Impact of Working Capital Management on Liquidity, Profitability and Risk: A Case Study of Hindustan Petroleum Corporation Limited (HPCL)

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Abstract

This paper makes an attempt to assess the impact of working capital management on liquidity, profitability and risk of HPCL, a leading public sector enterprise in India over a 10 year period (i.e. from 2006-07 to 2015-16). It also makes an attempt to gauge and test the correlation between liquidity and profitability as well as between profitability and risk. In this study, an attempt has also been made to establish the linear relationship between liquidity and profitability with the help of a multiple regression model. The study is based on secondary data collected from published annual reports of HPCL. The available data have been analyzed by using some important managerial and statistical tools. Various statistical tests viz. Average, SD, CV, CAGR, Spearman Correlation, Student t-test, and Durbin and Watson test have been applied to test the significance of the results obtained.

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1. INTRODUCTION

Originally, the activities of the public sector enterprises were limited to a definite field of basic and key industries of strategic importance. There were certain fields where the private enterprises were shy to operate as they involved huge investment and risk. It was the public sector alone which could build the capital-intensive infrastructure such as power, transport, etc. Since then the ideological objective of capturing the "commanding heights" by the public sector appears to be fulfilled. It not only has succeeded in creating the necessary infrastructural base for sustained industrial growth but also has tremendously boosted the technological capabilities. The public sector enterprises have firmly established the foundation for the construction of a self-generating industrial economy. During the planned era, the public sector has diversified its activities to cover a wide spectrum of industries. Today, the public sector in India has entered into the production of consumer goods such as bread, paper, watches, scooters, T.V., cement, and drugs. Some of the researchers are of the view that the public sector should now enter the fields of distribution and rural development as well.

This indicates the positive attitude of the government towards generation of greater employment opportunity for the vast population of the country by establishing more and more PSEs along with higher blockage of fund following the traditional production function approach whereby fixed capital is considered as one of the explanatory variables to establish the relationship between output and profit ignoring the role of working capital. In the wave of globalization and economic liberalization, growth and survival stability of the enterprises largely depend on the effective management of working capital, which has a direct bearing on the economic well-being of the country as a whole. Thus, it is felt that there is a need to manage various components of working capital in such a way that an adequate amount of working capital is maintained for smooth running of the wheel of an enterprise for the fulfilment of twin objectives of liquidity and profitability as well as for reducing non-insurable risk and uncertainty bearing associated with the volatility of various components of working capital in the firm's operating environment.

2. LITERATURE REVIEW

Chandra H. and Selvaraj A. (2012) analyses the working capital management of selected Steel Companies in India for the period from 2000-01 to 2009-10. To measure the effective utilization of working capital, operating cycle and cash conversion cycle were used. Besides, to measure the determinants of cash conversion cycle, the Kieschnick model was used. The study concludes with the observation that the size of a company plays a vital role in determining the efficiency of its working capital management. The working capital ratios across the small, medium and large sized steel companies have played a vital role in determining the working capital management of the selected Indian steel companies.

Dr. Panigrahi Ashok Kumar (2012) studies the relationship between working capital management and profitability of ACC Cement Company, the leading cement manufacturer of the country for assessing the impact of working capital management on profitability during the period 1999-2000 to 2009-10. The study is based on secondary data. The main objective of the study was to find whether the working capital management affects the performance of the firm. It can be deduced that there is a moderate relationship between working capital management and the firm's profitability.

Dr. Khatik S. K. and Jain Rashmi (2009) state that the management of working capital is one of the most important and key resources of an organization for its day-to-day operations. Working capital can be taken as funding resources for routine activities of business. It is the most vital and important part of fund management and profitability for business. The writer has analyzed the working capital position of MPSEB (Madhya Pradesh State Electricity Board) by ratio analysis technique and it was found that the position of current ratio, quick ratio, acid-test ratio, working capital ratio, inventory turnover ratio are not up to the standard benchmark.

Arunkumar O. N. and Jayakumar S. (2010) explain how working capital is considered to be the lifeblood and controlling nerve centre of the business. Profitability and solvency are two vital aspects of working capital management. The survival and growth of the company depends upon the ability to meet profitability and solvency. Here the authors have concentrated on the analysis of liquidity and solvency position of the major Public Sector Electrical Industries in Kerala such as Kerala Electrical and Allied Engineering Company Ltd (KEL) and Transformers and Electrical Kerala Ltd (TELK) for the financial years 1997-98 to 2007-08 and 1997-98 to 2005-06 respectively. In conclusion the authors have made a few important observations with regard to the companies. Both the companies show a trend of very low level of solvency position. The liquidity position of the companies is below the normal value. KEL has a lower level of net profit compared to TELK for the stated period. In comparison with KEL, the sensitivity of changes in the level of current assets is high in case of TELK.

Jain P. K. and Yadav Surendra S. (2007) study the different facets of working capital management. The issues addressed include relationship between CAs and CLs, the financing of working capital, and ways of dealing with excess or shortage of working capital. The study is based on an analysis of a thirteen year period data from 1991 to 2003 covering 137 public sector enterprises. In a nutshell, it is reasonable to contend that the sample PSEs (Public Sector Enterprises) are faced with long duration of net working capital cycle (time necessary to complete the following three events: 1. Conversion of cash into inventory 2. Conversion of inventory into debtors and 3. Conversion of debtors into cash less credit available from creditors) necessitating substantial working capital to be carried by them, eventually affecting their profitability in adverse manner.

Bhattacharya, (1997) explains modern financial management aims at reducing the level of current assets without ignoring the risk of stock outs.

Luther, (2007) describes that a firm should formulate certain policies to control the working capital so as to meet financial distress, which may occur in future. Efficient management of working capital is, thus, an important indicator of sound health of an organization, which requires reduction of unnecessary blockage of capital in order to bring down the cost of financing. In the light of the above an attempt has been made in this study to assess the impact of working capital on profitability and risk as well as on liquidity of Hindustan Petroleum Corporation Limited (HPCL), a leading Public Sector Enterprise in India during ten years (i.e. from 2006-07 to 2015-16).

3. PURPOSE OF THE STUDY

The main objective of the present research is to provide an insight into the conceptual side of working capital and to assess the efficiency of working capital management and its impact on

liquidity, profitability and risk of HPCL on the basis of available data collected from published annual reports of the company over a period of 10 years (i.e. from 2006-07 to 2015-16). The specific objectives of this study are as follows:

- To evaluate the liquidity position of HPCL;
- To determine the profitability position and risk factors of HPCL;
- To find out the correlation between liquidity and profitability as well as between profitability and risk; and
- To establish the linear relationship between liquidity and profitability with the help of simple as well as multiple regression equations fitted on the basis of least-squares principles.

4. RESEARCH METHODOLOGY

Sample design: The sample for the study has been selected a company named HPCL which is one of the top public sector companies in the mining sector.

Data Collection: The study is mainly based on secondary data which are collected from the annual reports and accounts of HPCL.

Time Period: The study covers the data from 2006-07 to 2015-16 .i.e. ten years data is being collected to analyze the performance of the company.

Research Tools: The available data have been analyzed by using various financial ratios as a managerial tool as well as some simple statistical tools like Arithmetic Mean, Standard Deviation, Co-efficient of Variation, Correlation and Regression etc. Various statistical tests viz. F-test, t-test and Durbin and Watson test have been applied for the purpose of testing in this study with the help of SPSS version 23.

5. HINDUSTAN PETROLEUM CORPORATION LIMITED (HPCL) - COMPANY PROFILE

HPCL is a Government of India Enterprise with a Navratna Status and a Fortune 500 and Forbes 2000 company, with an annual turnover of Rs. 1,32,670 crores and sales/income from operations of Rs 1,43,396 crores during the financial year 2010-11 having about 20% marketing share in India among PSUs and a strong market infrastructure. HPCL's crude throughput and market sales (including exports) are 14.75 Million Metric Tons (MMT) and 27.03 MMT respectively during the same period. HPCL operates 2 major refineries producing a wide variety of petroleum fuels and specialties, one in Mumbai (West Coast) with a capacity of 8.3 MMTPA. HPCL holds an equity stake of 16.95% in Mangalore Refinery & Petrochemicals Limited, a state-of-the-art refinery at Mangalore with a capacity of 9 MMTPA. In addition, HPCL is constructing a 9 MMTPA refinery at Bathinda, in the state of Punjab, as a Joint venture with Mittal Energy Investments Pvt. Ltd. HPCL also owns and operates the largest Lube Refinery in the India producing Lube Base Oils of international standards, with a capacity of 335 TMT. This Lube Refinery accounts for over 40% of the India's total Lube Base Oil production. HPCL's vast marketing network consists of 13 zone offices in major cities and 101 regional offices facilitated by a supply and distribution infrastructure comprising Terminals, Pipeline networks, Aviation Service Stations, LPG Bottling Plants, Inland Relay Depots & Retail Outlets, Lube and LPG Distributorships. HPCL, over the years, has moved from strength to strength on all fronts. The four main products of HPCL are petrol, diesel, lubes and LPG. Besides these, the other products that HPCL have are kerosene, aviation fuel, naphtha, hexane, bitumen, MTO, gas oil (which after cracking becomes gasoline),

benzene, light diesel oil, furnace oil, low sulphur heavy stock (goes to chemical industries. The biggest customer is Century Chemicals).

Meaning and Definition of Working Capital: The term working capital refers to the quantum of fund required to maintain day-to-day expenditure on operational activities of a business enterprise. It is actually required to run the wheels of the business. It is regarded as the life blood of human body. The estimation of working capital of a firm is a difficult task for the management because of its varying characteristics in a dynamic operating environment. It actually varies across the companies in an industry as well as over the period under consideration for a particular firm. It also varies with the nature and size of the enterprise, level of production, operating cycle, credit policy of the firm, different macro-economic factors. (viz. inflation, fiscal policy, business cycle etc.), availability of raw materials and so on and so forth.

Various Concepts of Working Capital: There are two approaches of working capital:

A) *Balance Sheet Approach:* Under balance sheet approach, there are two interpretations of working capital: (i) Gross working capital and (ii) Net working capital.

Gross working capital refers to the firm's investment in current assets that circulates from one form to another in the ordinary course of business. Thus, it simply refers to the sum total of current assets, which include cash, and near cash items of short term resources e.g. cash and bank balance, receivables, inventories, prepaid expenses, loans and advances, marketable securities etc.

Net working capital on the other hand refers to the difference between current assets and current liabilities. The difference between current assets and current liabilities may be of three types:

- Positive (if CA>CL),
- Negative (if CA<CL) and
- Zero (if CA = CL),

where CA = Current Assets, and CL = Current Liabilities.

B) *Operating Cycle Approach:* This approach has been gaining more and more importance in the present business scenario. Under this concept, the requirements of working capital depend on the operating cycle of a firm and the cost of all operational activities. The, *Operating Cycle (OC),* refers to the period during which investment of one unit of money will remain blocked in the normal course of operation till recovery out of revenue (Banerjee, 1973). It is the average time intervening between the acquisition of materials or services entering this process and the final cash realization (Fees, 1978). It may be broadly classified into the following four stages:

- Raw Material Storage Stage
- Work-in-Progress Stage
- Finished Goods / Inventory Stage and
- Receivables Collection Stage.

The necessary calculations under this approach for obtaining required working capital of a firm can easily be made on the basis of published annual financial statements of the firm. In our present study we are not dealing with the computation of required working capital under

operating cycle approach. We simply follow the traditional concept of working capital dimension i.e. balance sheet approach, for our purpose of the study.

The concept of working capital discussed above is exhibited in the following diagram:

Diagram-2: Various Concept of Working Capital
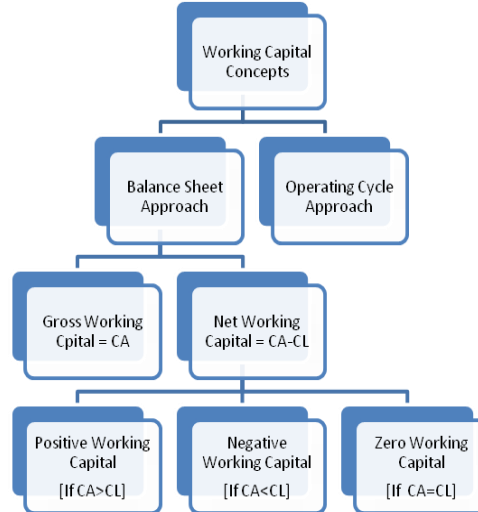
6. WORKING CAPITAL MANAGEMENT

Working Capital Management refers to the management of all types of current assets of the business enterprise in which adequacy of current assets as well as the level of non-insurable risk posed by current liabilities are optimally identified. It is concerned with the problems relating to the administration of all aspects of current assets, current liabilities and the inter-relationships that exist between them. It aims at reducing the locking up of funds in working capital so as to improve the return on capital employed (i.e. profitability in the business). It seeks to formulate proper policies for managing current assets and liabilities as well as the techniques for maximizing the benefits derived from it. The policies for managing the working capital of a firm should be such that the firm can accomplish its three important goals simultaneously--(a) Adequate liquidity (b) Maximizing profitability and (c) Minimization of non-insurable risk and uncertainty.

7. ADEQUATE LIQUIDITY

The term 'liquidity' refers to the capability of a firm to meet short-term financial obligations [i.e. Current Liabilities (CL)] by converting the short-term assets [i.e. Current Assets (CA)] into cash without suffering any loss. Here current assets refer to those which are readily convertible into cash within one accounting period. Current liabilities, on the other hand, are those, which are to be met within one accounting period. The liquidity of a firm actually depends on the effective management of the composition of CA vis-a-vis CL. In fact, the components of CA other than cash have varying degree of liquidity depending on the time taken for conversion of assets into cash. The components of CL also have varying degree of the span of time made available to the firm by the short-term creditors. A business enterprise making no profit may be considered as

sick but one having no liquidity will die soon. As a matter of fact, liquidity is a necessary condition (or a pre-requisite) for the very survival of the firm. The liquidity position of a firm is generally analyzed with the help of some important ratios computed on the basis of different constituents of working capital either in isolation or in aggregate or both. The important ratios reflecting the liquidity position of a firm are as follows:

1. **Current Ratios:** It is the ratio of current assets to current liabilities for establishing the relationship between them. It is determined by using the following formula:

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

This ratio measures the short-term solvency (i.e. liquidity) position of a firm indicating the amount of current assets available per unit of current liabilities. Higher the ratio the more will be the firm's ability to meet short-term obligations and the greater will be the safety of funds of short-term creditors.

2. **Quick Ratio / Acid Test Ratio:** It is the ratio of quick assets to quick liabilities for establishing the relationship between them. It is computed as follows:

$$\text{Quick Ratio} = \frac{Quick\ Assets}{Quick\ Liabilities} = \frac{Current\ Assets - Inventories - Prepaid\ Exp.}{Current\ Liabilities - Bank\ Overdraft}$$

Quick assets refer to those current assets which can be converted into cash/bank immediately or at a short notice without suffering any loss. It actually means the current assets excluding inventories and prepaid expenses. Generally, a quick ratio of 1:1 is considered satisfactory for a firm though it depends on many factors. Quick ratio is a more rigorous and penetrating test of the liquidity position of an organization as compared to the current ratio of the firm.

3. **Current Asset to Total Asset:** It is calculated by using the following formula.

$$\text{Current Asset to total Asset Ratio} = \frac{Current\ Asset}{Total\ Asset}$$

It explains the relationship between current assets and total investment in assets. Higher the investment in current assets, the more will be the liquidity of a firm but as the same time it decreases profitability. Thus, this ratio prescribes the optimum level of current assets that should be maintained in the firm by considering the concept of both liquidity and profitability.

4. **Working Capital to Turnover Ratio:** This ratio shows the number of times the net working capital of a firm is turned over within a specified period. It is calculated as follows:

$$\text{Working Capital Turnover Ratio} = \frac{Net\ Sales}{Net\ Working\ Capital}$$

It helps to assess the degree of efficiency in the use of short-term fund for operating sales. Higher the ratio, the lower will be the investment in working capital and the greater will be the profitability of a firm. However, a very high working capital turnover ratio is a symptom of over trading which may put the organization into financial crisis.

5. *Inventory Turnover Ratio:* This ratio is calculated as follows:

$$\text{Inventory turnover Ratio} = \frac{Net\ Sales}{Stock}$$

It establishes the relationship between cost of goods sold during a particular period and the average inventory level maintained by a firm during that period. It shows how rapidly the inventory is turned into account receivables through sales. It indicates whether investment in inventory is efficiently used or not and thus it is linked with the inventory control policy adopted by the management of a firm. A high inventory turnover ratio implies good inventory management. However, a very high ratio is a symptom of under-investment in inventory which adversely affects the ability of a firm to meet the customers' demand. This situation creates the problem of stock-out associated with high stock out cost and vice versa.

6. *Debtors Turnover Ratio:* It is calculated by using the following formula:

$$\text{Debtors Turnover Ratio (DTR)} = \frac{Net\ Credit\ Sales}{Average\ Debtors}$$

By the analysis of DTR we supplement the information regarding the liquidity of one item of current assets of the firm. This ratio reflects the efficiency of credit and collection policy pursued by the concern.

8. PROFITABILITY

The term 'Profitability' means the ability to earn profits by an enterprise on its static resources (i.e. invested capital). It, thus, expresses the relationship between profits and capital. The firm is said to be successful if its profitability exceeds the weighted average cost of capital to the firm. The profitability acts as a yardstick to measure the operating efficiency of the enterprise. The greater the profitability the more will be the efficiency and vice-versa. Some important ratios relating to profitability of a firm are briefly discussed below:

1. *Gross Profit Ratio:* This ratio establishes the relationship between gross profit and sales. It is calculated by using the following formula:

$$\text{Gross Profit Ratio} = \frac{Gross\ Profit}{Sales}\ x\ 100\_$$

It is also known as gross profit margin. It measures the percentage of each sales rupee remaining after meeting firm's expenses on its goods. The gross profit margin indicates the limit beyond which sales are not tolerated to fall. A high ratio of gross profit to sales is a symbol of good management whereas a relatively low gross profit margin is clearly a danger signal for the firm.

2. *Net Profit Ratio:* This ratio measures the relationship between net operating profit and sales of a firm. It is computed by using the following formula:

$$\text{Net Profit Ratio} = \frac{Net\ Operating\ Profit}{Sales}\ x\ 100$$

It is also known as net profit margin. It indicates the efficiency of management to operate the firm successfully in relation to earned revenues and all types of costs associated with it at a reasonable

level of risk and uncertainty. The high net profit ratio ensures good return to the owners and enables a company to maintain its survival stability in adverse economic condition like declining selling price, rising cost of production, falling demand etc.

3. ***Earnings Per Share (EPS):*** The overall profitability of a company can also be measured by computing earnings per share with the help of the following formula:

$$\text{(EPS)} = \frac{Net\ Profit\ after\ taxes\ and\ pref.dividend}{No.of\ Equity\ Shares} = \frac{(EBIT-I)(1-t)-Pd}{N}$$

where EBIT = Earnings before Interests & Taxes; I = Interest; t = Tax Rate; Pd = Preference Dividend and N = No. of Ordinary Shares held.

This is a well-known and widely used indicator of the economic performance of a corporate entity. It measures the profit available to equity shareholders on per share basis. The higher the ratio, the better will be the performance of the entity and vice-versa. It can be used to draw inference about the performance of a firm on the basis of its trend over a period of time, comparison with the EPS of nearest competitive firms and comparison with the industry average.

4. ***Return on Net Worth (RONW):*** It is the ratio of net profit after taxes to the amount of fund invested by the owners. It is calculated as under:

$$\text{Return on Net Worth} = \frac{Net\ profit\ after\ taxes}{Net\ Worth\ (or\ Ordinary\ shareholders'\ equity)} \times 100$$

It indicates how profitably the shareholders' fund or net worth has been utilized by the enterprise. It is an important yardstick to judge the performance of a firm for the equity shareholders. The higher the ratio, the better will be the performance of the firm in relation to the utilization of owner's fund and vice-versa.

5. ***Return on Assets (ROA):*** This ratio measures the average profitability of a firm in terms of the relationship between Net Profits and Assets. It is also known as profit to asset ratio. It is generally computed as follows:

$$\text{Return on Assets (ROA)} = \frac{Net\ profit\ after\ taxes}{Average\ Total\ Assets} \times 100$$

Though widely used, ROA is an old measure because its numerator measures the return available to both equity and preference shareholders whereas its denominator represents the contribution of shareholders and lenders.

6. ***Return on Capital Employed (ROCE):*** The strategic aim of a business enterprise is to earn a return on capital. Measuring the historical performance of an investment entity calls for a comparison of the profit that has been earned with capital employed. The rate of return on capital employed is determined by dividing the earnings before interest and taxes (EBIT) by the capital employed or investment made to achieve that profit. Thus, it is computed as follows:

$$\textit{Return on Capital Employed (ROCE)} = \frac{EBIT}{Capital\ Employed} \times 100$$

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9. LIQUIDITY-PROFITABILITY TANGLE

The relationship between liquidity and profitability can be explained with the help of return on capital employed ratio expressing it in the following form:

$$P = \frac{EBIT}{(FA+NWC)}$$

Where P= Profitability, EBIT=Earnings before interest and taxes, and NWC= Net working capital. This ratio indicates that other things remaining unchanged, continuous reduction in NWC (i.e. liquidity) improves the profitability (P) of a firm with the simple passage of time. This suggests that there always exists a negative relation between liquidity and profitability. But in reality it is seen that unless there is a minimum level of investment in CA, which could provide a promising vehicle for increasing profitability, the required amount of output and sales cannot be maintained.

9.1 Liquidity and Profitability-Risk Trade-off

Liquidity and profitability-risk trade-off may be discussed in the light of firm's net working capital position. The level of net working capital of a firm has a bearing on its liquidity, profitability as well as non-insurable risk and uncertainty. Liquidity is a two-dimensional concept – time and risk. Time dimension of liquidity is concerned with the speed of convertibility of different current assets (other than cash) into cash. Risk dimension of liquidity indicates the degree of certainty about the conversion of current assets into cash without suffering any loss or with as little sacrifice in price as possible. The term 'Profitability' used in this context is measured by profit after expenses. It is expressed as the ratio of profit after expenses to the invested capital (i.e. Fixed Asset + Net Working Capital). In the light of profitability of a firm the risk may be understood as the probability of technical insolvency. Technical insolvency occurs whenever a firm is unable to meet its cash obligations when they become due for payment. This risk of becoming technically insolvent is measured by detailed analysis of any change in the level of current assets and current liabilities (i.e. the change in the Net Working Capital). Any change in Net Working Capital brings about a considerable change in the quantum of profit after expenses of the firm. The evaluation of profitability-risk trade off in relation to NWC is based on the following three assumptions:

- the firm under consideration is a manufacturing firm;
- current assets of the firm are less profitable than non-current assets; and
- short-term financing is less costly than the long-term financing.

Under these assumptions, the trade off can be identified by using the ratio of current assets to total assets (CATA) which indicates the percentage of current assets in total assets. The higher the ratio of CATA the lower will be the profitability and risk and vice-versa. This trade off can also be demonstrated by using the ratio of current liabilities to total assets (CLTA). This ratio reflects the percentage of total assets financed by current liabilities. The higher the ratio of CLTA, the higher will be the profitability and risk and vice-versa. The combined effect of these two ratios reflects the true profitability-risk trade off of a firm.

The liquidity position of HPCL over the period of 10 years as captured by different liquidity ratios calculated on the basis of available data in its annual reports is presented in Table-1 given below:

Table 1: Liquidity Ratios of HPCL (Period 2006-07 to 2015-16)

Year	CR	QR	CATA	WCTR	ITR	DTR
2006-07	0.95	0.28	0.36	-161.05	11.08	56.87
2007-08	1.16	0.44	0.46	39.93	8.68	60.98
2008-09	1.05	0.47	0.34	170.09	14.21	55.75
2009-10	0.79	0.31	0.40	-19.76	8.53	44.02
2010-11	0.85	0.37	0.49	-26.07	8.03	43.39
2011-12	0.86	0.41	0.52	-30.00	9.16	49.97
2012-13	0.88	0.50	0.50	-41.04	12.56	41.85
2013-14	1.13	0.59	0.51	50.35	11.88	40.80
2014-15	1.16	0.62	0.41	52.86	15.91	57.28
2015-16	1.03	0.55	0.39	256.23	14.11	42.76
CAGR	0.81	6.98	0.80	4.75	2.45	-2.81
Average	0.99	0.45	0.44	29.15	11.41	49.37
SD	0.14	0.11	0.07	116.71	2.77	7.69
CV	14.14	24.44	15.91	400.38	24.28	15.58

Source: Annual Reports of HPCL (calculated values).

From Table-1 it is seen that the current ratio of the company grows at compounded rate of 0.81%. This ratio is below the standard norm of 2:1 over the period under study except in the year 2007-2016. The average current ratio is 0.99 which is found to be below the standard norm 2:1. Thus, the company is not capable to meet its short term obligations and it is also an indication about the inability of funds for the short term creditors.

The quick ratio of the company grows at a compounded rate of 6.98%. It is seen that the quick ratio throughout the period under study is tuned on an average at 0.45 which is again below the standard norm of 1:1. Thus, the quick short-term solvency position of the company is also very poor. From Table-1 it is also seen that the inventory turnover ratio of the company over the period under study is considerably high. The compounded growth rate of this ratio is 2.45% and the average ITR is 11.41%. The high inventory turnover of HPCL indicates good inventory management assuming that there is no problem of stock-out situation. Considering the current ratio in conjunction with the quick ratio and inventory turnover ratio of the company it may be pointed out that the company has a mixed liquidity position. It is seen that average CATA ratio is 0.44 which means that HPCL has maintained current assets on an average at 44% level out of the fund invested in total assets. It grows at the compounded rate of 0.80% over the period under consideration. It reveals that HPCL has given a considerable emphasis on working capital investment which has a bearing on liquidity as well as profitability of the firm.

Average DTR of HPCL (49.37) is found to be satisfactory with a compounded growth rate of -2.81%. The coefficient of variation of this ratio is 15.58%. Therefore, the credit management of HPCL is efficient enough. Moreover, less instability is found in this ratio over time, which indicates that credit collection policy pursued by the firm is more or less stable. These ratios

indicate that the ability of the company to pay its short-term contractual and non-contractual obligations is poor. Thus, in totality, it may be said that the short-term solvency position of HPCL over the period under study is found to be poor enough simply on the basis of analyzing the ratios and other statistical measures relating to those ratios. Motaal prescribes a comprehensive test for determining the soundness of a firm as regards liquidity position. According to him, a process of ranking is used to arrive at a more comprehensive measure of liquidity in which the following three ratios are combined in a point score:

9.2 Motaal's Comprehensive Test of Liquidity

i) Working Capital (WC) to Current Asset Ratio

$$= \frac{Current\ Assets - Current\ Liabilities}{Current\ Liabilities} \times 100$$

ii) Stock to Current Asset Ratio

$$= \frac{Stock}{Current\ Asset} \times 100$$

iii) Liquid Resources (LR) to Current Asset Ratio

$$= \frac{Current\ Asset - Stock}{Current\ Asset} \times 100$$

The higher the value of both working capitals to current asset ratio and liquid resources to current asset ratio, relatively the more favourable will be the liquidity position of a firm and vice-versa. On the other hand, lower the value of stock to current assets ratio, relatively the more favourable will be the liquidity position of the firm. The ranking of the above three ratios of a firm over a period of time is done in their order of preferences. Finally, the ultimate ranking is done on the basis of the principle that the lower the points score, the more favourable will be the liquidity position and vice-versa. The Motaal test has been applied for determining the liquidity position of HPCL over the period under consideration. As per Table 2, on the basis of ultimate ranking as suggested by Motaal it may be concluded that liquidity position of HPCL in the year 2014-15 was best followed by the years 2007-08, 2013-14, 2008-09, 2015-16, 2006-07, 2012-13, 2011-12, 2010-11, 2009-10 respectively in that order. It indicates that liquidity position of the enterprise is more or less fluctuating over the period under study. The result of the Motaal test as revealed in the study corroborates with the result about the liquidity position of HPCL by other important set of ratios presented inTable-1.

Table 2: Motaal's Comprehensive Test of Liquidity of HPCL
(Period 2006-07 to 2015-16)

Year	WCTCAR (%)	Rank	STCAR (%)	Rank	LRTCAR (%)	Rank	Total	Ultimate Rank
2006-07	-4.86	6	70.64	1	29.36	10	17	6
2007-08	13.54	2	62.29	2	37.71	9	13	2
2008-09	4.59	4	54.98	5	45.02	6	15	4
2009-10	-26.30	10	60.94	3	39.06	8	21	10
2010-11	-17.31	9	56.17	4	43.83	7	20	9
2011-12	-16.15	8	52.92	6	47.08	5	19	8
2012-13	-13.16	7	43.00	10	57.00	1	18	7
2013-14	11.15	3	47.25	7	52.75	4	14	3
2014-15	14.15	1	47.00	8	53.00	3	12	1
2015-16	2.55	5	46.23	9	53.77	2	16	5

9.3 Profitability Position of HPCL through Profitability Ratios: In the following table we analyze the data relating to profitability of HPCL in terms of important ratios.

Table 3: Profitability Ratios of HPCL
(Period 2006-07 to 2015-16)

Year	NPR (%)	ROA (%)	ROCE (%)	RONW (%)	EPS (%)
2006-07	1.75	4.94	8.62	16.37	46.35
2007-08	1.09	2.73	5.17	10.74	33.48
2008-09	0.46	1.22	6.13	5.36	16.96
2009-10	1.21	2.52	6.43	11.26	38.39
2010-11	1.15	2.53	5.79	12.27	45.45
2011-12	0.51	1.28	5.28	6.95	26.92
2012-13	0.44	1.19	4.05	6.59	26.72
2013-14	0.78	2.23	4.82	11.55	51.2
2014-15	1.32	4.05	6.80	17.06	80.72
2015-16	2.15	5.48	8.96	21.04	114.07
CAGR	2.08	1.04	0.39	2.54	9.42
Average	1.09	2.82	6.21	11.92	48.03
SD	0.57	1.53	1.58	5.03	29.10
CV	52.11	54.48	25.48	42.19	60.58

Source: Annual Reports of HPCL (calculated values).

From Table-3 it is seen that net profit on sales ratio of HPCL is slightly fluctuating over time. The average net profit ratio of the firm is 1.09%. The compounded growth rate of this ratio is 2.08% which indicates that the ratio is improving to a favourable extent over the period under study. Therefore it may be said that the profitability on sales of the company is averagely satisfactory. It also indicates that the management operates the firm successfully in relation to earned revenues and the costs associated with it. The same trend is observed in case of ROA, RONW & ROCE. The average growth rate of these three ratios is 1.04%, 0.39% and 2.54% respectively. Moreover, the average values of ROA, RONW, ROCE are found to be 2.82%, 6.21% and 11.92% respectively. The profitability ratios discussed above are found to be, more or less, in a stable position over time on the scrutiny of their coefficient of variations shown in Table-3. The Earning per Share ratio fluctuates considerably over the period of 9 years. The instability of EPS is clearly shown by its coefficient of variation, which is found to be 46.68%. The average EPS figure is 21.34% with standard deviation 60.58%. From the analysis of EPS it is clear that the company is in a favourable position towards the earnings available to equity shareholders on per share basis though it fluctuates over time. Thus, in totality, it can be said that the overall profitability position of HPCL is satisfactory enough for the period under study and the company is in a favourable position to create sufficient surplus for its growth and survival stability in the present competitive business environment.

9.4 Liquidity and Profitability Analysis by using Simple Rank Correlation: In the following table the relationship between liquidity and profitability is analyzed with the help of rank correlation:

Table 4: Liquidity and Profitability: The Relationship
(Using Rank Correlation)

Year	CATA (%)	Rank (R_1)	ROCE (%)	Rank (R_2)	d (R_1-R_2)	d^2
2006-07	36.07	9	8.62	2	7	49
2007-08	46.41	5	5.17	8	-3	9
2008-09	33.94	10	6.13	5	5	25
2009-10	39.95	7	6.43	4	3	9
2010-11	48.70	4	5.79	6	-2	4
2011-12	51.70	1	5.28	7	-6	36
2012-13	50.14	3	4.05	10	-7	49
2013-14	51.22	2	4.82	9	-7	49
2014-15	40.86	6	6.80	3	3	9
2015-16	39.01	8	8.96	1	7	49
					$\sum d^2$	288

Source: Annual Reports of HPCL (calculated values). Amounts in Million Rupees.

The relationship between liquidity (measured by CATA) and profitability (measured ROCE) of HPCL over the period of 9 years is presented in Table-4. This relationship is established by using Spearman's Rank Correlation Coefficient. The rank correlation between CATA and ROCE is computed by applying the formula r_{rank} = 1- $\frac{6\sum d^2}{n(n^2-1)}$ since there is no tie for giving the rank to the value of CATA and ROCE; here d = difference in rank and n = number of pairs of observations.

Correlations

			CATA	ROCE
Spearman's rho	CATA	Correlation Coefficient	1.000	-.745[*]
		Sig. (2-tailed)	.	.013
		N	10	10
	ROCE	Correlation Coefficient	-.745[*]	1.000
		Sig. (2-tailed)	.013	.
		N	10	10

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

Putting the respective values of in SPSS ver. 23 we obtain r_{rank} = -0.745 which indicates that there is a high negative correlation between liquidity and profitability of the company. To find out the significance of the above result we test the hypothesis with the help of student t-test in SPSS as under:

Null Hypothesis H_o: p =0 against
The Alternative Hypothesis H_1: p ≠ 0.

If H_o is true, then the value of test statistic

$t_{0.05}$, 8 = 2.306 (Table value of t)

For a correlation of -0.745 based on 10 observations, t(8) = -3.159, p = 1.986582 (2-sided p value).

Note: This tool mimics SPSS' t-test procedure for correlations.

Since computed value of t (-3.159) is greater than the table value of t (i.e. 2.365 at 5% level of significance), the null hypothesis, H_0: p=0 is rejected at 5% level of significance and thus, the alternative hypothesis, H_1: $p \neq 0$ is accepted both at 95% level of confidence. Therefore, we may conclude that there is no direct relationship between liquidity and profitability of the firm under study at 5% level of significance.

9.5 Liquidity and Profitability Analysis by Using Linear Multiple Regression: In order to find out the influence of liquidity ratios under consideration on profitability of the firm the following linear multiple regression model is used:

$$y = b_0 + b_1x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 \text{ ………... (Equation-1)},$$

where y = Return on Capital Employed (ROCE), x_1 = Current Ratio (CR), x_2 = Quick Ratio (QR), x_3 = Current Assets to Total Assets (CATA), x_4 =Working Capital Turnover Ratio (WCTR), x_5 = Inventory Turnover Ratio (ITR) and x_6 = Debtors Turnover Ratio (DTR). In this study CR, QR, CATA, WCTR, ITR and DTR have been taken as the explanatory variables and ROCE has been used as the dependent variable. For selecting the explanatory variables the correlation matrix is constructed (Table-5a) giving the correlation coefficients between the explanatory variables and the dependent variables. This table reveals that there is a poor correlation between CBTR and each of the remaining variables and hence CBTR has not been used in multiple regression analysis.

Table 5a: Correlation Matrix

	ROCE	CR	QR	CATA	WCTR	ITR	DTR
ROCE	1.000						
CR	.056	1.000					
QR	-.177	.686	1.000				
CATA	-.737	-.155	.185	1.000			
WCTR	.209	.460	.623	-.274	1.000		
ITR	.295	.541	.721	-.431	.528	1.000	
DTR	.191	.479	-.120	-.438	-.101	.120	1.000

The pooled regression results of the model used in this analysis representing the impact of working capital on profitability of the firm under study are exhibited inTable-5b.

Table 5b: Multiple Regression Analysis Results

Multiple Regression Mode: $y = b_0 + b_1x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6$

Coefficients[a]					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
ROCE (Constant)	10.888	19.023		.572	.607
CR	5.098	12.600	.447	.405	.713
QR	-13.212	34.970	-.956	-.378	.731
CATA	-8.632	35.329	-.360	-.244	.823
WCTR	.003	.011	.187	.221	.840
ITR	.302	.970	.530	.311	.776
DTR	-.070	.135	-.340	-.519	.639

a. Dependent Variable: ROCE					
Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.768[a]	.590	-.229	1.75289	1.318
a. Predictors: (Constant), DTR, WCTR, CATA, ITR, CR, QR					
b. Dependent Variable: ROCE					

Note: SPSS version 23.0 is used to compute the results shown in the table from the original values of dependent and independent variables.

Putting the respective values of all regression coefficients in equation-1 from Table-5b we obtain the required multiple regression equation as under:

$$y = 10.888 + 5.098x_1 - 13.212x_2 - 8.632x_3 + 0.003x_4 + 0.302x_5 - 0.070x_6$$

The multiple correlation coefficient of ROCE on CR, QR, CATA, WBTR, ITR and DTR is 0.768 which reveals that the profitability of the firm was highly influenced by those explanatory variables. The value of R^2 indicates that the explanatory variables taken together contributed about 59.00% of the variations in the profitability of the company. The regression analysis results also show that goodness of fit of the regression equation is statistically significant at 5% level.

Table 7: Computation of Risk Factor

Year	Shareholder's Funds (a)	Long term Debts (b)	Fixed Assets (c)	Current Assets (d)	Risk Factor = [(a+b)-c]/d
2006-07	9,598.65	8,615.18	13,064.40	11,464.70	0.45
2007-08	10,563.29	12,535.09	15,245.23	19,297.38	0.41
2008-09	10,730.63	19,252.83	16,655.82	15,992.69	0.83
2009-10	11,557.97	11,785.89	19,194.26	20,641.94	0.20
2010-11	12,545.81	5,418.05	22,340.53	29,593.21	-0.15
2011-12	13,122.52	6,291.37	25,294.12	36,765.26	-0.16
2012-13	13,726.40	8,947.18	27,721.57	38,230.64	-0.13
2013-14	15,012.16	15,554.88	30,497.80	39,736.78	0.01
2014-15	16,022.09	14,855.83	32,537.23	27,599.48	-0.06
2015-16	18,356.10	10,633.48	35,322.71	27,488.73	-0.23

The risk factor is measured by using the following formula:

$$\text{Risk Factor} = \frac{(a+b)-c}{d}$$

Table 7: Risk and Profitability: The Relationship (using rank correlation)

Year	Risk Factor (R_t)	Rank (R_1)	ROCE (%)	Rank (R_2)	d (R_1-R_2)	d^2
2006-07	0.45	2	8.62	2	0	0
2007-08	0.41	3	5.17	8	-5	25
2008-09	0.83	1	6.13	5	-4	16
2009-10	0.20	4	6.43	4	0	0
2010-11	-0.15	8	5.79	6	2	4

2011-12	-0.16	9	5.28	7	2	4
2012-13	-0.13	7	4.05	10	-3	9
2013-14	0.01	5	4.82	9	-4	16
2014-15	-0.06	6	6.80	3	3	9
2015-16	-0.23	10	8.96	1	9	81
					$\sum d^2$	164

Source: Annual Reports of HPCL (calculated values). Amounts in Million Rupees.

The relation between profitability and risk of HPCL over the period of ten years is analyzed in Table-7. This relationship is established by using the rank correlation between the risk factor (R_t) and profitability measured in terms of ROCE of the enterprise.

The rank correlation between the ranks of Rt and ROCE is calculated with the help of SPSS

Correlations			Risk Factor	ROCE
Spearman's rho	Risk Factor	Correlation Coefficient	1.000	.006
		Sig. (2-tailed)	.	.987
		N	10	10
	ROCE	Correlation Coefficient	.006	1.000
		Sig. (2-tailed)	.987	.
		N	10	10

Here, the rank correlation is 0.006, This indicates that there is a very low positive correlation between risk and profitability.

Now, we may test the null hypothesis again with the help of SPSS. For a correlation of 0.006 based on 10 observations, t(8) = 0.017, p = 0.986875 (2-sided p value).

Note: This tool mimics SPSS t-test procedure for correlations.

$t_{0.05}$, 8 = 2.306 (Table value of t)

Since the actual value of t (0.017) is lower than table value of t (2.306 at 5% level), the null hypothesis is rejected at 5% level of significance with 8 d.f. and thus the null hypothesis H_0: p = 0 is accepted at 95% level of confidence. Hence, there is no direct relationship between risk and profitability. This relationship is statistically insignificant at 5% level.

10. CONCLUSION

- From my study, it is shown that there is a significant relationship between profitability and liquidity of the firm. Therefore, the performance of the company should not be judged only on the basis of surplus generating capability/profitability measured in terms of return on sales and investment. This performance has a direct link with the fluctuation of working capital of the firm. Thus, management should also emphasize the growth and efficiency of investment in working capital along with the effective management of fixed capital over time.

- The study shows that there is a positive correlation between liquidity and profitability of the firm. It indicates that the investment in current assets lies in such a specified domain that increase in liquidity leads to an increase in profitability and vice-versa. Thus, the management may increase its investment in current assets up to that point of liquidity-profitability frontier (i.e. according to Gentry's Hypothesis) where the curve changes its

curvature from zero to negative because after that point the relationship between liquidity and profitability would become negative which is not desirable. Thus, liquidity-profitability analysis throws some light on the path of investment in current assets by which financial managers get an insight into the effect of their decisions regarding working capital investment in the way of achieving short-term as well as long-term goal of the organization.

- The multiple regression analysis in the study shows that the profitability of the firm is highly influenced by different liquidity ratios taken as the explanatory variables. It indicates that the different components of working capital influence the profitability differently. Therefore, the change of composition of working capital should also be analyzed to get a clear picture about the corresponding change in the profitability of a firm.

- In this study, I observe that there is a significant relationship between risk and profitability. The enterprise should always try to maintain a reasonable risk with optimum level of working capital for better profitability. Here the risk actually refers to the ability to meet the financial obligation (both-short-term & long-term) by the firm. The lack of sufficient liquidity to meet its short term financial obligations has a considerable contribution towards risk. Therefore, the management should maintain adequate level of working capital along with the fixed capital so that the firm can minimize its risk which has a bearing on profitability. This study relating to liquidity and profitability helps the financial managers to make their important decisions regarding the investment side of the pool of fund procured from different providers of capital.

- From the analysis so far it may be concluded that working capital management is very much useful to ensure better productive capacity, good profitability and sound liquidity of an enterprise, specifically the PSE in India, for managerial decision making regarding the creation of sufficient surplus for its growth and survival stability in the present competitive and complex environment. From our observation it is also clear that the overall financial health of an enterprise not only depends on the profitability of the concern but also it depends on the liquidity position of the firm. It is also observed that liquidity and profitability are two closely related concepts in financial management of a firm in the way of achieving its desired goals. Moreover, the risk dimension of liquidity cannot be ignored in the measurement of overall performance of the firm. Thus, it can be said that the efficiency of financial managers largely depends on their effective utilization of working capital for the growth and sustainability of the enterprise in the present global scenario. It is obvious that our study suffers from the inherent limitations in the construction of different financial ratios under considerations. Further research study may be conducted in this field of enquiry rigorously to explore the real situation behind the day to day problem of running the wheel of the enterprises, particularly the PSEs, in India.

REFERENCES
Articles
[1]. **Arunkumar, O.N. and Jayakumar, S. (2010).** Analysis of Working Capital Management in Major Public Sector Electrical Industries in Kerala, Udyog Pragati, Vol. 34, No.1, pp. 45-55

[2]. **Bhattacharya, H. (1997).** Working Capital Management, Sage Publication India Pvt. Ltd., New Delhi.

[3]. **Chandra H. and Selvaraj A., (2012).** Working Capital Management in Selected Indian Steel Companies, Indian Journal of Finance, Vol. 6, No. 11, pp.5-15

[4]. **Jain, P.K., and Yadav, Surendra S., (2007).** Working Capital Management Practices: A Study of Public Sector Enterprises in India, Management and Change, Vol. 11, No.2,pp.1-68

[5]. **Khatik S. K. and Jain Rashmi, (2009).** Working Capital Analysis of Public State Undertaking (A Case Study of Madhya Pradesh State Electricity Board, Indian Journal of Finance, Vol. 3, No. 5, pp. 31-38

[6]. **Luther, C.T.R. (2007).** Liquidity, Risk and Profitability Analysis: A Case Study of Madras Cements Ltd. 42(10), 784-789.

[7]. **Panigrahi Ashok Kumar, (2012).** Impact of Working Capital Management on Profitability-A Case Study of ACC Ltd, Asian Journal of Management, Vol. 3, No. 4, pp. 210-218

Books

[1]. **M. Pandey,** "Financial Management", Vikas Publishing House Pvt. Ltd, pp108-157,808-939

[2]. **Kothari and Garg, (2016).** Research Methodology: Method and Techniques, New Age International Publishers, New Delhi, 3rd Ed.

[3]. **Prasanna Chandra (IIM B),** "Financial Management Theory and Practice", Second Edition, Tata Mc-Graw Hill Publications, New Delhi, pp- 245-265

[4]. **Sharma,** "Working Capital Management", Surabhi Publications, 103-173.