CHAPTER - I

INTRODUCTION AND DESIGN OF THE STUDY
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INTRODUCTION

Business organisations are today faced with many challenges due to far-reaching changes in the environment and the external milieu which has changed drastically in recent times. The impact of these changes in the business environment has been profoundly enormous and it has become extremely dynamic and highly competitive. This has brought the need for companies to consider how they have to meet the new challenges and adopt appropriate strategies not only to meet challenges, but also to anticipate changes in order to increase their market share.

Competition is a new phenomenon for business organisations in India. Organisational and technological innovations, superior product quality, and customer satisfaction are the major pre-determinants of competitiveness placed in the global market today. Further, companies that want to be globally competitive have to critically re-engineer their business processes to meet the demands of an ever-changing market conditions. Organisations have to progressively build competence, capacity and competitiveness for business survival and market leadership.
For that purpose, the financial management, as an integral part of overall management, is not totally independent area. It draws heavily on related disciplines and fields of study, such as economics, accounting, marketing, production and quantitative methods.

The relevance of economics to financial management can be described in the light of the two broad areas of economics, one is macroeconomics and other one is microeconomics. Macroeconomics is concerned with the overall institutional environment in which the firm operates as a whole. Macroeconomics is concerned with the institutional structure of the banking system, money and capital markets, financial intermediaries, monetary, credit and fiscal policies and economic policies dealing with and controlling level of activity within an economy. Since business firms operate in the macroeconomic environment, it is important for financial managers to understand the broad economic environment especially, they should

- Recognise and understand how monetary policy affects the cost and the availability of funds;
- Be versed in fiscal policy and its effects on the economy;
- Beware of the various financial institutions or financing outlets;
- Understand the consequences of various levels of economic activity and changes in economic policy for their decision environment.
Microeconomics deals with the economic decisions of individuals and organisations. It concerns itself with the determination of optimal operating strategies. In other words, the theories of microeconomics provide for effective operation of business firms. They are concerned with defining actions that will permit the firms to achieve success.¹

The concepts and theories of microeconomics relevant to financial management are

- Supply and demand relationships and profit maximisation strategies,
- Issues related to the mix of productive factors, ‘optimal’ sales level and product pricing strategies,
- Measurement of utility preference, risk and the determination of value,
- The rationale of depreciating assets. In addition, the primary principle that applies in financial management is marginal analysis; it suggests that financial decision should be made on the basis of comparison of marginal revenue and marginal cost. Such decisions will lead to any company to get significance by continuous flow of finance and by increasing the profit earning capacity of firms.,

MAJOR INDUSTRIES

Industries determine a country’s economy, in fact the economy of the country flourishes with respect to the number of industries with massive

production unit. Basically industries are divided into large scale industries and small scale industries. There are six major sectors among the large scale industries. They are iron and steel, cotton and textile, sugar, jute, cement and paper, which play a major role in determining the growth rate of the economy.

After independence, the free India wanted to compete with other developing and developed countries. Many government policies were framed to launch many new avenues to enhance the growth rate. Among all the sectors, cement plays a vital role in its production and utilisation.

CEMENT

Cement is a mixture of compounds, consisting mainly of silicates and aluminates of calcium, formed out of calcium oxide, silica, aluminium oxide and iron oxide. Cement is manufactured by burning a mixture of limestone and clay at high temperatures in a kiln and then finely grinding the resulting clinker along with gypsum. The end product thus obtained is called Ordinary Portland Cement (OPC).

In India, OPC is manufactured in three grades, viz. 33 grade, 43 grade and 53 grade, the numbers indicating the compressive strength obtained after 28 days, when tested as per the stipulated procedure. Apart from OPC, there are several other types of cement, most of them meant for special purposes, e.g. sulphate resistant cement, coloured cement, oil well cement, etc. However, there
are some general purpose cements, the commonest one being Portland Pozzolana Cement (PPC).

**Portland cement**

Ever since civilisations first started to build, we've sought a material that would bind stones into a solid, formed mass. The Assyrians and Babylonians used clay for this purpose, and the Egyptians advanced to the discovery of lime and gypsum mortar as a binding agent for building such structures as the Pyramids. The Greeks made further improvements and finally the Romans developed cement that produced structures of remarkable durability. Most of the building foundations in the Roman Forum were constructed of a form of concrete, placed in some locations to a depth of 12 feet. The great Roman baths built about 27 B.C., the Coliseum, and the huge Basilica of Constantine are examples of early Roman architecture in which cement mortar was used.

**Historical Development of Cement**

The word 'Cement' is from the Latin verb 'to cut' and originally had reference to stone cutting used in lime mortar. Thus, it is logical that in the middle ages the mortar itself was commonly called cement. In correct modern usage, cement generally means only the chemical binder, and the term may be used with respect to any material serving such a purpose.2

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2 Encyclopedia Britanica, INC. William Benton, Publisher; Volume- 5, 1971, P.153.
In the 18th century a big effort started in Europe to understand why some limes possess hydraulic properties. John Smeaton often referred to as "father of civil engineering in England" concentrated his work in this field. The French Engineer Louis Vicat, inspired by the work of Smeaton and Parker, began a study of hydraulic limes in 1812 (published in 1818 as "Recherches experimentales surles chaux de construction"). He reported that in the absence of naturally occurring argillaceous components in limestone, quality hydraulic limes could be prepared by the calcination of fixed ratios of clay proportioned with quicklime.

In 1818 an English patent was granted to Maurice Leger for "Improvement method of making lime" (Leger used Vicat's method). In 1822, the production of "British Cement" had been started by James Frost at Swanscombe based on a patent for "a new cement or artificial stone" The invention of Portland cement is generally credited to Joseph Aspedin, an English Bricklayer in 1824. It involves a double kilning such as was described by Vicat. In 1838 a young chemical engineer, Isaac Johnson, burned the cement raw material at high temperature until the mass was nearly vitrified producing the modern Portland cement.

The German Chemist Wilhelm Michaelis proposed the establishment of cement standards in 1875. The earliest kiln is one of William Aspedin's bottle kilns from Robins & Aspedin factory at Northfleet. The earliest bottle or dome kilns were open kilns with tapered chimney to increase the draft. They were burned in a batch rather than in a continuous fashion and were charged with
alternating layers of raw feed and solid fuel. The chamber kiln was an improved design developed and patented by Mr. Johnson. The combustion gases from the kiln dried the raw material so that when the kiln was burned out a new charge of dried material is immediately ready for use.

The time and heat losses resulting from drawing the clinker, recharging the kiln, and then heating it again led to the design of shaft kiln with continuous burning of the materials, one of the main problem of the new kiln operation was the difficulty of obtaining an even clinker burning, as some of the product would be greatly under-burnt and others be much more heavily clinkered.

In 1898 Atlas Portland cement company according to Lewis improved the design by using what is called a rotary kiln, this improvement was a big revolution in the cement industry because the new kiln could produce 200 cement barrels per day compared to a shaft kiln which produced only 40 to max 80 barrels per day; in addition to quick improvement in this new design regarding the mixing, grinding equipments for raw material, grinding equipments for coal, belt conveyor using mix kind of fuel such as natural gas (1904, Iola Portland cement, Iola Kansas).

In practice, the operation with the first generation of rotary kiln (Ransone kiln) was very difficult due to problem of maintaining a sufficient and uniform kiln temperature with excessive boiling of raw feed and sticking on the Frederick lining. In 1899 Atlas Cement Company improved the technology of the rotary kiln and fuel economy by replacing fuel oil with powdered coal dust. Furthermore,
modifications to the kiln were made by addition of two auxiliary clinker coolers, in which the first hot discharged clinker was received as it fell from the kiln and air flowing over it was heated and helped to ignite the coal dust in the rotary kiln.

The new clinker produced from the new kiln technology was different than the old clinker especially from the setting time (much faster setting time). The French chemist Pierre Giron solved this problem by adding gypsum to the cement in order to control the setting time. After 1900 there was rapid growth in both rotary kiln and auxiliary equipment technology in the United States. Coal grinding mills were developed and coal burning in cement kilns became the predominant combustion process in the industry. All the equipments related to cement production crusher, raw mill, belt conveyors, bucked elevators were improved. Improvement in the following fields pertaining to cement manufacturing from material science technology has been an ongoing process for 200 years.

The following are some of the most significant years in the development of Portland cement manufacture.

- **1824** Aspdin patented Portland cement.
- **1845** Isaac Johnson recognised the significance of high temperature to produce C3S. This was the first cement as we know it.
- **1880** Gypsum first added for set control.
- **1885** Ransome patented the rotary kiln.
- **1891** The continuous fed ball mill was patented.
• 1928 Introduction of the grate preheater kiln (Lepol) by Polysius provided the first major improvement in thermal efficiency from the previous long, wet kilns.

• 1930 Roller mill first applied to cement manufacture; rapid development after 1960.

• 1930 Introduction of the roll press; rapid development after 1980.

• 1932 Patent of the cyclone preheater kiln with commercial development by KHD dating from 1951.

• 1937 Introduction by Fuller of the grate cooler.

• 1950 Introduction of mechanical separators.

• 1960 Introduction by KHD of the kiln by pass to allow use of raw materials with high volatiles contents.

• 1966 Introduction of pre-calcinations which was initially air-through riser-firing.

• 1970 Introduction of high-efficiency separators.

• 1973 Introduction by IHI of the flash calciner with tertiary air duct.

As the vital source for the development of a country, cement helps to build dams across river water, and to build huge factories, industries, space station, port, oil refineries, government buildings and domestic houses. The study on cement industries is a necessary task. The money spent on its production is huge and thus, it is imperative to study on the financing of cement to help us to make careful use of our money and the product as well.
CONCEPT OF FINANCE

Finance is the life blood of business. It is very important for industry and commerce as lubricant for wheels, marrow for bones and blood for arteries. In modern times, no trade, industry or commerce can operate its activities without finance. Finance is needed for establishing, developing and operating the business efficiently. Without proper financing, even the best project remains a futile exercise and if the project is put into operation, many problems crop up in its execution and control. Sometimes it is not the inadequate finance which is the cause of failure of business, but the mismanagement of resources which is ultimately responsible for it. The survival and growth of a firm is possible only if it utilises its funds in a right manner. Therefore, it is correct to say that without adequate finance no business can survive and without efficient financial management no business can prosper and grow. Hence, the success of a business depends on proper supply of finance and its efficient management.

Every business activity requires financial support, because financial viability is the central theme of any business proposition. This point of view has been well brought out by A.L.Kignshott, who stated that "Finance is the common denominator for a vast range of corporate plan must be expressed in financial terms". 3

Henry Ford remarked "Money is an arm or leg. You can either use it or lose it." Appear simple, but is quite meaningful. It brings home the significance of money or finance.\(^4\)

The Encyclopedia Britannica defines Finance as "the act of providing the means of payment". It is the financial aspect of corporate planning which may be described as the management of money.\(^5\)

**IMPORTANCE OF THE STUDY**

India being the leading and developing country in Asia after China has been continuously focusing on its fiscal development since long. Our industrial, infrastructures have to be under constant development to par ourselves with neighbours and other world countries to stabilise our status and to cater all sorts of people in India. Modern men need to run faster along with other competitors. A country's financial growth primarily depends on the availability of natural resources and the process how they are used. Man has learnt how to use all the natural resources to make his life better. Among the resources his discovery of cement helps him to build dams across river for better use of river water for harvesting, shipping, fishing and for domestic purposes.

Since the origin of civilisation man has fought with natural forces to domesticate his livelihood. As man is a social animal, he has found ways to habitate a territory and has learnt to housing. Man has changed his life style

\(^{4}\) Ibid.
\(^{5}\) Ibid.
along with the growing phase of civilisation. Today's skyscrapers tell tales about his achievement and his financing ability in the world market. Under globalisation everything belongs to anybody and he is in constant chase to have a nitch for his own. As cement has become a prime source for country's growth and development and as its production involves a lot of synthesis, the study on cement is a mandatory and details on its financing help to know the essence of cement and its manufacturing.

Increase in financial effectiveness is imperative in order to make targeted sales. Improvement in performance efficiency is also essential to increase total production of the company. Like any other functional management in a firm financial performance is a vital functional organ of the company. If financial performance does not operate well, the whole organisations activity will be ruined.

Inefficient financial management often paralyses the activity of the company. For this reason many companies have a separate department to look after the financial aspects of the company in order to measure and manage the financial performance. Financial analysis and review is very helpful for the assessment of financial strength, weaknesses, opportunities and threats of the company in future. Operating efficiency of the firm results in optimum utilisation of resources at minimum cost. If the company successfully controls operating costs, it will be able to improve net profit margin that will, in turn, release greater funds for working capital purposes.
Seasonal fluctuations in sales affect the level of variable working capital. Often, the demand for products may be of a seasonal nature. Yet inventories have got to be purchased during certain seasons only. The size of the working capital in one period may therefore, be bigger than that in another. Hence, the measurement of the financial performance is very much in need to check the effective management of working capital also. Thus, this research focuses on cement and its financing in this study.

**STATEMENT OF THE PROBLEM**

Cement is one of the most sensitive industrial products in a country. Indian cement industries planned to expand their industries in two or three years but failed to implement them due to current inflation and other crisis. It is estimated that India's per capita consumption of cement is the lowest among the world countries.

Indian infrastructure and real estate sectors are booming, there by boosting the demand for cement. The Prime Minister of India, Dr. Manmohan Singh, estimates that India would need about $350 billion to be invested in the infrastructure over the next 5 years, mainly in roads, airports, ports and power plants. About $10 billion is to be invested in enhancing capacities to produce cement by 10 metric tonnes over the next 5 years.

Indian cement industries have also planned to develop this sector and to increase production. Due to heavy inflation rate prevailing now and heavy cost of
raw materials, heavy interest on debt have prevented all these measures to nothing. Not only political reasons, but other factors like clearing heckles in getting the land where cement factory would be built pose a major set-back. Heavy decline in stock-exchange also hinders the funds required for their enlargement.

In recent years, Cement prices are high because of the factors like high government duties and taxes, and fragmentation of the industry, excise duties, sales and other local taxes, and limestone royalties add up to nearly half the cost of ex-factory cement prices. In addition to this, power costs are also soaring and in many States cement firms have to install expensive captive power units, as the State power supply is erratic and unreliable.

Cement industry requires support from three major sectors, namely coal, power and transportation. The industry consumes about 14 million tonnes of coal and 7 billion units of power. On an average, energy occupies 40 per cent of the cost of cement. This industry has been experiencing acute power shortage, poor quality of coal and inadequate transport facility. The paucity of some inputs prevented the industry from using its full capacity.

Continuous technological upgrading and assimilation of latest technology is essential for the cement industry. The induction of advanced technology has helped the industry immensely to conserve energy and fuel and to save materials substantially. Therefore cement industries require finance. Finance is the nerve
centre and life line of their economic activity. It plays an extremely crucial role in the continuity and growth of a cement business.

Based on the above issues, the following questions were probed by the researcher to take up this study.

i) To what extent the cement industry affected by its financial position?

ii) How the cement industries perform their capital structure?

iii) What strategies should be adopted for effective financial position?

**REVIEW OF LITERATURE**

The Indian cement industries have recorded an impressive growth during the last ten years and have come to occupy an important role in India’s economic development process. Even though the cement industries have shown a substantial growth, many companies have incurred perennial losses and some companies have made good profits. The profit represents one of the elements of the financial performance. In this section an attempt is made to review the earlier studies in evaluating the operating and financial performance of cement industries in order to identify the gaps that exists the study on cement industries. The research conducted by the different researchers and agencies were examined.
Nirmala Devi, K, (1989)\(^6\) in her article, “Productivity in Indian Cement Industries”, had examined the trends in productivity of cement industries in India during 1973-74 to 1987-88. An increasing trend with a significant growth rate of 1.65 per cent during 1973-74 to 1987-88 was observed in the cement production in India.

National Productivity Council Research Division in its Study, (1991)\(^7\) “Productivity in Indian Cement Industry,” attempted to analyse the productivity and performance ratios of the industry with a view to identifying the major problem areas and prospects of solving them.

Anjan Kumar Ghatak and Rathindra Nath Mukharjee (1996)\(^8\) in their study analysed the inventory financing in Associated Cement Companies Ltd (ACC) for the period 1986-87 to 1990-91 and found the increased proportion of long term finance, which resulted in reduced profitability as the long term sources of financing attracted high cost and concluded that the inventory financing policy was less than optimum as it neither minimised the short term financial risk nor earned profits and suggested a reoriented approach in financing inventory.

Nagendra Rao, K, (1997)\(^9\) in his paper, “Green Productivity - the Case study of Cement Industry” presented at the Asian Pacific Organisation (APO) world conference on Green Productivity, Development Academy of Philippines,

Manila, addressed the issue of polluted environment by the very nature of the raw materials and production process in cement industry. This article listed the steps taken in the direction of addressing this issue and the resultant positive impact on productivity.

Surasakdi Prugsamatz (1998)\textsuperscript{10} in his study, "Impact of Operating Efficiency on Financial Performance of Cement Industry in Thailand", attempted to find out the impact of operating efficiency on financial performance of three selected cement companies in Thailand. To measure the operating efficiency, he used overall productivity, economic value added productivity labour productivity and selling, distribution and administration productivity. He applied Hartley’s Fmax Test model to determine whether the four areas of productivity had any difference or not. He discussed also the financial performance by applying ratio analysis which consisted of profitability test, utilisation test, capitalisation test and market test of three selected cement companies.

Parthasarathy, R, (1998)\textsuperscript{11} in his article, "Growth Prospective in Indian Cement Industry," stated that the cement industry in India was a world class industry on a path of fast and vibrant growth. This is called for planned investment path for capacities as well as for improving the infrastructure support.


Suresh Babu, T.K., and Jain, P.K., (1999)\textsuperscript{12} in their article focused the empirical study of the Indian private corporate sector in short term and long term debt financing by taking the period from 1979-80 to 1993-94 to address the issue of debt financing practices. Cement companies constituted 6 per cent of their sample. It revealed that there was shift towards preference of long term debt in lieu of short term debt and the debt ascendant capital structure, with declining and alarmingly low debt service capacity, the majority of the corporate firms were exposed to a very high degree of risk and were subjected to financial distress. They suggested the corporate finance manager of the future to review the debt policy with a view to keeping the magnitude of debt within safe and serviceable limits.

Rajeshwari, N., (2000)\textsuperscript{13} in her study analysed the efficiency in liquidity management of Tamil Nadu Cement Corporation Ltd., (TANCEM), Allangulam, for the period from 1993-94 to 1997-98. She analysed the liquidity with the help of liquidity ratios and other related ratios from the annual reports of the company and concluded the liquidity management of TANCEM was not satisfactory.

Sathyasundaram, I., (2001)\textsuperscript{14} in his article revealed that the cement industry had received an investment of Rs.30,000 crores out of which almost Rs.15,000 crores was in the form of debt from financial Institutions and banks

and he estimated that the Industry had been experiencing an annual loss of Rs.1,000 crores. He further asserted that debts had been turned into non-performing assets and shareholding value has started eroding. He highlighted the cost cutting measures followed by the Industry, to improve their margins and supported the view that the Government should come forward to give relief in the tax burden of the Industry.

Muthukrishnan, S., (2002)\textsuperscript{15} in his study "Productivity in Cement Industry a Study with Special Reference to Tamil Nadu" attempted to find out the impact of productivity efficiency of four selected cement companies in Tamil Nadu. This study helps to understand the position of the cement industry in the world, the growth and development of the Indian cement industry, a comparative analysis of operating efficiency, the productivity performance of selected cement companies had been analysed with the help of eight parameters adopted by Alan Lawlor’s approach in productivity growth and ratio of the selected four cement companies of Tamil Nadu

Chidambaram, K., and Muthukrishnan, S., (2002)\textsuperscript{16} had contributed to the productivity improvement in the industry by comparing India Cement Ltd., and Madras Cements Ltd., by Choosing the period 1990-91 to 2001-02 in capacity utilisation, limestone, coal power consumption. They found out the improvement in productivity in Madras Cements Ltd., and suggested the productivity measures


followed in MCL and ICL. In addition they suggested Activity Based Costing (ABC) system to improve productivity.

Nanda Kishore Sharma, (2002)\textsuperscript{17} in his study analysed the sources of working capital in cement industry in Rajasthan. He identified the main sources as trade credit, bank credit, current provisions, short term borrowings and long term sources as well. The findings supported the basic view that the working capital should be financed by long term sources while the short term should be used to meet the temporary working capital and the resultant problem in the case of mismatch in the seven companies out of ten companies in the state.

Ghosh, S.K., and Maji, S.G., (2004)\textsuperscript{18} in their paper they made an attempt to examine the efficiency of Working capital management of the Indian cement companies during 1992-1993 to 2001- 2002. For measuring the efficiency of working capital management, performance, utilisation, and overall efficiency indices were calculated instead of using some common working capital management ratios. Findings of the study indicated that the Indian Cement Industry as a whole did not perform remarkably well during this period.

Deloof, M., (2003)\textsuperscript{19} discussed that most firms had a large amount of cash invested in working capital. It can therefore be expected that the way in which working capital is managed will have a significant impact on profitability of those

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firms. Using correlation and regression tests he found a significant negative relationship between gross operating income and the number of days accounts receivable, inventories and accounts payable of Belgian firms. On the basis of these results he suggested that managers could create value for their shareholders by reducing the number of days’ accounts receivable and inventories to a reasonable minimum. The negative relationship between accounts payable and profitability is consistent with the view that less profitable firms wait longer to pay their bills.

Eljelly, A., (2004)\textsuperscript{20} elucidated that efficient liquidity management involves planning and controlling current assets and current liabilities in such a manner to eliminate the risk of inability to meet due short-term obligations and avoids excessive investment in these assets. The relation between profitability and liquidity was examined, as measured by current ratio and cash gap (cash conversion cycle) on a sample of joint stock companies in Saudi Arabia using correlation and regression analysis. The study found that the cash conversion cycle was of more importance as a measure of liquidity than current ratio that affects profitability. The size variable was found to have significant effect on profitability at the industry level. The results were stable and had important implications for liquidity management in various Saudi companies. First, it was clear that there was a negative relationship between profitability and liquidity indicators such as current ratio and cash gap in the Saudi sample examined.

Second, the study also revealed that there was great variation among industries with respect to the significant measure of liquidity.

Santanu Kr. Ghosh and Santi Gopal Maji, (2004)\textsuperscript{2} "Working capital management efficiency: A study on the Indian cement industry". This paper makes an attempt to examine the efficiency of working capital management of the Indian cement companies during 1992-93 to 2001 -2002. For measuring the efficiency of working capital management three index values - performance index, utilisation index and overall efficiency index are calculated. Using industry norm as target - efficiency level of the individual firms, this paper also tests the speed of achieving that target level of efficiency by an individual firm during the period of study. Finding of the study indicates that the Indian Cement Industry on the whole did not perform remarkably well during this period.

Alovsat Muslumov (2005)\textsuperscript{2} "The financial and Operating Performance of Privatisation Companies in Turkish Cement Industry". This paper examines the post-privatisation performance of privatised companies in the Turkish cement industry. The findings indicate that, when performance criteria for both the state and private enterprises are considered, privatisation in the cement industry results in significant performance deterioration. Total value added and the return on investment declines significantly after privatisation. This decrease mainly


stems from deterioration in asset productivity. The decline in asset productivity, however, is not caused by an increase in capital investment, since post-privatisation capital investment did not change significantly. Significant contraction in total employment and an increase in financial leverage after privatisation are among the key research findings. Privatisation through public offering, gradual privatisation and domestic ownership are found to stimulate the financial and operating performance of firms.

Abdul Raheman and Mohamed Naser (2007) Working Capital Management has its effect on liquidity as well on profitability of the firm. In this research, they have selected a sample of 94 Pakistani firms listed on Karachi Stock Exchange for a period of 6 years from 1999 – 2004, they have studied the effect of different variables of working capital management including the Average collection period, Inventory turnover in days, Average payment period, Cash conversion cycle and Current ratio on the Net operating profitability of Pakistani firms. Debt ratio, size of the firm (measured in terms of natural logarithm of sales) and financial assets to total assets ratio have been used as control variables. Pearson's correlation, and regression analysis (Pooled least square and general least square with cross section weight models) are used for analysis.

The results show that there is a strong negative relationship between variables of the working capital management and profitability of the firm. It means that as the cash conversion cycle increases it will lead to decreasing profitability.

of the firm, and managers can create a positive value for the shareholders by reducing the cash conversion cycle to a possible minimum level. They find that there is a significant negative relationship between liquidity and profitability. They also find that there is a positive relationship between size of the firm and its profitability. There is also a significant negative relationship between debt used by the firm and its profitability.

Taiji Ohta, (March 2007)\textsuperscript{24} in his paper "Trends in international cement trading in Asia". In the years following the 1997 Asian crisis, Thailand became the main cement exporter in Asia, followed by Indonesia. This was due to the large excess capacity created in these countries as a result of the economic slowdown. Since then, domestic demand has been gradually improving in these countries, and producers are now reducing production by shutting down certain kilns according to local demand. This new wave of adjusting supply by reducing production capacity may have been influenced by the appearance of global cement producers in Asia after the Asian crisis. In the past, Asian cement producers, particularly Japanese producers, thought it is better to maximise their production in order to increase their operation ratio. To this end, they believed export to be a good tool for maximising operation ratios, as even if they could only achieve a low FOB price it might be sufficient to cover direct production costs. However, this scenario does not harmonise with the current market. The author has heard from many people involved in the export market asking why

\textsuperscript{24} Taiji Ohta, "Trends in international cement trading in Asia", 6\textsuperscript{th} Asia Cement Markets Conference, March 2007.
Japanese producers were selfishly dumping cement at their discretion, even though it was destroying the market.

Paul Maxwell-Cook, (2007)\textsuperscript{25} his article on “The current situation in China cement industry and its increased role on the international scene”. The current situation in the Chinese cement industry is one of the unprecedented growths: between 2001 and 2005, production increased from 66 metric tonnes to 430 metric tonnes, primarily due to the introduction of dry process production. China has also seen an increase in the business it does overseas. Chinese equipment is now helping to build production lines in the Middle-East and there are possibilities for extending co-operation into Russia, India, Mongolia and Kazakhstan. As the cement industry looks to the future, four major themes stand out: the development of PC kilns; the elimination of old fashioned technology; restructuring; and the impact of international corporations and financial groups will have as they move into China.

OBJECTIVES OF THE STUDY

The present study aims to analyse the financial performance of select cement industries in Tamil Nadu. Hence, the following objectives have been framed by the researcher.

- To study the origin, growth and role of cement industries in India.
- To study the over view of select cement industries in Tamil Nadu.
- To study the financial structure and operative performance of select cement industries in Tamil Nadu.
- To analyse working capital management of select cement industries in Tamil Nadu.
- To study the financial performance of select cement industries in Tamil Nadu.
- To summarise the findings and offer suggestions based on the analysis to improve the overall performance of the select cement industries in Tamil Nadu.

METHODOLOGY

Data Sources

The present study is mainly based on secondary data. The secondary data were collected from the annual reports, journals, periodicals, websites and officials of the select cement industries.
Period of the study

The study period is confined to ten years started from the financial year 1997-98 to 2006-07 and necessary data were collected from the industries.

Formation of the Sample Selection

Out of the eight cement industries in Tamil Nadu, five cement industries (Private sector-4 and Public sector-1) have been taken into account for this study. The four private sector companies are:

- Chettinad Cement Corporation Limited,
- Dalmia Cement (Bharat) Limited,
- The India Cements Limited,
- Madras Cements Limited,

The Public Sector industry is:

- Tamil Nadu Cements Corporation Limited.

Sample industries thus account for 80 per cent in private sector and 20 per cent in public sector.

Frame work of analysis

In this study, the particulars regarding material consumed, production, total inputs, value added gross output, sales, capital structure, fixed assets and all other financial variables were obtained from the annual reports of the respective companies.
The various financial and statistical parameters are used in this study for the purpose of detailed analysis. The financial parameters are Turnover Ratios, Profitability Ratios, and Financial Ratios. The simple statistical tools like mean, standard deviation, co-efficient of variation, annual compound growth rate are also calculated.

Correlation analysis, Multiple regression analysis, and Discriminant function analysis have been used to find the degree of relationship between select independent variables, to identify the determinants of profitability, to identify the variables which significantly discriminate the high and low profitability periods of select cement industries respectively.

The Statistical Techniques

**Correlation**

To evaluate the inter-relationship between various financial variables under study in determining the capital structure correlation coefficient is used. The formula used to calculate the correlation coefficient of any two variables is:

\[ r = \frac{\text{Cov}(x,y)}{N \sigma_x \sigma_y} \]

Where,

- \( r \) = Correlation Co-efficient
- \( \text{Cov}(x,y) \) = Co-variance of x,y.
- \( \sigma_x \) = Standard Deviation of x,
- \( \sigma_y \) = Standard Deviation of y,
- \( N \) = Number of Pairs of Observations.
Simple Regression

Simple regression is used to find out linear growth rate of various financial variables under study over the given period of time (in this study for 10 years period). The equation applied to find out the linear growth rate is as follows:

\[ Y = a + bX \]

Where,

\[ Y \] = Financial variable used in the study,
\[ X \] = Time,
\[ a \] = Constant, and
\[ b \] = Growth rate

Multiple Regression Analysis

In order to estimate the degree and extent of linear-relationship between a dependent variable and the number of independent variables, multiple linear regression equation is used. In this study multiple regression equation is used in determinant of profitability and also used to find out degree and extent of relationship of each financial variable with respect to its financial ratios.

The following is the multiple regression equation which is used to determine the profitability:

\[ \hat{P}_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_i X_i + e, \quad i = 1,2,3,\ldots \]
Where,

\( \hat{P}_1 \) = Net profit to total assets.
\( \hat{P}_2 \) = Net profit to total sales.
\( X_1...X_i \) = Various financial ratios used as independent variables
\( \alpha \) = Constant (Intercept)
\( \beta_1...\beta_i \) = Coefficient of respective financial ratio variables
\( e \) = error component

The overall variance and regression coefficients calculated using the above equation are tested with student 't' values and the goodness of fit of the estimated equation is worked out with the help of \( R^2 \) and adjusted \( R^2 \) and its significant level is tested with 'F' ratios.

**The Z-Score Model**

The 'Z-score' model by employing multiple discriminant analysis generally used to predict whether or not a company is likely to go bankrupt in the near future using various financial ratios were used. The 'Z-score' model is as follows

\[
Z = c_1X_1 + c_2X_2 + c_3X_3 + ... + c_nX_n
\]

Where,

\( Z \) = Score to measure the bankruptcy,
\( X_1, X_2...X_n \) = Various financial ratios
\( c_1, c_2,...c_n \) = Factor weights
If the compound ‘Z-score’ is below 1.81 (including negative amount) then it can be concluded that the firm went bankrupt, whereas ‘Z score’ is above 2.99 represented healthy firms. Firms with ‘Z-score’ in between were sometimes misclassified, so this represents as area of grey.

**LIMITATIONS OF THE STUDY**

The data published by the industries were combined in total but not based on the unit wise. Hence unit study was not made.

The evaluation of financial performance is mainly based on the financial data obtained from the financial statements.

Deliberately three industrial units were left because Ultra-Tech Cement Ltd. (G) is quite recently started and ACC and Grasim industries’ role is very limited in Tamil Nadu. Hence these industries are not taken into account for this study.

Therefore, the analysed results and the findings are subject to the accuracy of the data of the published annual reports of the select cement industries.
CHAPTER SCHEME

The present study "Financial Performance of Select Cement Industries in Tamil Nadu" has been organised into seven chapters.

- The first chapter presents with the introduction and design of the study comprising Introduction, historical development of cement, meaning and concept of finance, importance of the study, statement of the problem, objectives of the study, methodology followed, period of the study, limitations of the study and chapter Scheme.
- The second chapter deals with role of the cement industries in India.
- Third chapter gives profile of select cement industries in Tamil Nadu.
- The fourth chapter constitutes the financial structure and operative performance of select cement industries in Tamil Nadu.
- The fifth chapter deals with working capital analysis of the select cement industries in Tamil Nadu.
- The sixth chapter focuses the financial analysis of select cement industries in Tamil Nadu.
- The concluding chapter portrays the key findings of the study and based on the analysis of the previous chapters, some valuable suggestions are offered for overall improvement of cement industries in Tamil Nadu along with conclusion.