CHAPTER—3

"RESEARCH METHODOLOGY"
Research Methodology

In this Chapter, the systematic research-design followed by the researcher is given in detail stepwise.

Design

Researcher planned to investigate and identify the investment decision making behaviour of investor in the capital market in India; It was planned that the responses from the investors (under sample) should be amassed in respect of: the aspects influencing their investment-decision-making; and the methods they follow in forecasting the capital market ups and downs so that they can mould their behaviour for their better returns and less-risk. These aspects were (which the researcher identified after a lot of research survey and discussion with the people working in the Capital-Market arena; and also on the basis of self-experience that the researcher gained, still gaining, working in Broking company since 2004).

Area of the Study: In this part of 'Plan/design of the study, three Capital-market area of Delhi, Bombay and Calcutta were chosen for amassing the relevant information from the investors who play their investment games in these (or through the Brokers of these areas) capital market. These areas were selected endowed with reason that the maximum trading of financial vehicles (shares, Bonds and Derivatives) takes place (in numbers and volumes). Almost 80% or more of the total capital market trading is done through the Brokers of these areas. The on-line trading has made the trading from anywhere in the world. Moreover, being the employ of Broking Company,
it was easy for me to reach the individual investors/traders of all these areas

**Sample:** Factually speaking and here putting in the words, it was not possible for the single researcher to make all individual investors as party/respondents of the present study. Therefore, the random-cum-purposive sampling mechanism was adopted. The investors, in the backdrop of studying their investment decision-making behaviour, were sampled from each market area (i.e. Delhi, Bombay and Calcutta) in Table 3.1 as under

<table>
<thead>
<tr>
<th>Market Area</th>
<th>No. of Respondents</th>
<th>Nature of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delhi</td>
<td>400</td>
<td>Individuals</td>
</tr>
<tr>
<td>Bombay</td>
<td>400</td>
<td>-do-</td>
</tr>
<tr>
<td>Calcutta</td>
<td>400</td>
<td>-do-</td>
</tr>
<tr>
<td>Total</td>
<td>1200</td>
<td>-do-</td>
</tr>
</tbody>
</table>

**Why 400 respondents from each Market?**: Infact, it was very difficult to determine the no. of 'investor respondents' from each market under study. The discussion with some academicians, brokers from Delhi and Bombay, Researching employees of some big brokers, I was suggested that 300-400 could be an appropriate and representative sample from each market because, at Random, the total no. of 1200 shall cover all kinds of investors (regular, causal, momentum and contrarian traders, noise traders, herding and representative traders, Neoclassical etc.). Therefore, keeping into consideration the points of:

1. Representativeness of the sample to the universe
2. Large and Normal sample size with reference to total individual investors

3. Personal hindrances in the back drop of financial, Physical, time and reach, the samples were taken (given in table 3.1).

'Procedure of responses' amassing:

**Items for instruments:** I gleaned out the items from the 'reviewed literature' (as given in Chapter 2) and from the long deliberations with supervisor and professionals of Capital/Stock which were to be asked from the sampled investors so that there investment decision-making behaviour could be studied in detail. While preparing the instruments to cull the responses from the respondents under sample, the objectives of the study (given in chapter 2) were also kept into consideration with the deep sense of care and appropriateness. The following items were inserted into the instruments/questionnaire:

**Instruments:** A well-defined questionnaire comprising all the items given above was prepared to administer up on the respondent-investors in all the three markets under study. The items were put in the form of questions. The questions put in to the questionnaire were shown to the brokers and investors of Delhi area and to my supervisor. After modifying the instruments on the directions and suggestions of the above experts, the final shape was given. The brokers and some expert investors suggested that: Nothing should be complicated in the questionnaire, the question should be on the basis of behavioural aspects influencing the investors' investment behaviour and should not be on mathematical and statistical
aspects because those are used generally by the institutional investors who do not make the respondents of the present study. The format of the questionnaire is given in appendix-I.

**The Collection Of Information:** The questionnaires were got filled by the respondent investor who were randomly contacted either:

- In the brokers' offices at Delhi or by taking the time from those investors about whom I came to know at any place around Delhi.

- In case of Bombay and Calcutta, I visited only two times each. The four days at Calcutta and Two days at Bombay first visit was in February, 2006. During my first visit I was able to get 86 questionnaires from Calcutta area investors and 55 from Bombay area. I left 400 questionnaires with my friends in their office at Calcutta to get these questionnaires filled in from the individual investors. The same modus operandi, I followed for Bombay area, where also, I gave 400 questionnaires which I got well in time. In the month of March, 2007. I again visited Bombay and Calcutta to collect the left over questionnaires duly filled in by individual investors on the behest of my friends over there. It became possible due to the revolution in the information technology. I used to ring on mobile or did through e-mail counseling for repeating the requests to my friends at Calcutta and Bombay. This process took almost more than a year. During the same period, I kept on doing the review of literature from:
  - Journals,
For all this I visited, the libraries like:

- Institute of Economic Growth (Delhi-110007)
- Ratan Tata library (University of Delhi; Delhi school of Economics)
- Central library (M.D. university Rohtak)

The review of literature made me well acquainted with many aspects of “Research doing process”. The review of literature relating to the topic of present study is given in Chapter-2.

**Classification and Tabulation:** The questionnaires were already classified area wise. So, no much effort was made for it. However, the tabulation/process took a good amount of labour because all the responses of 1200 respondents were to be tabulated item wise. This took almost three months. The reason for such a long period only for tabulation was my office-occupation along with research work. The tabulated information/ responses were analysed about which delineation is given in the following pages.

**Analysis:** The classified and the tabulated data were analysed with the help of percentages/proportions, averages and the averages were calculated only in some cases of age and income of the investor. In maximum responses, the non-parametric statistics were used. The formula for calculating statistics were used given below:
1) Arithmetic Average ($\bar{X}$)
   \(A=\text{Assumed mean}\)
   \(f=\text{frequency of each class-interval}\)
   \(dx'=\text{Deviations from the assumed mean from the re-value of each class interval}\)

   \(N=\text{Total no. of frequencies/ respondents of class intervals}\)

   In other way:

   \[= \frac{[A+f_1dx_1'+f_2dx_2'+\ldots\ldots+f_ndx_n']}{\Sigma f}\]

2) Percentage = \(\frac{\text{frequencies of one item}}{\text{Total frequencies of all the items}}\) \times 100

3) Standard Deviations (\(\sigma\))

The standard deviations were calculated where the need of testing the differences in averages was required. The formula for calculating it was followed is given as under:

\[
\sigma = \sqrt{\frac{(\Sigma fdx'^2)}{N} - (\frac{\Sigma fdx}{N})^2}
\]

Where \(\sigma=\text{Standard deviations}\)

\(\Sigma fdx'^2=\text{Same as in calculation of arithmetic mean}\)

\(\Sigma fdx'=\text{Same as in calculation of arithmetic mean}\)
N=Total no. of respondents

Such calculated standard deviations were used to find out the standard error.

Test Statistics Used:

The tabulated information were analysed with the help of analytical statistic's methods given above. The obtained statistics were tested in terms of significance of: Differences, Associations, Homogeneity and 'goodness of fit'. The formulas (or test statistical instruments) used were:

- **Standard error**: The theoretical sampling distributions are known for all commonly used statistics. Infact, the "Standard Deviations" of the sampling distributions is called the Standard Error (Now it will also be written/indicated by SE after it). Thus SE is always a standard deviations which describes the variability of a statistics over repeated sampling. In the present study, the following to SEs were used:

1) **Standard Error of Mean**: The standard deviation of samples' means is termed as the standard error in same manner as the mean of the samples' means is known as "mean of the populaion" universe. Here, in the analysis process of the study, the under given formula was used to the Standard Error:

\[
\text{Standard Error}_{x_1-x_2} = \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}} = \sqrt{\text{S.E.}^2_{x_1} + \text{S.E.}^2_{x_2}}
\]
\[ \sigma_1^2 = \text{Square of the S.D. of 1st sample} \]
\[ \sigma_2^2 = \text{Square of the S.D. of 2nd sample} \]
\[ N_1 = \text{Total no. of respondents of 1st sample;} \]
\[ N_2 = \text{Total Number of respondents of 2nd sample.} \]

The another test of significance for testing the differences between proportions has also been applied in the test statistic methodology. This test is applied under the circumstances when the 2 or more samples are drawn from the different universities and their proportions’ differences are tested in terms of “significance”. The formula used is given below:

1) Standard Error \((P_1-P_2) = \sqrt{Pq\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}\)

Where \(P_1 = \text{Proportion of Sample-1;}\)
\(P_2 = \text{Proportion of sample-2;}\)
\(P = \frac{n_1P_1 + n_2P_2}{n_1 + n_2}, \text{Therefore } q = (1-P)\)

[Similarly, Standard Error \((P_2-P_3), \text{Standard Error } (P_1-P_3) \text{ can also be calculated by applying the same formula given above}]

2) The required normal deviate is then:

3) \[ z = \frac{(P_1-P_2)}{\sqrt{Pq\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} = \frac{\text{Difference}}{\text{Standard Error}_{(P_1-P_2)}} \]

This difference between the two proportions falls between 5 and 1 percent levels. Here, in the study, if the calculated value of \((\text{difference/ Standard Error}_{(P_1-P_2)} \text{ is less than 1.96 or 2.58 ( as the analyst felt appropriate)}, \text{then the difference was taken non-
significant and null hypothesis could be accepted at 95% or 99% level of confidence respectively, and vice-versa.

**Hypothesis of the study:**

The researcher has to make certain assumptions (or tentative solutions) about the sample/s and the population. Some researchers call it “Guess” also. Such assumptions (or guess/es), based on some reasoning, in advance, about the samples and population are called “Hypothesis” (or statistical-hypothesis). As a principle of the “Sampling Theory” our ‘Null-Hypothesis (H₀) are:-

- The nature of individual investors is identical in all the regions under study;

- All regions’ individuals consider and rank all the behavioural-aspects of investment identically (or in same way, or equally),

- The behavioural-aspects affect the individual-investors’ investment-decisions about capital market.

Some sub-hypothesis are developed at the time of analysis the collected information. So, for a man of research and reader, there is no need to mention such tentative-assumption well in advance.

**Test of Significance**
When a researcher analyse the collected data in the form of variables and frequencies, he/she requires a comparison and evaluation of two or more means, proportions (these two have been evaluated and compared in the present study in Chapter 4), Standard deviations or other statistics obtained for separate samples or from same sample for measurement obtained under two or more experimental conditions. The error enters during responses of data collection from a sampled group. The mean error for the groups (generally two) may be calculated. The study (of research based on survey and experiment) is made by collecting the information in the shape of measurable values. The results of numerical values require an evaluation. The evaluation is made in terms of difference between various statistical measurements. When two means (or other parameters) are compared, the researcher should have in his/her mind that means of the samples are subject to the sampling error. May the difference between the two means be probably ascribed to sample error, or may it be argued with confidence that the difference is significant. A decision is required between these alternatives. The statistical procedures which lead to decisions of this kind are known as “Test of Significance”.

Test of significance may be applied to the difference:

- Between statistics calculated on independent samples, or
- Between statistics obtained under different conditions of the same sample, or
- Between ‘single sample statistics’ and a fixed value.
In the present study, the test of significance has been applied to the difference between means of samples (which were independent) taken from Delhi, Bombay and Calcutta markets.

**Percentage Analysis: The percentage were also used for analysis.**

**χ²- Test (Chi-square Test):** The distribution of Chi-square (χ²) is of considerable theoretical and practical importance. In certain research-situations one has to compare a set of observed frequencies with a set of theoretical-frequencies. The theoretical frequencies are generated on the basis of some hypothesis or line of theoretical speculation which is independent of the data at hand. (In the present-work, the observed frequencies were grouped item wise in various tables in Chapter-4). The researcher would like to see whether the difference between the observed and theoretical frequencies are significant or non-significant. In this context, the null-hypothesis is that no difference exists between the observed and theoretical frequencies. The theoretical-frequencies are also known as the expected frequencies. Those are the frequencies (or numbers the investigator/researcher would expect to get if the particular theory in question were true.

So, here in the present study, in many cases, the observed and expected frequencies were compared by applying the Chi-square-test (χ²- test) that was calculated with the help of following formula:

\[ \chi^2 = \sum \frac{[(O-E)^2]}{E} \]
Where, O and E indicate observed and expected (or theoretical) frequencies respectively. If \( \chi^2 \) is equal to O, then no discrepancies exist; If \( \chi^2 \)-calculated-value is less than critical (also termed as "Table/reference-value") value then the difference are non-significant at particular level of significance and degrees-of-freedom. The calculated value of \( \chi^2 \) shall always be 0 or Positive. The negative value of \( \chi^2 \) can not occur. The degrees of freedom is calculated. In general, for any table of R rows and C columns, the degrees of freedom (d.f.) associated with the value of \( \chi^2 \), given the marginal totals, is \((R-1)(C-1)\).

**Results and Discussion**

After analyzing the information/data the results so obtained were explained (interpreted), and discussed with reasons, implications, supportive/contradicting previous studies' results, and suggestions.

**Summary, References and Appendix**

The last part of the research was given in the forms of “Summary of the entire research study”, References and Appendix

**Chapterwise Scheme**

The whole study has been divided into four Chapters. **Chapter 1**, under the title of “Introduction”, gives the theoretical framework of the literature relevant in the context of the present-research study.
Chapter-2 has been devoted to “Review of literature”. The reviewed literature is in the back-drop of the study upon which the researcher has dwelt upon. In the last of this Chapter-2, the objectives of the study are given because, the researcher has to determine the ‘purpose of the work’ after knowing the yester period work that has already been done by the scholars/experts/academicians/professionals/organizations etc.

Chapter-3 Delineates the ‘Research Methodology’ followed by the researcher in completing this work. It encompasses the whole modus-operandi stepwise including the ‘statistical-tools’ used for analysis.

Chapter-4. The last but the heart of whole-work, gives the results, based on appropriate analytical-tools, through tables; explanation of results; and the Discussion of the results with implications, reasons supporting/ contradicting results of yester-period researches given in chapter-3 of “Review of Literature”.

In the last positions of the thesis, the summary and suggestions; Bibliography and Appendix are given.