Research is diligent and systematic inquiry or investigation of a subject in order to discover or revise facts, theories, applications etc.\textsuperscript{75} While methodology is the system of methods followed by particular discipline.\textsuperscript{76} Any fundamental research process can have four major steps to achieve the objective. The first step is to decide the research problem or objective. Then second stage the research scope is decided. The third step the research design. And finally the fifth step relates to the Analysis and interpretation based on which the presentation of data is done.

4.1 Objectives of Study

The primary objective of the research is the analysis of Mergers and Acquisitions in India in recent times. Therefore, the core objectives of the study can be described as follows:

- To conduct in depth analysis of the trend of the mergers and acquisitions sector in India.
- To analyze post merger operating performance and efficiency of the acquiring firm.
- To measure the post merger impact on shareholders wealth.
- To evaluate the approach of corporate towards the mergers and acquisitions events.

\textsuperscript{75} http://dictionary.reference.com/browse/research as on December 24, 2010
\textsuperscript{76} http://ebook.org//dictionary/methodology/html as on December 24, 2010
4.2 Scope of the study

This empirical study is basically a step towards understanding mergers and acquisition process. The plenty of research work have taken place in India particularly for analysis of mergers and acquisitions (M&A). All the analysis is either individual objective based or particular industry based. But in depth analysis of overall mergers and acquisitions in India has not been explicitly recognized. In the era of globalization, small organizations would either merge with giant or exist from the market. The M&A will play crucial role in the growth of the business. Academically, M&A has been scrutinized from the viewpoint of a multitude of disciplines, e.g. finance, economics, law, business, strategy, organization theory, human resource management and sociology.

This study belongs to an overall research effort interested in the organization of economic activity in contemporary societies. This type of research is characterized by the appreciation of the need for multiple disciplinary perspectives to single management research phenomena, investigation at different levels of analysis (e.g. individual, firm, inter-organizational, industry and global) as well as a general appreciation of conceptual research aiming at building frameworks and mental models that operate as cognitive frameworks for academics and professionals.

The success of a merger or acquisition lies in a lot of issues such as corporate strategy, valuation, risk, and integration...etc. This empirical research study can be divided into five different categories. Firstly, the trend analysis would be conducted mainly in two ways.

i. Year wise analysis

ii. Sector wise analysis

Further it can be gauged in two ways i.e. M&A manufacturing sector and non manufacturing sector. Furthermore micro level classification for trend analysis is possible in terms of mean of payment, cross border vs. domestic etc. But primarily it can be divided into two ways i.e. year wise as and sector wise analysis of trends of mergers and acquisitions. The overall trend analysis can be presented from the following chart.
Secondly, an attempt has been made to analyze the research post merger operating performance of the organization in which the sample of 30 mergers was taken which consisted of 10 mergers for each of the 2004, 2005 and 2006 years. So total sample of 30 mergers are taken for the analysis in which internal mergers for corporate restructuring have been excluded.
The analysis was conducted for each acquiring company for 6 years of which 3 years were premerger period and 3 years was post merger period based on which conclusions have been derived. The focus of the analysis was to examine profitability, liquidity, operating efficiency and leverage or solvency of the firm.

Thirdly, M&A impact on shareholders wealth was analyzed. This is an ultimate test for the M&A because the shareholders are the ultimate owners of the organization. Two different types of sample were taken for the consideration i.e. top ten acquisitions by Indian companies and secondly, the sample of thirty acquisitions for last two years acquisitions by Indian companies. The analysis was done on the basis of two variable i.e. market return and script return. The former is independent variable while the later one is dependent variable. The pre and post merger impact on both variables was analyzed in terms of expected return, abnormal return and the relation between the same.

Fourthly, the procedural aspects are analyzed on two grounds. One through taking sample of twenty M&A managers evaluating different aspects of M&A and secondly through detail case study of Nirma Industries Ltd. and Core Healthcare Ltd.

Research type:
The thesis involves both descriptive as well as causal research
4.3 Research Design:

4.3.1 Trend Analysis:

As per the scope of the research, three types of trends were measured i.e. sector wise trend, year wise trend and integrated trend. The entire analysis was based on secondary sources of data. The main source of data was Capital Line database.

The first step of trend analysis was to collect data from PROWESS and Capital Line base. Subsequently the collections of data were segregated as the year of effective date and industrial sector. Two broad categories were created for the micro level trend analysis of the data i.e. manufacturing sector and non-manufacturing sector. Accordingly the data were segregated on the basis of manufacturing and non manufacturing sectors.

4.3.2 Post Merger Performance:

There are many ways of performance evaluation of the mergers and acquisitions event. This research follows fundamental approach of the performance evaluation. To evaluate the performance, a sample of 30 companies was taken for the analysis. The performance for three years of pre acquisitions period and three years of post acquisitions period was evaluated. And based on that conclusion of long term effect on six different aspects of performance evaluation was measured for a period of six years. The means of performance measurement are as follows.

1. Profitability
   a. Sales
   b. Profit After Tax
   c. Net profit margin
   d. Earnings Per Share
2. Liquidity Ratio
   a. Current Asset
   b. Debtor ratio
   c. Inventory Turnover ratio

3. Solvency Ratio
   a. Debt – Equity Ratio
   b. Interest Cover Ratio
   c. Impact on Capital Market
   d. Equity Paid Up
   e. Dividend
   f. Book Value
   g. Market Capitalization

4. Impact on the Cash Flows
   a. Operating Activities
   b. Investing Activities
   c. Financing Activities

5. Returns
   a. Return On Capital Employed
   b. Return On Net Worth

6. Forex Investment
   a. Revenue earnings in Forex
   b. Revenue Expenses in Forex
The result were compared with the results of the pre merger performance and the conclusions considered findings of the same. Although the approach is very much fundamental but it is very much effective. Although analysis has been done for many ratios but due to the limitation of space only important ratios have been considered in thesis.

4.3.3 Impact on Shareholders Wealth:

There are fundamentally two types of impacts on shareholders' wealth due to mergers and acquisitions. First, long term effect and secondly, short term effect. The long term effect on shareholders' wealth can be measured through analyzing post merger operating performance of the acquirer company. To evaluate short term impact on shareholder's wealth, the volatility in price of share of acquiring company during the period of mergers and acquisitions event should be measured. The time period for mergers and acquisitions considered for analysis has been framed following seven ways.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Time Period</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>30 days before source date to 1 day before source date</td>
<td>SD-30 to SD-1</td>
</tr>
<tr>
<td>2.</td>
<td>10 days before source date to 1 day before source date</td>
<td>SD-10 to SD-1</td>
</tr>
<tr>
<td>3.</td>
<td>The source date</td>
<td>SD</td>
</tr>
<tr>
<td>4.</td>
<td>1 day after source date to 1 day before effective date</td>
<td>SD+1 to ED-1</td>
</tr>
<tr>
<td>5.</td>
<td>The effective date</td>
<td>ED</td>
</tr>
<tr>
<td>6.</td>
<td>1 day after effective date to 10 days after the effective date</td>
<td>ED+1 to ED+10</td>
</tr>
<tr>
<td>7.</td>
<td>1 day after the effective date to 30 days after the effective date</td>
<td>ED+1 to ED+30</td>
</tr>
</tbody>
</table>

Note: Source date (SD) is the date of announcement of merger and effective date (ED) is the date of implementation of the merger

The formulation of the time-frame is the same for both price and volume effects that were considered for the study. The days taken in the timeframe were not the trading days as they also
included the days on which the stock market did not operate. Therefore, there is a possibility of varying number of trading days for different firms in the same timeframe.

The two variables considered were i. Return of BSE 500 (Market Return) and
ii. Script return.
The analysis considered the regression results and ANNOVA table to examine the variation in the actual and expected returns. The analysis involved the following steps.

- Collection of data of share price and closing index from BSE site
- Finding out daily script return and market return
- Regression analysis between market return and script return

Regression method was used to estimate expected rate of return. Besides abnormal return and cumulative abnormal return was also done based on which findings are measured. In addition to this, five days moving average were calculated for the opening and closing share price and trade volume for the pre merger and post merger in order to obtain results on shareholders wealth.

Type of Research:
Causal Research

Data and Sample
The study is constrained to the amalgamation announcements during the years 2007 to 2009. The data were collected for all publicly listed companies who announced their amalgamation plans.
during this specific time period. A total of 30 companies were selected for the study. The 30 companies were further classified into 10 sectors. The data for the companies were collected from Capitaline and Prowess Software which were listed with the Bombay Stock Exchange of India Ltd. All the data related to prices, volumes and indices of the companies were collected from the website of the Bombay Stock Exchange of India Ltd. (www.bseindia.com).

The following criteria were considered to select the merger & acquisition announcement that qualified for our selection of the sample:

- The amalgamation source date was the date on which the stock exchange that is Bombay Stock Exchange was informed that the mergers & acquisitions were approved by the Board of Directors.

- The closing price for days of time-frame decided for a particular firm was according to the website of Bombay Stock Exchange.

- The indices taken for the study of companies were BSE-500.

Type of Sampling:

- Simple Random Sampling method was used to select the M&A firms.

Methodology

This part attempts to explain calculation of the abnormal return using the excel worksheet. Following steps were involved:
I. Collection of data from bseindia.com and record it in the Excel worksheet

As mentioned earlier, the daily share price data was collected from bseindia.com and compiled in the excel worksheet. The above picture of excel worksheet represents the pattern in which share price data which were collected for each related firms. The data pertained to daily share prices, No. of shares traded, etc. The data were collected for all the related firms as per the time-frame decided earlier.
II. Computing Daily Script Return

Daily script return of each day is the difference between two consecutive working days closing price divided by the first day’s closing price. As shown in the above picture, the script return 1.32% is difference between closing price of two consecutive days i.e. 4th and 5th June 2008 divided by the 4th June’s closing price.
III. Calculating Daily Market Return

To calculate daily market return, the same formula which is used in finding out daily script return is used with slight alteration i.e. instead of closing price, BSE 500 indices closing value. It is clear from the above picture that for two different dates closing index for BSE 500 was 6087.93 and 6169.16. Thus, the daily market return would be 1.33%.

IV. Examining relationship between script return and market return

After finding out the daily script return and market return for the under consideration period, the next step was to examine the regression relation between the script and market return. The data used for the regression equation was, the period of 3 months before the source date of the merger or acquisition to 1 month before the source date of the Amalgamation (SD-90 to SD-30). This is
because it was assumed that most of the abnormality in trading would start about one month before the amalgamation announcement due to some insider leakage of information, before that period script tends to behave normally.

The interpretation of regression result involves four critical values. They are F statistic, R-Square, Alpha value and Beta coefficient. The explanation for each of these terms the data is given below.

i) **F statistic:**

F statistic indicates whether regression line is good fit or not. In population genetics, F-statistics (also known as fixation indices) describe the level of heterozygosis in a population; more specifically the degree of (usually) a reduction in heterozygosis when compared to Hardy–Weinberg expectation. F-statistics can also be thought of as a measure of the correlation between genes drawn at different levels of a (hierarchically) subdivided population. This correlation is influenced by several evolutionary processes, such as mutation, migration, inbreeding, natural selection, or the Whaled effect, but it was originally designed to measure the amount of allelic fixation owing to genetic drift.

ii) **R-square:**

The R-squared value shows how reliable the dependent variable on independent variable is. It varies between zero and one. An R-squared value of one indicates perfect correlation. The higher the R-square indicates stronger correlation between the script return and market return. So that leads to some of good decision making and helps in proper judgment and interpretation. Generally R-square of more than 0.50 is considered to be good.

**Intercept a or Alpha**

The ‘a’ is the constant value which indicates the unsystematic risk or company risk.
**Slope of the line b or Beta Coefficient**

The ‘b’ coefficient in the regression equation is called the slope of line. It represents how much of a unit change in the independent variable X could change the value of dependent variable Y. It is also known as Beta of script in comparison of market.

Both ‘a’ and ‘b’ are the numerical constants because for any given regression line, their values do not change.

**V. Estimating Expected Return**

The expected returns were calculated from the regression equation in the following form:

\[ Y = a + bX \]

\[
\text{Slope}(b) = \frac{(\Sigma XY - (\Sigma X)(\Sigma Y))}{(N\Sigma X^2 - (\Sigma X)^2)}
\]

\[
\text{Intercept}(a) = \frac{(\Sigma Y - b(\Sigma X))}{N}
\]

Where,

- \( Y \) = Independent Variable
- \( X \) = Dependent Variable
- \( a \) = The intercept point of the regression line and the y axis.
- \( b \) = The slope of the regression line
- \( N \) = Number of values or elements
- \( X \) = First Score
- \( Y \) = Second Score
- \( \Sigma XY \) = Sum of the product of first and second scores
- \( \Sigma X \) = Sum of first scores
- \( \Sigma Y \) = Sum of second scores
- \( \Sigma X^2 \) = Sum of square first scores
VI. Estimating the Abnormal Return

The abnormal return for a given day can be found out by subtracting expected return (found by using regression) from the actual return (found out in slope B). Positive abnormal return indicates the positive effect, generated by the M&A among the investors, and vice versa.

VII. Examining Cumulative Abnormal Return

In stocks, the sum of all the differences between the expected returns and the actual returns up to a given point in time. Since the expected return is computed by an asset pricing model, the cumulative abnormal return may be used to determine how accurate the model is. More often, it is used to investigate the affect extraneous events have on stock prices. As mentioned above, to analyze the long term and short term effect of the event, this research study has divided the M&A period in different windows. So, to check the cumulative effect of the abnormal return in a given time window can be found out by calculating cumulative abnormal return for that period. Same way for each time frame for each acquiring firm the abnormal return can be calculated. The following image clears the concept.
In order to draw overall inferences for the event of interest, the abnormal return observations are aggregated along two dimensions—through times and across securities. The following measures of abnormal performance are used:

❖ **Cumulative Abnormal Return (CAR):** cumulative sum of stock i’s prediction error (abnormal returns) over the window \((t_1,t_2)\)

\[
CAR_i(t_1,t_2) = \frac{1}{T} \sum_{j=t_1}^{t_2} AR_{ij}
\]

❖ **Average Abnormal Return (AAR):** stock i’s cumulative abnormal return divided by the number of days in the window \((t_1,t_2)\)

\[
AAR_i(t_1,t_2) = \frac{CAR_i(t_1,t_2)}{n_i(t_1,t_2)}
\]

VIII. **Examining Abnormal Volume Effect:**

After examining price effect, the same way impact on volume in the related period is examined. To examine the volume effect in M&A period, following three necessary measures was taken into consideration.

i. Effect on Average Daily Volume Effect  
ii. Abnormal Volume traded  
iii. Cumulative Abnormal Volume

As it is mentioned above, the effect on volume will be analyzed the same way as price effect. Through this analysis, a strong comment & conclusion can be derived on the volume traded during the M&A period that helps investor to develop the behavior regarding volume trading during the specific period to earn optimum profit in short term trading.
IX. Deriving Mean of different Measures:

To conclude on the exert behavior in short term trading during M&A period, mean of price and volume of the sample observation for the different period should be measured. The following four means for price and volume plays considerable role in deriving conclusion on margin trading.

- **Mean Cumulative Abnormal Return (MCAR):** average of the cumulative abnormal returns across observations (firms), it is a measure of the abnormal performance over the event period.

\[
MCAR(t_1, t_2) = \frac{1}{N} \sum_{t=1}^{N} CAR_i(t_1, t_2)
\]

- **Mean Average Abnormal Return (MAAR):** sample average of the cumulative abnormal returns sample average of firm AARs. This measure of abnormal performance takes into account the fact that the number of days in that window (t1,t2) may be different across firms and therefore gives a greater weight to the ARs of firms for which this window is shorter. On the contrary, MCAR gives same weight to every ARs. This implies that MAAR is more powerful when the "abnormal behavior" of returns is concentrated in short window, while MCAR is more powerful in detecting abnormal performance over long window.

\[
MAAR(t_1, t_2) = \frac{1}{N} \sum_{t=1}^{N} AAR_i(t_1, t_2)
\]

4.3.4 Analysis of the case study

There are basically two reasons behind selecting Nirma – Core merger as a case study. Any merger or acquisition is identically evaluated on the basis of achievement of the perceived objective of the event. If the company achieve the objective after merger than the merger is
successful even if though there is no financial synergy. The merger had taken place in the year 2006, therefore five years performance before merger was taken in to consideration for analysis. To calculate the financial synergy of Nirma ltd. after acquisition of Core group, the following steps is taken.

1. Valuation of each firm separately to calculate free cash flows and terminal values.

2. Evaluating the combined performance assuming there was no synergy. (Add up the present values for the two firms estimated in step 1)

3. Prepare a cash flow statement of merged data of both firms by just adding up the items on the individual firms' statements.

4. Evaluate where the gains from synergy were expected. (Higher revenue growth or lower costs)

5. Translate the synergy gain into dollars on the combined statement. If revenues are going to grow faster because of the synergy apply a faster growth rate to revenue in the combined statement. If costs are going to be cut, show the reductions in costs on the statement.

6. Calculate the values of the merged data considering changes made in step 5.

7. Compare with the value obtained in step 2. The difference would be the synergy gain.

8. Evaluating post merger operating efficiency.
4.3.5 Analysis of survey data

A questionnaire was designed to obtain information on the practical aspects of the mergers and acquisitions process and the valuation of target Company. The respondents for the survey were mergers and acquisitions managers and M&A consultants. The research methodology adopted can be narrated as follows.

1) Data Sources:
   
   **Primary Data:**
   Primary data was collected through sample survey using a designed and pretested questionnaire.

   **Secondary Data:**
   The secondary data and related information was collected from the following sources.
   
   - Annual reports of each company selected for the study
   - Library research
   - Journals and magazines
   - BSE website
   - News Paper Articles

2) Research Approaches:
   
   There are five approaches of conducting research. They are i. observations, ii. Focus groups, iii. Survey approach, iv. Behavioral approach and v. Experimental research. This thesis is based on survey method because.

3) Research Instruments:
   
   There are major three ways to attain data and they are questionnaires, qualitative measures and technological devices. As stated earlier, questionnaire was designed and pre tested in order to obtain the required information for the studies.
Sampling Plan:

- Sampling unit: managers & consultants involved in the M&A process
- Sample size: 50
- Sampling Procedure: Convenience sampling

4) Contact Method:

There are four types of contact methods i.e. mail questionnaire, telephonic interview, personal method and online interviews. The contact method used in this research was personal interview method.

4.4 Limitations of the study:

- The geographical area of research for the thesis covers the cities of Ahmedabad, Mumbai and Surat. Therefore, findings and conclusions would be applicable to the M&A that have taken place in these cities only.
- The sample size of 30 mergers was considered to examine the operating performance. Therefore, the conclusions drawn from the sample survey may different from some firms of the overall scenario.