Working Capital Management and Corporate Performance of Quoted Consumer Goods Sector in Nigeria: A Panel Data Approach

Abstract

Effective management of working capital management (WCM) has always been key to corporate profitability and survival. Specifically, the impact of cash conversion cycle (CCC), current ratio (CUR), quick asset ratio (QAR), asset turnover ratio (ATR), Average Payment Period (APP), Average Collection Period (ACP), and Inventory Collection period (ICP) on return on asset (ROA) of listed Nigerian Consumer goods sector from 2010 to 2018 covering 120 cross-sectional units. To ensure that the findings of the study are reliable, accurate, and valid, the study was further subjected to diagnostic tests using the Lagrange Multiplier Tests for Random Effects, Hausman test, and the cross-sectional dependence test. Accordingly, the Hausman test supports the Random Effect Model (REM) while the cross-sectional dependence test revealed that the variables of each company is unique and are independent of those of other companies in the sample. Findings emanating from the REM confirmed a mixed relationship between WCM and ROA. Specifically, the study found that managers can achieve high profitability if it addresses all inventory management issues since quick ratio and inventory conversion period exerted negative insignificant impact on firm performance. Again, the study found that the current ratio, quick asset ratio, and asset turnover ratio are the main determinants of corporate performance. Hence, the study concludes that WCM is the most efficient way firms can achieve outstanding success. To this end this paper recommends that if firms in the Nigerian consumer goods sector must achieve their core objective of maximizing high returns and minimizing risk, they must pay full consideration on current ratio, quick ratio, and asset turnover ratio.

Keywords: *working capital management*, Corporate Performance, Consumer Goods Sector, Panel Data Approach

1. Introduction

The issue which revolves around the nexus between working capital management (WCM) and corporate performance remains yet a perturbing issue in accounting research. This is because despite the crucial role of WCM in enhancing corporate performance, most once acclaimed highly profitable factories in the likes of Kastina steel rolling mill co. ltd, Aba textile Mills ltd Aba, Golden Guinea Breweries Umuahia, Niger sugar Company Bacita and the rest had all went down the drain and the aftermath has led to unplanned layoff of many workers. In addition, in 2007, the Ajakuta steel company reduced its work force 10000 as against 5000 workers which they once had. Meanwhile, few firms were unable to pay dividend to their share-holders while some others were acquired by others. Notably, Savannah sugar company ltd was acquired by Dangote industries limited in 2002 and the problem was traceable to poor working capital management problem.

Furthermore, the current thrust of empirical study on the relationship between WCM and corporate performance is directed towards formulating policies on the appropriate current asset-liability mix which maximizes a firm's profitability while minimizing its risk. More so, extant literatures on WCM revealed that WCM exerts significant negative effect on firm's performance, while others revealed insignificant negative effect and examples of these studies are reported in: Senthilmani, 2013; Caballero, Teruel& Solano 2014; Enqvist, Graham &Nikkinen 2014; Maria & Paulo, 2015; Li, 2016. However, other previous studies that proxy performance by return on capital employed and earnings per share revealed that, WCM exerts significant positive effect on performance (see the findings of Mohammad, 2011; Madugba&Ogbonnaya, 2016). Again, it is notable that a significant portion of the existing research concentrates on developed rather than

on developing economies (Alavinasab & Davoudi, 2013; Nduta, 2015). Thus, the lack of consensus calls for further research.

From the foregoing, it is then debatable whether the working capital methodologies used on firms in the developed economies can apply to firms within the developing economies whose contrasting economic conditions affect them in distinct ways. Although, the contributions made by these authors cannot be ignored, an investigation into the current WCM methodologies is necessary to capture the latest developments in this vital aspect of firms' operations. Such knowledge will help to inform current policies, practices and future studies on WCM within the context.

Lastly, the dearth in empirical studies on WCM in the Nigerian consumer goods sector has created a gap between policy makers and practitioners which to a large extent warrants attention. Hence, in attempting to fill this perceived knowledge gap, this study assesses the impact of WCM on the corporate performance of the Nigerian consumer goods sector using a panel data approach. Specifically, the study x-rayed the impact of cash conversion cycle (CCC), current ratio (CUR), quick asset ratio (QAR), asset turnover ratio (ATR), Average Collection Period (ACP), Average Payment Period (APP), and Inventory Collection period (ICP)on return on asset of listed Nigerian Consumer goods sector from 2010 to 2018.

This study is very significant to the following stakeholders:

1. This study will be of use to security analysts, financial analysts, stock brokers and other parties whose knowledge of the subject matter is an important input into investment analysis and portfolio investments.
2. Management of the Nigerian consumer goods sector can use this research to effectively manage both their current assets and liabilities.
3. This study will help to build up on existing body of knowledge and theories on the subject matter.
4. The study will shed more light on how firms in the Nigerian consumer goods sector can both its current assets and liabilities to increase its returns.
5. This research will serve as a preparatory ground for future research on the subject matter.

In synopsis, the rest segments of this paper cover literature reviews and hypotheses formulation, analytical methodology, results and discussions, alongside summary, conclusion, and recommendations.

2. Literature Reviews and Hypotheses Formulation

This subsection covered the conceptual linkages and theoretical underpinning alongside the empirical studies, gaps, and hypotheses formulation.

2.1. Conceptual Linkages and Theoretical Underpinning

Corporate performance sector is greatly impacted by working capital decisions which they make given the fact that WCM primarily entails how best management use both its current assets (cash, short-term securities debts i.e. accounts receivables, inventories, and bills receivables) and current liabilities (accounts payable, short term loans, and bank overdraft) to meet daily business needs without necessarily disrupting the firm's decision to invest its assets in productive adventures (Iqbal & Wang, 2018; Li, 2016;Madugba, & Ogbonnaya, 2016).

Although, endless WCM and corporate performance proxies exist in literature, this study only focused on cash conversion cycle (CCC), current ratio (CUR), quick asset ratio (QAR), asset turnover ratio (ATR), Average Payment Period (APP), Average Collection Period (ACP), and Inventory Collection period (ICP)on return on asset of listed Nigerian Consumer goods sector.

The implication of this conceptual linkage is that, all the targeted WCM indicators increases return on asset.

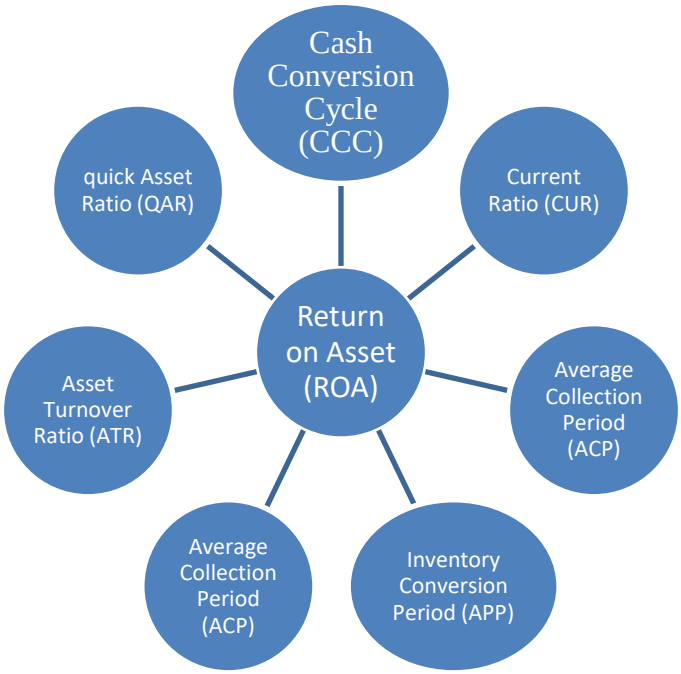

Figure 1: Working Capital Management and Corporate Performance Paradigm
Source: Researcher's Conceptual Model (2020)

Theoretically, this study supports the proposition of the risk and return theory. This theoryis one of the most renowned theories in portfolio management (Mukherji, Desai &Wright, 2008). This theory believes that an individual decision to invest is guided by two principles: risk and return theory which tend to be highly conflicting (Richard, Stewart & Franklin, 2008). Hence, classified investors based on their investment and risk appetite into risk seekers and risk averters (Tiegen & Brun, 1997). While the focuses on the opportunities for gain not necessarily minding the risk involvement, the risk averters tend to overestimate losses and underestimate gains.

Linkage of Theory into the Study

In order to integrate this theory into the study, it is highly imperative to stress that one of the cardinal objective ofWCM is the trade-off between liquidity and profitability in that if a firm is chooses to be highly liquid, then it must beready to be less profitability and vice-versa. Notably, either of these two (2) conflicting yet important decisions may result in either excess or shortage of the components of working capital (see table 1 below):

Table 1: Theoretical Relationship between Working Capital Components and Profitability.

S/N	Components of Working Capital	Excess Working Capital	Shortage Working Capital
1	**Cash**	It is considered as non-earning and this reduces profitability	Itbrings aboutilliquidity resulting from the firm's inability to meet maturing obligations. Hence,it ultimately reducesfirm profit.
2	**Receivables**	It is associated with collection of effort, costs, risk associated with defaults and low profit	Turnover will be low, and so the profitability.
3	**Inventory**	Price decline associated carrying costs, opportunity cost of funds. These also affect profit adversely.	Limited supplies, tends to interrupt production schedules, lower sales as well as profits.

Source: Adapted from Extant Literature

Furthermore, when we look inwardly at a firm's ability to determine what should constitute a firm's receivables, inventories, incentives and stocks in relation to its profitability objectives are all within the context of risk and return theory.

2.2. Empirical Studies, Gaps, and Hypotheses Formulation

This sub-section presents a review of prior studies carried out on the link between WCM proxies and corporate performance.

2.2.1. Cash Conversion Cycle and Corporate Performance

Idris and Yahaya (2018) examined the effect of WCM on profitability of the Nigerian quoted bottling company from 2001-2014 and discovered that CCC amongst others exhibited positively and significantly influenced the profitability of the Nigerian bottling company. Hence, the researchers recommend that, to enhance its profitability, management must have to optimize its CCC. However, the study is limited in scope in that it was only restricted to the Nigerian quoted bottling company.

Murtala and Saidu (2016) empirically investigated the effect of CCC on the profitability of listed ICT firms from 2010-2014. The multivariate analysis was used to test the formulated hypotheses. The findings indicate that CCC impact corporate profitability. However, this study is fairly outdated.

Conversely, Mahmoud, Amir, and Ali (2015) studied the effect of CCC on the profitability of three (3)separate firms. Multivariate linear regression analysis was used to test the hypothesis. Overall, the results indicated that the higher the CCC, the lower the performance of the three selected firms. However, this empirical study is fairly out-of-date and was not domiciled in the Nigerian consumer goods sector.

Kajola, Nwaobia, and Adedeji (2014) examined the impact of WCM on firms' financial performance of 30 targeted listed manufacturing firms from 2004-2010. The study reaffirmed that CCC is negatively and significantly related with firm's financial performance (ROA) of the Nigerian manufacturing sector. However, this study is fairly out-of-date and was not domiciled in the Nigerian consumer goods sector.

Furthermore, Mengesha, Seyoum and Gizaw (2014) and Takon (2013) in separate studies discovered that CCCis negatively and significantly related with firm performance. However, these studies are fairly out-of-date and were not domiciled in the Nigerian consumer goods sector. Hence, we hypothesize:

$H0_1$: Cash conversion cycle does not affect return on asset of the Nigerian Consumer goods sector significantly.

2.2.2. Current Ratio and Corporate Performance

Nwude and Agbo (2018) examined the impact of ACP on the profitability of quoted insurance companies in Nigeria from 2000 to 2011. The data obtained were utilized in running a cross-sectional regression analysis. The descriptive statistics and correlation matrix were obtained with the aid of the E-view version 9.0. The results show that current ratio amongst others had positive impact on profitability of quoted insurance companies in Nigeria. However, this study was not domiciled in the Nigerian consumer goods sector.

Rizwan (2016) examined the impact of the liquidity management on the performance of 64 Pakistani non-financial companies from 2006-2011. The multivariate regression analyses indicated that liquidity management proxies (current ratio amongst others) have high significant

positive impact on profitability proxy (ROA). However, this study is foreign-based and may not be address WCM issues in Nigeria.

Takon and Atseye (2015) examined the effect of WCM on profitability of Nigerian listed firms from 2000-2009. The panel data was used and the model supports the fixed effects model. The result evidenced that both current ratio and profitability are linearly related and tends to be strong as well. However, this study is foreign-based and may not be address WCM issues in Nigeria.

Iqbal, Ahmad and Riaz (2014) in their study on the relationship between WCM and the profitability of listed firms in Pakistan and discovered that proper management of current asset would result to increased fir profitability. However, this study is foreign-based and may not be address WCM issues in Nigeria. Hence, we hypothesize:

$H0_2$: Current ratio does not affect return on asset of the Nigerian Consumer goods sector significantly.

2.2.3. Quick Asset Ratio and Corporate Performance

Akhor and Jafaru (2015) investigated performance evaluation through ratio analysis of the selected quoted companies in Nigeria from 2009 to 2013. The study employed descriptive statistic, Pearson correlation matrix and simple OLS regression technique. The empirical findings using the simple regression techniques revealed that current ratio and quick ratio are significantly and negatively related to the selected quoted companies' performance. However, this study is fairly out-of-date.

Zawaira and Mutenheri (2013) affirmed that ICP, CCC, QUR, CUR, account receivables collection period, among other measures are not in any way related to firm performance. Rather, profitability was enhanced by the firm's liquidity position and its size. However, this study is foreign-based and may not be address WCM issues in Nigeria.

Using the OLS methodology, Usama (2012) discovered that quick ratio has a significant positive influence on the profitability of firms in the Pakistan food sector from 2006 to 2010. However, this study is foreign-based and may not be address WCM issues in Nigeria. Hence, we hypothesize:

$H0_3$: Quick asset ratio does not affect return on asset of the Nigerian Consumer goods sector significantly.

2.2.4. Asset Turnover Ratio and Corporate Performance

Using the OLS methodology, Enekwe (2015) discovered thattotal assets turnover ratio,interest coverage (IC), debtors' turnover ratio have positive statistical significant with the targeted quoted oil and gas firms in Nigeria from 2008 to 2012. However, this study is faced with series of methodological weaknesses.

Again, using the same OLS methodology, Warrad (2014) reaffirmed that quick ratio and asset turnover ratio have positive statistical significant impact on the Jordanian services sectors' profitability from 2009 to 2012. However, this study is foreign-based and may not be address WCM issues in Nigeria.

Again, Usama (2012) discovered that asset turnover ratio has positive statistical significant with corporate profitability in the Pakistan food sector from 2006 to 2010. However, this study is fairly outdated and is foreign-based. Hence, we hypothesize:

$H0_4$: Asset turnover ratio does not affect return on asset of the Nigerian Consumer goods sector significantly.

2.2.5. Average Payment Period (APP) and Corporate Performance

Madugba and Ogbonnaya (2016) empirically investigated the impact of WCM on financial performance of manufacturing companies in Nigeria. The study employed multiple regressions

in analyzing the data sourced from the published financial statement of the selected firms. The study evidenced that APP and ACP positively impacts on selected manufacturing firms' performance. However, the researcher used just a segment of the industrial sector but we focused on the industrial sector on the whole.

Muya and Gathogo (2016) examined the effect of APP and CCC on profitability of manufacturing firms in Kenya. The study targeted 156 employees in Nakuru town in Kenya but later used a sample of 62 valid respondents through the instrumentality of the stratified random sampling approach. The study strongly evidenced that both APP and CCC were significantly related to profitability of selected manufacturing firms. However, the use of secondary data would have made the research more robust.

Iyewumi, Remy, and Omotay (2015) explored the relationship between working capital management and firm's profitability in the Nigerian oil and gas sector from 1995 to 2011. The results affirmed that cash conversion cycle, average days' receivables, average days payables, average days inventories all affected firm performance positively.

Kolapo, Oke, and Ajayi (2015) evaluates the effect of working capital management (WCM) on corporate performance of selected listed firms in Nigeria from 2001-2010. The findings reveal that average payment period did not affect ROA significantly. Hence, we hypothesize:

$H0_5$: Average Payment Period does not affect return on asset of the Nigerian Consumer goods sector significantly.

2.2.6. Average Collection Period and Corporate Performance

Onuorah and Ifeacho (2017) affirmed that average collection periods are negatively correlated with return on assets of selected Nigerian manufacturing firms from 2010 to 2014. The study affirmed that average collection periods are negatively correlated with return on assets. The authors therefore recommend that the sales department of a company ought to make use of adequate credit policy for efficient operations.

Okpe and Duru (2015) affirmed that ACP has significant and positive effect on the profitability of building materials, chemical and plant manufacturing firms in Nigeria while debt ratio and sales growth rate have negative and non-significant effect on these companies.

Mohammad and Mahum (2014), explores WCM and corporate performance using 2007-2011 annual reports of cement, chemical and engineering sectors of Pakistan. The results of Pooled ordinary least squares method indicate that average payment period negatively related to performance while CCC has a positive significant association with return on equity (ROE). However, ACP, operating cycle and age of inventory have no significant association with ROE. However, this study is fairly out-of-date and is foreign-based.

Conversely, Justyna (2013) investigate the liquidity impact on profitability in listed IT companies in Polish from 2003-2011. APPP, ICP and receivable conversion period, are positively related to profitability of polish listed IT companies'. However, this study is fairly out-of-date and is foreign-based. Hence, we hypothesize:

$H0_6$: Average Collection Period does not affect return on asset of the Nigerian Consumer goods sector significantly.

2.2.7. Inventory Collection Period and Corporate Performance

Using the Generalized least square methodology, Sabo Rabi'U, and Usman (2015) confirmed a positive relationship between ICP and corporate profitability. Meanwhile, ACP and CUR were all positively related to corporate profitability of the 7 listed firms from 2008 to 2012. However, this study is fairly out-of-date.

Osundina and Osundina (2014) affirmed that ICP, CCC, ICP amongst others increased the market value of quoted food and beverages manufacturing firms in Nigeria to a meaningful extent. However, this study is fairly outdated.

Panigrahi (2013) found that ICP dampens firm profitability to a meaningful extent. Meanwhile, the study spanned from 2001-2010.However, this study is foreign-based and may not be address WCM issues in Nigeria.

Napompech (2012) examined the effects of WCM on profitability of sampled 255 companies in Thailand from 2007 to 2009. The results proved that ICP dampens firm profitability to a meaningful extent. However, this study is foreign-based and may not be address WCM issues in Nigeria. Hence, we hypothesize:

$H0_7$: Inventory turnover period does not affect return on asset of the Nigerian Consumer goods sector significantly.

3. Analytical Methodology

3.1. Research Design, Population, Sample Size, and Sample Size deter

The ex-post facto research design was deemed appropriate for the study since the data used already occurred. Further, the study covers the 20 consumer goods firms listed on the NSE from 2009 to 2018. However, only a sample size of 12 firms was selected using the Purposive (Judgmental) sampling technique. The criteria set for the selecting the sample size includes:

- The selected firms must have complete annual report under the periods review.
- The selected firms must be operational within the period under investigation.
- The selected firms must not be have been fined by the NSE once.
- The selected firms must remain listed on the NSE during the study periods.

3.2. Method of Data Collection and Data Analysis

In conducting this study, documentary evidences from secondary sources was used. The preference of secondary data over the primary data type in the context of this research stems from the fact that it is easy to access and is relatively affordable (data surfing wise). Hence, all relevant documents which were used for the study were collected from the annual reported of the 12 sampled consumer goods firms from 2009 to 2018. Again, we also downloaded some relevant academic research journals.

Furthermore, the study was a panel data study. To make sure that the model is reliable, accurate, and valid, the study was further subjected to diagnostic tests using the Lagrange Multiplier Tests for Random Effects, Hausman test, and the cross-sectional dependence test. More so, the statistical tool used include: descriptive statistics, correlation matrix, t-test (individual significance), F-test (overall significance of the model), R^2 (goodness of fit), and Durbin Watson test (auto-correlation). This has become expedient because of its simplicity, explanatory ability, theoretical plausibility, forecasting ability, and accuracy of the parameter estimates (Burns & Grove, 2003).

3.3. Model Specification

The general form of the multiple regression analysis is given thus,

$Y = b + b1X1 + b2X2 + \ldots + bnXn + e$ (1)

Where:

Y = regressed

bo = constant

b1-bn = coefficient of the regressors

X1-Xn = regressors

e = error term

However, this study adopts and modifies the econometric model used by Idris, M. & Yahaya, A. (2018) and Murtala, Y. & Sani, S. (2016) as we increased WCM proxies to seven proxies. Hence, our modified model is hereby stated as:

$ROA_{it}=\beta_0+\beta_1 CCCit+\beta_2 CURit+\beta_3 QURit+\beta_4 ATRit+\beta_5 APPit+\beta_6 APPit+\beta_7 ICPit+U_t$ …… (1)

Where:

ROA = Return on Asset
CCC = Cash Conversion Cycle
CUR = Current Ratio
QUR = Quick Asset Ratio
ATR = Asset Turnover Ratio
APP = Average Payment Period
ACP = Average Collection Period
ICP = Inventory Collection Period

Notably, the parameter estimates (β1, β2, β3, β4…….B7$^{)}$ accounts for the degree of change of the regressed (ROA) due a unit change of the regressors (CCC, CUR, QUR, ATR, APP, ACP, APP, and ICP). Meanwhile, the error term (Ut) captures the effect of other variables that are not included in the model.

Apriori Expectation

In line with extant empirical studies and the theories which underpin the study, we expect a positive relationship between all WCM proxies (CCC, CUR, QAR, ATR, APP, ACP, ICP) and corporate performance proxy (ROA). Hence, it is therefore mathematically expressed as:

CCC, CUR, QAR, ATR, APP, ACP, ICP>0

Chart 1: Variables Measurement Variables

Sign	Type of Variable	Definition
ROA	**Dependent**	Net operating Profit (after adjustment for interest and tax) /total assets.
CCC	**Independent**	ACP + ICP – APP
CUR	**Independent**	Current assets / current liabilities
QAR	**Independent**	Current assets - Inventory / current liabilities
ATR	**Independent**	Net Sales/ total asset
ACP	**Independent**	Average Account Receivable /Sales
APP	**Independent**	Average Account Payables/ Cost of Sales
ICP	**Independent**	Average Inventory/ Cost of sale

Source: Researchers Variable Measurement, 2020

4. Results and Discussions

This section focuses on the preliminary analysis, presentation, and interpretation of regression results.

4.1. Preliminary Analysis (Robustness Check)

Before running the main regression, the model was subjected to various robustness check vis-à-vis descriptive statistics, correlation analysis, Lagrange Multiplier Tests for Random Effects, the cross-sectional dependence test, and Hausman test. The test results alongside their explanatory notes are presented thus:

4.1.1. Descriptive Statistics

The descriptive statistics are illustrated on the table 2 below where the model variables are explained in terms of their mean, minimum and maximum values.

Table 2: Summary of Descriptive Statistics for the 120 Observations

	ROA	CCC	CUR	QUR	ATR	APP	ACP	ICP
Mean	0.0944	0.1767	1.3355	0.9046	1.0348	0.0912	0.0378	0.2300
Median	0.0786	0.1628	1.1469	0.6970	1.0086	0.0824	0.0307	0.2082
Maximum	0.3256	0.5434	15.084	11.7919	1.8783	0.2889	0.1419	0.6358
Minimum	-0.4416	-0.0462	0.0740	0.0361	0.2444	0.0099	0.0020	0.0625
Std. Dev.	0.1046	0.1054	1.3522	1.0832	0.3701	0.0584	0.0283	0.1051

Source: Research Computation Based on E-Views Output 9.0. (2020)

The descriptive statistic table above shows that, the proxy for firm's financial performance, which is the ROA, is 9.44% with standard deviation of 3.77%. The maximum ROA is 32.56% while the minimum ROA is -44.16%. That shows the firms performed very poorly over the period under study. Again, the variation in firm's financial performance in the consumer goods sector is also low with the standard deviation from the mean being 0.104582.

On current ratio, we establish that it averages 1.335542 with a reported standard deviation of 1.352194 suggesting that the ratio across firms oscillates around the mean. The averages of 1.335542 mean imply that current asset can pay 1.34% of the current liabilities, an indication that firms' current assets can only pay all outstanding current liabilities as and when due only 1.33 times. Again, when inventory is removed, the consumer goods sector current asset can pay 0.90% of its current liabilities.

The asset turnover ratio is 1.034783. This means that it took the revenue of the Nigerian consumer goods sector to outweigh their total asset by 1.034783 times. This is an evidence of good cash to cash management.

The average CCC is 0.18 days. This means that it took, on the average, less than a day to convert stocks into cash. By implication, the average ICP and the CCC are the same. This is because of the fact the average transactions are made on cash basis. The longest CCC is 0.543400 days. This is an evidence of good cash to cash management.

On the average, the Nigerian consumer goods sector takes less than a day to convert their inventory to sales. That is to say, the 0.230012 mean value of the days of ICP indicates that the firms take approximately 0.23 day to change inventory to sales or receivable. The fastest firm that changes the inventory to sale took just less than one day. The slowest firm however took a maximum of one (1) day to change the inventory to sales. That means while the fastest firm took only few hours to convert stocks to sales, the slowest took less than a day. This is a healthy statistics for the industry.

Lastly, the average APP and average ACP are both less than one (1) day. That shows that the average transaction for the industry is on cash basis. The mean value for average APP is 0.091179 while the ACP is 0.037835. The figures are equally healthy for the industry because it enhanced the liquidity of the firms.

4.1. 2. Correlation Analysis

This research employed the use of Pearson's correlation on the data to examine the existence or otherwise of the relationship between and among the study variables. Table 3 below presents the correlation matrix table:

Table 3: Pearson Correlation Matrix for all variables

	ROA	CCC	CUR	QUR	ATR	ICP	APP	ACP
ROA	1.0000							
CCC	0.0018	1.0000						
CUR	0.2123	0.0555	1.0000					

QUR	0.2197	-0.049	0.9839	1.0000				
ATR	0.3214	0.1186	0.1060	0.0335	1.0000			
ICP	0.0431	0.0825	0.0201	-0.0880	-0.0791	1.0000		
APP	-0.0426	-0.2276	-0.0650	-0.0582	-0.3707	0.2994	1.0000	
ACP	-0.2408	0.1918	-0.0018	0.0244	-0.0293	-0.0200	0.1029	1.0000

Source: Research Computation Based on E-Views Output 9.0. (2020)

The correlation analysis in table 3 above clearly reveals that cash conversion cycle, current ratio, quick ratio, asset turnover ratio and inventory collection period are positively correlated with corporate performance proxy (ROA). They clearly indicate that the increase in the selected sector's cash conversion cycle, current ratio, quick ratio, asset turnover ratio and inventory collection period will make the Nigerian consumer goods sector to perform better in terms of ROA. However, average payment period and average collection period are negatively correlated with corporate performance proxy (ROA). This implies that if average payment period and average collection period is not reduced, the sector will not perform better in terms of ROA.

Lastly, the correlation analysis clearly revealed that none of the regressors exhibited high correlation. This suggests the possibility of absence of multi-co linearity problem. This was further reaffirmed by the low variance inflation factor values which are all estimated below 10.

4.1.3. Lagrange Multiplier Tests for Random Effects

Following the submission of Torres-Reyna (2007), the basis of the OLS regression results for both cross-sectional and period effect is to detect omitted variable bias. The Omitted REM was done using the Breusch–Pagan Lagrange Multiplier test supported with the King-Wu and Honda test. The Breusch–Pagan test helps to decide between a simple pooled OLS model and random effect model. The null hypothesis is that cross-section and time effect has no panel effects (equal to zero) while the alternative hypothesis states that cross-section and time effect has panel effects. The results are presented below:

Table 4: Lagrange Multiplier Tests for Random Effects

Null hypotheses: No effects			
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided			
(all others) alternatives			
	Test Hypothesis		
	Cross-section	**Time**	**Both**
Breusch-Pagan	67.07214	0.022257	67.09440
	(0.0000)	**(0.8814)**	**(0.0000)**
Honda	8.189759	-0.149189	5.685541
	(0.0000)	**--**	**(0.0000)**
King-Wu	8.189759	-0.149189	5.248679
	(0.0000)	**--**	**(0.0000)**
Standardized Honda	10.07755	0.068502	3.043836
	(0.0000)	**(0.4727)**	
			(0.0012)
Standardized King-Wu	10.07755	0.068502	2.538070
	(0.0000)	**(0.4727)**	**(0.0056)**
Gourierioux, et al.*	--	--	67.07214
***Mixed chi-square asymptotic critical values:**			
1%	**7.289**		

5%	**4.321**		
10%	**2.952**		

Source: Research Computation Based on E-Views Output 9.0. (2020)

From table 4 above, all the five (5) tests (Breusch-Pagan test, Honda test, King-Wu tests, Standardized Honda tests, and Standardized King-Wu tests) reported that panel effect exist across cross-sections but does not exist across time. This is because while the former has a p-value lower than 5%, the later has a p-value greater than 5%.

4.1.4. Cross-Sectional Dependence test

The Pearson cross-sectional dependence test investigated whether the variables for each firm in the sample are dependent on those of other firms in the sample. When this test is not considered, it may cause contemporaneous correlation thus making the result bias. The result is presented thus:

Table 5: Residual Cross-Section Dependence Test

Test	Statistic	d.f.	Prob.
Pesaran CD	**1.806740**		**0.0708**

Source: Research Computation Based on E-Views Output 9.0. (2020)

Table 5 above accounted for the Residual Cross-Section Dependence Test. The test reported a low test statistics alongside a high probability value of 0.0708. This suggests that the variables of each company is unique and are independent of those of other companies in the sample.

4.1.5. Hausman Test on OLS Regression

Having considered the possibility of cross-sectional effect, we went further to choose between the FEM output and REM on which is preferable, researcher normally relies on the Hausman (1978) specification test. The use of the fixed effect model was based on the fact that the Hausman selection test favoured the random effect model. Hosna (2009) noted that, the Hausman test is a very general test and can be used if two models could be used for the same equation. Again, the H0 states that the random effect model is preferred while the H1 is that only the FEM is consistent. If the null hypothesis is rejected then the REM cannot be used. Accordingly, an abridged form of the Hausman test result is presented below:

Table 6: Correlated Random Effects - Hausman Test

Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random		**4.896623**	**7**	**0.6726**
Cross-section random effects test comparisons:				
Variable	**Fixed**	**Random**	**Var(Diff.)**	**Prob.**
CUR	-0.157565	-0.164296	0.000205	0.6386
QUR	0.207650	0.217640	0.000319	0.5757
CCC	23.836212	12.722602	207.027613	0.4399
ATR	0.168053	0.164263	0.000167	0.7694
APP	23.849201	12.758817	207.402551	0.4412
ACP	-24.396849	-13.369864	206.334059	0.4427
ICP	-23.632697	-12.486348	207.579439	0.4391

Source: Research Computation Based on E-Views Output 9.0. (2020)

The Hausman test above provides evidence in favour of the fixed effect model. This is because the Hausman test reported a low Chi-square value of 4.896623 and a high probability value of 0.6726 which was insufficient to reject the null hypothesis which supports the Random Effect model. Hence, the study used the Random Effect model to test the research hypotheses. This is premised on the fact that, unlike the fixed effects model, the random effect model assumed that

individual-specific variations across entities are uncorrelated and continuous in nature. Again, the random effects model also takes care of the individual differences in units.

4.2. TEST OF HYPOTHESES

The random effect model was used to test the research hypothesis formulated in earlier chapter. The corrected random effect model result is explicitly presented below:

Table 7: Cross-section random effects test equation

Dependent Variable: ROA				
Method: Panel Least Squares				
Date: 09/13/20 Time: 05:52				
Sample: 2009 2018				
Periods included: 10				
Cross-sections included: 12				
Total panel (balanced) observations: 120				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.083867	0.047716	-1.757632	0.0816
CUR	-0.157565	0.050274	-3.134122	0.0022
QUR	0.207650	0.062917	3.300389	0.0013
CCC	23.83621	107.9159	0.220878	0.8256
ATR	0.168053	0.033656	4.993270	0.0000
APP	23.84920	107.9164	0.220997	0.8255
ACP	-24.39685	107.9338	-0.226035	0.8216
ICP	-23.63270	107.9264	-0.218970	0.8271
R^2= 0.626216 (82.62%); Adj. R^2= 0.561653 (56.16%); F-statistic = 9.699333 Prob(F-statistic)= 0.0000; Durbin-Watson stat= 1.738823				

Source: Research Computation Based on E-Views Output 9.0. (2020)

The R^2 value in table 7 above stood at0.626216 suggesting that 62.62% proportion of variation in the ROA is explained by the independent variables. The adjusted R^2 for the model is 0.561653 which means that when the model account for the degree in the loss of freedom (n-k), 56.16% variances in ROA are explained by the regressors. This confirms that WCM is a good in influencing the performance of the firms in consumer goods sector of the Nigeria. Also, the model has f-test significance of 0.0000 which means that the model is fit and significant at 95% confidence level.

Lastly, Durbin-Watson (D-W) test was carried out to test the serial correlation of the explanatory variables. Serial correlation or autocorrelation examine the independence of the error terms of the regressors. The Durbin Watson statistics estimated at1.738823 shows that there is no auto-correlation among the regressors. Auto-correlation exists only if the D-W falls below 1.5 and above 2.5. Explicitly, the individual results are tested below:

Table 8: Summary of Hypothesis Testing

Variable	**Coefficient**	**t-Statistic**	**Prob.**	**Decision Rule**	**Conclusion**
CUR	-0.1576	-3.1341	0.0022	Reject $H0_1$ if P<5%; Otherwise accept HA_1	Reject $H0_1$ and Accept HA_1
QUR	0.2077	3.3004	0.0013	Reject $H0_2$ if P<5%; Otherwise accept HA_2	Reject $H0_2$ and Accept HA_2
CCC	23.8362	0.2209	0.8256	Reject $H0_3$ if P<5%; Otherwise accept HA_3	Accept $H0_3$
ATR	0.1681	4.9933	0.0000	Reject $H0_4$ if P<5%;	Reject $H0_4$ and

				Otherwise accept HA_4	Accept HA_4
APP	23.8492	0.2210	0.8255	Reject $H0_5$ if P<5%; Otherwise accept HA_5	Accept $H0_5$
ACP	-24.3969	-0.2260	0.8216	Reject $H0_6$ if P<5%; Otherwise accept HA_6	Accept $H0_6$
ICP	-23.6327	-0.2190	0.8271	Reject $H0_7$ if P<5%; Otherwise accept HA_7	Accept $H0_7$

Note: $H0_1$….$H0_7$: Null Hypothesis 1 to 7; HA_1…HA_7: Alternative Hypothesis 1 to 7
Source: Author Compilation based on E-Views 9.0.Output(2020).

4.3. DISCUSSION OF REGRESSION RESULTS

The results of the individual variables are discussed below for the purposes of clarity:

4.7.1. Current Ratio and Corporate Performance (ROA)

The study clearly revealed that WCM as measured by CUR negatively and significantly impact on ROA. The negative result implies that 1% increase in current ratio will reduce return on asset by 15.76%. This result contradicts the aprioiri expectation of this study. Put differently, the negative relationship indicates that if current ratio is reduced, the action improves ROA. However, CUR passed the test of statistical significant very well. This result may be attributed to huge obsolete inventories inherent in the sector.

Following the risk-return theory, if a firm chooses to be liquid, such decision may tend to decrease its profit margin. As such, in trying to resolve these two key financial decisions (profitability or liquidity) may result in either of excess or shortage of the components of working capital and the current assets of a business. Hence, it is not surprising for current ratio to exert a negative impact on firm performance. This is because, that a firm is highly liquid does not connote that the firm is profitable. This result agrees with the findings of Solabomi and Oboh (2013) but contradict the findings of Nwude and Agbo (2018); Rizwan (2016); Takon and Atseye (2015); Iqbal, Ahmad and Riaz (2014); Uwuigbe, Uwuigbe, Uwalomwa and Egbide (2012).

4.7.2. Quick Ratio and Corporate Performance (ROA)

The study revealed that QUR has positive yet statistical insignificant impact on ROA. This is adjudged from the fact that, the result for QUR revealed a beta coefficient of 0.2077, t-ratio value of 3.3004, and p-value of 0.0013. This implies that 1% increase in quick ratio will result to 0.2077 in ROA of selected firms in the Nigerian consumer goods sector from 2009 to 2018. This posits that quick ratio was inferred to be the most crucial element of WCM in respect of firm's performance. The positive result is not surprising because when obsolete inventory is removed from the selected firm's current asset, the selected firms were able to meet up all outstanding obligations as at when due using its current assets. The findings conform to the apriori expectation of positive relationship between quick ratio and firm performance. This study support the work of Usama (2012) but contradict the works of Akhor and Jafaru (2015); Sur, Maji, and Banerjee (2013); Zawaira and Mutenheri (2013).

4.7.3 Cash Conversion Cycle and Corporate Performance (ROA)

The result revealed that CCC has positive insignificant impact on the ROA. This positive relationship might not be a surprise because one of the three components of CCC has negative association with the profitability and account payable days is subtracted from the sum of ACP and inventory turnover in days to form the CCC. The result suggested that Nigerian consumer

goods sector should keep optimum level of account receivables and CCC to increase profit. The result further indicates that if cash conversion cycle and all its major components; namely, days in inventory, days sales outstanding and creditors' payment period is increased to a reasonable extent, profitability of firms quoted in the Nigerian consumer goods can be increased as well. This may also be attributed to the fact that making payments to suppliers, collecting payments from customers earlier and keeping inventories in stock for lesser time are associated with increase in profitability.

The foregoing finding is in line with the aprioiri expectation of this study alongside the work ofMuya and Gathogo (2016); Murtala and Saidu (2016), Syed, Mawih and Faris (2015); Akoto, Victor and Angmor (2013) but contradict the findings of Idris and Yahaya (2018); Amir and Ali (2015); Kolapo, et'al (2015); Mengesha, et'al (2014) Mohammad and Tayebeh (2014); KajolaNwaobia, and Adedeji (2014); Onyemaobi (2014); Takon (2013); Warnes (2013);Majeed, Makki, Saleem, and Aziz (2013); Attari and Raza (2012).

4.7.4. Asset Turnover Ratio and Corporate Performance (ROA)

The coefficient of ATR is 0.168053 which means that quick ratio has a positive impact of consumer goods firms. This coefficient suggests that when ATR increases by 1%, ROA will also arise by 0.168053.This implies that, the higher the ATR, the higher the ROA and vice versa. This is because high ATR suggests that the firm efficiently uses its assets to generate revenue. The positive result supports the aprioiri expectation of this study. Again, the results reported a P-value of 0.0000. This suggests that cash conversion cycle has a positive yet statistically significant impact on the performance of the firms in consumer goods sector. This is because its p-value is less than 5% significant level but greater than 95% confidence level. This provides sufficient evidence of rejecting the null hypothesis. Hence, the study agrees that there is positive statistical significant relationship between ATR and the ROA. This result supports the works of Warrad (2014); Enekwe (2015) but contradicts the findings of Jahan (2012).

4.7.5. Average Payment Period and Corporate Performance (ROA)

From the regression result presented in table 8 above, the co-efficient of regression gave a value of 23.8492 depicting a positive relationship between APPP and ROA. Implying that a unit increase in APP will lead to 2384.92% units increase in ROA. Also, the relationship between APP and ROA proved to be statistically insignificant as its p-value is greater than 5%. The policy implication of this result is that if the Nigerian consumer goods sector withholds its APP, its ROA will reduce as well. On the other hand, if it increases its APP, its return on asset will increase as well. However, it failed to pass the test of statistical insignificance since its p-value is greater than 5% but less than 95% confidence. Holistically, APP exerts a positive statistical insignificant impact on the ROA. This finding is in tandem with the findings of Madugba and Ogbonnaya (2016); Iyewumi Remy and Omotay (2015) but contradicts the findings of Muya and Gathogo (2016); Hassan, et'al (2014); Solomon (2014); Ponsian, et'al (2014); Mwangi (2013); Shah and Chaudhry (2013); Kimeli (2012); Uremadu, Egbide, and Enyi (2012).

4.7.6. Average Collection Period and Corporate Performance (ROA)

The REM estimate clearly revealed that ACP denoted by ACP has a negative beta coefficient value of -24.39685, negative t-ratio of -0.226035, and P-value of 0.8216. This suggests that 1% increase in ACP decreases the ROA by 2439.85. Again, the result also provides no sufficient evidence of rejecting the null hypothesis. Hence, the study agrees that there is a negative

insignificant relationship between ACP and ROA. The policy implication of this result is that the shorter the ACP, the more the return on asset of selected firms in the Nigerian consumer goods sector. This result supports the findings of Onuorah and Ifeacho (2017); Mohammad and Mahum (2014); Okpe and Duru (2015); Shah and Chaudhry (2013) but contradicts the findings of Justyna (2013) & Paul et'al (2013).

4.7.7. Inventory Collection Period and Corporate Performance (ROA)

From the regression result presented in table 8 above, the co-efficient of regression gave a value of -23.6327 depicting a negative relationship between ICP and ROA. Implying that a unit increase in ICP will lead to -2363.27% in ROA. Also, the relationship between ICP and ROA proved to be statistically insignificant as its p-value is greater than 5%.The findings indicated that the management can increase the level of sales by reducing their ICP to a reasonable level. In doing so, the profitability of the firms is expected to increase. In other words, the lesser the time a firm need to realize convert its inventory, the better it is for its liquidity position and thus reduces the risk of dependency on external and more expensive sources of capital. The study conforms to the findings of Ademola (2014); Sabo Rabi'U, and Usman (2015); Panigrahi and Sharma (2013); Panigrahi (2013) but contradicts the studies of Angahar and Alematu (2014); Rafiu and John (2014); Osundina and Osundina (2014); Onodje (2014); Moroki and Jagongo (2013); Pouraghajan, et'al (2013); Mansoori and Muhammad (2012).

5. Conclusion and Recommendations

Effective WCM has always been a key to firm`s profitability and survival. Specifically the study examined the impact of WCM on consumer goods sector's performance in Nigeria from 2009-2018 covering 120 cross-sectional units. To ensure that the findings of the study are reliable, accurate, and valid, the study was further subjected to diagnostic tests using the Lagrange Multiplier Tests for REM, Hausman test, and the cross-sectional dependence test. Accordingly, the Hausman test supports the REM while the cross-sectional dependence test clearly revealed that the variables of each company are unique and are independent of those of other companies in the sample. Findings emanating from the REM confirmed a mixed relationship between WCM proxies and ROA. Individually, the study reported that the Nigerian consumer goods sector is required to pay full consideration to all the selected WCM proxies if they must achieve their core objective of maximizing high returns and minimizing risk. This is because current ratio exerted positive significant impact on firm performance. Also, the study reaffirmed that managers can achieve high profit margin by addressing all inventory management issues. More so, quick ratio and inventory conversion period exert negative insignificant impact on firms' performance. Lastly, the study reaffirmed that current ratio, quick ratio, quick ratio, and asset turnover ratio are the main determinants of corporate performance. Hence, we conclude that good WCM will keep firms in the consumer goods sector a float.

In consonance with the conclusion above, the study made the following recommendations:

1. Managers of the Nigerian consumer goods sector should efficiently manage their liquid assets. This is because if they do so, their financial bottom lines are expected to improve significantly.
2. Managers of the Nigerian consumer goods sector should employ experts in the field of accounting and finance WCM strategies.
3. Managers of the Nigerian consumer goods sector should reduce/ shorten its CCC through processing and selling goods more quickly, reducing the receivable collection period or by lengthening the payable deferral period through slowing down payments to suppliers as this would improve profitability because the longer the CCC, the greater the need for expensive external financing.

4. Managers of the Nigerian consumer goods sector should efficiently and effectively utilize the assets they have in their operational activities as this would result in an increase in level of profitability and performance.
5. Managers of the Nigerian consumer goods sector should involve in credit terms bargaining with suppliers in order to optimize their account payables and also settle their debts within the shortest time possible as this practice helps in protecting their credit image and rating as well as better opportunity to access further credit facilities.
6. Management of the Nigerian consumer goods sector should have effective strategies for ensuring quick collection of cash for credit sales.
7. It is recommended that management of the Nigerian consumer goods sector should adopt the daily stock control policy in order to have an optimal inventory level which would reduce the cost of holding and ordering, as a result, maximize profitability in turn.

The study adds to existing body of knowledge in the following areas:

1. The study discovered that good WCM will keep firms in the consumer goods sector a float.
2. The study expounds the scope to 2018 in a bid to capture current issues regarding the construct.
3. The study contributes to existing body of knowledge as it expounds existing models on the subject matter.
4. The study provided a more robust, comprehensive and holistic approach of the subject matter.
5. The study increased the numbers of WCM proxies.
6. The study provided answers to contradictory issues regarding the nexus between profitability and liquidity.

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