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An Empirical Analysis of the Relationship between Working Capital Management and Profitability: Panel Evidence from Listed Manufacturing Companies in East Africa

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Abstract
This paper assesses the relationship between working capital management and profitability of manufacturing companies listed in East African stock exchange markets in the period (2005-2012). Profitability which was the dependent variable was represented by Return on Assets (ROA) and Operating Margin (OM) while the independent variable, working capital management was represented by Current Ratio, Quick Ratio, Cash Cover Ratio, Inventory Holding Period, Receivables' Collection Period, Payables' Deferral Period and Cash Conversion Cycle. The study also used Sales Growth, Debt Ratio and Company Size as the control variables. Data analysis was conducted using Pearson Correlation and Multiple Regression Analysis and it was observed that there exists a significant relationship between the components of working capital especially cash conversion cycle and profitability. Cash conversion cycle was negatively related to operating margin (OM) hence it is recommended that companies should shorten the cash conversion cycle by keeping the receivables' collection period, payables' deferral period and inventory holding period o the optimum level.
Keywords: Working Capital Management, Profitability, Listed Manufacturing Companies

1. Introduction

Working capital management is one of the key activities in the financial management process of a business entity (Lazaridis and Tryfonidis, 2006); this is attributed by the fact that it has an impact on the performance of an entity. Managing working capital is a challenging task because it involves management of several aspects of current assets and current liabilities altogether i.e. managing cash, stock movement, debtors and creditors. Managing one component of working capital may affect the other components hence increasing the delicacy of the task; this means that there is always a risk-return trade off involved with working capital decisions (Al-Debi'e, 2011).

The success of any entity relies largely on the ability of the financial managers to manage receivables, inventory, and payables effectively (Filbeck and Krueger, 2005). Working capital is regarded as the lifeblood of a company because its components are used to finance daily activities of the company compared to non-current assets which are long term investments hence not used in short term financing decisions (Dong and Su, 2010). It is therefore vital for companies to ensure sustainability of their short term investment because it will enable them to survive for many years in business (Bhunia and Das, 2012).

Working capital management has a tremendous impact on performance of the company; poor working capital management may result into deteriorated performance and increased bankruptcy risk as a result of liquidity problems (Chakraborty, 2008). For instance a company may prolong the debtors' collection period to boost sales in the short run, this may result into the overtrading problem because of prolonged cash conversion cycle (CCC) which may eventually result into bankruptcy due to the fact the company may fail to meet its short term obligations.

Nobanee and Alhajjar (2009) narrated that company's performance can be improved by reducing the cash conversion cycle; this can be achieved by decreasing the debtors' collection period and inventory holding period and at the same time increasing the creditors' referral period. Companies with shorter cash conversion cycle are healthier than those with prolonged cycles because inventory sales and collection of receivables will be made prior to settlement of liabilities hence minimizing the dangers of working capital shortage (Schein, 2009).

A few studies about working capital and profitability have been carried out in Africa, for instance (Osundina, 2014) evaluated this phenomenon in Nigeria but his analysis was limited to food and beverages firms only. Also the study used only net operating profit to represent profitability which excluded other measures like return on assets (ROA), operating margin and Tobin's Q. This study has managed to fill these gaps by using

manufacturing companies across various industries e.g. food and beverages, cement e.t.c and by also using more than one measure of profitability.

So this study has empirically assessed the relationship between working capital management and profitability of 12 manufacturing companies listed in various stock exchanges in East Africa for the period (2005-2012). Working capital was represented by current ratio (CR), quick ratio (QR), cash cover ratio (CCR), inventory holding period (IHP), receivables' collection period (RCP), payables' deferral period (PDP) and cash conversion cycle (CCC). On the other hand, profitability was measured using Return on Assets (ROA) and Operating margin (OM). The study also used company size (CS), sales growth (SG) and debt ratio (DR) as the control variables.

2. Literature Review

Various studies have been conducted worldwide on the relationship between working capital management and company's profitability.

Gill et al (2010) explored the relationship between working capital management and profitability in 88 companies listed on New York Stock Exchange for the period (2005-2007). They found a strong association between the cash conversion cycle and profitability, hence concluding that profits can be boosted by properly handling the cash conversion cycle and optimizing debtors' level. These findings were similar to those by (Chatreji, 2010) who studied the same phenomenon in companies listed on London Stock Exchange. Also the findings of these studies were synonymous with those of (Charitou et al. 2010) in Cyprus and (Karaduman et al. 2010) in Turkey and Deloof (2003) in Belgium.

Raheman and Nasr (2007) analyzed the impact of working capital management components which included debtors' collection period, inventory holding period, creditors' deferral period, cash conversion cycle, and current ratio on the net operating profitability of Pakistani companies in the period (1999 – 2004). They discovered a significant negative relationship between working capital components i.e. cash conversion cycle and profitability. A similar study was also carried out by (Dong & Sung, 2010) using the companies listed in Vietnam stock exchanges in the period (2006-2008) and discovered significant negative relationship between profitability and the cash conversion cycle. This implies that as the company increases the cash conversion cycle, its profitability would be adversely affected. The findings of these two (2) studies were synonymous to those of the studies conducted by Quayyum (2011) in Bangladesh, Al-Debi'e (2011) in Jordan, Mojtahedzadeh et al (2011) in Iran.

Ogundipe et al (2012) assessed the impact of working capital management on performance of non- financial companies listed in Nigeria stock exchange in the period (1996-2009). The findings confirm that there is a significant relationship between profitability and working capital components which is similar to those of the previously discussed studies in this section. These findings resembled those of the studies by (Onundina, 2014) in Nigeria and Mathuva (2009) in Kenya which also found a significant relationship between working capital components and profitability.

Despite the fact that many studies have found a significant relationship between working capital and profitability, other studies have found insignificant relation between these two (2) components. Bhunia & Das (2012) assessed the relationship between working capital and profitability in India and found a lower degree of correlation between working capital components and profitability.

3. Research Methodology

3.1 Research design

This study used the case study design, the case study of manufacturing companies listed in various stock exchanges in East Africa was chosen. This involved the selection of manufacturing companies listed in Dar es Salaam Stock Exchange (DSE) in Tanzania, Nairobi Stock Exchange (NSE) in Kenya and Uganda Securities Exchange (USE).

3.2 Sources of data

Data used for analysis purposes was obtained from the annual reports of listed manufacturing companies in East Africa. These reports were obtained from the respective websites of these companies. However there were other listed companies whose annual reports were not readily available in their websites.

3.3 Population of the study

The population of this study was comprised of manufacturing companies in East Africa which includes Kenya, Uganda and Tanzania.

3.4 Study sample

The study used purposive sampling technique to choose the listed manufacturing companies that were used for analysis purposes. The companies were chosen based on the availability of annual reports in their websites. However it was observed that many listed companies in East Africa especially in Tanzania and Uganda do not present their annual reports in their websites which limits availability of data for carrying out researches of these types. Therefore a sample of 12 listed manufacturing companies was chosen; this comprised of 3 companies listed in the Dar es Salaam Stock Exchange (DSE) and 9 companies listed in Nairobi Stock Exchange (NSE) covering a period (2005-2012). Due to the fact that Tanzania and Kenya use different currencies, the elements of financial statements of listed manufacturing companies in Kenya were converted from Kenyan Shillings to Tanzanian Shillings for consistent analysis. The exchange rate information was obtained from Bank of Tanzania (BoT) reports i.e. the central bank and the conversion was done using International Accounting Standard (IAS) 21 "The effects of changes in foreign exchange rates".

3.5 Selection of variables

The selection of variables used in this study was based on the variables that were commonly used in other studies of similar nature. These studies include;, Charitou et al. (2010), Alipour (2011), Quayyum (2011) and Gill et al. (2010). The variables together with their descriptions are shown below;

Dependent variables
Return on Assets (ROA) = Profit before interest and tax/Total assets
Operating Margin (OM) = Profit before interest and tax/sales

Independent variables
Current Ratio (CR) = Current assets/Current liabilities
Quick Ratio (QR) = Current assets – (inventory + prepayments)/Current liabilities
Cash Cover Ratio (CCR) = Cash and cash equivalents/Current liabilities
Receivables' Collection Period (RCP) = Trade receivables/sales*365 days
Creditors' Deferral Period (CDP) = Trade payables/cost of sales*365 days
Inventory Holding Period (IHP) = 365 days/Average inventory
Cash Conversion Cycle (CCC) = Receivables' Collection Period + Inventory Holding Period – Payables' Deferral Period

Control variables
Sales Growth = Sales1 – Sales0/ Sales0
Company Size = ln Total assets
Debt Ratio = Total debt/Total Assets

3.6 Research Hypothesis

After reviewing the literature on various studies conducted on the influence of working capital management on company's profitability for instance Quayyum (2011) and Gill et al. (2010), the researcher developed the following hypothesis;

H0: There is a significant relationship between working capital components and profitability

H1: There is no significant relationship between working capital components and profitability.

3.7 The Linear Regression models

Multiple regression analysis was used for data analysis purposes, for this task the following regression models were developed;

$$YROA = \beta 0 + \beta 1CR + \beta 2QR + \beta 3CCR + \beta 4IHP + \beta 5RCP + \beta 6PDP + \beta 7CCC + \beta 8CS + \beta 9SG + \beta 10DR + e$$

$$YOM = \beta 0 + \beta 1CR + \beta 2QR + \beta 3CCR + \beta 4IHP + \beta 5RCP + \beta 6PDP + \beta 7CCC + \beta 8CS + \beta 9SG + \beta 10DR + e$$

Whereby; β0 = a constant in the regression model e = Error term

β1 to β10 = coefficients of independent and control variables in the regression model

4 Data Analysis

4.1 Descriptive statistics

The descriptive statistics for the dependent, independent and control variables used in this study are presented in Table 1 below;

Table 1: Summary of Descriptive Statistics for the variables employed in the Study

	Minimum	Maximum	Mean	Std. Deviation
ROA	-.4651067560	.78050918515	.30421160800342	.212284505201684
Operating Margin	-.5620776605	.91158957800	.23874360657982	.172495449963014
Current Ratio	.5151373334	8.4745074406	2.1334517503370	1.23420697633849
Quick Ratio	.2401282098	8.0264410401	1.3645749917289	1.14449984392879
Cash cover ratio	.00361787569	6.1465659519	.57901406235925	.880471270830254
Inventory holding period	25.129477944	1960.7967952	110.07762264465	211.301440606440
Receivables' collection period	6.3316376972	107.65047431	37.537086207028	22.9050032385974
Payables' deferral period	20.568116912	3267.4438681	143.93331021058	366.311555665668
Cash conversion cycle	-1262.34860	175.64764321	3.6813986410941	185.387707651833
Company Size	22.931481347	27.613384183	25.564240534774	1.26306984552950
Sales growth	-1.000000000	90.315224548	1.1491767543640	9.97470276873041
Debt ratio	.16030899644	.95163090176	.40127053522623	.170205065356277

The results from Table 1 highlight some critical observations of working capital components of listed manufacturing companies in East Africa. Firstly it can be observed that the minimum values of current ratio, quick ratio and cash cover ratio are all below 1, this shows that there are some companies that may be vulnerable to liquidity problems despite being large in size. The problem can also be observed in the cash cover ratio which is the ultimate measure of liquidity by including only most liquid current assets i.e. cash and cash equivalents. The average cash cover ratio is 0.579 which is below 1 and indicates that the companies do not have enough cash and cash equivalents to cover for their short term obligations hence jeopardizing the operations.

The average inventory holding period, receivables' collection period and payables' deferral period are is 110 days, 37 days, 114 days respectively hence creating a cash conversion cycle of 3.7 days which. This implies that creditors have to wait for extra 3.7 days above the agreed credit period to receive payment from the company because the companies' funds are still tied up in inventory and debtors. This is a sign of liquidity shortage which has a tendency of reducing the company's ability to cover short term debts as shown in the cash cover ratio explanations.

4.2 Pearson Correlation Analysis

Before conducting multiple linear regression analysis, it was vital to determine the correlation between independent variables and dependent variables so as to determine the nature i.e. positive or negative correlation and the significance of the relationship between dependent variables and independent variables. The results of the Pearson correlation analysis are presented in table 2.

Table 2: The results of the Pearson's Correlation analysis for the selected study variables

	ROA	OM	CR	QR	CCR	IHP	RCP	PDP	CCC
Return on Assets	1	.476**	0.0295	-0.04	-0.005	.280**	-.266**	.200**	-0.124
Operating Margin	.476**	1	.281**	.277**	.291**	0.125	-.221**	.323**	-.263**
Current Ratio	0.0295	.281**	1	.691**	.417**	0.032	-.242**	-0.08	0.0114
Quick Ratio	-0.041	.277**	.691**	1	.406**	-.164*	-0.1	0.067	-.169*
Cash Cover Ratio	-0.005	.291**	.417**	.406**	1	-0.12	-.277**	0.024	-0.142
Inventory Holding Period	.280**	0.125	0.0319	-.164*	-0.122	1	-0.109	0.031	.314**
Receivables' Collection Perioc	-.266**	-.221**	-.242**	-0.1	-.277**	-0.11	1	0.038	0.1232
Payables' Deferral Period	.200**	.323**	-0.08	0.067	0.024	0.031	0.0376	1	-.520**
Cash Conversion Cycle	-0.124	-.263**	0.0114	-.169*	-0.142	.314**	0.1232	-.520**	1

The results from Table 2 show significant relationships between some independent variables and dependent variables. It can be observed that inventory holding period, receivables' collection period and payables' deferral period all have significant relationship with ROA with exception of current ratio, quick ratio, cash cover ratio and cash conversion cycle which showed insignificant relationship with ROA. On the other hand, Operating Margin showed significant relationship with all independent variables except inventory holding period. The results of the significant negative correlation between operating margin (OM) and cash conversion cycle are similar to those of (Chatreji, 2010) and (Dong and Sung, 2010).

4.3 Multiple regression analysis

This study used 2 dependent variables namely Return on Assets (ROA) and Operating Margin (OM), so multiple regression analysis was conducted for each dependent variable and but using the same independent and control variables.

4.3.1 Multiple regression analysis for ROA and independent variables

The multiple regression analysis results for ROA and the selected independent variables are presented in table 3 below;

Table 3: The results for multiple regression analysis involving ROA and the independent variables

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.152	.567		-2.033	.046
Current Ratio	.162	.066	.358	2.455	.000
Quick Ratio	-.175	.073	-.402	-2.398	.001
Cash cover ratio	-.135	.037	-.144	-3.648	.000
Inventory holding period	.112	.045	.111	2.489	.001
Receivables' collection period	-.270	.107	-.291	-2.531	.014
Payables' Deferral period	.237	.070	.376	2.314	.034
Cash conversion cycle	.176	.019	.153	9.263	.000
Company Size	.060	.020	.359	2.990	.004
Sales growth	.119	.023	.056	5.174	.000
Debt ratio	-.024	.161	-.019	-.147	.884

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.902	9	.105	2.806	.007[b]
	Residual	.748	72	.038		
	Total	3.650	81			

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.797[a]	.633	.621	.193735715259777	2.176

The results from table 3 show that all of the independent variables have significant relationship with ROA due to the fact that they all have the significance value of less than 0.05. Current ratio, inventory holding period, payables' deferral period and cash conversion cycle have significant positive relationship with ROA while quick ratio, cash cover ratio and receivables' collection period have significant negative relationship with ROA. These findings are different from those of many studies like (Mathuva, 2009) and (Nobani et al, 2010) that found a negative relationship between cash conversion cycle and profitability. However, there a few studies that found a significant positive relationship between profitability and cash conversion cycle (CCC) and supported their findings i.e. conservative policy. These studies include (Deloof, 2003) and (Summers and Wilson, 2000) all of which argue in favour of conservative policy i.e. keeping large amounts of inventory.

The multiple regression model developed from this analysis is significant due to the fact that the results from ANOVA test have shows the significance value of 0.007 which is less than the threshold of 0.05. Also there is no autocorrelation problem is the regression model as shown by the Durbin-Watson value of 2.176 which is supposed to be between 1 and 3 for zero autocorrelation. Furthermore results from table 1 show s that about 63% of the variations in ROA are caused by the independent variables selected as portrayed by the coefficient of determination (R square) of 0.633.

4.3.2 Multiple regression analysis for Operating Margin (OM) and independent variables

The multiple regression analysis results for Operating Margin (OM) and the selected independent variables are presented in table 4 below;

Table 4: The results for multiple regression analysis involving Operating Margin (OM) and the independent variables

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-1.008	.448		-2.249	.028
Current Ratio	.128	.052	.774	2.467	.001
Quick Ratio	-.143	.057	-.752	-2.509	.000
Cash cover ratio	.110	.029	.049	3.793	.000
Inventory holding period	-.124	.012	-.122	-10.333	.000
Receivables' collection period	.025	.011	.033	2.273	.000
Payables' Deferral period	.182	.065	.234	2.869	.000
Cash conversion cycle	-.147	.047	-.158	-3.128	.000
Company Size	.048	.016	.351	3.003	.004
Sales growth	.006	.002	.331	3.166	.002
Debt ratio	-.163	.127	-.161	-1.282	.204

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.932	9	.080	3.403	.002[b]
	Residual	.478	72	.023		
	Total	2.410	81			

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.802[a]	.643	.613	.153249150826942	2.971

The results from table 1 indicate that all the selected independent variables have significant relationship with Operating margin. Whilst current ratio and cash conversion cycle showed a significant negative relationship with operating margin (OM) the remaining independent variables showed a significant relationship with operating margin (OM). These findings are compatible with the theories that increase in cash conversion cycle adversely affects profitability and also they are similar to the studies by (Raheman and Nasr, 2007) and (Quayyum, 2011).

The multiple regression model is generally significant as it has the significance value of 0.002 which is below the threshold of 0.05 after conducting the ANOVA test. Also it can be observed that 64.4% of the variations in operating margin (OM) are explained by the independent variables as shown by the R-square value of 0.643, this shows that the multiple regression model is significant. Lastly there seems to be no autocorrelation problem between the variables i.e. independent variables as shown by the Durbin-Watson values of 2.971 which is satisfactory.

5 Conclusions

Working capital is the most crucial area of a financial manager responsibilities because it is comprised of various intertwined components that have to be managed together i.e. receivables, payables, inventories and cash. This study evaluates the relationship between working capital management and profitability of 12 manufacturing companies listed in various stock exchange markets in East Africa in the period (2005-2012). It was observed from the findings that the working capital components have significant relationship with profitability in both dependent variables namely, ROA and Operating Margin (OM). However the nature of the relationship between cash conversion cycle and (ROA) was different from that with operating margin (OM). ROA was positively related with cash conversion cycle, this may indicate that these companies are using the conservative working capital management policy. On the contrary, operating margin (OM) showed a negative relationship when compared with cash conversion cycle which is similar to many studies. ROA is not a very appropriate measure of profitability for this study because it includes investment in all assets of the company to get return on assets. Non-current assets are not part of working capital hence using ROA can somehow give different results from other measures like Operating margin which is the most appropriate tool.

So based on operating margin (OM) it is recommended that manufacturing companies should keep each component of working capital at an optimal level and strive to shorten the cash conversion cycle. This can be achieved by shortening the receivables' collection period e.g. by providing discounts for earlier payments by customers. However receivables' collection period should not be reduced to the point that customers may renege from trading with the company due to strict credit terms e.g. short repayment period. Also the company should shorten the inventory holding period by increasing turn over i.e. by massive promotion, hence avoiding extra inventory holding costs and at the same time increasing sales. Lastly companies should lengthen the payables deferral period by finding those suppliers with good credit terms e.g. longer repayment period so as to maintain liquidity. However, it should be kept at the optimum level because persistent lengthening of the payables' deferral period may increase payables in the statement of financial position hence creditors may be reluctant to deal with the company due to massive payables.

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