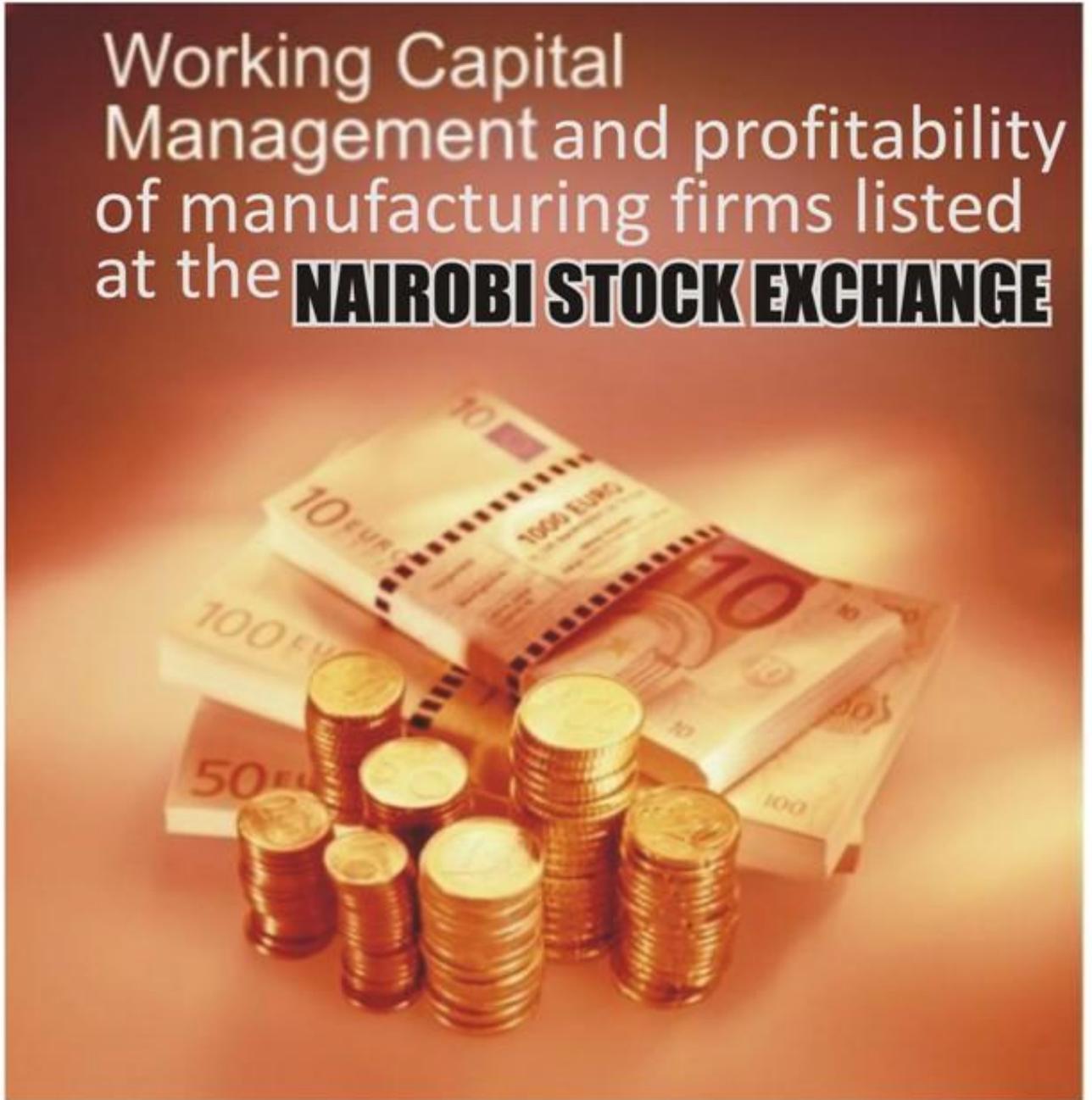


Working Capital
Management and profitability
of manufacturing firms listed
at the **NAIROBI STOCK EXCHANGE**



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Full Length Research

Working capital management and profitability of manufacturing firms listed at the Nairobi stock exchange

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Working capital management plays a significant role in better performance of manufacturing firms; this paper analyzes the impact of working capital management on firm's performance in Kenya. The study examined the relationship between working capital management and performance of manufacturing firms listed at the Nairobi Securities Exchange (NSE). The study used secondary data from a sample of 18 companies at the NSE. A regression model was determined to establish the relationship between the dependent variable and the independent variables. Pearson's correlation and regression analysis were used for the analysis. The results indicated that there is a strong negative relationship between firm's performance and liquidity of the firm.

Key words: Working capital, profitability, manufacturing firms.

INTRODUCTION

The working capital management deals with the management of current assets and current liabilities. According to Van Horne and Wachowicz (2000), excessive levels of current assets can easily result in a firm realizing a substandard return on investment and at the same time, too few current assets may incur shortages and difficulties in maintaining smooth operations of a firm. Indeed as was observed by Rao (1989), managers spend considerable time on day-to-day problems that involve working capital decisions.

In Kenya, the manufacturing sector is the fourth biggest sector after agriculture, transport and communication, and wholesale and retail trade. It contributed about 10.1 per cent of Kenya's GDP serving both the local market

and exports to the East African region. The sector, which is dominated by subsidiaries of multi-national corporations, contributed approximately 18% of the Gross Domestic Product (GDP) in 2009.

Challenges facing the sector include shrinking demands for locally manufactured goods due to rising poverty levels and reduced exports resulting from general economic slump after the recent global recession. In addition, the high cost of inputs resulting from poor infrastructure has led to high prices for final products leading to underutilization of capacity. Other challenges include security issues, arbitrary charges levied by regulatory and local authorities and high cost of securing financial facilities from the banks. However opportunity for

growth exists with the rollout of common tariff under the newly integrated EAC custom union, because Kenya's manufacturing sector is the largest in the region. As at the end of 2010, there were eighteen (18) manufacturing firms listed in the Nairobi Stock Exchange with the price movement of 5 of them being used to determine the daily average NSE index.

Literature review

Ganesan (2007) analyzed the working capital management efficiency of firms from telecommunication equipment industry. This study found evidence that even though "day's working capital" is negatively related to the profitability, it is not significantly impacting the profitability of firms in telecommunication equipment industry. However, this was contrary to the results of Chowdhury and Amin (2007) who had found positive correlations between WCM with financial performance of the Pharmaceutical industry in Bangladesh. Narware (2004) in his empirical study on Indian National Fertilizer Limited, for 1990-91 to 1999-2000 signify that working capital management and profitability of the company disclosed both negative and positive association.

Whilst, Afza and Nazir (2007) through cross-sectional regression models on working capital policies, profitability and risk of the firms, found a negative relationship between the profitability measures of firms and degree of aggressiveness on working capital investment and financing policies, their result indicates that the firms yield negative returns if they follow an aggressive working capital policy by investigating the relative relationship between the aggressive or conservative working capital policies for 208 public limited companies listed at Karachi Stock Exchange for a period of 1998-2005.

According to Padachi (2006), high investment in inventories and receivables is associated with lower profitability. He used return on total assets as a measure of profitability for a sample of 58 small manufacturing firms in Mauritius for the period 1998–2003. His findings reveal an increasing trend in the short-term component of working capital financing. Similar to most recent study by Christopher and Kamalavalli, (2009), which focus on 14 corporate hospitals in India for the period 1996-97 to 2005-06. Their correlations and regression analysis signifying that working capital component namely current ratio, cash turnover ratio, current assets to operating income and leverage negatively influence profitability.

However, it is evident from the literature that none of the studies has been able enough to develop a model that will assist managers to establish an optimum working capital under different operating environments or even industries. Instead the literature and studies suggest the existence of an optimum level without necessarily suggesting the same level or how to be established.

DATA AND METHODOLOGY

The research design adopted was cross-sectional study in which data was gathered just once over the period 2006 to 2010. The unit of analysis was the individual manufacturing firms listed at the NSE and the purpose of the study was to establish a relationship between Working Capital Management and profitability of these firms. The study used secondary data obtained from the annual reports and financial statements of manufacturing companies listed on the NSE for the period 2006-2010. A sample of 18 companies was selected but the firms that were analyzed after the screening process finally became 15. In order to obtain a representative sample from the population; a number of filters were applied. It was intended that the study was a census survey in which all manufacturing firms listed at the NSE were to be studied, due to the manageable numbers involved.

Regression analysis was used to analyze the data that was collected. On the basis of the sample data, the researcher estimated the value of the variable Y corresponding to a given value of variable X. The study followed Deloof (2003) in establishing the dependent variable (Y) represented by the Net Operating Profit (NOP) ratio which was obtained through $(\text{Sales} - \text{Cost of Sales} + \text{Depreciation and Amortization}) / (\text{Total assets} - \text{Financial assets})$. The NOP was then related with the following independent proxies for the hypothesized determination of working capital which are: Average Collection Period (ACP), Inventory Holding Period (IHP), Average Payment Period (APP), Cash Conversion Cycle (CCC), Leverage Ratio (LEV), Age of the Firm (AGE), Current Ratio (CR) and Log of Sales (LOS).

Empirical results

Descriptive analysis

Descriptive analysis shows the mean, and standard deviation of the different variables of interest in the study. It also presents the minimum and maximum values of the variables which help in getting a picture about the maximum and minimum values a variable can achieve.

Table 1 above shows descriptive statistics for 15 manufacturing firms in Kenya for a period of five years from 2006 to 2010 and for a total 75 firms year observations. The mean value of net operating profitability is 57.70% of total assets, and standard deviation is 65.84%.

Pearson's correlation coefficient analysis

Table 2 above presents Pearson correlation coefficients for all variables considered. The researcher started by presenting correlation results between the average collection period and net operating profitability. The result of correlation analysis shows a negative coefficient - 0.246, with *p*-value of (0.033).

Table 1: Descriptive statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---------|----|---------|----------|------------|----------------|
| NOP | 75 | .180 | 3.600 | .57697 | .658420 |
| ACP | 75 | .020 | 156.700 | 40.12160 | 34.354574 |
| IHP | 75 | 18.900 | 200.100 | 86.40427 | 42.844594 |
| APP | 75 | 2.600 | 210.500 | 47.09560 | 34.739233 |
| CCC | 75 | 1.300 | 197.300 | 81.95880 | 49.476679 |
| LEV | 75 | .060 | 18.600 | 1.30657 | 2.208959 |
| AGE | 75 | .903090 | 1.944483 | 1.58044412 | .278815234 |
| CR | 75 | .470 | 3.460 | 1.53803 | .565414 |
| LOS | 75 | 2.590 | 5.350 | 3.97583 | .607472 |
| Valid N | 75 | | | | |

Source: Calculations based on Annual reports of firms from 2006-2010

Table 2: Correlations coefficients

| | | NOP | ACP | IHP | APP | CCC | LEV | AGE | CR | LOS |
|-----|---------------------|-----------|-----------|-----------|-----------|-----------|---------|----------|-----------|-----------|
| NOP | Pearson Correlation | 1 | -.246(*) | -.110 | -.336(**) | -.057 | .289(*) | .305(**) | .074 | .223 |
| | Sig. (2-tailed) | . | .033 | .345 | .003 | .624 | .012 | .008 | .528 | .054 |
| ACP | Pearson Correlation | -.246(*) | 1 | .453(**) | .628(**) | .605(**) | -.073 | .123 | -.394(**) | -.242(*) |
| | Sig. (2-tailed) | .033 | . | .000 | .000 | .000 | .531 | .294 | .000 | .037 |
| IHP | Pearson Correlation | -.110 | .453(**) | 1 | .437(**) | .823(**) | -.028 | .332(**) | -.144 | -.325(**) |
| | Sig. (2-tailed) | .345 | .000 | . | .000 | .000 | .810 | .004 | .218 | .004 |
| APP | Pearson Correlation | -.336(**) | .628(**) | .437(**) | 1 | .172 | -.159 | .191 | -.412(**) | -.098 |
| | Sig. (2-tailed) | .003 | .000 | .000 | . | .140 | .173 | .100 | .000 | .404 |
| CCC | Pearson Correlation | -.057 | .605(**) | .823(**) | .172 | 1 | -.029 | .128 | -.096 | -.398(**) |
| | Sig. (2-tailed) | .024 | .000 | .000 | .140 | . | .805 | .275 | .414 | .000 |
| LEV | Pearson Correlation | .289(*) | -.073 | -.028 | -.159 | -.029 | 1 | .244(*) | .052 | .039 |
| | Sig. (2-tailed) | .012 | .531 | .810 | .173 | .805 | . | .035 | .655 | .743 |
| AGE | Pearson Correlation | .305(**) | .123 | .332(**) | .191 | .128 | .244(*) | 1 | -.016 | -.154 |
| | Sig. (2-tailed) | .008 | .294 | .004 | .100 | .275 | .035 | . | .890 | .187 |
| CR | Pearson Correlation | .074 | -.394(**) | -.144 | -.412(**) | -.096 | .052 | -.016 | 1 | -.197 |
| | Sig. (2-tailed) | .528 | .000 | .218 | .000 | .414 | .655 | .890 | . | .090 |
| LOS | Pearson Correlation | .223 | -.242(*) | -.325(**) | -.098 | -.398(**) | .039 | -.154 | -.197 | 1 |
| | Sig. (2-tailed) | .054 | .037 | .004 | .404 | .000 | .743 | .187 | .090 | . |

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

The last result of correlation analysis from above table for LOS is positive 0.223; with p -value of (.054). It shows that as size of the firm increases as measured by sales, it will increase its profitability.

Regression model

Relationship between accounts collection period and profitability

The model that we have applied in table 3 is as follows:

$$\text{NOP} = \beta_0 + \beta_1 (\text{ACP}) + \beta_2 (\text{LEV}) + \beta_3 (\text{CR}) + \beta_4 (\text{AGE}) + \beta_5 (\text{LOS}) + \varepsilon$$

R-Square (coefficient of determination) is a commonly used statistic to evaluate model fit. R-square is 1 minus

the ratio of residual variability. The adjusted R^2 also called the coefficient of multiple determinations, is the percentage of the variance in the dependent variable explained uniquely or jointly by the independent variables and is 20%. The F statistic is used to test the significance of R. Overall; the model is significant as F-statistics is 4.701.

According to the findings in table 4, the regression model for the stated variables was;
 $\text{NOP} = -1.546 - 0.004 (\text{ACP}) + 0.55 (\text{LEV}) + 0.037 (\text{CR}) + 0.755 (\text{AGE}) + 0.241 (\text{LOS}) + \varepsilon$

The results of this regression indicate that the coefficient of accounts receivable is negative and is significant at $\alpha = 5\%$.

Table 3: Model 1 summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | F | Sig. |
|-------|---------|----------|-------------------|----------------------------|-------|---------|
| 1 | .504(a) | .254 | .200 | .588888 | 4.701 | .001(a) |

Predictors: (Constant), LOS, LEV, CR, AGE, ACP

Table 4: Model 1 regression coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| (Constant) | -1.546 | .794 | | -1.947 | .056 |
| ACP | -.004 | .002 | -.206 | -1.691 | .095 |
| LEV | .055 | .032 | .186 | 1.720 | .090 |
| AGE | .755 | .258 | .320 | 2.923 | .005 |
| CR | .037 | .140 | .032 | .267 | .790 |
| LOS | .241 | .124 | .222 | 1.939 | .057 |

Dependent variable: NOP

Table 5: Model 2 summary

| Model | R | R ² | Adjusted R ² | Std. Error of the Estimate | F | Sig. |
|-------|---------|----------------|-------------------------|----------------------------|-------|---------|
| 2 | .484(a) | .235 | .179 | .596485 | 4.233 | .002(a) |

Predictors: (Constant), LOS, LEV, CR, AGE, IHP

Table 6: Model 2 regression coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| (Constant) | -1.854 | .771 | | -2.406 | .019 |
| IHP | -.002 | .002 | -.123 | -1.020 | .312 |
| LEV | .056 | .033 | .188 | 1.715 | .091 |
| AGE | .803 | .274 | .340 | 2.927 | .005 |
| CR | .118 | .129 | .101 | .914 | .364 |
| LOS | .269 | .125 | .249 | 2.149 | .035 |

Dependent variable: NOP

Relationship between inventory holding period and profitability

The second regression was run using the inventory holding period as an independent variable as a replacement for average collection period used in model one above. The other variables are the same as they have been in the first regression.

In this model (table 5) the adjusted R^2 was 17.9%. The F-statistic had a value equal to (4.233) that reflects the high significance of the model or significance of R-square.

From the findings (table 6), the regression model for the stated variables was;

$$\text{NOP} = -1.854 - 0.002 (\text{IHP}) + 0.056(\text{LEV}) + 0.118(\text{CR}) + 0.803(\text{AGE}) + 0.269(\text{LOS}) + \epsilon$$

The coefficient of intercept C has a value (-1.854) and

is also significant.

Relationship between average payment period and profitability

In this model (table 7) the adjusted R^2 was 28.3%. The F-statistic had a value equal to (6.843) that reflects the high significance of the model or significance of R-square.

As indicated by the findings in Table 8, the regression model for the stated variables was;

$$\text{NOP} = -1.493 - 0.007 (\text{APP}) + 0.038(\text{LEV}) - 0.044(\text{CR}) + 0.903(\text{AGE}) + 0.252(\text{LOS}) + \epsilon$$

In this model, the coefficient of C was -1.493 and hence it was significant. The findings are consistent with the results obtained by Deloof (2003) and Raheman and Nasr, (2007). However it is inconsistent with the findings of Mathuva (2010) in which he found a positive coefficient

Table 7: Model 3 Summary

| Model | R | R ² | Adjusted R ² | Std. Error of the Estimate | F | Sig. |
|-------|---------|----------------|-------------------------|----------------------------|-------|---------|
| 3 | .576(a) | .331 | .283 | .557500 | 6.843 | .000(a) |

Predictors: (Constant), LOS, LEV, APP, AGE, CR

Table 8: Model 3 regression Coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| (Constant) | -1.493 | .709 | | -2.104 | .039 |
| APP | -.007 | .002 | -.382 | -3.343 | .001 |
| LEV | .038 | .031 | .128 | 1.231 | .222 |
| AGE | .903 | .250 | .382 | 3.611 | .001 |
| CR | -.044 | .130 | -.038 | -.341 | .734 |
| LOS | .252 | .112 | .233 | 2.248 | .028 |

Dependent Variable: NOP

Table 9: Model 4 summary

| Model | R | R ² | Adjusted R ² | Std. Error of the Estimate | F | Sig. |
|-------|---------|----------------|-------------------------|----------------------------|-------|---------|
| 4 | .474(a) | .225 | .169 | .600351 | 4.001 | .003(a) |

Predictors: (Constant), LOS, LEV, CR, AGE, CCC

Table 10: Model 4 regression coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| (Constant) | -2.226 | .819 | | -2.718 | .008 |
| CCC | .001 | .002 | .044 | .375 | .709 |
| LEV | .059 | .033 | .199 | 1.805 | .075 |
| AGE | .709 | .263 | .300 | 2.697 | .009 |
| CR | .155 | .129 | .133 | 1.202 | .233 |
| LOS | .331 | .131 | .306 | 2.533 | .014 |

Dependent variable: NOP

of relationship between accounts payment period and net operating profit.

Relationship between cash conversion cycle and profitability

According to table 9, the adjusted R² was 16.9%. The F-statistic had a value equal to (4.001) that reflects the high significance of the model or significance of R-square.

According to table 10, the regression model for the stated variables was;

$$\text{NOP} = -2.226 + 0.001(\text{CCC}) + 0.059(\text{LEV}) + 0.155(\text{CR}) + 0.709(\text{AGE}) + 0.331(\text{LOS}) + \varepsilon$$

The result indicates that the coefficient of cash conversion cycle is positive and is significant at $\alpha = 1\%$ and implies that the increase or decrease, in the cash conversion period, significantly affects profitability of the firm.

Relationship between independent variables (ACP, IHP, APP), control variables and Profitability

As indicated by table 11, the adjusted R² was 26.2%. The F-statistic had a value equal to (4.747) that reflects the high significance of the model or significance of R-square.

According to table 12, the regression model for the stated variables were;

$$\text{NOP} = -1.489 + 0.00(\text{ACP}) + (9.522\text{E}-05)(\text{IHP}) - 0.007(\text{APP}) + 0.038(\text{LEV}) + 0.899(\text{AGE}) - 0.046(\text{CR}) + 0.252(\text{LOS}) + \varepsilon$$

The model shows that leverage, current ratio and logarithm of sales had more influence on profitability of firms than average collection period, inventory holding period and average payment period.

Table 11: Model 5 summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | F | Sig. |
|-------|---------|----------|-------------------|----------------------------|-------|---------|
| 5 | .576(a) | .332 | .262 | .565743 | 4.747 | .000(a) |

Predictors: (Constant), LOS, LEV, APP, AGE, CR, IHP, ACP

Table 12: Model 5 regression coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| (Constant) | -1.489 | .773 | | -1.927 | .058 |
| ACP | .000 | .003 | -.007 | -.048 | .962 |
| IHP | 9.522E-05 | .002 | .006 | .050 | .960 |
| APP | -.007 | .003 | -.381 | -2.740 | .008 |
| LEV | .038 | .032 | .129 | 1.215 | .229 |
| AGE | .899 | .263 | .381 | 3.419 | .001 |
| CR | -.046 | .137 | -.039 | -.334 | .740 |
| LOS | .252 | .123 | .233 | 2.056 | .044 |

Dependent variable: NOP

DISCUSSION OF FINDINGS

The results shows that for overall manufacturing sector, Working Capital Management has a significant impact on profitability of the firms and plays a key role in value creation for shareholders as longer Cash Conversion Cycle have negative impact on Net Operating Profitability of a firm. The Cash Conversion Cycle offer easy and useful way to check working capital management efficiency. For value creation of shareholders, firms must try to keep these numbers of days to minimum level. The negative association of Average Collection Period with Net Operating Profitability helps us in setting credit policy for the sector in general for the firms in manufacturing sector. It recommends a shorter credit period for the firms to realize higher profitability. There exists negative association between Inventory Turnover in Days and Net Operating Profitability for the manufacturing sector as a whole, which implies that taking lesser days to convert inventories to sales will increase profitability. Similarly there is a negative relationship between Accounts payment period and Net operating profitability of firms. The shorter the accounts payable, the better the profitability this could be due to good name created by suppliers and suppliers will not interrupt supplies to the firm which in turn leads to smooth operation during the year and ends up with better profitability. The study concluded that the ACP, IHP, APP and CCC have a negative correlation with the NOP. The results are similar to that found by Deloof (2003).

CONCLUSION

Most of the Kenyan manufacturing firms have large amounts of cash invested in working capital. It can therefore be expected that the way in which working

capital is managed will have a significant impact on profitability of those firms. The study found out existence of negative correlation between net operating profit and the firms average collection period, inventory holding period, accounts payment period and the cash conversion cycle. These results suggest that managers can create value for their shareholders by reducing the number of day's accounts receivable, accounts payment period and inventories to a reasonable minimum.

On the basis of the above analysis it can further be concluded that these results can be strengthened if the firms manage their working capital and leverage in more efficient ways. Management of working capital means management of current assets and current liabilities, and financing these current assets using cheap sources of finance. If these firms properly manage their cash, accounts receivables, accounts payables and inventories in a proper way, this will ultimately increase profitability of these companies.

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