Review of Literature and Methodology
Chapter -2

REVIEW OF LITERATURE AND METHODOLOGY

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2.1 Review of Literature

This part briefly reviews the studies on different aspects of financial performance connected directly and indirectly with the present study. The review of literature is highly useful to design the present study as it indicates the research gap in the study of financial performance of the cement companies. Measuring the financial performance of the corporate sector has always been an area of controversy from the point of view of the government, shareholders, investors, creditors, employees and other stakeholders. The study of financial performance has attracted the attention of many researchers and research organizations. Many studies on financial performance have been made in the past, which mainly focus on large enterprises but they do not deal with the entire aspects of the financial performance of the cement companies. Some of the important studies conducted on the financial performance are reviewed here.

Bierman and Thomas (1975) in their study have made an attempt to relate the working capital and the capital structure decisions. According to them, working capital is used not only as a cushion to avoid ruin but also to offset sales. The study has found that working capital affects the expected earnings and leads to variations in the earnings. It has been assumed that the loss of optimum level of working capital is the ruin,
which reduces equity. Given a certain level of revenues, dividends can be paid only after discharging the interest on long-term debt and reaching optimum amount of working capital.

Barthwal (1976) in his study on "The Determinants of Profitability in Indian Textile Industry" has identified the factors which cause variation in profitability. The explanatory variables used in this study are past profitability, size of the firm, age of the firm, past growth, capital output ratio and changes in average cost of production. Among them, past profitability and changes in the average cost of production over the previous years have been found to be significant determinants of profitability for the firms in the industry, in different regions of the country. The other factors like capital-output ratio, size and age of the firm and past growth have explained less than 25% of variation in the profitability.

Richard and Howard (1977) have observed that the pre-tax profit to total liabilities, current assets to total liabilities and current liabilities to total assets are the significant ratios which can explain the corporate failures more accurately than others.

Altman et al. (1977) have developed a zeta model, using financial ratios. The Multiple Discriminant Analysis is used along with linear and quadratic structure. The model discriminates the bankrupt firms from the non-bankrupt firms with 69.8% degree of accuracy, three years prior to bankruptcy.

Bhattacharya and Raghavachari (1977) have conducted a study to determine the effectiveness of working capital taking 72 large companies,
14 banks and financial institutions. The study has used 11 ratios namely, current ratio, quick ratio, average finished stock as number of days sales, average raw materials as number of days raw material consumption, average receivables as number of days sales, cash flow as percentage of sales, creditors as per cent of raw material consumed, profit after tax as per cent of sales, sales as number of times of total assets, profit after tax as per cent of total assets and debt as percent of equity.

Ramamoorthy (1978) stresses that profitability and solvency are the twin goals of working capital management. He states that the firm's survival and growth depend greatly on its ability to achieve these goals. If liquid assets can pay off the current liabilities, financial strength can be created and it can sustain its reputation.

Gupta (1979), in his work entitled "Financial Ratios as Forewarning Indicators of Sickness," has made an attempt to study 41 Indian textile companies, of which 20 are sick and 21 are non-sick companies. He has applied 63 financial ratios and concluded that 2 ratios, viz., earning before depreciation, interest and taxes to sales and operating cash flow to sales are significant.

Kulshrestha (1980)" has made a study on "Corporate Liquidity: X Rayed". He has found that excessive liquidity would reflect lower profitability and deterioration in managerial efficiency exhibited through inappropriate decisions taken in the spheres of expansion, credit policies and dividend policies.

Singh (1981) has stated that the size of the units has a significant role in the capital structure of the cement industry. He has emphasized
that increasing the size from small to big can increase the returns and profitability.

Banerjee (1982) in his study entitled "Corporate Liquidity and Profitability in India" has examined the trend of liquidity position and its association with the profitability, taking medium and large scale public limited companies from 1970-71 to 1977-78. He has found that in India, in certain industry groups, a rise in liquidity has led to a rise in profitability and vice versa, whereas in other industry groups, the association between liquidity and profitability is negative.

Myers (1984) has made a study on the debt-equity structure and he has called it the pecking order theory of capital structure. The pecking order theory has two important empirical implications: most profitable firms tend to borrow the least and less profitable firms have higher debt-equity ratio.

Sharma and Reddy (1985) have identified the factors influencing liquidity, by conducting a study on the liquidity position of Nigam Sugar Limited, during the period 1974-75 to 1981-82. They have concluded that government policy with respect to input and output has significantly affected the liquidity.

Industrial Development Bank of India Review (1984-85) on the financial performance of the companies has brought out the striking features of the cement industry during the Sixth Plan period. A significant point is the growth in the after tax profits at 33.8 per cent per annum over the Plan period. This has been attributed to the partial decontrol measures of the government with effect from February 1982. The industry has
recorded higher growth rates in gross value-added compared to the overall industry rate. Growth in net assets is also higher than industry average. Increase in long term borrowings from financial institutions is significantly higher, coupled with increase in the growth of gross fixed assets.

Pandey (1985) has conducted a study on "The Financial Leverage in India". He has found out that there is no definite structural relationship between the degree of financial leverage, profitability and growth. The study reveals that Indian companies follow a high-leverage capital structure.

Kumar (1985), in his study on "Corporate Growth and Profitability in the Large Indian Companies," has examined the relationship between profitability and growth in 83 large companies in India's corporate sector during 1968-69 to 1978-79. The study reveals the significant inter-industry differences in the growth process of firms under study. The very low value of R Square in all the cases shows that only a small fraction of the growth of firms in Indian corporate sector has been caused by profitability.

Arthur et al. (1985) in their study on "Basic Financial Management" have found that managing of firms' liquidity, investment in current assets and managing of current liabilities are the important problems of working capital management. Each of these problems is shown to involve risk return trade off. The study has revealed that investing in current assets, a firm could reduce its risk of liquidity but the lower overall rate of return on its investment would be lower. Use of
long-term sources has enhanced the firms' liquidity, reducing the rate of return on its assets.

Mukerjee (1986), in his study on "Management of Working Capital in Public Enterprises" in respect of Central Government undertakings and covering a period from 1974-75 to 1978-79, has identified that the current assets have increased due to the accumulation of inventories and current liabilities have increased due to increase in payables. The overall size of the working capital has been significantly influenced by the size of sales and output. He has found out that the working capital requirements of the units are not ascertained based on the considerations as suggested for prudent financial management. There is a negative correlation between overall profitability and size of working capital. The liquidity and profitability have a very significant negative correlation. There has been an over investment in structural determinants and huge size of working capital due to faulty financial policies of the units.

Srivastav and Yadav (1986) have developed a multivariate model to establish the determinants of effective working capital management, taking 78 companies, which include 39 sick units. A discriminant model consisting of 4 variables, namely cash flow from operations to total tangible assets, current ratio, net sales to total tangible assets and defensive assets to total operating expenses have been employed as the best discriminating function in determining the effectiveness of working capital management. In their opinion, 95% of the companies are non-effective in working capital management. The ratio of cash flow to total tangible assets is the most significant variable followed by the ratio of net
sales to total tangible assets, to classify the companies into sick and healthy with respect to working capital management.

Thomas et al. (1987), in their study titled "Empirical Measurement of Operating Leverage for Growing Units," have discussed the relationship between the degree of operating leverage and the ratios between total assets and net sales, depreciation and net sales, fixed assets and total assets and depreciation and total assets. There has been a very low degree of negative correlation between them. However, the above said ratios are not at all related to the degree of operating leverage of the selected firms.

Ganga Prasad (1987) made a detailed study on the working and management of Uttar Pradesh State Cement Corporation during 1984-85 to 1986-87. According to him, efficiency in the production front and better management practices were the reasons for the continuous success of the corporation.

Gupta (1988) analyzed the profitability of the cement industry with special reference to the cement units in Rajasthan. The study revealed that profitability of the units had been consistently good due to partial decontrol of cement.

Pramod Kumar (1988) has made an analysis of the financial statements of the cement industry in India since 1979, based on a sample of 23 cement units in the private and public sectors. The study reveals investment in the private sector has registered significant growth in sales compared to the public sector. A comparison of these sectors shows that utilization of investment in augmenting sales is better in the private
sectors than in the public sectors. The operating ratio of the industry as a whole is good. The national income generated by the industry has shown an upward trend.

Krishnan Swarup Gupta (1988), in his analysis of "Financial Statements of Indian Cement Industry: A Case Study of Associated Cement Companies," brought out the results that the rate of return on total capital employed was meagre at 4.2 per cent against the ideal rate of 18 per cent to 24 per cent. The total investment had been highly unprofitable. However, the activity and liquidity position showed significant levels. Stock turnover ratio was uniformly good. Debtors varied from 5 per cent to 8 per cent to total current assets. Credit and collection policies were effectively enforced. The percentage of equity to net fixed assets was below 45 per cent, indicating that shareholders funds were inadequate to finance fixed assets.

Chandrasekaran (1989) in his study on "Market Structure and Financial Performance of the Indian Cement Industry" discusses the significance of structural factors viz., investment, external finance, dividends and profitability and their impact on price and distribution. The study reveals that during the 70s demand had outstripped supply, which had led to a flourishing, black market. Government then had imported cement to relieve the situation. This had gone against the basic objectives of price and distribution control.

Brealey and Myers (1991) have emphasized that according to trade off theory, high profit should mean more debt servicing capacity and more taxable income to protect resulting in a higher optimal debt-equity
ratio. They have stated that the non-profitable companies with risky, intangible assets must rely primarily on equity financing.

Bhanu (1992) has made an attempt to study the capacity utilization, investment and inventory behaviour of the Indian cement industry during 1980s. She has found that underutilization of capacity is attributed to the infrastructural bottlenecks, and the effect of liberalization has diluted the investment in coal and power, which in turn has led to underutilization of capacity and deceleration in additional investment in the cement industry.

The Cement Manufacturers' Association (1993) carried out a study to compare the average cost of production of cement as on March 31, 1982 and as on 31st March 1993. It observed that the cost had gone up by a gigantic 267 per cent in the last 10 to 11 years. The input cost had increased steeply during the above period.

The Industrial Credit and Investment Corporation of India (1993) carried out a study on the cement industry and concluded that unless a bag of cement was sold at Rs.120, the industry would not have reasonable return on its investment. It has been pointed out that currently the industry is suffering from three vital factors: liquidity, growth in the market, and substantial cutback. There is a vicious circle of cost-push inflation for which the infrastructure industries in the public sector are responsible.

Harsh Dwivedi (1993) has made a detailed study on the marketing perspectives of cement in India in its wider ramifications, analyzing the stages of control, marketing practices, trends and innovation, consumer preferences and importance of management. He has observed that
existing capacities are inadequate to meet the growing demand for cement and marketing practices.

Sinha (1993) has made an attempt to investigate the debt-equity ratio of the private sector companies in India. His study shows that there is a negative correlation between the debt-equity ratio and profitability in the case of public limited companies but in the case of private limited companies, the margin on sales has a negative correlation with debt-equity ratio.

Hyderabad (1995), in his article on "Capital Structure Planning: A New Approach", has stressed on the financial risk and risk on account of non-employment of debt capital and the tradeoff between the financial risk and risk on account of non-employment of debt capital. He has concluded that the firm should arrive at a tradeoff between the two extremes and balance the financial risk and risk on account of non-employment of debt capital by minimizing the total risks/costs and follow an optimum capital structure.

Aramvalarthan (1996) in his study has applied regression analysis and operating cycle for estimating working capital requirements. In the regression analysis, he has taken inventory and sales as dependent variables. In operating cycle approach, the operating cycle is treated as a combination of period of production, period of turnover of finished goods, period of credit taken by customers and the difference between the period of turnover of raw materials and stores, and period of credit granted by suppliers.
Vijayakumar (1996) has made an attempt to assess the corporate liquidity with the help of discriminate analysis. He has observed that industries with lower current and liquid ratios are in the high-risk group and the industries with higher current and liquid ratios are in the low risk group where the standard current and liquid ratios are 2:1 and 1:1 respectively. He states that the private sector sugar mills have maintained a better liquidity position than the co-operative sugar mills.

Suresh Kataria (1996) has made an attempt to analyze the published statements of accounts of cotton textile industry in Malwa Region. The object of the study is to gain an insight into the profitability and financial position of the select cotton textile units. He has noticed that the financial strength of the sample units is weak with negatively increasing profits. Further, the fixed assets funded by owners' fund and the working capital of the units are not managed properly. He suggests that loss-making units require the judicious combination of efficient financial administration and skilful people management.

Hyderabad (1997) in his article titled "EPS Management: An Analysis" has explained that earning per share is linearly related to the amount of earning before interest and tax, amount of debt and preferred stock. An increase in these determinants increases earning per share, other things being equal. Tax rate, cost of debt and preferred stock affect earning per share negatively. All these determinants change simultaneously and in different directions. He has concluded that this analysis helps in mitigating the effects of adverse changes.
Beaumont Smith and Begemann (1997) have made a study to measure the association between working capital and return on investment and to find out whether the more recently developed alternate working capital measures show improved association with return on investment to that of traditional working capital ratios. The firms listed on Johannesburg Stock Exchange are considered for study. Chi-square test and step-wise regression analyses have been applied. It is observed that the traditional working capital leverage measure of total current liabilities divided by fund flow accounted have greatest association with return on investment.

Hyun Han Shin and Luc Soenen (1998) in their study entitled "Efficiency of Working Capital Management and Corporate Profitability" of 58,985 firms, covering the period of 1975-1994, on a composite sample, have identified that there is a strong negative relationship between the length of the firm's net trade cycle and its profitability. In addition, shorter net trade cycles are associated with higher risk adjusted stock returns. They have noticed that the net trade cycle measures liquidity differently from the conventional current ratio, which is positively related to profitability.

Jane Cote et al. (1999) have stated that lack of attention to the working capital management would ultimately contribute to the demise of a once profitable organization. Failure to manage cash conversion cycle will cause a firm's demise, though the traditional liquidity ranges are within the acceptable ranges during the period. They have brought the effects of the current assets and current liabilities accounts into a single
merchandising ratio, which provides a measure of the net effect of a firm's working capital management strategy. Merchandising ratio, according to them, is a composite of the three turnover ratios, which is computed, as merchandising ratio is the sum of average receivables turnover, inventory turnover, and average payable turnover, which can also be expressed in days. They suggest that the analysis of the trends in merchandising ratio will discriminate clues about changes in strategy or managerial skill.

Carol Lancaster et al. (1999) have analyzed the incremental explanatory power of cash flow over the accrual income in explaining differences in measures of liquidity, for a large sample of firms. They have examined that relationship between the cash flow, accrual income and liquidity are sensitive to the sample period and the measure of liquidity. According to them, cash flow has significant incremental explanatory power over accrual income when a more recent period is analyzed and when the cash conversion cycle is used as an alternative measure of liquidity. The sample of 417 firms include 253 firms from manufacturing, 55 firms from retail/wholesale, 45 firms from services, 2 firms from professional services, 15 firms from natural resources, 4 firms from construction and 2 firms from financial services. They suggest that industry differences exist in relationships between liquidity, accrual income and cash flow.

Germain Beer (1999) in his article on "Managing the Cash Gap" has emphasized the fact that cash gap affects profits directly as it has cost of financing which should be kept at low level. Stretching out payment term
on purchases for inventory, shortening the collection period and increasing the inventory turnover can shrink the cash gap.

Sakthivel Murugan (1999) has made an attempt to identify the indicators for the efficient management of working capital. He has seen that one of the several indicators of efficient management of working capital is maintenance of adequate liquidity. The Z test used in this study reveals that any organization maintains above 3 points for all the years taken for the study. He has concluded that the company is maintaining adequate working capital by investing sufficient funds in its current assets and it is able to meet the current obligations without inviting the risk of bankruptcy.

Siddhanti (1999) has studied the financial health of Indian Farmers Fertilizers Corporation (IFFCO) using Z score analysis. He has observed that the financial health of the IFFCO was excellent during the year 1992-93 while in the rest of the period it was not satisfactory since Z scoring had declined from 2.72 to 1.74. The most discriminatory variable of financial performance is the ratio of earnings before interest and tax to total assets. He has concluded that the overall performance of the IFFCO is quite satisfactory but has shown aggressive financial results in the absence of subsidy factor.

Desai (2000) has studied the capital structure and the causes for business failure. The study reveals that sickness might have been caused by non-accounting factors. There is no single non-accounting factor responsible for sickness. The financial and accounting factors can be broadly stated as causing sickness; the company has earned inadequate
returns on total assets, which are correlated, to the overcapitalized financial plan. The financial institutions have not granted funds to the company on the ground of declining operations found from its annual published accounts.

Sahu (2000) in his study on "Analysis of Corporate Profitability: A Multivariate Approach" has made an empirical analysis based on the secondary data from a sample of 100 non-financial non-government public limited companies, in Eastern India, for a period of ten years from 1984-85 to 1993-94. He has chosen profitability ratios and interest coverage ratio for the analysis. Cross sectional Spearman's rank correlation of the profitability ratios for all the companies have been calculated and applied for selecting the ratios for analysis. He has arrived at a single index to measure the composite profitability of a firm and ranked the companies based on the overall score.

Hrishikes Bhattacharya (2001) has made an attempt to capture the essence of natural business year and translated it into operating cycle. He is of the opinion that if the company could manage to obtain credit from its suppliers equal to or more than 158 days, which is sometimes possible in Indian conditions and, when a unit has become financially sick and is unable to pay the creditors, then the company would have zero or negative operating cycle which betrays the concept of operating cycle because in such cases, all the current items would either mature on 'Zero' days or on 'negative' days. According to him, if logical natural business year is followed, then the true operating cycle of a business should be either the days of current assets or current liabilities, whichever is higher.
Ganesan (2001) has selected State Bank of India Group and 19 nationalized banks as sample to identify the determinants of profits and profitability. The empirical examination of profit function shows that interest cost, interest income, other income, deposit per branch, credit to total assets, proportion of priority sector advances and interest income loss are the significant determinants of profits and profitability of Indian public sector banks. The study has identified that banking sector reforms and individual banks policies towards direct investment and direct credit programmes have played a significant role in improving the profitability of the banking sector.

Shanmugam and Poornima (2001) have studied the crucial role of working capital in the success of a business firm. The top management of a firm spends most of the time on working capital management. In most of the firms, the market for raw material as well as the finished product is a key factor in determining the working capital requirements. Budgetary control is widely used to control working capital. They have found that the main form of working capital finance is cash credit.

Navdeep Agarwal and Singla (2001) have developed a single index for the appraisal of financial performance. They have analyzed eleven ratios in distinguishing profit making and loss making units. Only four ratios, namely, net profit to assets, interest coverage ratio, earning per share ratio and inventory turnover ratio are significant as the discriminatory variables.

Mahesh et al. (2002) have studied the determinants of capital structure in India. The study reveals that assets composition, collateral
value of assets, life of the company and the corporate size have significantly influenced the capital structure whereas the business risk is found to be insignificant in deciding the leverage of the firm. Asset composition is significantly and positively related to the debt-equity ratio in cotton and engineering industries and negatively related to chemical, pharmaceuticals and cement industries. Life of the company is, all the more, positively related to the long-term debt-equity ratio of cotton, chemicals, pharmaceuticals and cement industries. Business risk is statistically significant in the positive direction in engineering industry only with long-term debt-equity ratio.

Sankaran and Krishnaveni (2003) have studied the funds management of select spinning mills in Gujarat. The objective of their study is to analyze the long-term and short-term funds position of the 30 spinning mills selected for their study. They have collected data from the published financial accounts of the mills for a period of 10 years from 1990-91 to 1999-2000. They have observed that continued erosion of profit leads to increased borrowings of the mills which have resulted in liquidity problem and then have led to desperate high-cost borrowing in order to keep the unit running somehow.

Achilleas Zapranis et al. (2006), through their study on "Forecasting Corporate Failure with Neural Network Approach: The Greek Case," have stated that the recent developments in the field of non-parametric statistical analysis have established neural networks as an efficient approach to identify the complicated relationships in multidimensional data sets, without making a prior assumption regarding
the nature of these relationships. They have contrasted the neural networks approach with multivariate discriminate analysis in predicting corporate failure in Greece. They have seen that neural networks outperform the linear approach, within the sample average classification rate of 95%. The equivalent in sample figure for multivariate discriminate analysis is 86.5% and the increased classification rates of neural models can be attributed to their improved ability to classify correctly the problematic firm. The most important variables in the neural network model appear to be current asset/total assets, cash and cash equivalent/current assets and total debt/stock holders' equity.

The above reviews show that there have been studies on the financial performance of public or private companies. The earlier studies on cement companies have taken a few aspects of the financial performance. Hence, a more comprehensive study is felt essential. With this background, the present study makes an attempt to fill a gap in the available research studies in the area of financial performance of cement units.

Sagan in his paper (1955), perhaps the first theoretical paper on the theory of working capital management, emphasized the need for management of working capital accounts and warned that it could vitally affect the health of the company. He realized the need to build up a theory of working capital management. He discussed mainly the role and functions of money manager inefficient working capital management. Sagan pointed out the money manager’s operations were primarily in the area of cash flows generated in the course of business transactions.
However, money manager must be familiar with what is being done with the control of inventories, receivables and payables because all these accounts affect cash position. Thus, Sagan concentrated mainly on cash component of working capital. Sagan indicated that the task of money manager was to provide funds as and when needed and to invest temporarily surplus funds as profitably as possible in view of his particular requirements of safety and liquidity of funds by examining the risk and return of various investment opportunities. He suggested that money manager should take his decisions on the basis of cash budget and total current assets position rather than on the basis of traditional working capital ratios. This is important because efficient money manager can avoid borrowing from outside even when his net working capital position is low. The study pointed out that there was a need to improve the collection of funds but it remained silent about the method of doing it.

Walker in his study (1964) made a pioneering effort to develop a theory of working capital management by empirically testing, though partially, three propositions based on risk-return trade-off of working capital management. Walker studied the effect of the change in the level of working capital on the rate of return in nine industries for the year 1961 and found the relationship between the level of working capital and the rate of return to be negative. On the basis of this observation, Walker formulated three following propositions:

Proposition I— If the amount of working capital is to fixed capital, the amount of risk the firm assumes is also varied and the opportunities for gain or loss are increased.
Walker further stated that if a firm wished to reduce its risk to the minimum, it should employ only equity capital for financing of working capital; however by doing so, the firm reduced its opportunities for higher gains on equity capital as it would not be taking advantage of leverage. In fact, the problem is not whether to use debt capital but how much debt capital to use, which would depend on management attitude towards risk and return. On the basis of this, he developed his second proposition.

Proposition II— The type of capital (debt or equity) used to finance working capital directly affects the amount of risk that a firm assumes as well as the opportunities for gain or loss.

Walker again suggested that not only the debt-equity ratio, but also the maturity period of debt would affect the risk-return trade-off. The longer the period of debt, the lower be the risk. For, management would have enough opportunity to acquire funds from operations to meet the debt obligations. But at the same time, long-term debt is costlier. On the basis of this, he developed his third proposition:

Proposition III— The greater the disparity between the maturities of a firm’s debt instruments and its flow of internally generated funds, the greater the risk and vice-versa.

Thus, Walker tried to build-up a theory of working capital management by developing three prepositions. However, Walker tested empirically the first proposition only. Walker’s Study would have been more useful — had he attempted to test all the three propositions.

Weston and Brigham (1972) further extended the second proposition suggested by Walker by dividing debt into long-term debt
and short-term debt. They suggested that short-term debt should be used in place of long-term debt whenever their use would lower the average cost of capital to the firm. They suggested that a business would hold short-term marketable securities only if there were excess funds after meeting short-term debt obligations. They further suggested that current assets holding should be expanded to the point where marginal returns on increase in these assets would just equal the cost of capital required to finance such increases.

Van horn in his study (1969), recognizing working capital management as an area largely lacking in theoretical perspective, attempted to develop a framework in terms of probabilistic cash budget for evaluating decisions concerning the level of liquid assets and the maturity composition of debt involving risk-return trade-off. He proposed calculation of different forecasted liquid asset requirements along with their subjective probabilities under different possible assumptions of sales, receivables, payables and other related receipts and disbursements. He suggested preparing a schedule showing, under each alternative of debt maturity, probability distributions of liquid asset balances for future periods, opportunity cost, maximum probability of running out of cash and number of future periods in which there was a chance of cash stock-out. Once the risk and opportunity cost for different alternatives were estimated, the form could determine the best alternative by balancing the risk of running out of cash against the cost of providing a solution to avoid such a possibility depending on management’s risk tolerance limits. Thus, Vanhorne study presented a risk-return trade-off of working capital
management in entirely new perspective by considering some of the variables probabilistically. However, the usefulness of the framework suggested by Van horn is limited because of the difficulties in obtaining information about the probability distributions of liquid-asset balances, the opportunity cost and the probability of running out of cash for different alternative of debt maturities.

Welter, in his study (1970), stated that working capital originated because of the global delay between the moment expenditure for purchase of raw material was made and the moment when payments were received for the sale of finished product. Delay centers are located throughout the production and marketing functions. The study requires specifying the delay centers and working capital tied up in each delay centre with the help of information regarding average delay and added value. He recognized that by more rapid and precise information through computers and improved professional ability of management, saving through reduction of working capital could be possible by reducing the length of global delay by rescuing and/or favorable redistribution of this global delay among the different delay centers. However, better information and improved staff involve cost. Therefore, savings through reduction of working capital should be tried till these saving are greater or equal to the cost of these savings. Thus, this study is concerned only with return aspect of working capital management ignoring risk. Enterprises, following this approach, can adversely affect its short-term liquidity position in an attempt to achieve saving through reduction of working capital. Thus, firms should be conscious of the effect of law
current assets on its ability to pay-off current liabilities. Moreover, this approach concentrated only on total amount of current assets ignoring the interactions between current assets and current liabilities.

Lambrix and Singhvi (1979) adopting the working capital cycle approach to the working capital management, also suggested that investment in working capital could be optimized and cash flows could be improved by reducing the time frame of the physical flow from receipt of raw material to shipment of finished goods, i.e. inventory management, and by improving the terms on which firm sells goods as well as receipt of cash.

However, the further suggested that working capital investment could be optimized also (1) by improving the terms on which firms bought goods i.e. creditors and payment of cash, and (2) by eliminating the administrative delays i.e. the deficiencies of paper-work flow which tended to extend the time-frame of the movement of goods and cash.

Warren and Shelton (1971) applied financial simulation to simulate future financial statements of a firm, based on a set of simultaneous equations. Financial simulation approach makes it possible to incorporate both the uncertainty of the future and the many interrelationships between current assets, current liabilities and other balance sheet accounts. The strength of simulation as a tool of analysis is that it permits the financial manager to incorporate in his planning both the most likely value of an activity and the margin of error associated with this estimate. Warren and Shelton presented a model in which twenty simultaneous equations were used to forecast future balance sheet of the firm including forecasted
current assets and forecasted current liabilities. Current assets and current liabilities were forecasted in aggregate by directly relating to firm sales. However, individual working capital accounts can also be forecasted in a larger simulation system.

Moreover, future financial statements can be simulated over a range of different assumptions to portray inherent uncertainty of the future.

Cohn and Pringle in their study (1973) illustrated the extension of Capital Asset Pricing Model (CAPM) for working capital management decisions. They tried to inter-relate long-term investment and financing decisions and working capital management decisions through CAPM. They emphasized that an active working capital management policy based on CAPM could be employed to keep the firm’s shares in a given risk class. By risk, he meant unsystematic risk, the only risk deemed relevant by CAPM. Owing to the lumpy nature for long-term financial decisions, the firm is continually subject to shifts in the risk of its equity. The fluid nature of working capital, on the other hand, can be exploited so as to offset or moderate such swings. For example they suggested that a policy using CAPM could be adopted for the management of marketable securities portfolio such that the appropriate risk level at any point in time was that which maintains the risk of the company’s common stock at a constant level. Similarly,

Copeland and Khoury (1980) applied CAPM to develop a theory of credit expansion. They argued that credit should be extended only if
the expected rate of return on credit is greater than or equal to market
determined required rate of return.

They used CAPM to determine the required rate of return for the
firm with its new risk, arising from uncertainty regarding collection due
to the extension of credit. Thus, these studies show how CAPM can be
used for decisions involved in working capital management. One more
approach, used mainly in empirical studies, towards working capital
management has been to apply regression analysis to determine the
factors influencing investment in working capital. Different studies in the
past have considered different explanatory variables to explain the
investment in inventory. A brief review of these studies is important as
regression equation of investment in working capital, in the present study,
would be formulated on the basis of works on investment in inventory.

In inventory investment literature, there is basically one school of
thought according to which firms aim at an optimum or desired stock of
inventories in relation to a given level of output/sales. This is known as
acceleration principle.

Pioneering work in this field has been done by Metzler (1941). However, his work was mainly on simple acceleration principle which
postulated that firms liked to maintain inventories in proportions to
output/sales and they succeeded in achieving the desired level of
inventories in a unit time period. That is to say, any discrepancy between
the actual level and desired level of inventories is adjusted within the
same time-period. Needless to say, that such an instantaneous adjustment
is not a realistic assumption to make. Modifications, therefore, have been introduced in the literature to provide for partial adjustment.

Goodwin (1948) assumed that firms attempted only a partial adjustment of the discrepancy between the desired stocks as determined by the level of output and the existing stock. Similarly, Darling and Lovell (1965) modified Metzler’s formulation based on simple acceleration principle and obtained, the relationship based on flexible accelerator principle. There are several reasons physical, financial and technical those motivate partial adjustment. Among the physical factors, mention may be made of procurement lags between orders and deliveries. The length of such lags is connected with the source of supply, foreign or domestic availability. Import licensing procedures on account of foreign exchange scarcity could cause further delays in adjustment. Among the financial factors, cost advantages associated with bulk buying and higher procurement costs for speedy delivery are also mentioned. Uncertainties in the market for raw materials and in the demand for final product also play a role in influencing the speed of adjustment.

Technically, firms like to make sure those changes in demand are of a permanent character before making full adjustment. The acceleration principle has great relevance in inventory analysis than in the analysis of fixed investment, as there are limits to liquidate fixed capital in the face of declining demand. Other variables influencing inventories have been introduced in the literature in the context of accelerator model.

Rate of interest is used as a proxy for the opportunity cost of carrying stocks or as a measure of the cost of funds needed to hold
inventories. It has been found significant in the studies of Hilton (1976) and Irwin (1981). Time-trend is expected to be important because inventories generally accumulate with the expansion of economic activities of the company. Anticipated price changes, measured by changes in wholesale price index of inventories, are taken as an explanatory variable to capture speculative element in inventory. This suggests a positive relationship between price changes and inventory. An increase in sales is expected to increase the demand for stocks to meet orders regularly. An increase in capacity utilization is also expected to increase the demand for stock by increasing the demand for raw materials and increasing the inventories of finished goods. Thus, the variable, capacity utilization, is postulated to have a positive coefficient in the equation.

Abramovitz (1950) and Modigliani (1957) highlighted the impact of capacity utilization on inventory investment. Existing stock of inventories is expected to take account of adjustment process to the desired levels. Thus the variable, existing stock of inventories, is postulated to be negatively related with the desired stock. The ratio of inventory to sales may affect inventory investment positively because a high ratio of stocks to sales in the past suggests the maintenance of high level of inventories in the past and thus also calling for high investment in inventories in the current period.

The studies of Metzler (1941) and Hilton (1976) have found this variable, inventory-sales ratio, to be statistically significant. Fixed investment is generally expected to affect inventory investment inversely
because of competing demand for the limited funds. However, in case of an expanding firm, the two components may be complementary. Besides, availability of funds from retained earnings and external sources, may affect investment decision by providing funds for financing inventory investment. Therefore, retained earnings and flow of debt are postulated to have positive coefficients.

The studies described so far, are the important studies conducted abroad. A number of studies on working capital management have been conducted in India also. The following discussion describes Indian studies. Studies on Working Capital Management in India this part briefly reviews the studies conducted in India in respect of working capital management in Indian industries.

The first, small but fine piece of work is the study conducted by National Council of Applied Economic Research (NCAER) in 1966 with reference to working capital management in three industries namely cement, fertilizer and sugar. This was the first study on nature and norms of working capital management in countries with ‘scarcity of investible resources’. This study was mainly devoted to the ratio analysis of composition, utilization and financing of working capital for the period 1959 to 1963. This study classified these three industries into private and public sector for comparing their performance as regards the working capital management. The study revealed that inventory constituted a major portion of working capital i.e. 74.06 per cent in the sugar industry followed by cement industry (63.1%) and fertilizer industry (59.58%). The study observed that the control of inventory had not received proper
attention. The inventory control was mainly confirmed to materials management leading to the neglect of stores and spares. So far as the utilization of working capital was concerned, cement and fertilizer industry had a more efficient utilization of working capital. The sugar industry had inefficient utilization of working capital largely due to the accumulation of stock with the factories. As regards financing of working capital, the study showed that internal sources had contributed very little towards the financing of working capital. It was 11.87 per cent in the cement industry, 15.03 per cent in sugar and 31.25 per cent in fertilizer industry, 17.78 per cent being the average. However, this study failed to put into sharp focus the various problems involved in the management of specific working capital accounts.

Appavadhanulu (1971) recognizing the lack of attention being given to investment in working capital, analysed working capital management by examining the impact of method of production on investment in working capital. He emphasized that different production techniques require different amount of working capital by affecting goods-in-process because different techniques have differences in the length of production period, the rate of output flow per unit of time and time pattern of value addition. Different techniques would also affect the stock of raw materials and finished goods, by affecting lead-time, optimum lot size and marketing lag of output disposals. He, therefore, hypothesized that choice of production technique could reduce the working capital needs. He estimated the ratio of work-in-progress and working capital to gross output and net output in textile weaving done
during 1960, on the basis of detailed discussions with the producers and not on the basis of balance sheets which might include speculative figures. His study could not show significant relationship between choice of technique and working capital. However, he pointed out that the idea could be tested in some other industries like machine tools, ship building etc. by taking more appropriate ratios representing production technique correctly.

Chakra-borty (1973) approached working capital as a segment of capital employed rather than a mere cover for creditors. He emphasized that working capital is the fund to pay all the operating expenses of running a business. He pointed out that return on capital employed, an aggregate measure of overall efficiency in running a business, would be adversely affected by excessive working capital. Similarly, too little working capital might reduce the earning capacity of the fixed capital employed over the succeeding periods. For knowing the appropriateness of working capital amount, he applied Operating Cycle (OC) Concept. He calculated required cash working capital by applying OC concept and compared it with cash from balance sheet data to find out the adequacy of working capital in Union Carbide Ltd. and Madura Mills Co. Ltd. for the years 1970 and 1971. He extended the analysis to four companies over the period 1965-69 in 1974 study. The study revealed that cash working capital requirement were less than average working capital as per balance sheet for Hindustan Lever Ltd. and Guest, Keen and Williams Ltd. indicating the need for effective management of current assets. Cash working capital requirements of Dunlop and Madura Mills were more
than average balance sheet working capital for all years efficient employment of resources. For Union Carbide Ltd., cash working capital requirements were more in beginning years and then started reducing in the later years as compared to conventional working capital indicating the attempts to better manage the working capital. Chakraborty emphasized the usefulness of OC concept in the determination of future cash requirements on the basis of estimated sales and costs by internal staff of the firm. OC concept can also be successfully employed by banks to assess the working capital needs of the borrowers.

Misra (1975) studied the problems of working capital with special reference to six selected public sector undertakings in India over the period 1960-61 to 1967-68. Analysis of financial ratios and responses to a questionnaire revealed somewhat the same results as those of NCAER study with respect to composition and utilization of working capital. In all the selected enterprises, inventory constituted the more important element of working capital. The study further revealed the overstocking of inventory in regard to its each component, very low receivables turnover and more cash than warranted by operational requirements and thus total mismanagement of working capital in public sector undertakings.

Agarwal (1983) also studied working capital management on the basis of sample of 34 large manufacturing and trading public limited companies in ten industries in private sector for the period 1966-67 to 1976-77. Applying the same techniques of ratio analysis, responses to questionnaire and interview, the study concluded the although the
working capital per rupee of sales showed a declining trend over the years but still there appeared a sufficient scope for reduction in investment in almost all the segments of working capital. An upward trend in cash to current assets ratio and a downward trend in cash turnover showed the accumulation of idle cash in these industries. Almost all the industries had overstocking of raw materials shown by increase in the share of raw material to total inventory while share of semi-finished and finished goods came down. It also revealed that long-term funds as a percentage of total working capital registered an upward trend, which was mainly due to restricted flow of bank credit to the industries.

Kamta Prasad Singh, Anil Kumar Sinha and Subas Chandra Singh (1986) examined various aspects of working capital management in fertilizer industry in India during the period 1978-79 to 1982-93. Sample included public sector unit, Fertilizer Corporation of India Ltd. (FCI) and its daughter units namely Hindustan Fertilizers Corporation Ltd., the National Fertilizer Ltd., Rashtriya Chemicals and Fertilizers Ltd. And Fertilizer (Projects and Development) India Ltd. And comparing their working capital management results with Gujarat State Fertilizer Company Limited in joint sector. On the basis of ratio-analysis and responses to a questionnaire, study revealed that inefficient management of working capital was to a great extent responsible for the losses incurred by the FCI and its daughter units, as turnover of its current assets had been low. FCI and its daughter units had high overstocking of inventory in respect of each of its components particularly stores and spares. Similarly, quantum of receivables had been excessive and their
turnover very low. However, cash and liquid resources held by FCI and its daughter units had been much lower in relation to operation requirements. So far as financing of working capital was concerned, long-term funds had been financing a low proportion of current assets due to rapid increase of current liabilities. The profitability providing an internal base for financing of working capital had been very low in these undertakings.

Verma (1989) evaluated working capital management in iron and steel industry by taking a sample of selected units in both private and public sectors over the period 1978-79 to 1985-86. Sample included Tata Iron and Steel Company Ltd. (TISCO) in private sector and Steel Authority of India Ltd. (SAIL) and Indian Iron and Steel Company, a wholly owned subsidiary of SAIL, in public sector. By using the techniques of ratio analysis, growth rates and simple linear regression analysis, the study revealed that private sector had certainly an edge over public sector in respect of working capital management. Simple regression results revealed that working capital and sales were functionally related concepts. The study further showed that all the firms in the industry had made excessive use of bank borrowings to meet their working capital requirement vis-à-vis the norms suggested by Tandon Committee.

Vijay-Kumar and Venkatachalam (1995) studied the impact of working capital on profitability in sugar industry in Gujarat by selecting a sample of 13 companies; 6 companies in co-operative sector and 7 companies in private sector over the period 1982-83 to 1991-92. They
applied simple correlation and multiple regression analysis on working capital and profitability ratios. They concluded through correlation and regression analysis that liquid ratio inventory turnover ratio, receivables turnover ratio and cash turnover ratio influenced the profitability of sugar industry in Gujarat.

They also estimated the demand functions of working capital and its components i.e. cash, receivables, inventory, gross working capital and net working capital, by applying regression analysis. They showed the impact of sales and interest rate on working capital and its components. When only sales was taken as independent variable, coefficient of sales was more than unity in all the equations of working capital and its components showing more than unity sales elasticity and diseconomies of scale. When sales and interest rate were taken as independent variable, sales elasticity was again more than unity in demand functions of working capital and its components except cash. So far as capital costs were concerned, these had negative signs in all the equations but significant only in inventory, gross working capital and net working capital showing negative impact of interest rates on investment in working capital and its components. Thus study showed that demand for working capital and its components was a function of both sales and carrying costs.

Studies on Determinants of Inventory Investment Inventory, in most industries, accounts for largest proportion of gross working capital. A number of studies, therefore, have been conducted to find the determinants of investment in inventories. The following discussion
provides a brief review of studies, dealing with factors influencing investments in inventory in India.

Econometric studies to analyze the factors that influence inventory accumulation in India are based on time series and pooling of cross section of time series date pertaining to manufacturers’ inventories.

Krishnamurthy’s study (1964) was aggregative and dealt with inventories in the private sector of the Indian Economy as a whole for the period 1948-61. This study used sales to represent demand for the product and suggested the importance of accelerator. Short-term rate of interest had also been found to be significant.

Sastry’s study (1966) was a cross section analysis of total inventories of companies across several heterogeneous industries for the period 1955-60 using balance sheet data of public limited companies in the private sector. The study brought out the importance of accelerator represented by change in sales. It also showed negative influence of fixed inventory investment.

Krishnamurty and Sastry’s study in 1970 was perhaps the most comprehensive study on manufacturer’s inventories. They used CMI data and the consolidated balance sheet data of public limited companies published by RBI, to analyze each of the major components i.e. raw material, goods-in-process and finished goods for 21 industries over the period 1946-62. It was a time series study but some inter-industry cross section analysis had also been done. Accelerator represented by change in sales, bank finance and short-term interest rate were found to be important determinants. Utilization of productive capacity and price
anticipations had been found to be of some relevance. Another study conducted by them in 1975 analyzed inventory investment in the context of flexible accelerator with financial variables. Both RBI and Stock Exchange, Official Directory, Mumbai data for seven important industries had been taken for the period of 1956-69. Their study of pooled cross section was in current prices whereas time series analysis based on RBI data was a constant prices. OLS results showed the important influence of accelerator, internal and external funds flow and fixed investment on inventory investment.

The study by Vinod Prakash (1970) was a time series analysis with mostly un-deflated data taken from CMI and Annual Survey of Industries (ASI) for the period 1946-63. It examined the influence of structural changes in manufacturing activity on the relative size and composition of inventory in the large scale-manufacturing sector in India. Three different models for industry groups and for six important individual industries had been tried. Output/sales, capacity utilization, short-term rate of interest, money supply, foreign exchange availability, price index, size and time trend were taken as explanatory variable. The simple accelerator model with output gave better results for industrial groups, whereas the ratio model seemed to perform better in the analysis of individual industry. The flexible accelerator models were found to be inferior. The impact of price index was found to be generally insignificant, while the impact of foreign exchange and money supply was absent. The rate of interest showed a perverse impact. Time trend appeared to be important than the
size of establishment. The role of availability of funds was completely ignored in this study.

The study by George (1972) was cross section analysis of balance sheet data of 52 public limited companies for the period 1967-70. Accelerator, internal and external finance variables were considered in the equations for raw materials including goods-in-process and total inventories. However, equations for finished goods inventories considered only output variable. Accelerator and external finance variables were found to be important.

The analysis by Seamy and Rao (1975) of the flow of funds of public limited companies had an equation for aggregate inventory investment. RBI data for the period 1954-70 had been used. The explanatory variables considered were accelerator, flow of bank borrowings, an index of man-days lost, capacity by the call rate. Accelerator, bank finance and fixed investment were found to be significant.

The study by R. N. Agarwal (1982) estimated total inventory investment equation for individual firms in automobile manufacturing industry, which was divided into two sectors—car-sector and non car-sector. His study was based on the data for 1959-60 through 1978-79. Official Directory of Mumbai Stock Exchange had been the basic source of data. Analysis of two sector revealed that sales and stock sales ratio were important explanatory variables. Cost of capital and trend were important in only car sector while fixed investment and flows of external funds were significant in non car sector. Existing stock of inventories was
statistically significant in both the sector but contrary to expectations, it possessed negative coefficient. Several other variables as dividends, capacity utilization and liquidity ratio were found to be of no importance in explaining inventory investment behaviour.

N.C. Gupta study (1987) examined the determinants of total inventory investment in aluminum and non-ferrous semi firms in private sector. The data had been taken from Stock Exchange, Official Directory, Mumbai for 9 years 1966-67 to 1974-75. variables considered were current sales change, one-lagged sales change, inventory stock at the beginning, gross fixed investment during the year, flow of net debt (external finance) and profits net of dividends and taxes but gross of depreciation provision (retained earnings or internal finance). The equation also provided for firm dummies and year dummies. Analysis was based on pooling of time series of cross section data. Demand factor and external finance turned out to be significant determinants in aluminum. Both retained earnings and external finance were important determinants in case of non-ferrous semis. Competition for investment funds between fixed and inventory investment was suggested both in aluminum and non-ferrous semis.

Adesh Sharma (1994) applied accelerator model with financial variables to determine the factors influencing investment in inventories in pesticides industry in India. Data had been taken form the Stock Exchange Official Directory, Mumbai for the period 1978-1992 in respect of 18 firms in this industry. The coefficients of the accelerator and
financial variables were found to be significant and positive. The coefficient of inventory of inventory stock was significant and negative.

The above brief review of studies in Indian context shows that no attempt has been made to analyze working capital management in Hotel industry in India. Secondly, there have been many studies exploring the determinants of inventory investment; no attempt has been made to study the factors influencing investment in total working capital. On the basis of previous studies, the present study aims at filling both these gaps.

2.2 Statement of the Problem

Limestone, coal, freight, electricity and furnace oil are the major cost factors. As per standard input-output norms, to produce one ton of cement, 1.5 tons of limestone, 0.25 ton of coal, 120 kw of power and 0.05 ton of gypsum are required. As far as limestone is concerned, the major cost is the royalty paid to the Central government and cess levies on royalties charged by the State governments. Coal and oil constitute around 35-40 per cent of the production cost of cement. India's coal has low calorific value and high ash content. As the cost per calorie of imported coal compares favourably with domestic coal, the industry also resorts to import.

Cement is power-intensive industry, accounting for nearly 16% of the operating costs. As state governments usually supply power, the tariff varies from State to State and location to location. The cement sector accounts for 10.3% of total fuel costs in the manufacturing sector. Within the group of energy-intensive industries, the sector, therefore, holds the
lead in energy intensity measured as the nominal value of fuels consumed compared to the nominal value of output. Due to a high frequency of power failures, shortage of coal, limited availability of furnace oil, etc., the capacity utilization has decreased steadily in recent years.

With freight costs at 15 per cent of the total cost, cement plants are ideally located closer to the limestone quarries. However, this results in substantial difference in prices within the country. Inclusive of freight costs, the selling and administrative expenses of the industry are relatively high at 24 per cent of the total operating costs. Spiraling fuel prices and the resulting increase in freight charges is one of them. As the cement industry is highly capital-intensive, leading players have leveraged on their balance sheets and have huge loan exposure. On cost front, there has been 10-45 per cent rise in the spot road freight rates, depending on the locations. Increased cost of production and availability constraints of raw material have led to underutilization of installed capacity and ultimately dampened the level of production and operating profit.

In spite of the fact that the macro level scenario of cement industry is very bright and promising, Industry circle raises hues and cries about the fall in operating profit over the years. Fall in the level of operating profit will affect, the working capital position as operating profit is a major source of working capital which ultimately threatens the short term solvency and the interest cover and ultimately shaken the long term solvency.
It is necessary to keep the cement industry going since lakhs of people directly depend on it. As the cement industry has become economically important and politically sensitive, the government has taken upon itself the responsibility of supplying buyers at reasonable prices. Better cost control, lowering debt-equity ratio caused by funding of acquisitions and Greenfield projects primarily through borrowings and better capacity utilization are critical success factors. Nevertheless, with robust increase in domestic demand, coupled with improved prospects of cement and clinker exports, the industry's fundamentals remain strong. The cement industry has been gradually witnessing improvement in realizations. Coupled with volume growth in the domestic markets, this should lead to improved margins. High frequency of power failures, shortage of coal, limited availability of furnace oil, problems of transportation, stiff competition, and higher cost of production are the problems faced by the cement industry, and these problems have significant effect on its financial performance. With this backdrop the researcher is interested in making an in-depth study on the capital structure of cement manufacturing companies. At the macro level, the cement industry is often characterized by the ever escalating cost of production and underutilization of installed capacity ultimately affecting its profitability and short-term & long-term solvency. Hence an attempt is made to study the capital structure of a few cement units at micro level, over a period of 5 years and to suggest measures to tackle the improve their profitability and short-term & long-term solvency.
The research problem is identifying in to following words.
"Analysis of Capital Structure of Cement Industry of Gujarat"

2.3 Objectives of the Study

The broad objective of this study is to probe into the capital structure of select cement units, with particular reference to their profitability, short term and long term solvency. The following are the specific objectives:

1. To study the Impact of Capital structure of sample units with respect to their:
   a) Short term solvency;
   b) Long term solvency and
   c) Profitability

2. To make inter-firm comparison of Profitability and short-term & long-term solvency of select units.

3. To suggest suitable measures to improve the Profitability and short-term & long-term solvency of the select cement companies in Gujarat.

4. To analyze the capital structure pattern.

2.4 Testing of Hypothesis

With a view to make the inter-firm comparison of profitability and short-term & long-term solvency of select units the following null hypotheses were made and the validity was tested by using F test.
1. There is no significant difference in the liquidity ratios among the select cement companies.

2. There is no significant difference in the long-term solvency ratios among the select cement companies.

3. There is no significant difference in the profitability ratios among the select cement companies.

2.5 Operational Definitions

Growth Rate

Growth rates are calculated as annual averages and represented as percentages. Except where noted, growth rates of values are computed from constant price series.

Annual Growth Rate

The annual growth rate measures the growth of the time series data in terms of percentage. AGR gives the percent growth achieved on average per year during the study period.

Linear Annual Growth Rate

Linear annual growth rate assumes linear trend in the time series data. It is also measured in terms of percentage. It estimates what would be the expected growth on average each year, if the linear trend is assumed.

Compounded Annual Growth Rate

The compound annual growth rate (CAGR) measures the annual change in earnings, an investment, or some other financial amount. The compound annual growth rate assumes that the initial amount grows at
the same rate every year. The compound annual growth rate also assumes each annual increment compounds during the period measured.

**Trend Analysis**

The analysis of a variable's past value changes to determine if a trend exists and, if so, what the trend indicates.

**Financial Performance**

Financial performance refers to the present state of the select cement companies with respect to liquidity, long-term solvency, activity and profitability.

**Liquidity**

Liquidity refers to the ability of the select cement companies to meet their current obligations as and when these become due.

**Long term Solvency**

The term "long term solvency" refers to the ability of the select cement companies to meet their long-term obligations.

**Activity**

Activity is the effectiveness with which the select cement companies manage their resources. It is also called "turnover," because it indicates the speed with which assets are turned over into sales.

**Profitability**

It refers to the ability of the select cement companies in making profits in relation to the capital employed and sales.
2.6 Accounting methods and statistical methods

The following accounting methods and statistical methods has been used in to the study.

**Accounting methods**

1. Ratio analysis
2. General statements
3. Attribute

**Statistical methods**

1. Average
2. F test(ANOVA)
3. Correlation

2.7 Scope of the Study

This study has been undertaken to assess the capital structure of the select cement companies namely, Gujarat Ambuja Cements (Kodinar), Gujarat Siddhi Cements (Veraval), Saurashtra cements (Ranavav), Digvijay Cements (Sikka), Tata chemicals (Mithapur) and Narmada cement ltd (narmada). The study focuses its attention only on four key areas of finance, namely, short term solvency, long term solvency, and profitability. The most common financial ratios that are widely used to measure liquidity, long-term solvency and profitability positions only were employed to study the capital structure. As the study is confined to the assessment of capital structure, issues like technology, pricing, export and distribution have not been dealt with.
2.8 Sampling

Out of the 131 large cement plants in India, 10 are located in Gujarat. Out of these 10 units, six units are selected as sample for this study on the basis of their installed capacity.

The study covers a period of 5 years from 2007-08 to 2011-12. The period is considered sufficient to reveal the short and long-term fluctuations.

2.9 Details of selected units

1. Gujarat Ambuja Cement

Object and activities: Manufacture of cement.

Incorporation and promotion—

The company was incorporated on 20th October, 1981 as Ambuja Cements Pvt. Ltd. It was jointly promoted by Gujarat Industrial Investment Corporation Ltd. N.S. Sekharia and his associates Vinod K. Neotia and Suresh Mulani for setting up a cement project in the joint sector. The company was converted into a public limited company on 19th March 1983 and its name was changed to Gujarat Ambuja Cement Ltd. on 19th May, 1983.

Process and technology—

The Company adopted the latest dry process pre-calcination technology incorporating five stages pre-heater for the main processing system of the cement plant. For grinding the raw material the company undertook to install the latest air swept roller mills of polysious designs which were for extremely energy efficient. A computerized process
control system with field instruments supplied by Larsen and Turbo were also being installed to give consistently high quality cement with maximum productivity. In addition, electronic packing material machine were being obtained from Haver & Boecker West Germany and reserve air bughouse equipment from Zurn Industries USA.

**Foreign collaborations**–

The Company entered into an agreement with Krupp Polysius AG, West Germany (KP) for supply of plant equipment and service for the project. KP agreed to supply raw material and coal grinding vertical roller mills, homogenizing and kilns kid burning, cooling and coal firing equipment and pneumatic transport pumps. KP has a collaboration agreement with Back au Wolf India, Ltd. who is supplying the balance items of the main plant as per KP design. The scope of the agreement with KP provides for complete engineering of plant, technical documentation and information and supervision of erection and commissioning of the project.

**Project site and construction**–

The company undertook to set up a project for the manufacture of cement with a licensed capacity of 5,00,000 tons per annum. The plant location was initially contemplated at Mahuva Taluka in Bhavanagar district of Gujarat. On the basis of the preliminary report of limestone availability at the site, orders were placed for plant and equipment with a capacity of 6,25,000 tones per-annum. Due to delay and difficulty in acquiring land, the location of the plant was shifted to Ambuja Nagar, Vadnagar village in Kodinagar Taluka of Amreli district a
notified backward area in Gujarat. In view of the better quality of limestone at the new site the company had sought an increase in the licensed capacity to 7 lakh ton per annum. 193 acres of land was acquired and major civil work at the site was started. Owing to delay in completion of the 33 km. Long 132 k high tension power line, the project could not be commissioned as per the original schedule. The kiln was fired in June 1986 and commercial production commencement in October 1986.

Operations–

Since the commencement of commercial production up to 30th June 1987, the company produced 3,37,017 tones of cement, 3,52,902 tones of cement worth Rs.40.52 crore was sold in 87-88, the company produced 3,20,185 tones of cement which worked out to a capacity utilization of 117 per cent. 8,10,046 tones of cement valued at Rs. 90.14 crore was sold. Power supply situation during the year was reasonably satisfactory.

2. Gujarat Siddhi Cement Limited

Gujarat Siddhi Cement Limited (GSCL) was originally set up as a joint venture between the Gujarat Industrial Investment Corporation and The Mehta Group. GSCL’s plant is located at Siddhi gram in Sutrapada Taluka, District Junagadh, Gujarat State, India.

GSCL’s plant uses the latest Dry Process Pre-calcination technology comparable to international standards. The state-of-the art plant makes use of machinery which is sourced from reputed international companies. The plant, operating at over 100% capacity, is also one of India's cost effective cement producers.
Because of its proximity to the Porbandar and Pipavav ports, it has competitive access to the large export markets in the Africa, Middle East countries, Sri Lanka and Bangladesh by the economical sea route.

GSCL has got national and international recognition:

- India’s first 53 grade Cement.
- Thrice winner of National Productivity.
- India’s highest exporter of cement clinker earlier.
- Gujarat’s first cement company to get ISO 9002 (RWTUV, Germany).
- IMS certified company i.e. qualified under OHSMS 18001:2007 and ISO 14001:2004 certification for Environmental Management Systems (RWTUV, Germany)

Gujarat Siddhi Cement Limited (GSCL) markets cement under the brand name "Siddhi". GSCL product range includes Ordinary Portland Cement (OPC) 53 Grade and 43 Grade, Portland pozzolana Cement (PPC) and clinker.

YEAR EVENTS 1973 - The Company was incorporated on 29th March, in the State of Gujarat as a wholly owned subsidiary of Gujarat Industrial Investment Corporation Ltd. (GIIC) on 29th March. The Company was promoted by GIIC and Mehta International Ltd., a non-resident company of Mehta Group of companies. The Company's object is to manufacture Portland cement.

- The Company undertook to set up a project to manufacture 1 million tons per annum of portland cement on a 344 hectares of land obtained at
village Prashnawada, a notified backward area in the Junagadh district of Gujarat. Mining lease for 254 hectares of land was obtained and that for another 184 hectares was awaited. Part of plant, equipment and services were procured from F.L. Smith & Co., A/S, Copenhagen, Denkar, and the remaining parts were procured indigenously from Larsen and Toubro Ltd.

- The project incorporated the latest dry process pre-calcination technology. For raw material grinding, cement grinding and for quality control, the company installed A tox vertical roller mills two number Combidan mills of FLS design and FLS ACC system in conjunction with FLS ADR colour CRT along with gas analyzer and OCX x-ray analyzer respectively.

1987 - Allotted 1,00,000 shares to GIIC.3,01,50,000 shares then issued at par out of which 81,70,000 shares to GIIC and 79,30,000 shares to the Mehta International Ltd., and its nominee (including 66,80,000 shares to non-resident) were reserved and allotted.

3. Saurashtra Cement Limited (SCL)

1956 - The Company was incorporated on 11th June, at Rajkot (Saurashtra). The Main Object of the Company is to manufacture of cement.

1957 - 25,000 Pref. and 50,000 No. of equity shares subscribed for by directors, etc. 25,000 Pref. and 50,000 No. of equity shares offered to the public during November, 1956.

1965 - With effect from 1st July, the Company acquired from the Govt. of Gujarat lease of Ran mines in the district of Jamnagar consisting of 107.23 acres of land for a period of 20 years for excavation of gypsum.
1966 - The Company acquired lease of land admeasuring 150 acres each near Pipalia village and Barda hills in Ranavav-Mahal Forest Area for mining ordinary clay for a period of 10 years with effect from 23rd March, and 16th January, 1967 respectively, besides 50 acres of land obtained in Barda hills area for black stone.

1968 - In September, 40,000 Bonus equity shares issued in the proportion 2:5.

_Saurashtra Cement Limited (SCL)_ is the flag ship company of The Mehta Group, formed in 1956. SCL is one of the leading players in the Indian cement industry, manufacturing Portland Pozzolana Cement (PPC), Ordinary Portland Cement (OPC) and Portland Slag Cement (PSC).

SCL markets cement under the brand name "HATHI CEMENT". The product is marketed in 50 kg HDPE / PP / paper bag, in bowser and in jumbo bags (1 MT) as per user need. The product is preferred for its proven durability and is noted in the market for its special greenish tinge and superior finish on the external surface.

Saurashtra Cement Ltd. Saurashtra Cement (SCL) is the flagship company of the _Mehta_ Group, formed in 1956. SCL is one of the leading players in the Indian cement industry, manufacturing Ordinary _Portland_ Cement (OPC) and Pozzolana _Portland_ Cement (PPC).

SCL’s plant at Ranavav located in Gujarat state has a capacity of 1.5 MTPA. The plant is a modern energy efficient dry process plant comparable to international standards and makes use of latest machinery sourced from reputed international companies. The plant offers locational
advantages because of its proximity to the Porbandar and Veraval /Okha ports, rail network and is close to highways. SCL thus has competitive access to the domestic markets and also to the large export markets in the Africa, Middle East countries, Sri Lanka etc. by the economical sea route.

SCL's modernization implemented in the recent years has paid results. State-of-the-art equipment and control systems installed have led to capacity enhancement. The new captive power plant which can be operated with different fuels like coal, pet coke & lignite has improved the overall performance by way improved reliability, consistency, better cost control and improvement in quality and lower emission levels.

4. **Shree Digvijay Cement Co Ltd.**

Shree Digvijay Cement Co Ltd., established in 1942 at Sikka – Jamnagar and one of the pioneers in the Cement business, is a flagship Company of Votorantim. A fully computer controlled plant; it has a production capacity of 1.30 million tons per annum.

*Shree Digvijay Cement Co Ltd., established* on November 6, 1949 at Sikka – Jamnagar and one of the pioneers in the Cement business, is a flagship company of the Cimpor Group. Cimpor acquired management control of the company in the year 2008. Its basket of products includes special cements like Oil Well Cement,

Its basket of products includes special cements like Oil Well Cement, Sulphate Resisting Portland Cement and Railway Sleeper Manufacturing Cement in addition to other varieties of Ordinary Portland Cement etc.
Well connected by Road, Rail, Air, and Sea, Digvijay has its own port. Digvijay’s prolific experience in the domestic and international markets is now further honed with the Votorantim Group’s management skills and technology.

“KAMAL” cement is a well-known name in the cement industry. We have a significant market share in Gujarat and internationally in SAARC countries, Middle East and East Africa.

Sikka is situated in the State of Gujarat, India on western coast at the Gulf of Kutch. The rich culture of Sikka is drawn from the famous Dwaraka temple of Lord Krishna, 120 Kms away from it. It is also a proud neighbour to the city of Jamnagar, an industrial hub. Traditionally it has been a coastal township famous for fishing and Pearl trade. Today it boasts of a world famed marine park and sanctuary, the abode of rare marine life.

5. **Tata Chemicals (TCL)**

*Tata Chemicals* (TCL), *established in 1939*, is the second largest producer of soda ash in the world with manufacturing facilities spread across four continents. *Tata Chemicals* is the *... Chemical* plant at Mithapur bags 'Certificate of Honors’ and salt-works awarded 'Certificate of Merit' by Gujarat State Safety Council Mithapur

Tata Chemical. Tata Chemicals Limited (TCL) (BSE: 500770) is an Indian global company with interests in chemicals, *crop nutrition* and consumer products headquartered in Mumbai, India. The company is one of the largest chemical companies in India with significant operations in India and Africa.
The company is world's most geographically diversified company with an efficient supply chain that can service customers across the globe. *Tata Chemicals Ltd* was incorporated on January 23, 1939. In the year 1942 the company completed the bromine plant the first unit of the company's chemical works in the year 1943.

Dec 18, 2001 - Company History - *Tata Chemicals Ltd. 1939* - The Company was In-corporate on 23rd January at Mumbai. The Company Manufacture salt, by-products of salt alkalizes, heavy chemicals and insecticides and flux technical and battery grades. - 37,000 equity shares issued without payment in cash. 1978.

Our story began in Mithapur, Gujarat, in western India in 1939 with a small plant that would raise a wealth of marine chemicals from the ocean. From these humble beginnings, *Tata Chemicals* has evolved into a market-leading international business, with operations across four continents, and businesses that touch the lives.

*Tata Chemicals Ltd* is a global company with interests in businesses that focus on LIFE - living industrial and farming essentials. The company is the world's second-largest producer of soda ash. They have manufacturing facilities in India UK USA the Netherlands and Kenya with global capacity of around 5.5 MTPA.

6. **Narmada Cement Co. Ltd.**

The company is engaged in manufacturing and sales of cement and clinker. *Narmada Cement Co. Ltd.* operates as a subsidiary of *Ultra-Tech Cement Ltd.* West Wing Metropolitan. Plot No C - 26/27 4th Floor


In 1981 - Allotted 34,70,000 No. of equity shares to Chowgule & Co. Pvt. Ltd. and 17,30,000 No. of equity shares to Gujarat Govt.1,50,000 Pref. shares and 48,00,000 No. of Equity shares offered at part the public in May.

2.10 Data Collection and Analysis

The study encompasses primary and secondary data. For collecting the primary data, personal discussions were held through unstructured questionnaire with the officials of the select cement companies. The secondary data were extracted from the published annual reports of the study units for a period of five years. These reports are the financial statements, books of accounts, minutes of meetings, audit reports, annual reports, and circulars. Literature relating to the study was gathered from published reports, journals, magazines, books etc. Analysis of variance technique (ANOVA) has been employed for testing the validity and hypothesis was framed. Statistical measures like arithmetical mean, standard deviation and coefficient of variation, correlation, multiple regression model and Trend Analysis were used to analyze time series data. Compound Annual Growth rate, Linear Annual Growth rate,
Annual growth rate have been computed from the time series data. Altman model was used as a tool for testing the significance. The collected data were analyzed and interpreted as intelligibly as possible to highlight the divergent activities related to the financial performance of the select cement companies.

2.11 Limitations of the Study

As stated earlier, a period of five years from 2007-08 to 2011-127 has been selected for this study. Because of the constraint of time five cement companies alone have been selected and studied. Hence, the conclusion drawn is specific and cannot be universalized.

1. This study has used the historical accounting data available from the published Reports of the sample units. The limitations of historical accounting data are very well applicable to the data used for the present study.

2. The overall trend in the profitability and short-term & long-term solvency of the sample units may or may not be noticeable in the rest of the units of the industry owing to the varying economies of location, size and management.

3. The findings of this study hold good for the study period.

4. The influence of external factors on the capital structure of the select units has not been studied.

2.12 Chapter Arrangement

The thesis has been arranged in six chapters.
The first chapter, "Introduction: Indian cement industry", presents Introduction, brief history of Indian cement industry, List of cement plants in India etc.

The second Chapter deals with the brief review of related literature and the research methodology.

The third Chapter deals with the various definitions of the capital structure related to the study.

The fourth Chapter deals with the study of liquidity of the select units’ capital structure.

The fifth chapter deals with the study of long-term solvency and profitability of the select units’ capital structure.

The sixth chapter presents a summary of findings, conclusions and suggestions for improving the profitability, liquidity and solvency of the select cement companies.
References:


Simulation involves developing a model of some real phenomenon and then performing experiments in the model evolved. In stimulation, a given system is copied and the variables and constants associated such it are manipulated in that artificial environment to examine the behaviour of the system. The benefit of simulation is that the results of taking a particular course of action can be estimated prior to its implementation in the real world.

CAPM states that the required rate of return on a security (investment) is equal to the riskless rate plus premium for unsystematic risk of the security. Unsystematic risk, which is specific to the company of the security, can be eliminated by diversification in the portfolio. But systematic risk, which is because of general market fluctuations, cannot be eliminated by diversification.

Thomas E. Copeland and Nabil T. Khoury, “Analysis of Credit Extension in a World with Uncertainty”, in K.V. Smith, op.cit.

A detailed survey of literature in respect of inventory investment is not undertaken here as it is available in R. Eisner & R. Strotz, “Determinants of Business Investment”, in Impacts of Monetary Policy, Commission on Money and Credit, Prentice-Hall, 1963, M.C. Lovell, “Determinants of Inventory Investment”, in Models of Income Determination, NBER, Princeton University Press, 1964. Here, emphasis is on factors influencing inventory investment, which have been considered in the literature.


Lloyd Metzler, *op.cit.*

Hilton, *op.cit.*


