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Management of working capital and its effect on profitability of manufacturing companies listed on Nairobi securities exchange (NSE), Kenya

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ABSTRACT

The efficient management of working capital is very vital for a business survival and thus a factor for overall boost in profitability. Thus the study analyzed the effects of working capital management on the profitability of manufacturing firms listed on the Nairobi Securities Exchange. Diagnostic research design was utilized and the study targeted the nine listed manufacturing firms trading on the Nairobi Securities Exchange. Multiple regression and correlation analyses were carried out to determine the relationships between components of working capital management and the gross operating profit of the firms. The results from the study revealed that gross operating profit was positively correlated with average collection period and average payment period but negatively correlated with cash conversion cycle. The relationship between inventory turnover in days and gross operating profit was insignificant. From this study, it is recommended that managers focus on reducing cash conversion cycles and try to collect receivables as soon as possible.

INTRODUCTION

Working capital management is the administration of current assets and current liabilities. It deals with the management of current assets and current liabilities and directly affects the liquidity and profitability of the company (Deloof, 2003; Eljelly, 2004; Raheman and Nasr, 2007; Appuhami, 2008; Christopher and Kamalavalli, 2009; Dash and Ravipati, 2009). Management of working capital has profitability and liquidity implications and proposes a familiar front for profitability and liquidity of the company. To reach optimal working capital management, firm manager should control the trade-off between profitability maximization and liquidity accurately (Raheman and Nasr, 2007). An optimal working capital management is expected to contribute positively to the creation of firm value (Howorth and Weshead, 2003; Deloof, 2003; Afza and Nazir, 2009). Working capital management is important due to many reasons. One of them is that the current assets of typical manufacturing firms account for over half of their total assets. For distribution companies, they account for even more. Excessive levels of current assets can easily result in a firm's realizing a sub-standard return on investment. However, firms with too few current assets may incur shortages and difficulties in maintaining smooth operations (Horne and Wachowicz, 2000).

Efficient working capital management involves excessive planning and controlling. There must be a balance between current assets and current liabilities in

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order to eliminate the risk of inability to meet short term obligations on one hand and avoid excessive investment in these assets on the other hand (Eljelly, 2004). Many surveys have indicated that managers spend considerable time on day-to-day problems involving working capital decisions. One reason for this is that current assets are short-lived investments that are continually being converted into other asset types (Rao, 1989). When current liabilities are taken into account, the firm is responsible for paying these obligations on a timely basis. Liquidity for the ongoing firm is not reliant on the liquidation value of its assets, but rather on the operating cash flows generated by those assets (Soenen, 1993). Taken together, decisions on the level of different working capital components become frequent, repetitive, and time consuming.

Working Capital Management is a very sensitive area in the field of financial management (Joshi, 1995). It involves the decision of the amount and composition of current assets and the financing of these assets. Current assets include those assets that in normal course of business have to return into cash within a short period of time under normal conditions, ordinarily within a year and such temporary investment as may be readily converted into cash upon need.

The working capital management of a firm in turn affects its profitability. The ultimate objective of any firm is to maximize profit. At the same time, preserving liquidity of the firm is an important objective too. The problem is that increasing profits at the cost of liquidity can bring serious problems to the firm (Shin and Soenen, 1998). Therefore, there must be a trade-off between these two objectives of firms. One objective should not be fulfilled at the cost of the other since both are important. If we do not care about profit, we cannot survive for a longer period. On the other hand, if we do not care about liquidity, we may face the problem of insolvency or bankruptcy. For these reasons working capital management should be given proper consideration and will ultimately affect the profitability of the firm. Firms need to have the optimal level of working capital that maximizes their value (Afza and Nazir, 2009).

Research objectives

The purpose of this study was to analyze the relationship between working capital management and company profitability. The study had the following specific objectives and hypotheses.

i. To analyze the relationship between average collection period and profitability of listed manufacturing firms.
ii. To assess the relationship between inventories turnover in days and profitability of listed manufacturing firms.
iii. To establish the relationship between average payment period and profitability of listed manufacturing firms.
iv. To evaluate the relationship between cash conversion cycle and profitability of listed manufacturing firms.

The following hypotheses were tested at $\alpha=0.05$:

$H0_1$: There is no statistically significant positive relationship between average collection period and profitability of listed manufacturing firms.
$H0_2$: There is no statistically significant positive relationship between inventory turnover in days and profitability of listed manufacturing firms.
$H0_3$: There is no statistically significant positive relationship between average payment period and profitability of listed manufacturing firms.
$H0_4$: There is no statistically significant positive relationship between cash conversion cycle and profitability of listed manufacturing firms.

METHODOLOGY

The study adopted the diagnostic research design. Diagnostic research tries to determine the association of the subject matter with something else (Kothari, 2004). The study is concerned with the effects of working capital components on profitability. The impacts of working capital components, which are the average collection period (ACP), inventory turnover in days (ITID), average payment period (APP) and cash conversion cycle (CCC) on profitability, were analyzed. The adopted research design enabled the researchers to identify the relationship that existed between the independent variables and the dependent variable. Examining data for the study required panel data analysis to find out the relationships that existed among the variables under study over a given period (Huang et al., 2008).

The population of study comprised all the manufacturing companies listed on the Nairobi Securities Exchange (NSE). Listed companies were appropriate for the study since they are public entities operating under strict corporate governance regulations, making their financial and accounting disclosures largely reliable. There are nine manufacturing firms listed on the NSE. These are: Bauman & Co. Ltd; Carbacid Investment Ltd; Kenya Orchards Ltd; B.O.C Kenya Ltd; East Africa Breweries Ltd; Mumias Sugar Company Ltd; British America Tobacco Kenya Ltd; Eveready East Africa Ltd and Unga Group Ltd.

At the time of the study, three (3) of the nine targeted manufacturing companies (Bauman & Co. Ltd, Kenya Orchards Ltd and B.O.C Kenya Ltd) had been suspended

from trading on the NSE. These companies were therefore eliminated from the sample, enabling the study to utilize mainly secondary data from the remaining six companies actively trading on the NSE. The data was obtained through document analysis of consolidated financial reports of years ending December: 2006, 2007, 2008, 2009 and 2010 of the six companies. The use of the secondary data enabled researchers to collect reliable information from the target population. These reports enabled the researchers to save time in data collection; they were cost effective and contained the required information. The data collected was analyzed using multiple regression and correlation analysis to establish the relationship between the independent variables of working capital: ACP, APP, ITID and CCC and the dependent variable (Gross Operating Profit). According to Kothari (2004), regression analysis is concerned with the study of how one or more variables affect changes in another variable. To test the hypotheses of the study, the following 4 models were used to analyze the relationship between the variables:

First Model: The first hypothesis test model; the relation between average collection period and profitability:

$$Y_{it} = a+\beta_1(ACP)_{it}+\beta_2(LOS)_{it}+\beta_3(CR)_{it}+\beta_4(DR)_{it}+\beta_5(FATA)_{it}+e$$

Second Model: The second hypothesis test model; the relation between average payment period and profitability:

$$Y_{it}=a+\beta_1(APP)_{it}+\beta_2(LOS)_{it}+\beta_3(CR)_{it}+\beta_4(DR)_{it}+\beta_5(FATA)_{it}+e$$

Third Model: The third hypothesis test model; the relation between inventory turnover in days (ITID) and profitability:

$$Y_{it}=a+\beta_1(ITID)_{it}+\beta_2(LOS)_{it}+\beta_3(CR)_{it}+\beta_4(DR)_{it}+\beta_5(FATA)_{it}+e$$

Fourth Model: The fourth hypothesis test model; the relation between cash conversion cycle and profitability:

$$Y_{it}=a+\beta_1(CCC)_{it}+\beta_2(LOS)_{it}+\beta_3(CR)_{it}+\beta_4(DR)_{it}+\beta_5(FATA)_{it}+e$$

The following were used as control variables:

Liquidity (CR): Liquidity variable was used as control variable in order to make its effect on profitability neutral. Current ratio was used as liquidity criterion.

$$CR = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Company Size (LOS): Company size variable was used to control the effect of this. The company size is: *natural logarithm* (sale).

Financial Assets (FATA): Long term and short term investments in deposits, stock and bills of exchange of the companies are considered as financial assets. Therefore, this variable was used as control variable in order to make its effect neutral on the company profitability.

$$FATA = \frac{\text{Financial Assets}}{\text{Total Assets}}$$

Debt Ratio (DR): Used as proxy for leverage and is calculated by dividing total debt by total assets:

$$DR = \frac{\text{Total Debt}}{\text{Total Assets}}$$

Where: Y, gross operating profit (Profitability); it, time; a, constant term for the independent variables; ACP, average collection period; CR, current ratio; LOS, the size of the company; DR, debt ratio; FATA, financial assets to total assets; ITID, inventory turnover in days; APP, average payment period; CCC, cash conversion cycle; e, the error term; β, regression model coefficient.

RESULTS AND DISCUSSION

This section begins by testing the correlations between the variables under study. To determine the effect of working capital management on profitability, regression models have been used.

Correlations between the variables

As shown in Table 1, the relationship between profitability and components of working capital is discernable. From the table, it is understood that operating profit (LOP) is positively correlated with APP, LOS, ACP and FATA, though the correlations with ACP and FATA are statistically insignificant. This means if firms delay their payments they will earn less profits. The strong positive correlation between LOP and LOS confirms that gross profits are directly proportional to company size; that as firm size increases, so do their sales, translating to higher profits. On the other hand, ITID, CCC, CR and DR are negatively correlated with LOP which shows that any increase in any of these factors will reduce operating profit of firms. However, the correlations between ITID and CR, and LOP are statistically insignificant. The matrix also reveals significant correlations between the predictor variables, which could result to multi-colinearity, thus have serious ramifications on these parameters' effects on the dependent variable, that is, gross operating profit.

Table 1. Correlation matrix for the study variables.

	ACP	APP	ITID	CCC	CR	LOS	DR	FATA	LOP
ACP	1								
APP	0.1854 (0.3267)	1							
ITID	0.3299 (0.0750)	0.4358* (0.016)	1						
CCC	-0.1447 (0.4454)	-0.6453** (0.0001)	0.3380 (0.0677)	1					
CR	0.5911** (0.0006)	-0.1185 (0.5328)	-0.3506 (0.0575)	0.0239 (0.9003)	1				
LOS	-0.3673* (0.0459)	0.4367* (0.0158)	0.0742 (0.6969)	-0.5641** (0.0012)	-0.7531** (0.0000)	1			
DR	-0.0051 (0.9830)	(-0.0146) 0.9514	0.6136** (0.0040)	0.7310** (0.0003)	-0.3415 (0.1406)	-0.8113** (0.0000)	1		
FATA	0.5492* (0.0183)	0.3663 (0.1349)	0.0039 (0.9877)	-0.2892 (0.2445)	0.6854** (0.0017)	-0.3991 (0.1009)	-0.0640 (0.8701)	1	
LOP	0.2018 (0.2850)	0.6726** (0.0000)	-0.0844 (0.6575)	-0.7662** (0.0000)	-0.3429 (0.0636)	0.7602** (0.0000)	-0.4528* (0.0450)	0.0251 (0.9211)	1

* and ** indicate significance levels at 5 and 1%, respectively; values in parentheses are the P-values.

Table 2. Regression results for the effect of average collection period on profitability.

Independent variable	Dependent variable (gross operating profit)			
	A (DR dropped)	B (FATA dropped)	C (CR dropped)	D (FULL model)
ACP	0.0590535 (5.28)***	0.042204 (3.77)***	0.0959543 (11.01)***	0.096503 (7.86)***
LOS	1.579755 (3.18)***	1.562349 (2.93)***	0.202916 (0.38)	0.136686 (0.13)
CR	0.0462364 (0.21)	0.1458221 (0.31)	-	0.0492927 (0.08)
DR	-	1.89165 (0.55)	-8.241398 (-3.15)***	-8.164119 (-2.57)**
FATA	1.569174 (0.41)	-	21.41342 (3.80)***	21.1669 (3.80)***
Constant	-14.37849 (-1.75)*	-13.5502 (-1.54)	5.985497 (0.470)	6.946506 (0.44)

Z-statistics are in parentheses; *, ** and *** indicate significance levels of 10, 5 and 1%, respectively.

Regression models

The previous section shows that some components of working capital correlate with company profitability. This section determines how much of each of the variables of working capital impact profitability. To estimate the research models, pooled ordinary least squares (OLS) method was used. As control variables, CR; LOS and FATA were used while the DR was used to proxy for leverage. To avoid the effects of multi-colinearity due to the strong negative correlations between LOS and CR and DR and LOS, stepwise remodeling was done by separately entering the variables in different models.

Effect of average collection period on profitability

To test the first regression model, the study hypothesized that there would be no statistically significant relationship between ACP and profitability. Table 2 present the results of the first regression model.

Multiple regression analysis was conducted using ACP as a predictor of operating profit (profitability) and LOS, CR, DR and FATA as controls. The results obtained show that an increase in ACP increases the LOP. The values in column D show that if ACP increases by 1, gross operating profit would increase by 0.097. Among the control variables, the effect of LOS on the gross LOP only becomes significant when DR and FATA are dropped separately while the effects of FATA and DR are separately insignificant in the absence of each other as shown in columns A and B, respectively. The effects of FATA and DR are only significant where an increase of 1 in DR decreases LOP by 8.164 while a similar increase in FATA would increase LOP by 21.167. The results indicate that ACP has a positive relationship with LOP.

Table 3. Regression results for the effect of inventories turnover in days on profitability.

Independent variable	Dependent variable (gross operating profit)			
	A (DR dropped)	B (FATA dropped)	C (CR dropped)	D (FULL model)
ITID	0.0050837 (0.87)	-0.0024856 (-0.35)	0.0250021 (2.26)**	0.0211176 (1.44)
LOS	2.228911 (2.62)***	2.61847 (3.88)***	4.482825 (2.88)***	5.370443 (2.13)*
CR	0.5702273 (1.55)	-0.0336407 (-0.04)	-	-1.071328 (-0.48)
DR	-	7.991454 (1.89)	13.90805 (1.93)*	9.397045 (0.76)
FATA	-3.728866 (-0.55)	-	36.67873 (1.88)*	39.16816 (1.76)*
Constant	-23.36414 (-1.63)	-28.32695 (-2.31)**	-62.50038 (-2.48)**	-74.45468 (-1.99)*

Z-statistics are in parentheses; *, ** and *** indicate significance levels of 10, 5 and 1%, respectively.

Therefore, the null hypothesis ($H0_1$) is rejected.

These findings mean that firms early in collecting their receivables earn higher profits as compared to firms recovering receivables late. The findings are in agreement with Ghosh and Maji (2003) who analyzed the relationship between working capital management efficiency and Earnings before Interest and Taxes (EBIT) and found an inverse relationship between collection period and EBIT, indicating that credit facility increases sales of firm which ultimately increases profitability. However, the findings contradict Hyder et al. (2007) who investigated the dependence of profitability on working capital management of manufacturing firms listed on respective stock exchanges in Asia including China, Japan, India, Pakistan, Bangladesh, Iran and Korea and established a significant negative relationship between receivable period and firm's profitability. Raheman and Nasr (2007) also established that most of the firms invest huge amount of cash in their working capital, thus profitability was inversely related to receivable collection period.

Effect of inventories turnover in days on profitability

To test the second regression model, the study hypothesized that there would be no statistically significant relationship between ITID and profitability. The results of the second regression model are presented in Table 3.

The results of the regression analysis conducted using ITID as a predictor of operating profit and LOS, CR, DR and FATA as controls show that ITID has an insignificant effect on gross LOP. The values in column C show that ITID only impacts on LOP when CR is dropped. In this case, a unitary increase in ITID increases LOP by 0.25. On the other hand, company size positively affects LOP where an increase in LOS by 1 increases LOP by 5.37. CR, DR and FATA have insignificant impacts on LOP. Since ITID only impacts LOP in the absence of FATA, the null hypothesis ($H0_2$) was therefore accepted. This means that inventory turnover in days had statistically insignificant effect on gross operating profits of the assessed firms. Holding inventories incurs costs to the firm, such as the funds which are tied up in inventories, cannot have the interest earnings. Instead, storage and insurance costs have to be paid, furthermore, spoilage, damage, and loss of goods lead to costs to firms.

The findings were consistent with those of Roumiantsev and Netessine (2005) who did not find a relationship between return on assets and inventory levels but instead found that superior earnings are associated with the speed of change/responsiveness in inventory management. Roumiantsev and Netessine (2007) also reported that the relationship both between days of work in process inventory and ROS, and between days of finished goods inventory and ROS, is statistically insignificant. However, they contradict the findings of Chen et al. (2005, 2007) who reported that firms with abnormally high inventories have abnormally poor long-term stock returns and Gaur et al. (2005) who equally reported that inventory turnover for retailing firms is positively associated with both capital intensity and sales surprise, and this was negatively associated with gross margins. Hyder et al. (2007) and Raheman and Nasr (2007) have also reported a negative relationship between Inventory period and profitability.

A limitation that could explain the variation in the findings is the fact that different manufacturing firms report different types of inventories. Use of total inventories without regard to the type may therefore explain the variation.

Effect of average payment period on profitability

To test the third regression model, the study hypothesized that there would be no statistically significant relationship between APP and profitability. The third regression model is presented in Table 4. Multiple regression analysis was conducted using APP as a predictor of operating profit and LOS, CR, DR and

Table 4. Regression results for the effect of average payment period on profitability.

Independent variable	Dependent variable (gross operating profit)			
	A (DR dropped)	B (FATA dropped)	C (CR dropped)	D (FULL model)
APP	0.0115163 (2.89)***	0.0153429 (2.58)**	0.0189322 (4.96)***	0.0189824 (3.43)***
LOS	1.778297 (2.61)***	2.272046 (4.25)***	3.500821 (4.04)***	3.481045 (2.10)**
CR	0.4875201 (1.72)*	1.551299 (2.00)**	-	0.0204783 (0.02)
DR	-	7.551746 (2.13)**	4.693913 (1.11)	4.754879 (0.75)
FATA	-6.695494 (-1.23)	-	24.42538 (2.83)***	24.33543 (2.09)**
Constant	-16.37986 (-1.45)	-26.87986 (-3.02)***	-45.11853 (-3.26)***	-44.83961 (-1.83)*

Z-statistics are in parentheses; *, ** and *** indicate significance levels of 10, 5 and 1%, respectively.

Table 5. Regression results for the effect of cash conversion cycle on profitability.

Independent variable	Dependent variable (gross operating profit)			
	A (DR dropped)	B (FATA dropped)	C (CR dropped)	D (FULL model)
CCC	-0.0116302 (-1.42)	-0.0228936 (-2.35)**	-0.0771765 (-32.43)***	-0.0779092 (-23.87)***
LOS	1.579699 (1.79)*	1.71806 (2.56)**	3.400816 (23.83)***	3.319662 (12.69)***
CR	0.3727155 (1.07)	0.6032469 (1.01)	-	0.0835289 (0.39)
DR	-	10.12978 (2.71)***	-7.896266 (-8.88)***	-7.758174 (-7.31)***
FATA	-3.044518 (-0.49)	-	-26.4497 (-16.45)***	-27.32498 (-9.52)***
Constant	-11.62606 (-0.78)	-14.18994 (-1.25)	-35.70964 (-15.45)***	-34.48782 (-8.51)***

Z-statistics are in parentheses; *, ** and *** indicate significance levels of 10, 5 and 1%, respectively.

FATA as controls. The results in Table 4 show that an increase in APP leads to an increase in gross LOP. The values in column D show that if APP increases by 1, gross operating would increase by 0.019. On the other hand, if LOS increases by 1, then LOP would increase by 3.481 while a unit increase in FATA would translate to 24.335 in LOP. DR and CR do not significantly predict LOP. However, all the other independent variables significantly predict LOP when FATA is dropped (column B) while only DR remains insignificant in the absence of CR (column C). Conversely, only APP, LOS and CR significantly predict LOP when DR is dropped.

Based on the foregoing findings, the null hypothesis ($H0_3$) is rejected. Firms with longer payment period/delay their payment period earn higher profits as compared to firms with shorter payment period. Lazaridis and Tryfonidis (2006) found that there was positive relationship between payment period and profitability; this means profitable firms delay their payments. Ramachandran and Janakirama (2006), in their analysis of the relationship between working capital management efficiency and Earnings before Interest and Taxes (EBIT) also found that there was a positive relation between payable period and EBIT, indicating that profitable firms delay their payables. In contrast, Falope and Ajilore (2009) found a significant negative relationship between net operating profit and the average payment period, implying that companies with short payment period are unprofitable. The inverse relationship could be explained by the discounts enjoyed by the firms by paying the suppliers in time, thus reducing the cost of production.

Effect of cash conversion cycle on profitability

To test the fourth regression model, the study hypothesized that there would be no statistically significant relationship between CCC and profitability. The results of the fourth regression model are presented in Table 5. The results obtained indicate that an increase in cash conversion cycle leads to a drop in the gross operating profit. Colum D in Table 5 shows that if CCC increased by 1, gross operating profits would drop by 0.078. With regard to the control variables, a unit increase in company size (LOS) increases gross LOP by 3.32 while similar increases in DR and FATA would decreases LOP by 7.76 and 27.32 respectively. Almost similar effects would be observed if CR was dropped as indicated by the results in column C. On the contrary, whereas CR has an insignificant impact on LOP, all the other variables become insignificant in the absence of DR as shown in column A. The regression results indicate

that CCC has a significant negative relationship with operating profit; that as CCC increases, profitability decreases. This means that firms with high cash conversion cycle earn lower profits as compared to firms with low cash conversion cycle. Therefore the null hypothesis ($H0_4$) was rejected.

The findings above concur with those of Ejelly (2004), who reported that cash conversion cycle is a better measure of liquidity than current ratio and liquidity has a negative relation with profitability. Ramachandran and Janakirama (2006) established a negative relationship between EBIT and CCC. Nobanee (2009), Chaterjee (2010), Nobanee et al. (2010), Akgun and Meltem (2010) and Rezazade and Heidarian (2010) have all reported a negative relationship between CCC's components with profitability. One of the effective ways for shortening CCC is to shorten the period of receivable accounts, delaying the payment of payable accounts and inventories. By shortening CCC, firm profitability improves. The longer the cash conversion cycle, the more the firm must invest in working capital, while the shorter cash conversion cycle, the fewer funds are tied up in the working capital. Corporate liquidity is influenced by the cash cycle because cash cycle measures the average amount of time that cash is tied up in operations process. Therefore, a firm with a short cash cycle is expected to have higher levels of cash and marketable securities, all else being equal.

RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDIES

Managers should focus on reducing cash conversion cycles and try to collect receivables as soon as possible because it is better to receive inflows sooner than later. Managers should reduce inventory periods and try to delay payables because it will provide them opportunities to invest in different profitable areas thus increasing the firms' profitability.

The following are some of the areas that further research may be focused:

i. Similar study done on the same topic with different companies over an extended sample period of financial years.
ii. A study undertaken on the impact of external factors on working capital management in manufacturing companies.
iii. Similar study with an extended scope to cover other components of working capital management including cash and marketable securities.

Conclusion

The study has shown that profitability of manufacturing firms depends on effective working capital management. Gross operating profit is positively related with average collection period and average payment period. It is therefore profitable to delay payables and invest the money in different profitable ventures/areas. On the other hand, firms should collect receivables as soon as possible because it is better to receive inflows sooner than later.

Gross operating profit on the other hand it is negatively correlated with the cash conversion cycle. This means that by shortening CCC, firms' profitability improves. The longer the CCC, the more the firm must invest in working capital.

The study therefore concludes that there is a relationship between the various components of working capital indicating that effective working capital management has a great impact on profitability.

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