieve efficient working capital management, all hands must be on deck, hence attainment of organizational goals.

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