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**WORKING CAPITAL MANAGEMENT AND PROFITABILITY – CASE OF INDIAN PETROCHEMICALS
COMPANY- RIL, HPCL, GAIL****PRAKASH CHAWLA**

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**S. K. PATEL INSTITUTE OF MANAGEMENT
GANDHINAGAR – GUJARAT****ABSTRACT**

Working Capital Management has its effect on profitability of the firm. In this research, we have selected a sample of 3 firms from Petrochemical industry for a period of 5 years from 2004 – 2009, we have studied the effect of different variables of working capital management including the Average collection period, Inventory turnover in days, Average payment period, Cash conversion cycle (CCC) and Current ratio on the Gross operating profitability of the firms.. Pearson's correlation and linear regression t-test are used for analysis. The results show that there is a strong negative relationship between variables of the working capital management (CCC) and profitability of the firm. It means that as the cash conversion cycle increases it will lead to decreasing profitability of the firm, and managers can create a positive value for the shareholders by reducing the cash conversion cycle to a possible minimum level. We find that there is a significant negative relationship between liquidity and profitability. We also find that there is a negative relationship between net working capital of the firm and its profitability.

KEY WORDS

Cash Conversion Cycle, Gross operating Profitability, Liquidity, Working Capital Management.

INTRODUCTION

Maintaining the smooth and continuous flow of organization is the challenging task for each organization, for this management needs the availability of each and every component of 4M i.e. Man, Machine, Money and Material. Day to day management of these four components is known as "WORKING CAPITAL MANAGEMENT". Working capital management is an important activity for any organization as it maintains the continuous flow. Purchase of fixed assets decisions are taken once and it continues for a longer period of time but the decisions relating to the working capital are taken on each day based on the circumstances. Working capital is very important component of corporate finance because it directly affects the liquidity and profitability of the company. Working capital is the base for any organization especially for manufacturing organization.

Excessive levels of current assets can easily result in a firm's realizing a substandard return on investment. However firms with too few current assets may incur shortages and difficulties in maintaining smooth operations (Horne and Wachowicz, 2000) The Working Capital Management of a firm in part affects its profitability. The ultimate objective of any firm is to maximize the profit. But, 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. Therefore, there must be a trade off between these two objectives of the firms. One objective should not be at cost of the other because both have their importance. 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.

Efficient working capital management involves planning and controlling current assets and current liabilities in a manner that eliminates the risk of inability to meet due short term obligations on the 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 that involve 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). With regard to current liabilities, the firm is responsible for paying these obligations on a timely basis. Liquidity for the on going firm is not reliant on the liquidation value of its assets, but rather on the operating cash flows generated by those assets (Soenen, 1993).

Current assets include all those assets that in the normal course of business return to the form of cash within a short period of time, ordinarily within a year and such temporary investment as may be readily converted into cash upon need. Firms may have an optimal level of working capital that maximizes their value. Large inventory and a generous trade credit policy may lead to high sales. Larger inventory reduces the risk

of a stock-out. Trade credit may stimulate sales because it allows customers to assess product quality before paying (Long, Maltiz and Ravid, 1993, and Deloof and Jegers, 1996). Another component of working capital is accounts payable. Delaying payments to suppliers allows a firm to assess the quality of bought products, and can be an inexpensive and flexible source of financing for the firm. On the other hand, late payment of invoices can be very costly if the firm is offered a discount for early payment. A popular measure of Working Capital Management (WCM) is the cash conversion cycle, i.e. the time lag between the expenditure for the purchases of raw materials and the collection of sales of finished goods. The longer this time lag, the larger the investment in working capital (Deloof 2003). A longer cash conversion cycle might increase profitability because it leads to higher sales. However, corporate profitability might also decrease with the cash conversion cycle, if the costs of higher investment in working capital rise faster than the benefits of holding more inventories and/or granting more trade credit to customers.

LITERATURE REVIEW

Many researchers have studied working capital from different views and in different environments. The following ones were very interesting and useful for our research:

Raheman & Nasr, (2007) the Paper focus on Working Capital Management has its effect on liquidity as well on profitability of the firm. In this research, a sample of 94 Pakistani firms listed on Karachi Stock Exchange for a period of 6 years from 1999 – 2004 was taken, studied the effect of different variables of working capital management including the Average collection period, Inventory turnover in days, Average payment period, Cash conversion cycle and Current ratio on the Net operating profitability of Pakistani firms. Debt ratio, size of the firm (measured in terms of natural logarithm of sales) and financial assets to total assets ratio have been used as control variables. Pearson's correlation, and regression analysis (Pooled least square and general least square with cross section weight models) are used for analysis. The results show that there is a strong negative relationship between variables of the working capital management and profitability of the firm. It means that as the cash conversion cycle increases it will lead to decreasing profitability of the firm, and managers can create a positive value for the shareholders by reducing the cash conversion cycle to a possible minimum level. The study finds that there is a significant negative relationship between liquidity and profitability. The study also found that there is a positive relationship between size of the firm and its profitability. There is also a significant negative relationship between debt used by the firm and its profitability.

Eljelj, (2004) elucidated that efficient liquidity management involves planning and controlling current assets and current liabilities in such a manner that eliminates the risk of inability to meet due short-term obligations and avoids excessive investment in these assets. The relation between profitability and liquidity was examined, as measured by current ratio and cash gap (cash conversion cycle) on a sample of joint stock companies in Saudi Arabia using correlation and regression analysis. The study found that the cash conversion cycle was of more importance as a measure of liquidity than the current ratio that affects profitability. The size variable was found to have significant effect on profitability at the industry level. The results were stable and had important implications for liquidity management in various Saudi companies. First, it was clear that there was a negative relationship between profitability and liquidity indicators such as current ratio and cash gap in the Saudi sample examined. Second, the study also revealed that there was great variation among industries with respect to the significant measure of liquidity.

Deloof, Marc (2003) The relation between working capital management and corporate profitability is investigated for a sample of 1,009 large Belgian non-financial firms for the 1992-1996 period. Trade credit policy and inventory policy are measured by number of days accounts receivable, accounts payable and inventories, and the cash conversion cycle is used as a comprehensive measure of working capital management. The results suggest that managers can increase corporate profitability by reducing the number of days accounts receivable and inventories. Less profitable firms wait longer to pay their bills.

Ghosh and Maji, (2003) in this paper made an attempt to examine the efficiency of working capital management of the Indian cement companies during 1992 – 1993 to 2001 – 2002. For measuring the efficiency of working capital management, performance, utilization, and overall efficiency indices were calculated instead of using some common working capital management ratios. Setting industry norms as target-efficiency levels of the individual firms, this paper also tested the speed of achieving that target level of efficiency by an individual firm during the period of study. Findings of the study indicated that the Indian Cement Industry as a whole did not perform remarkably well during this period.

Singh, (2000) study on working capital in Lupin laboratories Ltd., attempted to assess the significance of management of working capital through working capital ratio and operating cycle. Having analyzed seven years data (1995-2002), he concluded that the liquidity position of the company was good, mean percentage of current assets was very high when compared to the percentage of net fixed assets and the operating cycle showed declining trend. The element-wise analysis of working capital also revealed that trade debtors constituted the highest percentage of current assets followed by loans and advances, inventories and cash and bank balances. The study brought out the need for efficient management of debtors, the percentage of which was the highest.

METHODOLOGY

The purpose of this research is to contribute towards a very important aspect of financial management known as working capital management with reference to RIL, HPCL, and GAIL Petrochemical companies. The relationship between working capital management components and its effects on profitability of three companies for a five years from 2004 – 2009. Objective behind selecting these three companies is there are very few companies which able to maintain its existence and growth in the petrochemical industry in India, due to high entry barriers and low growth rate of this sector. These three companies are similar in case of producing the products and the same we have selected these companies

and growth rate is also best in the industry.

OBJECTIVES

- To study the impact of "Working Capital Management" on Profitability of the "RIL", "HPCL" & "GAIL".
- To find out impact of different components of Working Capital (CCC) on Profitability."
- To establish a relationship between Liquidity & Profitability of "RIL", "HPCL" & "GAIL".

DATA SET & SAMPLE

The data used in this study was acquired from companies website for a period of five years from 2004- 2009.

VARIABLES

Choice of the variables is influenced by the previous studies on working capital management. All the variables stated below have been used to test the hypotheses of our study. They include dependent, independent variables:

Gross Operating Profit (GOP) which is a measure of Profitability of the firm is used as dependant variable. It is defined as Operating Income plus depreciation, and divided by total assets minus financial assets.

Average Collection Period (ACP) used as proxy for the Collection Policy is an independent variable. It is calculated by dividing account receivable by sales and multiplying the result by 365 (number of days in a year)

Inventory turnover in days (ITID) used as proxy for the Inventory Policy is also an independent variable. It is calculated by dividing inventory by cost of goods sold and multiplying with 365 days.

Average Payment Period (APP) used as proxy for the Payment Policy is also an independent variable. It is calculated by dividing accounts payable by purchases and multiplying the result by 365.

The Cash Conversion Cycle (CCC) used as a comprehensive measure of working capital management is another independent variable, and is measured by adding Average Collection Period with Inventory Turnover in Days and deducting Average Payment Period.

Current Ratio (CR) which is a traditional measure of liquidity is calculated by dividing current assets by current liabilities.

Hypothesis testing formula (calculation done using Excel)

Regression :

$$b_{yx} = \frac{N \sum dxdy - \sum dx \sum dy}{N \sum dx^2 - (\sum dx)^2}$$

Correlation:

$$r = \frac{N \sum dxdy - \sum dx \sum dy}{\sqrt{N \sum dx^2 - (\sum dx)^2} \sqrt{N \sum dy^2 - (\sum dy)^2}}$$

T – test:

$$t = \frac{b_{xy}}{\text{Standard Error}}$$

HYPOTHESIS TESTING

Since the objective of this study is to examine the relationship between profitability and working capital management, the study makes a set of testable hypothesis (the Null Hypotheses H0 versus the Alternative ones H1). Correlation and Linear Regression T-test is been done to conduct analysis.

Hypothesis 1

H01 : There is no significance relationship between net working capital & profitability of "RIL", "HPCL" & "GAIL".

H11 : There is negative relationship between Net Working Capital & Profitability of RIL", "HPCL" & "GAIL".

Hypothesis 2

H02 : There is no significance relationship between Components of Net working capital (Cash Conversion Cycle) & Profitability of "RIL", "HPCL" & "GAIL".

H12 : There is negative relationship between Components of Net Working Capital (Cash Conversion Cycle) & Profitability of RIL", "HPCL" & "GAIL".

Hypothesis 3

H03 : There is no significance relationship between the Liquidity & Profitability of "RIL", "HPCL" & "GAIL".

H13 : There is negative relationship between the Liquidity & Profitability of RIL", "HPCL" & "GAIL".

DATA ANALYSIS

Pearson's Correlation Coefficient Analysis

Pearson's Correlation analysis is used for data to see the relationship between variables such as those between working capital management and profitability. If efficient working capital management increases profitability, one should expect a negative relationship between the measures of working capital management and profitability variable. There is a negative relationship between gross profitability on the one hand and the measures of working capital management on the other hand. This is consistent with the view that the time lag between expenditure for purchases of raw material and the collection of sales of finished goods can be too long, and that decreasing this time lag increases profitability.

Table 1 Pearson correlation coefficients for variables considered.

Correlation (r)	RIL	HPCL	GAIL	Overall
GOI – NWC	(0.688)	(0.670)	(0.458)	(0.505)

GOI – CCC	0.724	(0.899)	0.757	(0.280)
GOI – CR	(0.258)	(0.624)	(0.760)	(0.273)

Source: Annual Report of the RIL , HPCL, GAIL 2004-09

Correlation results between the Net working capital and gross operating profit. The result of correlation analysis shows a negative coefficient – 0.688, - 0.670, -0.458 (Table 1) respectively, It indicates that the result is highly significant at $\alpha = 5\%$, and that if the NWC increases it will have a negative impact on the profitability and it will decrease. Correlation results between current ratio a measure of liquidity and the Gross operating Profit also indicate the same type of result. The correlation coefficient is – 0.258, - 0.624, - 0.760 respectively. This again shows that the result is highly significant $\alpha = 5\%$. It indicates that if the firm increase more liquidity it will adversely affect its profitability. So, there is a need of trade-off between liquidity and profitability. The cash conversion cycle which is a comprehensive measure of working capital management also has a negative coefficient – 0.624 in HPCL. It is significant at $\alpha = 5\%$. It means that if the firm is able to decrease this time period known as cash conversion cycle, it can increase its profitability, whereas for RIL and GAIL shows positive correlation coefficient 0.724 and 0.757 respectively, it is significant at $\alpha = 5\%$. It means that firms are able to manage its working capital components effectively.

Overall Correlation results between the NWC and gross operating profit is - 0.505 means if the current assets and current liabilities are managed in a proper manner as a whole in petrochemical industry increase the Profitability. Correlation results between the CCC and gross operating profit is - 0.280 it means that if the firms in petrochemical industry are able to decrease this time period known as cash conversion cycle, it can increase its profitability. Correlation results between current ratio a measure of liquidity and the Gross operating Profit also indicate the same type of result – 0.273 focusing on decrease in liquidity increases the profitability of the companies.

LINEAR REGRESSION T-TEST ANALYSIS

Table 2 Linear regression t-test between GOI and NWC for RIL, HPCL, GAIL

GOI - NWC	RIL	HPCL	GAIL
R	(0.688)	(0.670)	(0.458)
Byx	-0.0000105	-0.0000471	-0.0000563
SE	0.066019	0.121155	0.071778
T – value	-0.0001588	-0.0003887	-0.0007837

Source: Annual Report of the RIL , HPCL, GAIL 2004-09

As the t- value for each company is less than P-Value (0.05), alternate hypothesis is accepted (Table 2). It states that there is negative relationship between networking capital & profitability of “RIL”, “HPCL”, & “GAIL”.

Table 3 linear regression t-test between GOI and CCC for RIL, HPCL, GAIL

GOI – CCC	RIL	HPCL	GAIL
R	0.724	-0.899	0.757
Byx	0.005783	-0.037546	0.00318
SE	0.063	0.072	0.053
T – value	0.092	-0.524	0.060

Source: Annual Report of the RIL , HPCL, GAIL 2004-09

As the t-value for HPCL Company is less than P-Value (0.05), alternate hypothesis is accepted (Table 3). It states that there is negative relationship between CCC & profitability of “HPCL”, and t-value is greater than 0.05 for “RIL” & “GAIL”, it means there is no impact of CCC on Profitability, as null hypothesis accepted.

Table 4 linear regression t-test between GOI and CR for RIL, HPCL, GAIL

GOI – CR	RIL	HPCL	GAIL
R	-0.258	-0.624	-0.760
Byx	-0.206739	-0.652818	-0.604323
SE	0.0879	0.127485	0.052462

T – value	-2.35198	-5.12075	-11.5192
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Source: Annual Report of the RIL , HPCL, GAIL 2004-09

As the t-value for each company is less than P-Value (0.05), alternate hypothesis is accepted (Table 4). It states that there is negative relationship between Liquidity & Profitability of RIL, "HPCL", & "GAIL".

Table 5 linear regression t-test between GOI and NWC, CCC and CR overall for RIL, HPCL, GAIL as petrochemical industry

Regression	t -test for GOI	NWC	CCC	CR
SLOPE		-0.0000125	-0.0017596	-0.2816624
SE		0.0997647	0.1111978	0.1109631
R		-0.5050860	-0.2731307	-0.2801843
t – value		-0.0000125	-0.0158237	-2.5383438

Source: Annual Report of the RIL , HPCL, GAIL 2004-09

As the t-value for each company is less than P-Value (0.05), all alternate hypotheses i.e. H11, H12, and H13 are accepted (Table 5). It states that there is negative relationship between petrochemical company's Net working capital, cash conversion cycle, Liquidity towards Profitability.

CONCLUSION

By analyzing the results we conclude that if the firm is able to reduce these time periods, then the firm is efficient in managing working capital. This efficiency will lead to increasing its profitability. We found a strong negative relationship between the measures of working capital management including the average collection period, inventory turnover in days, and average payment period and cash conversion cycle with corporate profitability. On basis of the above analysis we may further conclude that these results can be further strengthened if the firms manage their working capital in more efficient ways. Management of working capital means "management of current assets and current liabilities, and financing these current assets". If these firms properly manage their cash, accounts receivables and inventories in a proper way, this will ultimately increase profitability of these companies.

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APPENDIX

Appendix 1 – Five year data of GOI, NWC, CCC, CR of RIL, HPCL, GAIL

Year	Companies	GOI (%)	NWC (RS Corer)	CCC (days)	C.R (%)
2004-05	RIL	0.288	3149.150	-3.133	1.146
2005-06		0.311	4352.930	8.393	1.168
2006-07		0.270	12522.700	1.593	1.389
2007-08		0.134	10622.380	-18.012	1.233
2008-09		0.165	15011.240	1.187	1.291
2004-05	HPCL	0.456	1138.880	-7.479	1.135
2005-06		0.155	1670.650	0.659	1.177

2006-07		0.290	-75.690	-4.479	0.994
2007-08		0.086	5267.710	-0.712	1.370
2008-09		0.254	2633.510	-5.470	1.193
2004-05	Gail	0.466	1684.600	-15.778	1.180
2005-06		0.397	2274.950	-17.254	1.215
2006-07		0.291	1875.610	-49.364	1.316
2007-08		0.336	3029.920	-48.216	1.404
2008-09		0.320	2755.840	-23.809	1.286

Source: Annual Report of the RIL, HPCL, GAIL 2004-09

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