Chapter – 3

Research Design

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References
3.1 Introduction

The developing economies are generally faced with the problems of inefficient utilization of resources available to them. Capital is the scarce productive resource in such economies and proper utilization of resource promotes the rate of growth, cuts down the cost of production, and above all beefs up the efficiency of the productive system. Hence, the purposeful harnessing of capital is of paramount importance in any development policy of economies.

The total capital of a company comprises of fixed capital and working capital. The emphasis has ever been on the growth and efficiency of fixed capital. The management of working capital has often been neglected, resulting in sub-optimal utilization of not only working capital but also fixed capital. Management of working capital in a given enterprise has profitability and liquidity implications. Working capital represented by current assets, constitutes a dominant and controllable segment of investment, particularly in manufacturing enterprises, and efforts to prune it or optimize its size must promptly enhance the profitability. These efforts would simultaneously activate the flow of funds through the enterprise by focusing on dormant inventories and overdue outstanding and by curbing the long established tendency of funds to stagnate at different stages in the enterprise operations. Thus working capital offers a common front for profitability and liquidity management.

Importance of working capital can further be judged from the fact that many a time the main cause of the failure of a business enterprise has been found to be the shortage of current assets and their mishandling. Inadequate working capital is a serious handicap in the business. Whereas fixed capital investment generates production capacity, working capital makes the utilization of that capacity possible. Competent administration of current assets solves the problem of underutilization of capacities.

Cement industry, which has been signed out from investigation in the present study, is indeed the backbone of economic growth in any country. A thick relationship has been found between the level of economic growth and the quantum of cement consumption in developed as well developing countries. Cement industry, through its forward linkages provides the maximum
stimulus to growth in other industry also. One employee in cement manufacturing activity supports eight to ten persons in related activities.

In India, since independence, great emphasis has been laid on the development of cement industry. It is one of the key basic industries in India. It plays dominant role in the national economy. Cement industry ranks second after the Iron and steel industry. Cement is indispensable in building and construction works. The production and consumption of cement, to a large extent, indicates a country’s progress. The development of transport, infrastructure, irrigation and power projects etc. depends to a very large extent on the availability of the cement. The per capita consumption level of cement is regarded as one of the indicators of development and standard of living in a nation.

Keeping in mind the above importance of the cement industry in the economic development, it is required to do an in-depth study of the problems faced by the industry especially in the area of working capital management. The study aims to analyse the working capital issues like cash management, inventory management, receivable management and liquidity and profitability aspects of the working capital management. It also analyse the various sources of working capital finance.

3.2 Review of Existing literature

Working capital management is a very important component of corporate finance because it directly affects the liquidity and profitability of the company. It deals with current assets and current liabilities. Working capital management is important due to many reasons. For one thing, the current assets of a typical manufacturing firm accounts for over half of its total assets. For a distribution company, they account for even more. 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). 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 ongoing firm is not reliant on the liquidation value of its assets, but rather on the operating cash flows generated by those assets (Soenen, 1993). Taken together, decisions on the level of different working capital components become frequent, repetitive, and time consuming. Working Capital Management is a very sensitive area in the field of financial management (Joshi, 1994). It involves the decision of the amount and composition of current assets and the financing of these assets. 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. 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 can not survive for a longer period. On the other hand, if we do not care about liquidity, we may face the problem of insolvency or bankruptcy. For these reasons working capital management should be given proper consideration and will ultimately affect the profitability of the firm.

Firms 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.

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

(Eljelly, 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, 2003) discussed that most firms had a large amount 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. Using correlation and regression tests he found a significant negative relationship between gross operating income and the number of days accounts receivable, inventories and accounts payable of Belgian firms. On basis of these results he suggested that managers could create value for their shareholders by reducing the number of days’ accounts receivable and inventories to a reasonable minimum. The negative relationship between accounts payable and profitability is consistent with the view that 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.

(Shin and Soenen, 1998) highlighted that efficient Working Capital Management (WCM) was very important for creating value for the shareholders. The way working capital was managed had a significant impact on both profitability and liquidity. The relationship between the length of Net Trading Cycle, corporate profitability and risk adjusted stock return was examined using correlation and regression analysis, by industry and capital intensity. They found a strong negative relationship between lengths of the firm’s net-trading Cycle and its profitability. In addition, shorter net trade cycles were associated with higher risk adjusted stock returns.

(Smith and Begemann 1997) emphasized that those who promoted working capital theory shared that profitability and liquidity comprised the salient goals of working capital management. The problem arose because the maximization of the firm's returns could seriously threaten its liquidity, and the pursuit of liquidity had a tendency to dilute returns. This article evaluated the association between traditional and alternative working capital measures and return on investment (ROI), specifically in industrial firms listed on the Johannesburg Stock Exchange (JSE). The problem under investigation was to establish whether the more recently developed alternative working capital concepts showed improved association with return on investment to that of traditional working capital ratios or not. Results indicated that there were no significant differences amongst the years with respect to the independent variables. The results of their stepwise regression corroborated that total current liabilities divided by funds flow accounted for most of the variability in Return on Investment (ROI). The statistical test results showed that a traditional working capital leverage ratio, current liabilities divided by funds flow, displayed the greatest associations with return on investment. Well-known liquidity concepts such as the current and quick ratios registered insignificant associations whilst only one of the newer
working capital concepts, the comprehensive liquidity index, indicated significant associations with return on investment.

All the above studies provide us a solid base and give us idea regarding working capital management and its components. They also give us the results and conclusions of those researches already conducted on the same area for different countries and environment from different aspects. On basis of these researches done in different countries, we have developed our own methodology for research.

This discussion of the importance of working capital management, its different components and its effects on profitability leads us to the problem statement which we will be analyzing.

The problem statement to be analyzed in this study is:

“A Study of Working Capital Management in Cement Industry in India”

To analyze this problem statement, we have developed objectives of our research, which will hopefully contribute towards a very important aspect of financial management known as working capital management. It is almost untouched in India or very little research has been done in this area.

3.3 **Objectives of the Study:**

1. To analyse and evaluate working capital management with respect to trade off between liquidity and profitability
2. To study the various factors affecting working capital requirements in cement industry
3. To assess the relative significance of various sources of financing of working capital
4. To analyse relative asset liquidity and relative finance liquidity in cement industry
5. To analyse and evaluate inventory management techniques and performance
6. To evaluate the management of receivables with respect to credit policy, credit terms and collection policy
7. To analyse and evaluate the techniques and strategies of cash management
8. To assess the relative significance of marketable securities where surplus cash can be invested
9. To suggest, on the basis of conclusion, innovations in the management of working capital in cement companies in India.

3.4 **Hypothesis:**

1. Current Ratio of cement companies does not differ significantly among the years.
2. Current Ratio does not differ significantly among the various cement companies over the years.
3. Quick Ratio of cement companies does not differ significantly among the years.
4. Quick Ratio does not differ significantly among the various cement companies over the years.
5. Gross Working Capital Turnover Ratio of cement companies does not differ significantly among the years.
6. Gross Working Capital Turnover Ratio does not differ significantly among the various cement companies over the years.
7. Net Working Capital Turnover Ratio of cement companies does not differ significantly among the years.
8. Net Working Capital Turnover Ratio does not differ significantly among the various cement companies over the years.
9. Inventory Turnover Ratio of cement companies does not differ significantly among the years.
10. Inventory Turnover Ratio does not differ significantly among the various cement companies over the years.
11. Debtors Turnover Ratio of cement companies does not differ significantly among the years.
12. Debtors Turnover Ratio does not differ significantly among the various cement companies over the years.
13. Cash Turnover Ratio of cement companies does not differ significantly among the years.
Cash Turnover Ratio does not differ significantly among the various cement companies over the years.

3.5 Research Methodology

The detailed research methodology is narrated in the following paragraphs:

Data source:

The study is mainly based on secondary data and primary data are collected as per requirements of the study through questionnaire and discussion with concerned company’s finance and accounts executives.

Secondary data is taken from CMIE, Prowess Database and published annual reports of the cement companies. In addition to that, financial literature and published articles on the related aspects also considered. The secondary data is basically for financial analysis purpose. Various publications of “Cement Manufacturers’ Association”, National Council for Cement and Building Material, World Cement and Stock Exchange Official Directory are used for this purpose. Other information related to the industry are collected from the Economic Times, Financial Express, Business Standard, RBI Bulletin, other periodicals, journals and other various documents of the companies.

Research Approach and Tools of Analysis:

The research approach is descriptive observational research. The observed secondary data is used for financial analysis purpose. In the course of analysis, use of various accounting and statistical techniques have been made. Accounting techniques include ratio analysis, trend analysis and common size statements while among statistical techniques the arithmetical mean, standard deviation, coefficient of variation, maximum, minimum, simple and average growth rates, correlation coefficient, coefficient of determination and liner regression equations have been applied. The use of all these techniques at different places have been made in the light of nature
and suitability of data available and requirements of analysis. All these tools are described in brief in the following paragraphs.

**Ratio Analysis:**

Ratio analysis is regarded as one of the best tools in analyzing and comparing the time series account data of different firms. It has been extensively used in the present study. The purpose of ratio analysis was three-fold: size analysis, composition analysis and circulation/efficiency analysis. Various ratios computed in order to analyse the size, composition and circulation of working capital and its various components (inventory, receivables, cash and current liabilities) have been explained at the relevant places in different chapters.

However, in this study the use of ratios has not been made in the course of analysis directly. To make the analysis and interpretation more precise and accurate the values of mean, and C.V. have been computed from the ratios.

**Arithmetic Mean:**

Arithmetic mean gives a single value to describe the whole data. Simple arithmetic mean of each series of different ratios has been obtained by adding the values of observations and dividing it by the number of observations.

**Co-efficient of Variation:**

Co-efficient of variation is a relative measure of dispersion. Among different measures of relative variation, one developed by Karl Pearson is the most common in use. Co-efficient of variation is used in problems where we want to compare the variability of two or more than two series. That series (or group) for which the co-efficient of variation is greater is said to be more variable or conversely less consistent, less uniform, less stable or less homogeneous. On the other hand, the series for which co-efficient of variation is less is said to be less variable or more consistent, more uniform, more stable or more homogeneous. In ratio analysis of financial data,
lower co-efficient of variation in a ratio is taken as relatively better control of the management on that ratio. Co-efficient of variation is denoted by C.V. and obtained as follows:

\[ \text{C.V.} = \frac{S}{\bar{x}} \]

Where \( \bar{x} \) = mean,

\( S \) = standard deviation,

However, in this study, while computing the co-efficient of variation, the standard deviation (S) has been for (N-1) number of observations.

**Simple Growth Rates:**

In order to see at what rate the growth has taken place in the working capital and its various components in relation to sales during the period under study, simple growth rates and average growth rates have been computed. Here, growth rates simply mean the per cent increase in a variable over the previous year figure, i.e.,

\[ G = \frac{(Y_t - Y_{t-1})}{Y_{t-1}} \times 100 \]

Where, \( G \) = Growth rate

\( Y_t \) = values of variable Y in time t (current year)

\( Y_{t-1} \) = values of variable Y in time t-1 (previous year)

The average growth rate has been taken as the geometric means of individual growth rates.

**Trend Indices:**

In order to compute the index of change in a variable, the following formula has been used:

\[ \text{Trend Indice} = \left( \frac{Y_t}{Y_0} \right) \times 100 \]

where \( Y_t \) is the value of the variable in the year t for which the index is to be computed, \( Y_0 \) is the value of the variable in the base year.

In order to measure the change in the relative proportion of various components of the working capital to the total such indices have been computed.
Correlation Co-efficient:

Correlation is a numerical expression of relationship between two variables, i.e., X and Y. It is defined as:

\[ r = \frac{N \Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{[N \Sigma x^2 - (\Sigma x)^2][N \Sigma y^2 - (\Sigma y)^2]}} \]

Where:
- \( N \) = number of pairs of scores
- \( \Sigma xy \) = sum of the products of paired scores
- \( \Sigma x \) = sum of x scores
- \( \Sigma y \) = sum of y scores
- \( \Sigma x^2 \) = sum of squared x scores
- \( \Sigma y^2 \) = sum of squared y scores

The correlation co-efficient calculated in this way measure the degree or relationship between the variables, but it does not necessarily imply functional relationship. The significant correlation may be due to chance factor, especially is small samples, or it may be influenced by a third common factor and so on. So, one very convenient and useful way of interpreting the value of 'r' is to use \( r^2 \) which is called co-efficient of determination. The co-efficient of determination explains the variations in dependent variable caused by independent variable. Thus, before coming to a conclusion about the extent of relationship between two variables, the use of \( r^2 \) is very much useful.

Further, in order to test the significance of correlation between two variables, “t” test has been applied. The null hypothesis here is that the correlation co-efficient of population is zero, i.e., the variables in the population are uncorrelated. The “t” value for “r” is:

\[ t = r \sqrt{\frac{N-2}{1-r^2}} \]

where 'r' is the correlation co-efficient and 't' is based on (N-2) degrees of freedom.

If the calculated value of “t” exceeds the table value at 5% significance level for (N-2) degrees of freedom we say that the value of r is significant at 5% level. If “t” value is less than the table
value at 5% significance level, the data are consistent with the hypothesis of an uncorrelated population.

**ANOVA (Single factor) F test:**

Analysis of variance (ANOVA) enables us to test for the significance of the differences among more than two sample means. Analysis of variance helps in making inferences about whether our samples are drawn from populations having the same mean.

**Universe of study:**

The universe consists of all the limited cement companies working in India and listed on any stock exchange of India.

**Sampling Plan:**

Sampling method was convenience and judgment sampling. The samples have selected considering following factors.

1. The installed capacity of the company should be at least one million tonnes per annum.
2. The company should be engaged in the production of gray cement.
3. Data for the entire study period i.e. 2003-04 to 2008-09 are available.
4. The company should be listed on any stock exchange of India.

The followings companies were selected for the purpose of study.
Table 3.1
List of sample companies

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Company</th>
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<tbody>
<tr>
<td>1</td>
<td>A C C Ltd.</td>
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<tr>
<td>2</td>
<td>Ambuja Cements Ltd.</td>
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<tr>
<td>3</td>
<td>Andhra Cements Ltd.</td>
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<td>4</td>
<td>Binani Cement Ltd.</td>
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<td>5</td>
<td>Birla Corporation Ltd.</td>
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<td>6</td>
<td>Century Textiles &amp; Inds. Ltd.</td>
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<tr>
<td>7</td>
<td>Dalmia Cement (Bharat) Ltd.</td>
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<td>8</td>
<td>Gujarat Sidhee Cement Ltd.</td>
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<tr>
<td>9</td>
<td>Heidelberg Cement India Ltd.</td>
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<td>10</td>
<td>India Cements Ltd.</td>
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<tr>
<td>11</td>
<td>J K Lakshmi Cement Ltd.</td>
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<td>12</td>
<td>K C P Ltd.</td>
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<td>13</td>
<td>Madras Cements Ltd.</td>
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<td>14</td>
<td>Mangalam Cement Ltd.</td>
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<td>15</td>
<td>N C L Industries Ltd.</td>
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<td>16</td>
<td>O C L India Ltd.</td>
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<td>17</td>
<td>Prism Cement Ltd.</td>
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<tr>
<td>18</td>
<td>Shree Digvijay Cement Co. Ltd.</td>
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<tr>
<td>19</td>
<td>Ultratech Cement Ltd.</td>
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</tbody>
</table>
3.6 Chapter Plan:

Chapter 1

Conceptual framework of working capital management

This chapter deals with introduction and concept of working capital-types of working capital-method of estimating working capital- inadequacy and excess of working capital-factors affecting to working capital-sources of working capital-structure of working capital-meaning of current assets and liabilities-test of working capital policy-techniques for analysis of working capital-meaning of management of working capital-principles of working capital management and conclusion.

Chapter-2

Profile of cement industry in India


Chapter -3

Research Design

It describes the importance of the study and states the objectives and scope of the study. It also contains brief review of literature and the research methodology.

Chapter - 4

Sources of working capital finance

This chapter starts with the different sources available to finance working capital and review of recommendations of various study groups constituted by RBI to frame guideline to regulate bank credit. It also contains the analysis of the relative finance liquidity and profitability of the selected cement companies.
Chapter – 5
Inventory Management – Analysis
This chapter covers the analysis of size, trend, composition, circulation, turnover and growth of the inventory with the help of financial ratios along with the prevailing control techniques.

Chapter – 6
Receivables Management – Analysis
Analysis of size, trend, composition, turnover ratio and growth of receivables in the selected companies have been studied. Apart from this, the credit and collection polices and practices in the cement companies under study have been examined.

Chapter – 7
Cash Management – Analysis
Cash planning and control techniques used have been presented in this chapter.

Chapter - 8
Findings and Suggestions
Major conclusions based on the study are summarized in this chapter. Besides, it contains some suggestions for the effective and efficient working capital management.

3.7 Limitations of the study:
In a research design selected in the study, there is a great chance of personal bias in the selection of sample companies. However, it is attempted to be as objective and impartial to obtain reliable and meaningful results from final analysis. This study is based on secondary data taken from CMIE database as well published annual reports of the said companies and as such its finding depends entirely on the accuracy of such data. Moreover, the data were processed to 12 months on an average basis wherever required. The study is largely based on the financial tool of ratio analysis, which has its own limitations that also applies to this study. Executives, who were interviewed and asked to fill up questionnaire, sometime became very reluctant to share the
information on their privacy policy ground. As an alternative, it was possible to collect some relevant information through general discussion with top management finance executives. Hence, the conclusions drawn in the present study should be taken in the light of these deficiencies of data.

References: