USING GROSS PROFIT MARGIN (GPM) MODEL TO TEST THE RELATIONSHIP BETWEEN WORKING CAPITAL MANAGEMENT AND PROFITABILITY OF COMPANIES LISTED ON THE NIGERIAN STOCK EXCHANGE.

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ABSTRACT

This study had successfully used Gross Profit Margin (GPM) to test the relationship between working capital management and profitability of companies listed on the Nigerian Stock Exchange. Panel data methodology was employed to test this relationship and a sample of 55 manufacturing companies listed on the Nigerian Stock Exchange. Panel regression results and findings revealed a statistically significant relationship between major components of working capital (ACP and ICP) and profitability of companies. It was therefore recommended that more restricted working capital investment policy is more profitable than a more flexible policy by the Nigerian manufacturing firms listed on the stock exchange.

Keyword: *Gross Profit Margin, Nigerian Stock Exchange, Profitability*

INTRODUCTION

Efficient and effective management of working capital is an important component of overall corporate strategy to create the shareholder`s value. Firms try to keep an optimal level of working capital that maximizes the value (Deloof, 2003; Howorth & Westhead, 2003; and Afza & Nazir, 2007). In line with this, working capital management has become one of the most important issues in the organizations, where many financial managers are striving to identify the basic working capital drivers and what is considered as an appropriate level of working capital (Lamberson, 1995).

In addition to this, the importance of working capital management is reflected in the fact that financial managers spend a great deal of time in managing both current liabilities and assets. This is seen in the area of controlling movement of cash, administering of accounts receivable, arranging short term financing and negotiating appropriate credit terms, consume a great deal of time of financial managers Prasana (2000).

Therefore, working capital and its importance is unquestionable (Fillbeck & Krueger, 2005). It directly influences the liquidity and profitability of firm (Raheman & Nasr, 2007). Excellent management of working capital decreases the dependence on external financing due to increased cash flow, thus lowering the chances of default for an organization (Deloof, 2003).

Efficient working capital management involves planning and controlling the current assets and current liabilities in a manner that eliminates the risk of inability of a firm to meet due short-term obligations and to avoid excessive investment in these assets on the other hand (Eljelly, 2004). Current assets are short-lived

investments that are continually being converted into other asset types (Rao, 1989). However, paying of those liabilities is a responsibility of the firm and is done on timely basis. Therefore, decisions on the level of different working capital components become frequent, repetitive and time consuming (Appuhami, 2008).

There is no doubt therefore, that working capital management is a very sensitive area in the field of Finance and Accounting. It is concerned with decisions on the ideal composition and amount of current assets and the manner in which these assets are financed. A clear distinguishing feature of current assets is that, they include all these assets that in the normal course of business can be easily converted to the form of cash within a short period of time, mostly within a year, and such temporary investment as may be readily converted into cash when needed (Raheman & Nasr, 2007). Decisions that are likely to maximize profitability tend to minimize the chances of sufficient liquidity. On the other hand focusing almost totally on liquidity will likely reduce the potential profitability of the firm (Deloof, 2003).

It therefore, follows that working capital is known as the life giving force for any economic unit hence its management is considered among the most important functions of corporate management (Raheman, Afza, Qayyum & Bodla, 2010). All organizations, either with profit motive or not, no matter the size and nature of the business, require necessary amount of working capital. It is therefore the most crucial factor for ensuring survival, profitability, liquidity and solvency of business (Raheman, *et al*, 2010).

The study analyzed working capital management in relation to the profitability of manufacturing companies listed on the Nigerian Stock Exchange. The working capital management (WCM) was approached using the cash conversion cycle model, the average collection period, the inventory conversion period, the average payment period for receivable, inventory and payables respectively. This is in line with studies of Deloof, 2003.

LITERATURE REVIEW

Historical Antecedents of Working Capital Management

The term "Working Capital" originated with old Yankee peddler, who would load up his wagon and then go off to peddle his wares. The merchandise was called "working capital" because it was what he actually sold, or "turned over" in order to make profits. The fixed assets comprise of the horse and the wagon. The wagon and the horse belongs to him, so they were financed with "equity" capital, but he bought his merchandise on credit (that is by borrowing from his supplier) or with money borrowed from bank. These are termed as loans relating to working capital and they are repaid at the end of each trip to demonstrate to the lender that the credit was sound. Once the peddler repaid the loan, he could take out another loan, and lenders that followed this procedure were said to be employing "effective practices of lending". Consequently, the high the frequency of the peddlers trips per year, the faster his working capital turnover and the greater his profits (Brigham & Houston, 2007).

Undoubtedly, the above process which was practiced by the old Yankee peddler was the true origin of working capital and could conveniently be linked to our present system of what we consider as working capital in the modern system. This will therefore lead us into knowing the exact definition of working capital in both theoretical and operational perspectives.

According to Van-Horne and Wachowics (2004), working capital management has been defined as the management of current assets such as cash, marketable securities, receivable and inventories. Deloof (2003) described working capital management as the adjustment, regulation and management of balance between current assets and current liabilities of a firm. He further lamented that for working capital management to be considered efficient, it must ensure an adequate relationship between the different components of an organization's working capital, in order to make an efficient mix which guarantees capital adequacy. Thus, an efficient working capital management is the one that maintains appropriate quantities of each component of working capital in an organization.

Working capital management is sometimes called the short-term financial management. The main difference between long-term financial management and short term financial management is in terms of timing of

cash. Short term financial decisions typically involve cash flows within a year or within the operating cycle of the firm (Prascana, 2000). Management of working capital refers to the management of current assets and liabilities. The emphasis is on the management of current assets. This is quite true because current liabilities arise in the context of current assets (Prasana, 2000).

Working capital management deals with the management of current assets- inventories, accounts receivable and cash- and their financing (Moles, Parrino & Kidwell, 2011). They further explained that paying attention to how working capital is being used in a business can help improve the returns on the capital that is invested in a business.

Concept of Profitability

Profitability is identified as the dependent variable of this study. The efficiency of working capital management is measured by the components of the cash conversion cycle (namely; the average collection period, the average payment period and the inventory conversion period) in relation to either an increase or decrease in PROFITABILITY. The other explanatory variables of the study (i.e. the CATAR, CLTAR, Operating cycle) are all geared towards assessing the position of profitability. More so, all the working capital policies (Aggressive or Conservative) are viewed on the basis of their impact on profitability.

Therefore, in line with above, profitability is a concept which originated from the word "Profit". A profit is an excess of revenues over associated expenses for an activity over a period of time (CIMA, 2009). Some terms with similar meanings include "earnings", "income", and "margin". Lord Keynes remarked that "profit is the engine that drives all businesses". This makes it imperative for all businesses to earn enough profit in order to survive and be able to expand over a time period.

It is the index of business progress, enhanced national income and an appreciating standard of living. Profit is quite essential for business expansion. It is the yardstick for judging the managerial efficiency as well as the Economic and Social Objectives (CIMA, 2009). Profitability therefore means ability to make profit from all the business activities of an organization, company, firm or an enterprise. Profitability shows how efficiently the management can make profit by using the markets' available resources. Furthermore, "Profitability is the effort of a given investment to earn return from its use" (CIMA, 2009).

Profitability is an index of efficiency, and is regarded as a measure of efficiency and management guide to greater efficiency. In as much as profitability is an important yardstick to measure efficiency, it cannot alone be considered a final proof of efficiency. Since working capital management efficiency is the main dimension in this study, to measure the focus of the study "Profitability", it should be understood that sometimes satisfactory profits may mark inefficiency and in the opposite way, a firm might be efficient to some extent but with no profit. The figure of a net profit simply reveals a satisfactory balance between the values received and value given. However, the change in operational efficiency is merely one of the factors on which profitability of an enterprise largely depends (CIMA, 2009).

METHODOLOGY

Panel data methodology was employed to test the relationship between working capital management and profitability of companies.It is considered important that the population is meticulously defined before the sample design is considered. The use of the word "population" in the sampling context is different from its general usage. A population refers to "the entire group of persons (or institutions, events, or the subjects of the study) that one wishes to describe or about which one wishes to generalize" (Vogt, 1993). Similarly, Sekaran and Bougie (2009) defined population as the entire group of people, events or things of interest that the researcher wishes to investigate. It is the group, events or things of interest that the researcher wants to make inferences (based on sample statistics). For this study, the population comprised all the manufacturing companies listed on the floor of Nigerian Stock Exchange (NSE) totaling 55.

In Nigeria, firms, businesses or companies register with the various regulatory bodies or agencies some of which includes the Corporate Affairs Commission (CAC), the small and medium scale business development

commission, the patent and trademark division of the federal ministry of commerce and of course, the Nigerian Stock Exchange (NSE) as the apex. There are criteria for listing a company on the Nigerian Stock Exchange as discussed earlier. However, in reality and practical terms, it is perceived as relatively difficult to get the full data required to compute all the indices of measurements and related ratios highlighted from all the 55 manufacturing companies listed on the Nigerian Stock Exchange, this is principally due to the possibility of having a missing data from the financial statements provided and partly due to the peculiarity of data (financial) in a developing and rather rudimentary stock exchange, like Nigeria. Hence, the study needs to identify a specific listing of the members of the population that can be the basis of the research.
The equation for the fixed effects model becomes:

$Y_{it} = \beta_i X_{it} + \alpha_i + \mu_{it}$ (1)

Where

- α_i (i = 1 …… n) is the unknown intercept for each entity

- Y_{it} is the dependent variable (DV) where i = entity and t = time.

- β_i is the coefficient for a given independent variable $(IV)_i$

- μ_{it} is the error term.

- X_{it} is the independent variable (IV), where I = entity and t = time.

It is worthy to note that "the key insight is that if the unobserved variable does not change overtime, then any changes in the dependent variable must be due to influences other than these fixed characteristics (Stock & Watson, 2007). Another way to see the effects model is by using binary variables. So the equation for the effect becomes:

$Y_{it} = \beta_0 + \beta_i X_{it} + \ldots\ldots\ldots + \beta_k X_{it} + Y_2 E_2 + \ldots\ldots\ldots + Y_n E_n + \mu_{it}$ …….. (eq. 2)

Where

Y_{it} is the dependent variable (DV) where i = entity and t = time

$X_{it,}$ it represents independent variables (IV)

B_k is the coefficient for the IVs

μ_{it} is the error term

E_n is the entity n, since they are binary (dummies) $Y_n E_n$ entities included in the model.

Y_2 is the coefficient for the binary repressors (entities) and E_2 is the entity.

Both equations 1 and 2 are equivalents.

STATA version 11 was employed as the software of running and analysing the data. The choice of the version 11 was as a result of its robustness and sophistication. By far, the version 11 was an improvement upon version 10 and simpler to operate or execute. The section that follows attempt to describe the methodology or procedure of operation as much as possible, it shall begin with data management.

Model specification

GPM = a0 + a1(ICP) + a2(ACP) + a3(APP) + a4(OCATAR) + a5(OCLTAR) + a6(DR) + a7(NLS) + e

RESULTS AND DISCUSSION

Gross Profit Margin (GPM) Model

The first test conducted for GPM model was the variance inflation factor (VIF) test, to check for multicollinearity. The results are as follows:

Table 4.4

Result of Variance Inflation Factor test for GPM model

Variance	VIF	I/VIF
ACP	1.78	0.5628
APP	1.72	0.5796
ICP	1.67	0.5980
OCATAR	1.31	0.7649
OCLTAR	1.18	0.8456
NLS	1.26	0.7924
DR	1.25	0.8016
Mean VIF	1.45	

The above test was conducted under pooled OLS, the outcome of the test confirmed that there was no multicollinearity in the model. The mean VIF was found to be 1.45. Generally, under normal circumstance, VIF mean should not be more than 5. Therefore, the model was confirmed free of multicollinearity.

The second test conducted for this model was the Wooldridge test for autocorrelation. The result of the test for GPM model is that the probability of F-statistic being more than the critical value is 18.29% (The prob > F = 0.1829) which is not significant, and thus, the assumption of no autocorrelation cannot be rejected. Therefore, based on the above result, the model could be said to be free from autocorrelation.

The third test conducted for the GPM model was the serial correlation test for heteroskedascity, with the command (xt test). The Chi-square probability was found as 0.0000 (This signifies the presence of heteroskedascity in the model). Therefore according to Asterious and Hill (2007), to treat heterosekesdacity problem, a model should be made robust and hence the robust model should be reported. Accordingly, the GPM model was made robust and reported. Making a model robust is simply logging all the variables in the model (this can be seen in appendix B). After conducting the relevant tests, the following is the GPM random effect results:

Table 4.5

Summary Table of Model 1 (GPM, random effect result).

GPM	Coefficients	Z value	P value	Decision
ACP	-04104	-6.22	0.000***	-sig.
ICP	-0.3381	-4.61	0.000***	-sig.
APP	0.4051	4.45	0.000***	+sig.
OCATAR	-0.0841	-2.58	0.010**	-sig.
OCLTAR	0.0270	0.87	0.386	not sig.
NLS	0.8215	2.78	0.006***	+ sig.
DR	0.0027	0.20	0.839	not sig.

*** (1% sig. level) ** (5% sig. level)

Accordingly both fixed effects and random effects were run, and that the influences of the independent variables on the GPM were similar for the two models. In addition, Hausman test was used to select the more superior of the two models, which in this case is the random effects model. Based on that, the overall model has a quite good fit, with F statistics as 0.000, and the overall R-square value of 0.5234. The result also disclosed that the average collection period (ACP) was significantly and negatively related with gross profit margin at less than 1% (0.0000) level of significance. The interpretation of this finding is that, the lower the average collection period (ACP) the higher the gross profit margin (a proxy for profitability). This depicts an inverse relationship. It goes further to suggest that manufacturing companies on the Nigerian stock exchange should always strive to ensure minimum number of days within which they collect their receivables from the respective debtors. This leads to higher profit. However, where the average collection period extends longer, the gross profit margin will be lower, and thus affect the companies' profitability. This finding is consistent with most studies conducted, notably Deloof (2003), Raheman and Nasr (2007), Padachi (2006) and Mathuva (2010).

Another important variable in the model is the inventory conversion period (ICP). Finding from the panel data regressions of the GPM model signifies that the ICP was strongly and negatively related to gross profit margin (GPM). This result suggests that, the shorter the inventory conversion period in terms of number of days, the higher the gross profit margin (a proxy for profitability). The finding is also consistent with studies of Deloof (2003), Garcia-Terual and Maurtinez-Solano (2007) and Afza and Nazir (2007).

Additionally, in line with the resource-based theory, inventories are important resources to manufacturing companies and thus maintaining them is very vital for the survival of the companies. Let us also recall that more than 50% of the current assets of a typical manufacturing company are inventories. The negative significant relationship between ICP and profitability indicates that based on the GPM model, a shorter inventory conversion period leads to higher profit. A shorter ICP means the inventory resources are converted in a shorter period and this facilitates the inventory usage. The resource-based theory is employed in this model to explain the relevant of size of companies as one of the control variable of this study. Size of companies was measured by the natural logarithm of sales, and size itself is a product of resources and plays a vital role in firms' profitability.

The average payment period (APP) based on the result of the GPM model, was found to be strongly and positively related to gross profit margin. That is, at less than 1% (0.0000) significance level. This finding connotes that the longer it takes the companies to pay back their creditors, the higher the gross profit margin.

In line with this finding therefore, Nigerian manufacturing companies on the stock exchange could improve their profit if they delay or prolong payment to their suppliers or creditors. This is in conformity with the principle of the financial management, which advocates hastening of receivables and delaying making payments. By so doing, a company might have held the cash for a reasonable time period which could be turned over to make additional gains. This finding is consistent with most of the studies conducted on working capital management and profitability, some of them include; Deloof (2003), Afza and Nazir (2007).

From the results and findings of the above three components of cash conversion cycle, namely; ACP, ICP and APP, it was clear that the three components have all been found to be statistically significant. This by extension connotes by implication that the cash conversion cycle is significant with profitability. It goes further to suggest that in the context reducing CCC can increase profit. This finding is in consistent with the studies of Deloof (2005), Lazaridis and Tryfonidis (2006), Afza and Nazir (2007), Hussein, et al (2010) and Alipour (2011).

Based on the findings so far, in respect of the average collection period of (ACP) and inventory conversion period (ICP) it was clear that the duo were found to be statistically significant in relation to gross profit margin (GPM). Let's also recall that the operating cycle is the composition of the ACP and ICP, it therefore follows that the operating cycle as far as GPM model is concerned, has also been found to be statistically significant with the profitability.

Another variable considered in the study was the other current assets to total assets ratio (OCATAR). The variable was found to be negatively related and significant at less than 5% level in the GPM model with coefficient value of -0.0841 and the P value of 0.010. The interpretation of this result is that, the lower the other current assets to total assets ratio (other current assets minus receivables and inventory), the higher the gross profit margin. Let us recall that, other current assets to total asset ratio measures the composition of other current assets compared to the total asset of a company. The simple interpretation of this negative significance is that, the higher the OCATAR the lower the profitability, conversely the lower the OCATAR, the higher the profitability. This suggests that higher investment in other current assets (flexible working capital investment policy) translates to lower profitability of the manufacturing companies listed on the Nigerian stock exchange. The implication of this is that more restricted working capital investment policy is more profitable than a more flexible policy by the Nigerian manufacturing firms listed on the stock exchange. The finding goes further to validate the earlier assertion in chapter two (Literature review) that majority of the empirical studies support the convention of maintaining lesser investment (at least at an appropriate proportion) in working capital would positively affect the profitability of firms (restricted working capital investment policy). This does not mean maintaining a zero current asset, since it is never possible. The finding is consistent with the study of Raheman, et al (2010).

CONCLUSION AND RECOMMENDATION

In conclusion, the Gross Profit Margin (GPM) model had revealed that relationship between working capital management and profitability of companies listed on the Nigerian Stock Exchange had varying impact based on the outcome of each variable studied in the model as discussed in the results. However, and most importantly is that the average collection period (ACP) and inventory conversion period (ICP) were found to be statistically significant in relation to gross profit margin (GPM). Let's also recall that the operating cycle is the composition of the ACP and ICP, it therefore follows that the operating cycle as far as GPM model is concerned, has also been found to be statistically significant with the profitability and that more restricted working capital investment policy is more profitable than a more flexible policy by the Nigerian manufacturing firms listed on the stock exchange.

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