CHAPTER 2

METHODOLOGY

2.1 Introduction
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2.3 Selection of Sample
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2.1 INTRODUCTION

2.1.1 This chapter deals with the methodology followed in collection and analysis of the data for the study. The nature and sources of data, procedure for selection of the sample, different techniques used for the analysis and interpretation, the hypothesis set for the study and the various limitations of the study are also included in this chapter.

2.2. NATURE AND SOURCES OF DATA

2.2.1 The data required for the purpose of this study are of the following nature:

1) Information relating to historical background, type, size, industrial growth, corporate growth and mobilisation of funds in Aluminium Industry of India.

2) Annual published financial statements of sample companies from 1991-92 to 2002-03.

2.2.2 The information for the study relating to the number, size and age of the Aluminium Companies and Annual Financial Statements have been collected from the Stock Exchange Official Directory, Mumbai from 1991-92 to 2002-03. The additional information have been collected from Annual Reports on the Working and Administration of Companies Act, 1956, Companies
The data relating to introduction and other theoretical portions have been collected from different journals of Trade and Commerce, and different books.

2.3 SELECTION OF SAMPLE

2.3.1 The Aluminium Industry of India is classified into two categories, viz. primary producers and secondary industries. The primary producers are those, who produce ingots and billets from bauxite, whereas secondary industries add value to ingots and billets to produce semi-fabricated products. At the end of 2003, there are 5 major aluminium producing companies who are operating in Aluminium in India. They are NALCO, MALCO, BALCO, HINDALCO and INDALCO. All these five companies are listed in Mumbai Stock Exchange. The data relating to their financial performance are available either from Official Stock Exchange Directory or Internet from 1991-92 to 2002-03. As continuity and homogeneity of data is a pre-requisite for financial analysis. Therefore, all the above five companies are selected for the purpose of study. Hence, the present sample represents 100 percent of the Industry. Which can be taken as true representative of the entire Aluminium Industry of India.
2.4 PERIOD OF STUDY AND METHODOLOGY

2.4.1 The data of these companies covers a period of twelve years from 1991-92 to 2002-03. This period includes one Annual Plan (1991-92), two five year plans, i.e. Eighth Five year plan (1992-97) and Ninth Five year plan (1997-2002). As our basic objectives to study the working capital management in liberalisation period, the year 1991-92 was adopted as the base year for the study because it was the beginning of liberalisation era in India. The data have been collected from secondary sources i.e. from various issues of Mumbai Stock Exchange Official Directory, Annual Reports of different sample companies, Journals and Magazines.

2.4.2 For evaluating the performance of working capital management, simple mathematical tools like percentage, arithmetic mean, ratio and statistical tools like trend percentage; coefficient of correlation, linear regression model etc. have been used. T-test has been used to test the significance of coefficient of correlation between two variables. At the same time, some financial tools like funds flow statement/analysis, trend analysis, ratio analysis and common-size statements are also used to simplify the study and its interpretation.
2.5 TECHNIQUES OF WORKING CAPITAL ANALYSIS

2.5.1 Proper management of working capital requires a careful enquiry into current assets and current liabilities and trends of their components. The following techniques are used to analyse the management of working capital.

Ratio Analysis:

2.5.2 Ratio Analysis is a most commonly used technique of working capital management. In order to appraise and review the effectiveness of working capital management, financial ratios are employed. These are helpful for analysis and interpretation of financial and operational data connected with working capital. By comparing ratios of the current year with that of previous periods and industry norms, the financial manager can locate its deviation. The most important ratios of working capital management used in analysing the various aspects of the working capital positions of an enterprise are:

A. Current Ratio: Current Ratio express the relationship between current assets and current liabilities. Current assets includes cash and bank balances, marketable securities, sundry debtors, inventories, prepaid expenses, accrued income, bills receivables, work-in-progress and the other assets which can
be converted into cash within one year. Current liabilities include those obligations which are payable within a period of one year like outstanding expenses, income received in advance, sundry creditors, bills payable, short-term advances, income tax payable, dividend payable and bank overdraft. The standard of this ratio is 2:1. A high degree of current ratio indicates, the firm's ability to pay its current obligations in time. On the other hand, a relatively low current ratio represents that the liquidity position of the firm is not good. However, a too high ratio does not indicate a satisfactory situation. Such a ratio may be result of accumulation of accounts receivable due to slackness in collection and piled up inventories due to poor sales. It is calculated as:

\[
\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}.
\]

B. Acid Test Ratio or Quick Ratio: It is a measure of judging the immediate ability of the company to pay its current liabilities. It is obtained by dividing quick current assets by current liabilities. Inventories are excluded from quick current assets because they are slower to convert into cash and generally exhibit more uncertainty as to conversion price. A quick ratio of 1:1 is usually considered adequate. A low quick ratio
does not necessarily mean a bad liquidity position, as inventories are not absolutely non-liquid. Hence, a firm having a high quick ratio, may not have a satisfactory liquidity position, if it has slow-paying debtors. On the other hand, a firm having a low quick ratio may have a good liquidity position if it has first moving inventories.

\[
\text{Acid Test Ratio or Quick Ratio} = \frac{\text{Quick Current Assets}}{\text{Current Liabilities}}.
\]

C. **Absolute liquid Ratio or Cash Position Ratio:** It is most rigorous test of the liquidity position of a business unit. Absolute liquid assets include only cash and bank balances and marketable securities on temporary investments. The acceptable norm for the ratio is 0.5:1 or 1:2. It is calculated as:

\[
\text{Cash Ratio} = \frac{\text{Absolute Liquid Ratio}}{\text{Current Liabilities}}
\]

D. **Inventory Turnover Ratio:** Inventory turnover ratio reflects the efficiency at which, the inventory is being managed in a concern. The purpose of the ratio is to see whether minimum funds have been locked up in the inventory or not. The constituents of inventory turnover ratio are cost
of goods sold and average inventory. The average inventory can be determined by adding the stock at the beginning and at the end of the period and dividing it by 2. There is no "rule of thumb" for interpreting the inventory turnover ratio. However, a high turnover ratio indicates efficient management of inventory because it indicates that the stock is frequently sold, whereas a low inventory turnover ratio indicates inefficient management of inventory, over-investment in inventory, slow disposal of stocks and poor quality of goods etc. But a high turnover of inventory may not always necessitates a favourable situation. It may be the result of a very low level of inventory, which results in shortage of goods in relation to demand and using the conservative method of valuing inventories at lower values.

\[
\text{Inventory Turnover Ratio} = \frac{\text{Cost of goods Sold}}{\text{Average Inventory}}.
\]

E. Debtors or Receivable Turnover Ratio: It indicates the velocity of debt collection of a firm. It also indicates the number of times the average debtors or receivables are turned over during a year. A high receivable turnover ratio implies the more efficient management of debtors. On the other hand, the lower turnover ratio implies the inefficient management of debtors. But a precaution is needed while interpreting a
very high debtors turnover ratio, because a very high ratio may imply a firm’s inability, due to lack of resources, to sell on credit, thereby loosing sales and profit.

Debtors or Receivables Turnover Ratio = $\frac{\text{Net Sales}}{\text{Average Debtors}}$.

Average Debtors is calculated by adding debtors at the beginning and at the end and dividing it by 2. “Average collection period” represents the average number of days for which a firm has to wait before its receivable is converted into cash. The shorter average collection period is better, because it implies quick payment by debtors. Higher collection period implies the inefficient collection performance.

Average Collection Period = $\frac{\text{Average Debtors}}{\text{Sales per day}}$.

Debtors include Sundry Debtors and Bills Receivable.

Sales per day = Net Sales/ number of working days in a year. In our study, we have taken no of working days in a year as 365.

F. Working Capital Turnover Ratio: The difference between current assets and current liabilities is called net working capital. Working capital turnover ratio indicates the velocity of the utilisation of net working capital. This ratio indicates the number of times the working capital turned over in the
course of a year. Higher ratio implies efficient utilisation of working capital. However, a very high working capital turnover ratio is not a good sign for the firm, because the higher working capital turnover ratio may arise due to insufficient working capital.

\[
\text{Working Capital Turnover Ratio} = \frac{\text{Net Sales}}{\text{Net Working Capital}}.
\]

G. Cash to Current Assets Ratio: Holding of unnecessary cash affects adversely the profitability of a concern, because the cash remains idle and lowers the earning power. The lower the ratio, the greater is the profitability of the concern.

\[
\text{Cash to Current Assets Ratio} = \frac{\text{Cash Balances}}{\text{Current Assets}}.
\]

H. Cash to Sales Ratio: This ratio is important for controlling the cash. Cash and Bank balances will increases, if the sales increases. This ratio indicates the cash balances held in a firm as compared to its sales.

\[
\text{Cash to Sales ratio} = \frac{\text{Cash Balances}}{\text{Sales}}.
\]

I. Current Assets to Total Assets Ratio: This ratio indicates the effect of current assets on profitability risk-trade-off. The
increase in the ratio of current assets to total assets leads to decline in profitability.

Current Assets to Total assets ratio = \( \frac{\text{Current Assets}}{\text{Total Assets}} \).

J. Current Liabilities to Total Assets Ratio: This ratio indicates the percentage of total assets financed by the current liabilities. Higher ratio is better for the organisation, because the total assets financed by the current liabilities are less expensive than long-term sources of finance. The effect on change in current liabilities can also be demonstrated by using this ratio.

\[
\text{Current liabilities to \ Total Assets ratio} = \frac{\text{Current Liabilities}}{\text{Total Assets}}.
\]

K. Current Assets Turnover Ratio: In this ratio, the gross concept of working capital is used. It indicates the rate at which working capital has been used. Generally, a higher ratio is considered as an indicator of better efficiency and a lower one is an indicator of the lack of efficiency.

\[
\text{Current Assets Turnover Ratio} = \frac{\text{Net Sales}}{\text{Current Assets}}.
\]

L. Accounts Receivables to Sales Ratio: This ratio is useful for evaluating the efficiency of granting credit and collecting past
due accounts. Lower the ratio, better for the organisation because, the ratio indicates the percentages of credit sales in total sales. A credit sale creates the problem of collection for the organisation.

\[
\text{Accounts receivables to sales ratio} = \frac{\text{Accounts Receivables/Debtors}}{\text{Sales}}
\]

Funds Flow Analysis:

2.5.3 Funds Flow Analysis is the detailed analysis of the net working capital position of the firm. Such an analysis helps the management to administer and control the amount of total working capital, its various elements as well as its financing. Management can use funds flow analysis to determine the followings:

1. The amount of net working capital deployed in business.
2. The change in net working capital over the period.
3. The ratio of short-term finance to long-term finance is reasonable or not.
4. The funds provided by business operation in order to finance permanent assets.
5. The volume of long-term sources of funds, that can be further tapped to finance current assets.

The funds flow statement on working capital basis, presents:
a. Sources of working capital –
It includes:
  i) Funds from operation: Working capital increases, because funds from operation is equal to net income plus depreciation.
  ii) Issue of share capital: An issue of share capital results in an inflow of working capital because it brings a cash inflow or an increase in short-term receivables.
  iii) Long-term borrowings: When a long-term loan is taken, there is an increase in working capital because of cash inflow.
  iv) Sale of non-current assets.

b. Uses of working capital –
It includes:
  i) Payment of dividend.
  ii) The payment of long-term liability.
  iii) Purchase of non-current assets

c. Changes in working capital – Statement of changes in working capital is prepared to show the changes in working capital between the two balance sheet dates. The statement is prepared with the help of current assets and current
liabilities derived from the two balance sheets. The amount of any current asset and current liability in the current balance sheet is compared to that of the previous balance sheet. The difference is recorded for each individual current asset and current liability. In case of current asset in the current period is more than the previous period; the effect is an increase in working capital and vice-versa. In case of current liability, of the current period is more than the previous period, the effect is decrease in working capital and vice-versa. The total increase and total decrease are compared and the difference shows the net increase or decrease in working capital.

For the purpose of our study, we prepare the funds flow statement in the format which is given in the next page.

Trend analysis

2.5.4 Trend analysis studies the percentage relationship of each item of statement bears to the same item in the base year. This method determines the direction either upwards or downwards. The information for a number of years is taken up and one year, generally the first year, is taken as a base year. The figures of the base year are taken as 100 and trend ratios for other years are calculated with reference to the base year.
<table>
<thead>
<tr>
<th>PARTICULARS</th>
<th>PREVIOUS YEAR(RS)</th>
<th>CURRENT YEAR(RS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOURCES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit (Change in Reserve and Surpluses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add Depreciation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Funds from operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issue of share capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in current liability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in deferred liability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in current asset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in fixed asset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in misc. assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>APPLICATIONS:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redemption of Share Capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in current asset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in fixed asset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in misc. assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in current liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in deferred liability</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Common-size-statement

2.5.6 Common-size-statement is a financial tool for studying key changes and trends in financial position of a company. In common-size-statement each item is stated as a percentage of total of which that item is a part. Each percentage exhibits the relation of individual item to its respective total. The common-size-statement may be prepared in following ways:

1. The totals of assets or liabilities are taken as 100.
2. The individual assets are expressed as a percentage of total assets.

Cash Flow Statement

2.5.5 A cash flow statement is a statement, which summaries the cash inflows and outflows of a firm during a particular period of time. The main objective of this statement is to provide information about the cash flows of an enterprise and to assess the ability of the enterprise to generate cash and cash equivalents and the needs of the enterprise to utilise these cash flows. Now, we present the cash flow statement according to Revised Accounting Standards (AS)-3.
<table>
<thead>
<tr>
<th>PARTICULARS</th>
<th>PREVIOUS YEAR(RS)</th>
<th>CURRENT YEAR(RS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Cash Flows from operational activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit(changes in Reserve &amp; Surplus)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add Depreciation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit from trading operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Sundry Debtors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Inventories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Misc. current assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Current liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Deferred liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Cash from operational activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Cash flows from Investing activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Fixed Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Misc. Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net cash from investing activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Cash flows from Financing activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in Share Capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net increase/decrease in cash and cash equivalents (A+B+C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add Cash and Bank balances at the Beginning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and Bank balances at the end</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Gross Working Capital Statement

2.5.7 From the year-wise balance sheet of different sample companies, gross working capital statements are prepared. Year-wise investment in current assets is presented in the following format.

<table>
<thead>
<tr>
<th>CURRENT ASSETS</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Cash &amp; Bank Balances</td>
<td></td>
</tr>
<tr>
<td>b. Sundry Debtors</td>
<td></td>
</tr>
<tr>
<td>c. Inventories</td>
<td></td>
</tr>
<tr>
<td>d. Misc. Current Assets</td>
<td></td>
</tr>
<tr>
<td><strong>Gross Working Capital</strong></td>
<td>(a+b+c+d)</td>
</tr>
</tbody>
</table>

Net Working Capital Statement

2.5.8 These information are also obtained from the year-wise balance sheet of different sample companies. The net working capital is obtained by deducting total current liabilities from gross working capital. The net working capital statement is presented in the following format.
Correlation Analysis

2.5.9 Correlation in statistics refers to the relationship between any two or more variables. If a change in the value of one variable causes to change the value of another, then two variables are said to be correlated. It is used in deriving precisely the degree and direction of relationship between variables. The management of working capital can be studied by finding out the relationship between the current assets and net sales, current assets and net working capital, receivables and net working capital, cash and net working capital and inventory and net working capital. For this purpose, test of significance (student t-test) have been applied to interpret the results. The coefficients of correlation for the industry are computed by using the following formulae.

<table>
<thead>
<tr>
<th>PARTICULARS</th>
<th>AMOUNT (RS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Gross Working Capital</td>
<td></td>
</tr>
<tr>
<td>B. Less Total Current Liabilities</td>
<td></td>
</tr>
<tr>
<td>a) Sundry Creditors</td>
<td></td>
</tr>
<tr>
<td>b) Short-term loans</td>
<td></td>
</tr>
<tr>
<td>Net Working capital (A-B)</td>
<td></td>
</tr>
</tbody>
</table>
\[ r = \frac{N \sum XY - \sum X \sum Y}{\sqrt{N \sum X^2 - (\sum X)^2} \cdot \sqrt{N \sum Y^2 - (\sum Y)^2}} \]

Where,

- \( X \) = First variable
- \( Y \) = Second variable
- \( N \) = Number of pairs of observations
- \( r \) = Co-efficient of correlation

Regression analysis

2.5.10 Under this technique of forecasting, the assumption is that variables to be examined have linear relationship. The estimation of working capital requirements of the sample has been made on the basis of simple regression technique. In the process, the variation between actual and estimated working capital has been ascertained and the same has been tested with the help of Chi-Square test. The linear regression equation is used as:

\[ Y = a + bx \]

Where,

- \( Y \) = Working Capital.
- \( x \) = Sales
- \( a \) = The intercept of a line on ‘X’ axis, i.e., the amount of working capital required when sales are nil.
- \( b \) = Rate of growth of working capital.
We can find the value of ‘a’ and ‘b’, by using the following formulae.

\[ b = \frac{\sum XY - \sum X \cdot \sum Y}{N} \text{ and } \frac{\sum X^2 - (\sum X)^2}{N} \]

\[ a = \frac{\sum Y}{N} - b \cdot \frac{\sum X}{N} \]

To test the significance of relationship between working capital and sales, “t-test” has been applied. The value of “t” is determined as follow:

\[ t = \frac{\bar{d} \cdot \sqrt{N}}{S} \]

Where,

\( \bar{d} \) = mean of the differences between working capital and sales.

\( S \) = The standard deviation of the differences

And \( S = \sqrt{\frac{\sum d^2 - N(\bar{d})^2}{N-1}} \)

It should be noted that ‘t’ is based on \( [N-1] \) degrees of freedom. If the calculated value of ‘t’ is less than the table value at 1 percent and 5 percent level of significance, the hypothesis is accepted, otherwise it is rejected.
2.6 HYPOTHESIS

2.6.1 In the process of "A CRITICAL ANALYSIS OF WORKING CAPITAL MANAGEMENT IN ALUMINIUM INDUSTRY OF INDIA", the following hypothesis are undertaken for examination:

1. Investments in Current Assets are generally made on regular basis in the liberalisation era.

2. Inventories occupy a major share in the constituent of the working capital in the industry in the post liberalisation era.

3. Working capital generally grows with increase in current assets and sale and decrease in current liabilities.

4. Current Ratio, Acid Test Ratio or Quick Asset Ratio and Absolute Liquid Ratio of the Industry generally be 2:1, 1:1 and 1:2 respectively.

5. Higher Inventory Turnover rate, normally, reduces the need of working capital in the Industry.

2.7 LIMITATIONS OF THE STUDY

2.7.1 The study uses secondary data collected from Annual Reports of sample companies and the Stock Exchange Official
Directory, Mumbai. Thus, the limitation of the secondary data and of the financial statements cannot be ruled out in this study. The study is confined to a period of twelve years, i.e. from 1991-92 to 2002-03. The present study suffers from the following limitations:

1. The changes in accounting policies of the firm, price level changes, accounting concepts and conventions are not taken into consideration at the time of collection of data for the present study.

2. Financial analysis is based on only monetary information and non-monetary factors are ignored.

3. Financial and statistical tools used in this study do have their own limitations.

4. The number of sample is small due to non-availability of continuous and complete data.

5. Sophisticated significant test could not be made to generalise the findings of the study.

Therefore, the user of the study may make use of the findings with much care and prudence. In spite of these limitations, the findings of the study are of utmost relevance both to the Industry and to outsiders. It has been rightly pointed out “Analysis is only a means and not an end to itself”.

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