Chapter III

Research Methodology
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RESEARCH METHODOLOGY

3.1 INTRODUCTION

Methodology and Measurement of Variables are detailed in this chapter. This study is based on data collected from secondary source for 37 selected cement companies, which is about 40 percent of total cement companies in India. These 37 companies are selected based on the criteria of availability of data for the ten-year period. However, the reliability of the findings is enhanced by the presence of companies, which are market leaders in the industry.

3.2 PERIOD OF STUDY

3.3 SOURCE OF DATA

The study is mainly based on the secondary data, which are collected from the Official Directory and "PROWESS", database of the Centre for Monitoring Indian Economy (CMIE).

The Stock Exchange Official Directory, Mumbai and Kothari’s Industrial Directory of India were also referred to supplement the data. The Reserve Bank of India Bulletin and the publications of the Central Statistical Organisation were also used as data sources. Random checks were conducted by comparing the data with the annual reports of the companies.

3.4 CLASSIFICATION BY SIZE OF THE COMPANY

The collected data were analysed with reference to each of the specific objectives of the study. The 37 companies are divided into three categories as follows. The companies are classified on the basis of the value of total assets, during the year 2000 – 2001, because the latest year information would help to improve the quality of the study.
TABLE 3.1 CLASSIFICATION OF COMPANIES BASED ON THE VALUE OF TOTAL ASSETS

<table>
<thead>
<tr>
<th>Category</th>
<th>Value of Total Assets in Rupees</th>
<th>No of Companies</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Less than 250 crores</td>
<td>21</td>
<td>57</td>
</tr>
<tr>
<td>Medium</td>
<td>250-500 crores</td>
<td>05</td>
<td>13</td>
</tr>
<tr>
<td>Large</td>
<td>Above 500 crores</td>
<td>11</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>37</td>
<td>100</td>
</tr>
</tbody>
</table>

The analysis is carried out for each category separately. Conventional tools like descriptive tables and percentages were used to examine the effectiveness of management of working capital.

3.5 FRAME WORK OF ANALYSIS

The study makes use of various statistical tools in order to analyse the data and form conclusions out of it. The statistical tools employed in the study are:

- Arithmetic Mean (X)
- Co-efficient of Variation (CV)
- Average Growth Rate
- Multiple Regression Analysis
The application of all these techniques at different places is made in the light of the nature and suitability of data available and to satisfy the requirements of the analysis. A brief description of the tools used for the analysis and their application in the study is given below.

3.5.1 ANNUAL GROWTH RATE (AGR)

This shows the rate of growth of a variable at a point of time in the study period. It is given by the formula:

\[ Y = a + bt \]

Where

\[ b = \frac{N \sum y_t - \sum y \sum t}{N \sum t^2 - (\sum t)^2} \]

\[ a = \bar{Y} - bt \], where \( \bar{Y} \) = mean of \( Y \) and \( t = \) mean of \( t \) series
‘b’ gives the rate of growth of the variable at a point of time of the series or study period.

3.5.2 ARITHMETIC MEAN ($\bar{X}$)

It is a single value to describe the whole data. It has been obtained by adding the values of all observations and dividing it by the number of observations.

$$\bar{X} = \frac{\sum x}{N}$$

Where $\sum x =$sum of variables

$N =$ Number of observations.

3.5.3 CO-EFFICIENT OF VARIATION

It is a measure of relative variation to compare the variability of two or more series.

The series, for which the co-efficient of variation is greater, indicates that the series has more variation less consistent, less uniform or less stable.
On the other hand, if the co-efficient of variation is less, it indicates that the series has less variation, more consistent, more uniform or more stable.

In ratio analysis of financial data, less co-efficient of variation in a ratio is considered to have relatively better control of the management on that ratio

$$\text{C.V.} = \frac{S}{X}$$

Where ‘S’ is the standard deviation

$\overline{X}$ is the mean ratio.

3.5.4 ‘t’-test:

Along with the $\overline{X}$ and CV values for each group of ratios, the values of ‘t’ statistic have been computed in order to determine whether the mean of a sample company deviates significantly from industry mean using the t-statistic,

Test Statistic:

$$t = \frac{\overline{X} - \mu}{S / \sqrt{N}}$$
In applying the t-test the overall mean value of the ratios in the different categories.

3.5.5 MULTIPLE REGRESSION ANALYSIS

Multiple Regression Analysis is a statistical process by which several independent variables are included to predict the dependent variable. Multiple regression is a functional relationship between a dependent variable and more than one independent variable. In this study the technique of multiple regression is applied by taking working capital as dependent variable and Share Capital, LTB, Debenture, Retained Earnings, Stock, Debtors, Cash, Banks, Bills Receivable, Sundry Creditor, Current Liabilities and Provision as independent variables. The co-efficient of determination $R^2$ is used to assess the fraction of variation of the dependant variable that is explained by independent variables.

3.5.6 ANALYSIS OF VARIANCE (ANOVA)

The technique of Analysis of Variance using F-test is used in the study to test the homogeneity of Mean values of variables under the three categories considered.
All the tests in this study are carried out at 5 percent level of significance and the statistical analyses were performed using SPSS (Statistical Package for Social Science).

3.6 ACCOUNTING RATIOS

3.6.1 MEANING OF RATIO ANALYSIS

Among the various tools available, the most important effective tool is Ratio Analysis. Ratio Analysis is a widely used tool of financial analysis. Ratio analysis means the process of computing, determining and presenting the relationship of items and groups of items of financial statements. It is the technique which is commonly used as a yardstick to evaluate the financial condition and performance of a concern.

3.6.2 MEANING AND NATURE OF RATIO ANALYSIS

Ratio expresses numerical relationship between two numbers. In the words of Kennedy and McMullen, “The relationship of one item to another expressed in simple mathematical form is known as a ratio”.

Thus, the ratio is a measuring device to judge the growth, development and present condition of a concern. It plays an important role in measuring the
comparative significance of the income and position statement. Accounting ratios are expressed in the form of time, proportion, percent, or per one rupee. Ratio analysis is not only a technique to point out relationship between two figures but also a device to measure the fundamental strengths or weaknesses of a concern. As James C. Van Horne observes: “To evaluate the financial condition and performance of a firm, the financial analyst needs certain yardsticks. One of the yardsticks frequently used is a ratio. The main purpose of ratio analysis is to measure past performance and project future trends. It is also used for inter-firm and intra-firm comparison as a measure of comparative productivity. The significance of the various components of financial statements can be judged only by ratio analysis. The financial analyst X-Rays the financial conditions of a concern by the use of various ratios and if the conditions are not found to be favourable, suitable steps can be taken to overcome the limitations. The main objectives of ratio analysis are:

(i) To simplify the comparative picture of financial statements.
(ii) To assist the management in decision making
(iii) To gauge the profitability, solvency and efficiency of an enterprise.
(iv) To ascertain the rate and direction of change and future potentiality.

Financial ratios may be categorised in various ways. Van Horne has divided financial ratios into four categories, viz., liquidity, debt, profitability and coverage ratios. The first two types of ratios are computed from the
balance sheet. The last two are computed from the income statement and sometimes from both the statements.

3.6.3 CASH TO TOTAL CURRENT ASSETS RATIO

Efficient management of the inflow and outflow of cash plays a crucial role in the overall performance of a business. Cash is the most liquid form of asset, which safeguards the security and interest of a business. Cash including bank balances plays a vital role in the total net working capital.

The ratio of cash to working capital signifies the proportion of cash to the total net working capital and can be calculated by dividing the cash including bank balance by the working capital. Cash is not an end in itself, it is a means to achieve the end. Therefore, only a required amount of cash is necessary to meet the day-to-day operations. A higher proportion of cash may lead to shrinkage of profits due to idleness of resources of a firm.

3.6.4 DEBTORS TO TOTAL CURRENT ASSETS RATIO

Here the trade debtors, including accounts receivable, are compared with the total current assets to know the proportion of debtors included in the total current assets. Total trade debtors are divided by the total current assets to understand the volume of debtors. Higher the ratio reveals the high level of
credit sales and advises the firm to speed-up the collection process to maintain more liquidity whereas lower the ratio indicates the low level of credit sales and speedy collection of debts.

3.6.5 INVENTORY TO TOTAL CURRENT ASSETS RATIO

Inventory includes raw materials, semi-finished goods, finished goods, consumables and spares. This ratio reveals the proportion of inventories in the total current assets. The amount of inventory is divided by the amount of the total current assets to arrive at the ratio.

It informs the level of stock blocked in the above forms. If the ratio is larger, the firm is expected to ensure the level of production at an optimum level. At the same time, if there is smaller ratio, then the firm has high level of liquid assets.

3.6.6 CURRENT RATIO

The most widely used measure of liquidity position of an enterprise is the current ratio, i.e., the ratio of the firm’s current assets to current liabilities. It is calculated by dividing current assets by current liabilities.

The current assets of a firm represent those assets which can be in the ordinary course of business, converted into cash within a short period of time,
normally not exceeding one year and include cash and bank balance, marketable securities, inventory of raw materials, semi-finished and finished goods, debtors net of provisions for bad and doubtful debts, bills receivable and pre-paid expenses. The current liabilities defined as liabilities which are short-term maturing obligations to be met, as originally contemplated, within a year, consist of trade creditors, bills payable, bank credit, provision for taxation, dividends payable and outstanding expenses.

N.L. Hingorani and others observe: Current Ratio is tool for measuring the short-term stability or ability of the company to carry on its day-to-day work and meet the short-term commitments earlier.

Generally 2:1 is considered ideal for a concern i.e., current assets should be twice of the current liabilities. If current assets are two times of the current liabilities, there will be no adverse effect on business operations when the payment of current liabilities is made. If the ratio is less than 2, difficulty may be experienced in the payment of current liabilities and day-to-day operations of the business may suffer. If the ratio is higher than 2, it is very comfortable for the creditors but, for the concern, it indicates idle funds and lack of enthusiasm for work.
3.6.7 QUICK RATIO

Quick ratio is a measurement of a firm’s ability to convert its current assets quickly into cash in order to meet its current liabilities. It is a measure of judging the immediate ability of the firm to pay-off its current obligations. It is calculated by dividing the quick assets by current liabilities.

The term quick assets refer to current assets, which can be converted into cash immediately or at a short notice without diminution of value. Thus quick assets consist of cash, marketable securities and accounts receivable. Inventories are excluded from quick assets because they are slower to convert into cash and generally exhibit more uncertainty as to the conversion price.

This ratio provides a more stringent test of solvency. 1:1 ratio is considered ideal ratio for a firm because it is wise to keep the liquid assets at least equal to the current liabilities at all times.

3.6.8 SALES TO TOTAL CURRENT ASSETS RATIO

This ratio ascertains the efficiency with which current assets are used in a business. Professor Guthmann observes that “current assets turnover is to give an overall impression of how rapidly the total investment in current assets is being turned”. This ratio is strongly associated with efficient utilisation of
costs, receivables and inventory. A higher value of this ratio indicates greater circulation of current assets while a low ratio indicates a stagnation of the flow of current assets. By dividing sales by the current assets this ratio is arrived at.

3.6.9 WORKING CAPITAL TURNOVER RATIO

This ratio shows the number of times working capital is turned-over in a stated period. Working Capital turnover ratio reflects the extent to which a business is operating on small amount of working capital in relation to sales. It is calculated by dividing the sales by net working capital.

The higher the ratio, the lower is the investment in working capital and greater are the profits. However, a very high turnover of working capital is a sign of over-trading and may put the firm into financial difficulties. On the other hand, a low working capital turnover ratio indicates that working capital is not efficiently utilised.

3.6.10 DEBTORS TURNOVER RATIO

One of the major activity ratios is the receivables or debtors turnover ratio. Allied and closely related to this is the average collection period. It shows how quickly receivables or debtors are converted into cash. In other
words, the debtors’ turnover ratio is a test of the liquidity of the debtors of a firm. The liquidity of a firm’s receivables can be examined in two ways:

(i) debtors/receivables turnover and
(ii) average collection period.

The debtors turnover shows the relationship between credit sales and debtors of a firm. Here the average debtors divide the net credit sale. Net credit sales consist of gross credit sales minus returns if any, from the customers. An average debtor is the simple average of debtors at the beginning and at the end of the year.

The second type of ratio measuring the liquidity of a firm’s debtors is the average collection period. It is calculated by dividing the number of days in a year by debtors’ turnover. This ratio indicates the speed with which debtors/accounts receivables are being collected. The higher the turnover ratio and shorter the average collection period, the better the trade credit management and better the liquidity of debtors. On the other hand, low turnover ratio and long collection period reflects that payments by debtors are delayed. In general, short collection period (high turnover ratio) is preferable.
3.6.11 CREDITORS TURNOVER RATIO

Creditors’ turnover ratio indicates the speed with which the payments for credit purchases are made to the creditors. This ratio can be computed by dividing net credit purchases by the average accounts payable.

The term accounts payable includes trade creditors and bills payable. A high ratio indicates that creditors are not paid in time while a low rate gives an idea that the business is not taking full advantage of credit period allowed by the creditors.

Sometimes, it is also required to calculate the average payment period or average age of payables or debt period enjoyed to indicate the speed with which payments for credit purchases are made to creditors. This ratio is worked out by dividing number of days in a year by creditors turnover.

Both the creditors’ turnover ratio and the debt payment period enjoyed ratio indicate about the promptness or otherwise in making payment for credit purchases. A higher creditor’ turnover ratio or lower credit period enjoyed ratio signifies that the creditors are being paid promptly.
3.6.12 INVENTORY TURNOVER RATIO

It is also known as stock turnover ratio that establishes the relationship between cost of goods sold and averages inventory. This ratio indicates whether investment in inventory is within proper limit or not. In the words of S.C. Kuchal, “this relationship expresses the frequency with which average level of inventory investment is turned over through operations”. In order to calculate this ratio the cost of goods sold is divided by average inventory.

In general, a high inventory turnover ratio is better than a low ratio. A high ratio implies good inventory management. A very high ratio indicates under-investment in, or very low level of, inventory which results in the firm being out of stock and incurring high stock-out cost. A very low inventory turnover ratio is dangerous. It signifies excessive inventory or over-investment in inventory. A very low ratio may be the result of inferior quality goods, over-valuation of closing inventory, stock of unassailable/obsolete goods.

3.6.13 CASH TURNOVER RATIO

The cash turnover ratio indicates the number of times the average cash balance is turned over during the year. It helps to evaluate the cash management performance. While interpreting this ratio, it should be borne in mind that increase in the ratio may be due to inadequate cash balances. The
study of cash turnover ratio provides a deep insight into the cash balance held by a concern.

3.6.14 WORKING CAPITAL PERFORMANCE RATIO (DRS/CRS)

It reflects the degree to which credit extended by the firm is financed by the credit enjoyed by the firm from the creditors. Higher the ratio, more is the level of spontaneous source of financing used to finance the firm's activities.

3.6.15 OPERATING CASH FLOW TO CURRENT LIABILITIES (OCF/CL)

It is a measure of liquidity based on flow concept, which indicates the capability of the concern in discharging its short-term obligations, using the cash available from its operations. The extent of firm's dependence on other sources of finance to meet its current obligations will reduce with a higher ratio.

This section has attempted to study the relationship of liquidity with the profitability and the quality of earnings of the firms in the cement industry. The overall performance of the different liquidity measures – traditional and improved have been studied. A correlation matrix has been prepared to find out the extent of correlation between the liquidity ratios and to select the variables for the step-wise multiple regression analysis.
A step-wise multiple regression analysis has been employed to find out the relationship between liquidity and profitability and the liquidity and the quality of earnings, along with the extent of their influence.

3.7 NNRT

NNRT means Net of Non Recurring Transactions. Non-recurring transactions include profit / loss on sale of fixed assets / sale of investment, provisions written back, prior period income / expenses and insurance claims.