CHAPTER 3

METHODOLOGY

Research methodology is a methodical way to find solution for a research problem. It is defined as the study of methods by which knowledge is gained. In Methodology, the researcher uses different criteria for solving or searching the given research problem. It consists of the framework of the study, sequence of steps to be carried out, planned tools and techniques to be adopted. In order to achieve the objectives of the study and to analyse the factors considered, an appropriate methodology is developed. The collection of data and analysis strategy are planned accordingly.

3.1 RESEARCH DESIGN

The present study is concerned with analyzing the impact of capital structure on dividend decisions of select Construction associated Industries in India. The growth of construction industry is largely depended on its associated industries like steel, cement, paint, granite, ceramic tiles, rubber, plastic, glass etc. Of these industries, steel industry and cement industry primarily impacts the construction industry. Among other industries that impacts secondarily, paint industry, granite industry and ceramic tiles industry occupies leading position. Hence, these five industries are selected for the research study. The multi-stage sampling method was used to select sample companies for the study. For the research purpose, the Construction associated Industries are classified as Basic Industries and Ancillary Industries. Under Basic Industries, Steel Industry and Cement Industry were selected as sample. Under Ancillary Industries, Paint Industry, Granite Industry and Ceramic Tiles Industry were selected as sample. The companies were selected based on the framed sample selection criteria.

Sample selection criteria

The criteria for sample selection are,

(i) The companies should be listed in Bombay Stock Exchange during the period of study.

(ii) The companies should have declared dividend for ten continuous years from financial year 2007-08 to 2016-17.

Accordingly, 7 Steel Companies, 12 Cement Companies, 4 Paint Companies, 4 Granite companies and 3 Ceramic tiles Companies, totally 30 companies were selected for the study. Table 1 shows the list of companies selected for the study.

Table 1

List of Sample Companies

BASIC INDUSTRIES		**ANCILLARY INDUSTRIES**		
Steel Companies	**Cement Companies**	**Paint Companies**	**Granite Companies**	**Ceramic Tiles Companies**
Hisar Metal Industries Limited	ACC Limited	Akzo Nobel India Limited	Aro Granite Industries Limited	Kajaria Ceramics Limited
JSW Steel Limited	Ambuja Cements Limited	Asian Paints Limited	Divyashakti Granites Limited	Orient bell Limited
Kirloskar Ferrous Industries Limited	Birla Corporation Limited	Berger Paints Limited	Inani Marbles and Industries Limited	Somany Ceramics Limited
Rishabh Digha Steel and Allied Products Limited	Deccan Cements Limited	Kansai Nerolac Paints Limited	Madhav Marbles and Granites Limited	
Sardha Energy & Minerals Limited	JK Cement Limited			
Tata Sponge Iron Limited	J.K Lakshmi Cements Limited			
Tata Steel Limited	Kakatiya Cements Limited			
	KCP Limited			

BASIC INDUSTRIES		ANCILLARY INDUSTRIES		
Steel Companies	**Cement Companies**	**Paint Companies**	**Granite Companies**	**Ceramic Tiles Companies**
	Mangalam Cements Limited			
	OCL India Limited			
	The Ramco Cements Limited			
	Shree Cement Limited			

Source: Computed Data

3.2 PERIOD OF STUDY

The study covers a period of ten financial years from 2007-08 to 2016-17. The financial year starts from 1st day of April of a calendar year and ends on the 31st day of March of next year.

3.3 SOURCES OF DATA

For the research study, the Construction associated Industries are classified as Basic Industries and Ancillary Industries. Under Basic Industries, Steel Companies and Cement Companies were selected as sample. Under Ancillary Industries, Paint Companies, Granite Companies and Ceramic Tile Companies were selected as sample. The necessary secondary data was collected from the Published Annual Reports of the selected companies from Capitaline database.

3.4 VARIABLES SELECTED FOR THE STUDY

Various ratios were selected as dependent variables and independent variables for the purpose of the study. The selected dependent and independent variables (Chandra sekhar 2011), (Anupam Mehta 2012) and (Maryam and Abiha 2014) are as follows.

- To identify the factors influencing the capital structure and dividend decisions of the select industries.

(I) Factors influencing the capital structure

(a) Dependent Variables:

Long term debt Ratio, Short term debt Ratio, Total debt Ratio.

(b) Independent Variables:

Profitability (Return on Asset, Return on Equity), Growth, Risk, Asset Tangibility, Firm size, Earning volatility, Non-debt tax shields, Liquidity Ratio.

(II) Factors influencing the dividend decisions

(a) Dependent Variable:

Dividend Payout Ratio.

(b) Independent Variables:

Profitability (Return on Asset, Return on Equity), Earnings per share, Risk, Liquidity, Growth, Leverage, Size, Cash holdings, Solvency Ratio.

- To examine the impact of capital structure on the firm value of the select industries.

(a) Dependent Variable:

Firm value.

(b) Independent Variables:

Long term debt to equity, Long term debt to asset.

- To access the impact of dividend decisions on the firm value of the select industries.

(a) Dependent Variable:

Firm value.

(b) Independent Variables:

Dividend payout ratio, Dividend yield ratio.

- To study the inter industry and intra industry differences of capital structure and dividend decisions.

(a) Capital Structure Variables:

Long term debt ratio, Short term debt ratio, Total debt ratio, Return on Asset, Return on Equity.

(b) Dividend Decision Variables:

Dividend payout ratio, Dividend yield ratio.

- To study the impact of capital structure on dividend decisions of the select industries.

(a) Dependent Variable:

Dividend payout ratio.

(b) Independent Variables:

Return on Asset, Return on Equity, Risk, Asset Tangibility, Firm size, Earning volatility, Non-debt tax shields, Liquidity Ratio.

Table 2 exhibits the description of variables implemented in the study.

Table 2

Description of Variables

Variables	Description
Long term debt Ratio	Long term debt/Total assets
Short term debt Ratio	Short term debt/ Total assets
Total debt Ratio	Total debt/Total assets
Return on Asset	Net profit/Total assets
Return on Equity	Net profit - preference dividends/No. of shareholder's equity
Growth	Market capitalization/ Net assets value
Market capitalization	Current market price per share x Number of outstanding equity shares
Risk	Market price per share/Earnings per share
Asset Tangibility	Net fixed assets /Total assets
Firm size	Natural logarithm of sales
Earning Volatility	Standard deviation of EBIT/Total assets
Non-debt tax shields	Depreciation/Total assets
Liquidity ratio	Total current assets/Total current liabilities
Earnings per share	Earnings available for equity shareholders/Number of equity shares
Dividend payout ratio	Dividend per equity share/Earnings per share

Variables	Description
Leverage	Total debt/Total assets
Cash holdings	Cash + short –term investment/Total assets
Solvency ratio	Total liabilities to outsiders/Total assets
Long term debt to equity	Long term debt/Total equity
Dividend Yield ratio	Dividend per share/Market value per share
Firm value	Market value of equity + Market value of debt

Source: Computed Data

Exhibit 6

THEORETICAL FRAMEWORK OF THE STUDY

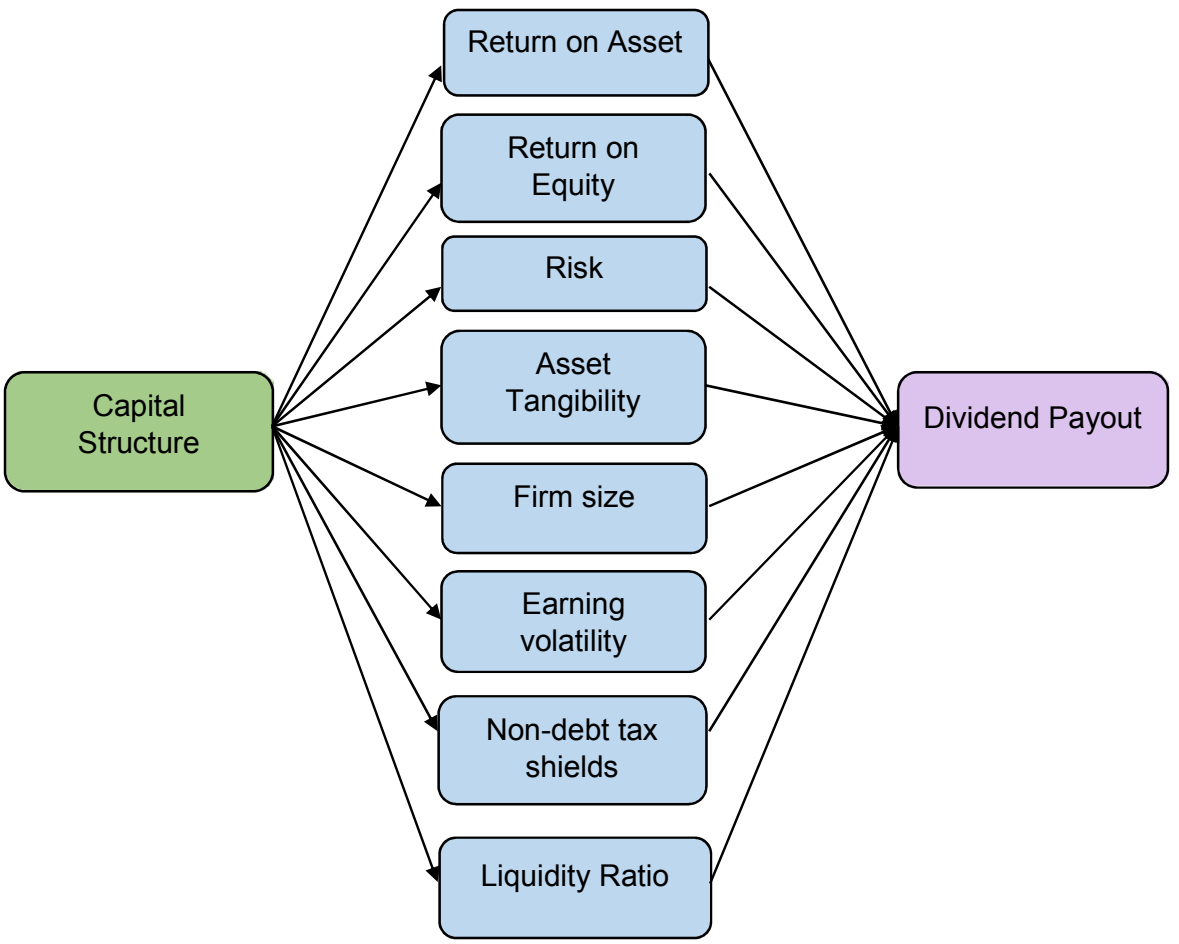

Exhibit 6 displays the theoretical framework of the study. It indicates Return on Asset, Return on Equity, Risk, Asset Tangibility, Firm size, Earning volatility, Non-debt tax shields and Liquidity Ratio as the factors of capital structure. These are analysed with dividend payout ratio with a view to reveal the prevailing impact.

3.5 TOOLS USED FOR ANALYSIS

Analysing data involves examining the collected information in different ways to reveal the prevailing relationships, patterns, deviations and trends. The SPSS 21 version software package was used to analyse the data. The impact of capital structure on dividend decisions of select Construction associated Industries in India was analysed based on the Financial Statements of the corresponding companies during the period of study. The financial and statistical tools were applied to analyse the data, draw proper conclusions and to understand better the overall situation. The following tools were used to analyse the collected data.

3.5.1 FINANCIAL TOOLS

Financial analysis involves the practice of evaluating businesses, projects, budgets and entities to determine their suitability for investment. It includes the usage of financial tools for analyzing data to find out the positions of efficiency, solvency, liquidity or profitability, to decide on investment. The financial tools used in the current research study are,

1. RATIO ANALYSIS

The Ratio Analysis is a quantitative analysis of financial statements of a company like balance sheet, income statement, cash flow statement and so on. Ratio analysis is used to evaluate various aspects of a company's operating and financial performance such as efficiency, profitability, liquidity and solvency. The trends over these ratios could be evaluated for a particular period of time, to find any improvement or decline.

(a) Long Term Debt Ratio

The long term debt to total assets ratio is a measurement denoting the percentage of a company's assets that are financed with loans and financial obligations lasting for more than a year. The ratio provides a general measure of the financial position of a company, including its ability to meet financial requirements for outstanding loans. The calculation for long term debt ratio is:
Long term debt ratio = long term debt / total assets

(b) Short Term Debt Ratio

The short term debt account is shown in current liabilities portion of a company's balance sheet. This account is comprised of any debt incurred by a company that is due within one year. The debt in this account is usually made up of short-term bank loans taken out by a concern. The calculation for the short term debt ratio is:
Short term debt ratio = Short term debt / Total assets

(c) Total Debt Ratio

Total debt to total assets is a leverage ratio that defines the total amount of debt relative to assets. This enables comparisons of leverage to be made across different companies. The higher the ratio, the higher the degree of leverage, and consequently, financial risk. This is a broad ratio that includes long-term and short-term debt (borrowings maturing within one year), as well as all assets including tangible and intangible. The calculation for the total debt ratio is:

Total debt to total assets = Total debt / Total assets

(d) Return On Asset

Return on assets (ROA) ratio indicates the profitability of a company in relation to its total assets. ROA denotes the efficiency of management to use its assets to generate earnings. ROA is presented as a percentage and it is also referred as "return on investment". The calculation for the Return on assets (ROA) ratio is:

Return on Assets ratio = Net Income / Total Assets

(e) Return On Equity

Return on equity (ROE) ratio is the amount of net income returned as a percentage of shareholders equity. Return on equity measures the profitability of a company by revealing the amount of profit it generates with the money invested by the shareholders. ROE is expressed as a percentage. The calculation for the Return on assets (ROA) ratio is:

Return on Equity = Net Income / Shareholder's Equity

(f) Growth

Market capitalization and Net assets value of a company helps to evaluate its growth during a particular period. Net assets value is a measure of a company's size and market capitalization is a measure of the total value of a company's outstanding stock. The calculation for Growth ratio is:

Growth = Market capitalization / Net assets value

(g) Risk Ratio

The price earning (P/E) ratio implicitly incorporates the perceived risk of a given company's future earnings (Anupam Mehta 2012). A higher P/E ratio indicates that the investors are interested in higher earnings growth in the future. Market price per share indicates the company's market value per share and Earnings per share is an indicator of a company's profitability. The calculation for Risk ratio is:

Risk = Market price per share / Earnings per share

(h) Asset Tangibility

Net fixed asset is the total value of all fixed assets and total assets includes total of current assets, tangible and intangible assets. The calculation for Risk ratio is:

Asset Tangibility = Net fixed assets / Total assets

(i) Firm Size

Natural logarithm of sales is an indicator of firm size. The calculation for firm size is: Firm size = Natural logarithm of sales

(j) Earning Volatility

Earnings volatility refers to fluctuations in the earnings of a company. Volatility in earnings is a serious issue that makes management very hard to plan ahead. The calculation for Earnings volatility is:

Earnings volatility = Standard deviation of EBIT / Total assets

(k) Non-Debt Tax Shields

Non-debt tax shield is the scaled depreciation tax shield for a particular year calculated by multiplying the effective tax rate by the depreciation amount scaled by total assets. They contributes to decrease in tax payments. The calculation for Non-debt tax shield is:

Non-debt tax shield = Depreciation / Total assets

(l) Liquidity Ratio

Liquidity ratios indicates a company's ability to pay off its short-terms debts obligations. Generally, these ratios show the cash levels of a company and its ability to convert other assets into cash to pay off liabilities and to meet its current obligations. The calculation for Liquidity ratio is:

Liquidity ratio = Total current assets / Total current liabilities

(m) Dividend Payout Ratio

The dividend payout ratio is the percentage of earnings paid to shareholders in the form dividends. It indicates the quantum of money a company is returning to its shareholders in relation to the amount of total net income of a company. The calculation for Dividend payout ratio is:

Dividend payout ratio = Dividend per share / Earnings per share

(n) Leverage Ratio

Leverage ratio is a measure to evaluate a company’s debt levels. It indicates the portion of capital comes in the form of debt (loans), or assesses the ability of a company to meet its financial obligations. The calculation for Leverage ratio is:

Leverage ratio = Total debt / Total assets

(o) Cash Holdings Ratio

Cash holdings ratio is the ratio of a company's cash and cash equivalent assets to its total liabilities. It indicates the extent to which readily available funds in the company to pay off its current liabilities. The calculation for Cash holdings ratio is:

Cash holdings ratio = Cash + short-term investment / Total assets

(p) Solvency Ratio

Solvency ratios are used to measure a company's ability against its long-term obligations. In general, a solvency ratio measures the profitability of a company to meet its obligations. A higher ratio indicates financial strength of the company and a lower ratio indicates its weaker financial position. The calculation for Solvency ratio is:

Solvency ratio = Total liabilities to outsiders / Total assets

(q) Long Term Debt To Equity

Long term debt to equity ratio indicates the proportion of shareholders' equity and long-term debt used to finance a company's assets. A high ratio indicates a higher degree of business risk because the company must meet principal and interest on its obligations. The calculation for Long term debt to equity is:

Long term debt to equity = Long term debt / equity

(r) Dividend Yield Ratio

Dividend Yield ratio is expressed in percentage that indicates the portion of income a company pay out as dividends each year relating to its share price for its shareholders. The calculation for Dividend Yield ratio is:

Dividend Yield ratio = Dividend per share / Market value per share

(s) Firm Value

Firm Value represents the total economic value of a company. It is the entire market value of all ownership interests and asset claims of both debt and equity holders of the company. The calculation for Firm Value is:

Firm Value = Market value of equity + Market value of debt

(t) Earnings Per Share

Earnings per share (EPS) is the portion of a company's profit allocated to each outstanding share of common stock. Earnings per share is a measure of a company's profitability. The calculation for Earnings per share is:

Earnings per share = Net profit / Number of ordinary shares

3.5.2 STATISTICAL TOOLS

The statistical analysis involves the procedure of collection, examination, summarization, manipulation and interpretation of quantitative data using appropriate statistical tools to ascertain the underlying causes, patterns, relationships and trends. The statistical tools used in the current research study are,

1. Descriptive Statistics

Descriptive statistics summarize and organize research data. It is used to describe the group that is being studied. The measures of central tendency represent the typical value in a set of values. The mode is the most frequently occurring value, the median is the middle value, and the mean is the arithmetic average of the set of values. Measures of variability represent the degree of dispersion of values. Range is the difference between the highest and lowest values. Variance is the average of the squared deviations from the mean of the set of values, and standard deviation is the square root of the variance.

Average Mean, also known as arithmetic average, is the most common measure of central tendency. It may be defined as the value which is obtained by dividing the total of various given items in a series by the total number of items. The average of a set of *n* data *x*, the formula to find average value is,

$$\overline{X} = \frac{\sum x}{n}$$

The standard deviation is a statistical tool used to indicate the level of deviations, among the individual values in a group. The standard deviation is the square root of variance. The formula used to find the standard deviation is,

$$\sigma = \sqrt{\frac{\sum(\bar{x}-x)^2}{n-1}}$$

Variance = σ^2

The Mean, Standard deviation and Variance were calculated for the selected companies.

2. Compound Annual Growth Rate

The Compound Annual Growth Rate (CAGR) is used to measure the growth of any financial item over multiple time periods, expressed in annual percentage terms. It helps to remove the volatility from year to year and evaluate an average value of growth rate for particular time period. CAGR is calculated for capital structure and dividend variables.

The formula used to find Compound Annual Growth Rate (CAGR) is,

CAGR = (End period value / Beginning period value) $^{1/n}$ -1

3. Trend analysis

Trend analysis evaluates the financial information of an organization over a period of time. The financial statements of various years are compared with each other and the future values are forecasted accordingly. It helps to predict various aspects such as profitability, liquidity, capital structure, performance, dividend payouts etc. The trend values are computed for capital structure and dividend variables using the formula,

Trend analysis percentage = (Current year amount – Base year amount) / Base year amount

4. Multiple Regression Analysis

Regression analysis is a statistical method for estimating the relationships among variables. It helps to understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed. Generally, regression analysis estimates the conditional expectation of the dependent variable when the independent variables are fixed.

Multiple regression is an extension of simple linear regression in which more than one independent variable (X) is used to predict a single dependent variable (Y). The predicted value of Y is a linear transformation of the X variables such that the sum of squared deviations of the observed and predicted Y is a minimum. For computations, the interrelationships among all the variables are taken into account in the weights assigned to the variables. With two independent variables the prediction of Y is expressed by the following equation:

$$Y_i = b_0 + b_1X_{1i} + b_2X_{2i}$$

The Regression Analysis was computed, to find the factors that influence the capital structure and dividend decisions of the selected industries. To evaluate the Impact of capital structure on dividend decisions of the selected companies multiple regression model was framed.

5. Correlation Analysis

Correlation is a statistical measure that indicates the extent of association that exist among two or more variables. A positive correlation indicates the extent to which those variables increase or decrease in parallel and a negative correlation indicates the extent to which one variable increases as the other decreases. When the fluctuation of one variable reliably predicts a similar fluctuation in another variable, it could be predicted that the change in one causes the change in the other. However, a high degree of correlation does imply that the relationship of cause and effect exists between the variables. It also does not necessarily imply causation or functional relationship though the causation always implies correlation. It establishes only covariation. The formula for calculating Pearson's correlation is,

$$r = \frac{\sum XY - \frac{\sum X \sum Y}{N}}{\sqrt{\left(\sum x^2 - \frac{(\sum x^2)}{N}\right]\sqrt{(\sum y^2 - \frac{(\sum y^2)}{N})}}}$$

The Correlation analysis was computed, to find the impact of capital structure on the firm value of the select industries and the impact of dividend decisions on the firm value of the select industries.