CHAPTER-3

RESEARCH METHODOLOGY

Research Methodology is a science of studying how research is done scientifically or it is a way to systematically solve the research problem. It includes the various steps that are generally adopted by a researcher in studying his research problem. Research is a system of models, procedures and techniques used to find the result of research problem is called research methodology.

“Through the use of methods and techniques that are scientifically defendable, we may come to conclusions that have a high probability of being justifiable in a court of law if so needed.”

The present chapter is divided in three parts. Part one deals with need of the present study, scope of the study, companies selected for the purpose of study and the objectives of the study. Part second gives details about the material such as research design, sampling design, collection of data, time period of the study, variables of the study and chapter scheme for the study. Part three describes the hypothesis and statistical techniques/tools for data analysis. The end of this part also describes about the limitations of the study.

PART-I

NEED OF THE PRESENT STUDY:

Capital market has always been susceptible to the variety of variables pertaining the prices, trading, behaviour, settlement, liquidity, economy and listed companies. Every time one kind of formula or principle does not work that’s why the researcher plans to dwell upon research work on the present topic.

Technical and fundamental analyses are the important tools for the security analysis. If we think about security analysis then it is easy to predict the future stock price trend on the basis of technical analysis and show the profitability position on the basis of fundamental analysis. All stake holders (investors, brokers, management, merchant bankers, regulatory agencies, Government and researchers etc.) of the
stock market have benefited by taking the use of technical and fundamental analyses. That is why the researcher has decided to conduct a study on “technical and fundamental analyses of Sensex Representative Companies”.

**SCOPE/AREA OF THE STUDY:**

There are thousands of companies listed on the Bombay Stock Exchange. There are many indices in the Bombay Stock Exchange i.e. BSE-30/Sensex, BSE-100, BSE-200, BSE-500, BSE-IT and BSE-FMCG etc. It is very difficult to conduct technical and fundamental analyses of all listed companies on BSE or all indices of BSE. So, the researcher decided to study the BSE-Sensex because BSE-Sensex is the barometer of Indian Capital Market and all the companies of Sensex are well established and financially sound, and dominant company in their respective industry.

**PROFILE OF THE COMPANIES:**

The researcher has selected all the seventeen companies in the present study which have survived in Sensex during the study period (April, 2005 to June, 2012). The researcher has done Technical and Fundamental Analyses of these seventeen companies.

1. **State Bank of India**

   The company belongs to Banking Industry. The bank was incorporated in 1955. The Chairman of the bank is Pratip Chaudhuri and Managing Director of the bank is Hemant G Contractor. The registered office of the bank is in Mumbai, (Maharashtra). The bank is listed at Ahmedabad, Chennai, Delhi, Kolkata, London, Mumbai and NSE.

2. **Housing Development Finance Corporation Ltd.**

   The company belongs to Finance - Housing - Large Industry. The company was incorporated in 1977, the Chairman of the company is Deepak S Parekh, Managing Director of the company is Renu Sud Karnad and company secretary is Girish V Koliyote. The registered office of the company is in Mumbai (Maharashtra). The company is listed at Mumbai, NSE, and Singapore.
3. Maruti Suzuki India Ltd. Company
The company belongs to Engineering - Turnkey Industry. The company was incorporated in 1981. The Chairman & Managing Director of the company is R C Bhargava and company secretary is S Ravi Aiyar. The registered office of the company is in New Delhi. The company is listed at Mumbai and NSE.

4. Infosys Ltd. Company
The company belongs to Computers - Software Industry. The company was incorporated in 1981. The Chairman & Managing Director of the company is K V Kamath and company secretary is N R Ravikrishnan. The registered office of the company is in Bangalore,(Karnataka). The company is listed at Mumbai, NASDAQ, and NSE.

5. Tata Steel Ltd. Company
The company belongs to steel Industry. The company was incorporated in 1907. The Chairman of the company Ratan N Tata is & Managing Director of the company is H M Nerurkar and company secretary is A Anjeneyan. The registered office of the company is in Mumbai, (Maharashtra). The company is listed at London, Luxembourg, Mumbai, NSE and Singapore.

6. Tata Motors Ltd. Company
The company belongs to Automobiles - LCVs/HCVs Industry. The company was incorporated in 1945. The Chairman of the company Ratan N Tata is & Managing Director of the company is P M Telang and company secretary is H K Sethna. The registered office of the company is in Mumbai, (Maharashtra). The company is listed at London, Luxembourg, Mumbai, New York and NSE.

7. Bharti Airtel Ltd. Company
The company belongs to Telecommunication-Service Industry. The company was incorporated in 1995, the chairman and managing director of the company is Sunil Bharti Mittal and company secretary is Makesh Bhavnani. The registered office of the company is in New Delhi. The company is listed at Mumbai and NSE.
8. Larsen & Toubro Ltd. Company
The company belongs to Engineering - Turnkey Industry. The company was incorporated in 1946. The Chairman & Managing Director of the company is A M Naik and company secretary is N Hariharan. The registered office of the company is in Mumbai, (Maharashtra). The company is listed at London, Luxembourg, Mumbai, and NSE.

9. ITC Ltd. Company
The company belongs to Cigarettes Industry. The company was incorporated in 1910. The Chairman & Managing Director of the company is Yogesh Chander Deveshwar and company secretary is Biswa Behari Chatterjee. The registered office of the company is in Kolkata, (West Bengal). The company is listed at Kolkata, Luxembourg, Mumbai and NSE.

10. Hindustan Unilever Ltd. Company
The company belongs to Personal Care - Multinational Industry. The company was incorporated in 1933, the Chairman and Managing Director of the company is Harish Manwani\ and company secretary is Dev Bajpai. The registered office of the company is in Mumbai (Maharashtra). The company is listed at Mumbai and NSE.

11. Bharat Heavy Electricals Ltd. Company
The company belongs to Electric Equipment - General - Large Industry. The company was incorporated in 1964, the Chairman and Managing Director of the company is B Prasada Rao and company secretary is I. P Singh. The registered office of the company is in New Delhi. The company is listed at Mumbai and NSE.

12. Reliance Industries Ltd. Company
The company belongs to Refineries Industry. The company was incorporated in 1973. The Chairman & Managing Director of the company is Mukesh D Ambani and company secretary is K Sethuraman. The registered office of the company is in Mumbai, (Maharashtra). The company is listed at London, Luxembourg, Mumbai, NASDAQ, and NSE.
13. Hindalco Industries Ltd. Company
The company belongs to Aluminium Industry. The company was incorporated in 1958, the Chairman of the company is Kumar Mangalam Birla, Managing Director of the company is D Bhattacharya and company secretary is Anil Malik. The registered office of the company is in Mumbai (Maharashtra). The company is listed at Luxembourg, Mumbai and NSE.

14. Oil & Natural Gas Corporation Ltd. Company
The company belongs to Oil Exploration / Allied Services Industry. The company was incorporated in 1993. The Chairman & Managing Director of the company is Sudhir Vasudeva and company secretary is N K Sinha. The registered office of the company is in New Delhi. The company is listed at Mumbai and NSE.

15. HDFC Bank Ltd.
The company belongs to banking- private sector Industry. The company was incorporated in 1994, the Chairman of the company is C.M Vasudev, Managing Director of the company is Aditya Puri and company secretary is Sanjay Dongre. The registered office of the company is in Mumbai (Maharashtra). The company is listed at Luxembourg, Mumbai, New York and NSE.

16. ICICI Bank Ltd.
The company belongs to Banking - Private Industry. The company was incorporated in 1994. The Chairman & Managing Director of the company is K V Kamath and company secretary is Sandeep Batra. The registered office of the company is in Vadodara, (Gujarat). The company is listed at Mumbai, New York and NSE.

17. Wipro Ltd. Company
The company belongs to Computer software Industry. The company was incorporated in 1945. The Chairman & Managing Director of the company is Azim H Premji, and company secretary is V Ramachandran. The registered office of the company is in Bangalore, (Karnataka). The company is listed at Mumbai, New York and NSE.
OBJECTIVES OF THE STUDY:

The objectives of the present are:

1. To identify the reasons of inclusion and exclusion (Replacement) of Sensex Companies,
2. To identify market trends shown by Companies Scrips on the basis of Oscillators,
3. To find out the application of Ralph’s wave theory on the stock prices of the companies,
4. To examine the profitability of companies on the basis of fundamental analysis’s tools and
5. To suggest a model/import workable suggestions on the basis of results of technical and fundamental analyses.

PART – II

RESEARCH DESIGN:

A research design is the arrangement of conditions for collection and analyses of data in a manner that aims to combine relevance of the research purpose with economy in procedure. The present study is empirical-cum-analytical in nature. It has verified the theories of technical analysis on the basis of observation or experience. So, it is empirical by nature. It has examined the profitability of companies with the help of suitable statistical tools. So, it is analytical by nature.

SAMPLING DESIGN (POPULATION, SAMPLE SIZE AND SAMPLING TECHNIQUE):

All the companies listed on Bombay Stock Exchange or all indices of Bombay Stock Exchange is the population/universe. In the present study, BSE-Sensex has been considered. To achieve first objective, replaced (included and excluded) companies of BSE-Sensex during study period (from April, 2005 to June, 2012) have been taken. For second, third and fourth objectives 17 (Seventeen) companies which have survived (not replaced) in BSE-Sensex during the study period have been taken. Non-probability sampling technique was used for the study.
NATURE, SOURCES AND COLLECTION OF DATA:

In the present study, both types of data—secondary as well as primary have been used. The primary data collected by interview of stock brokers (Nos. 10) at Delhi. Secondary data was collected from financial statements of the companies, PROWESS (database of CMIE), Capitaline Plus Database, website of SEBI, website of BSE, and websites of the companies.

TIME PERIOD OF THE STUDY:

The period of seven years and three months from April, 2005 to June, 2012 have been taken to carry out the present study.

VARIABLES STUDIED:

The profitability position BSE-Sensex companies have been calculated on the basis of some fundamental analysis tools like, return on capital employed, return on net worth, gross profit ratio, net profit ratio, earning per share and dividend per share (formulas of these ratios have been given in chapter 1). The valuation of companies has been calculated on price-earning ratio and price to book ratio) formulas of these ratios have been given in Chapter 1).

CHAPTER WISE SCHEME OF THE STUDY:

This research work has been classified into seven chapters. These are:

1. First chapter describes investment, investment process, security analysis, technical analysis, fundamental analysis and background of BSE and BSE Sensex. It gives an overview of Capital Market, risk-return analysis and efficient market hypothesis etc.

2. Second Chapter includes the existing literature reviewed by researcher and relevance of this literature along with research gap and the justification of the present study.

3. Third chapter elaborates the research methodology, adopted by researcher in order to complete the study.

4. Fourth chapter presents the reasons of replacement (included and excluded) of the Sensex Companies and profitability analysis of Sensex Representative Companies with the help of different statistical tools.
5. Fifth Chapter shows the monthly volatility of stock prices of companies and application of Ralph Nelson Elliott wave theory.

6. Sixth chapter portrays the trends of shares prices of companies on the basis of Oscillators.

7. After using all the analytical tools it is time to put the results and findings of significant nature at a single place, which is done in seventh chapter of the study, which also presents the suggestions based on the findings of the study.

PART – III

HYPOTHESES:

To achieve the objectives in an effective manner, the following hypothesis were framed:

H₁: There is no significant difference in Return on Capital Employed Ratios of the companies during the study period.

H₂: There is no significant difference in Return on Net Worth Ratios of the companies during the study period.

H₃: There is no significant difference in Gross Profit Ratios of the companies during the study period.

H₄: There is no significant difference in Net Profit Ratios of the companies during the study period.

H₅: There is no significant difference in Earning Per Share Ratios of the companies during the study period.

H₆: There is no significant difference in Dividend Per Share Ratios of the companies during the study period.

H₇: There is no significant difference in Price- Earning Ratios of the companies during the study period.

H₈: There is no significant difference in Price to Book Ratios of the companies during the study period.
STATISTICAL TECHNIQUES/TOOLS USED:

To analyses the collected data, various simple statistical techniques like Average, Standard Deviation, Annual Average Growth Rate and t-test have been used. The tools of technical analysis/Oscillators (MACD, ROC and RSI) have been used.

LOGARITHMIC STRAIGHT LINE: It is the method generally used by the researcher while analyzing the data of a long period (i.e. the period consisting the several years). This method, (also known as simple exponential curve method) is used as expression of the secular movement when the data is increasing or decreasing at regular interval of time. Generally, the Economic/ Business data have such characteristics.

The equation of this method is:

\[ Y = a b^t \]

When this equation is solved with the help of Logarithm, then it may be written as:

\[ \log Y = \log a + t \log b \]

To find out the value of ‘a’ and ‘b’, two normal equations are used. These are:

\[ \sum \log y = N \log a + \sum t \log b \]
\[ \sum (t \log y) = \sum t \log a + \sum t^2 \log b \]

The Annual Average Growth Rate in case of exponential trend is obtained as

\[ \text{AAGR} = \frac{\text{Antilog } b - 1}{\text{Antilog } b} \times 100 \]

In the analysis of this time series data concerning Return on Capital Employed Ratio, Return on Net Worth Ratio, Gross Profit Ratio, Net Profit Ratio, Earning Per Share Ratio, Dividend Per Share Ratio, Price- Earning Ratio and Price to Book Ratio have been treated with the same method. We have used the rotation as:

Y= Required Trend value

\[ t = \text{unit of time} \]

\[ a = \text{constant and Y-intercept} \]

\[ b = \text{slope of Y} \]

The statistic of t-test is:

\[ t = \frac{b}{\text{standard error} (b)} \]

\[ \text{standard error}(b) = \sqrt{\text{variance} (b)} \]

Degree of freedom =n-k (n-2)
b = least squares of estimate
Variance of b= estimated variance of b
n = sample size

**OSCILLATORS:**

**MACD:** (formula has been given in chapter 1) has been calculated by taking short-term moving average for five months (period) and long-term moving average for nine months (period).

**ROC:** (formula has been given in chapter 1) has been calculated by taking five months (period).

**RSI:** (formula has been given in chapter 1) has been calculated by taking five months (period).

**LIMITATIONS OF THE STUDY:**

The present research work had following shortcomings/limitations:

1. The researcher has not taken into account all indicators/techniques/tools of technical analysis i.e. Dow Theory, charts, support and resistance level, Fibonacci number and stochastic etc because of certain reasons. The reasons of avoiding or leaving any item are terminals limitation, constraint or beyond the “reach” item, on account of times and monetary impediments for any individual researcher. If all these techniques are taken into consideration for any research project of technical analysis, it will require team of researchers. That is why; studying with these limitations the present research work was delimited to oscillators and Ralph Nelson Elliott wave theory only.

2. In case of fundamental analysis only company analysis (Profitability analysis) was taken up as an analytical tool. The economy and Industry analyses have not been considered because every company as constituents of BSE-Sensex basically explicates the whole industry to which it belongs. Moreover, all 30 companies were almost all the industries of Indian economy. That is why; the economic and industry analyses were also left out from this research project.
3. Due to Non-availability of financial statements of the HUL Ltd. for the year 2007-08 required as such, fundamental analysis (profitability analysis) of this company could not be exercised. Only technical analysis has been done.

**FORMAT OF WRITING BIBLIOGRAPHY**

Broadly, in the area of research, two main styles of bibliography viz. American Psychological Association (APA) and Modern Language Association (MLA) are used. In this study, APA style has been used for writing bibliography.