CHAPTER-II

RESEARCH METHODOLOGY

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CHAPTER II
RESEARCH METHODOLOGY

2.1 Introduction:

Research Methodology is a description of all the methods used by the researcher during the course of the research. This chapter gives a detailed account of the methodology used for the purpose of this research work. The discussion includes two main aspects: 1. The methods concerned with the collection of the data and 2. The statistical techniques used for establishing relationship between the variables.

2.2 Objective of the Study:

Based on the review of literature, the following areas were identified for study in this research work. The review of literature is dealt separately in the proceeding chapter. The research objectives for the current study are:

RO 1: To study the social structure of stock market.
RO 2: To find the pattern of social stratification in the stock markets.
RO 3: To examine socio economic profile of the actors within the stock market.
RO 4: To study the Brokers as an interest group.
RO 5: To identify the importance of social referencing in investment decisions.
RO 6: To find out the influence of gender on aspects like risk bearing ability, investment, participation and performance.
RO 7: To examine the patterns of trading over different time periods and also to analyze the influence of social factors on them.
2.3 Hypotheses of the Study:

Hypotheses act a guiding light to be focus and provide a direction in the pursuit of a research into the unknown or unexplored domain. This research work seeks to test the following hypotheses. These hypotheses were formulated based on the above mentioned objectives. The following are the hypotheses tested in this study:

H₁: Membership in bigger network groups is positively related with the availability of varied and valuable information.

H₂: Investors base their investment decisions on anticipated decisions of other market players than on their independent forecast.

H₃: Women rely more on network assistance than men.

H₄: Men tend to have more risk bearing attitude than woman.

H₅: The speed with which investors respond to new information is positively related to the number of years of market participation.

H₆: Major social events tend to positively affect the volume of trade.

2.4 Research Design:

The methodology used for the purpose of this research work incorporates the triangulation method. This is a culmination of three different methodologies for procuring data. The evolution of the methods of data collection passes through the different phases beginning with observation where the data that is needed can be collected by observing the facts that are evident to the plain sight.

The research design involves the use of survey method along with social network methods for the purpose of data collection. The use of social
network analysis methods is appropriate because by using the concept of the social network it becomes possible to analyze informal social relationships in a way which admits both the various channels of recruitment of an individual into the market, the participation levels and performance levels while not being affect much by potentially transitory character of the social networks.

The need for the use of multiple methods arises out of the structure and the functioning of the stock markets, which has a set of social actors whose integrations are taking place at a virtual level. The use of non-human or technical element is very high in this setting. The role of money, is primary and the procurement of which seen as the driving force being these actions. Hence a sociological study is required to understand the multiple facets of these transactions by making use of the different perspectives and approaches available in the sociological repertoire. Along with the secondary data, primary data has been collected and statistical methods are used on these for gaining insights about the social dynamics of the stock markets.

The use of social network analysis methods is appropriate because by using the concept of the social network it becomes possible to analyze informal social relationships in a way which admits both the various channels of recruitment of an individual into the market, the participation levels and performance levels while not being affect much by potentially transitory character of the social networks.

**2.4.1 The study Universe:**

The universe of this study comprises of the participants of the stock market in general and the members of Bangalore Stock Exchange in particular. Bangalore Stock Exchange is one of the regional stock exchanges of India. The Indian stock market transaction happens through both national
and regional stock exchanges. One significant feature of the Indian financial markets is that it has 22 regional stock exchanges. This is supposed to be the highest number of regional exchanges in a country. The Regional exchanges provide investors and companies easy access to the stock markets.

The use of the terms stock exchange and stock market necessitates the explanation of the differences between the two. The difference between stock market and stock exchange is that the Stock Exchanges are an organized marketplace. They can be either corporation or mutual organization, where members of the organization gather to trade company stocks or other securities. The members may act either as agents for their customers, or as principals for their own accounts. Stock exchanges are also facilitators for the issue and redemption of securities and other financial instruments including the payment of income and dividends.

Stock Market on the other hand, is a market where the trading of company stock, both listed securities and unlisted takes place. It is different from stock exchange because it includes all the national stock exchanges of the country. The stock exchange is only a part of the larger stock market.

**TABLE 2.1: LIST OF REGIONAL STOCK EXCHANGES IN INDIA WITH PERMANENT MEMBERSHIP WITH SEBI**

<table>
<thead>
<tr>
<th>I.No</th>
<th>Name of the Exchange</th>
<th>Membership Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ahmedabad Stock Exchange Ltd.</td>
<td>Permanent</td>
</tr>
<tr>
<td>2</td>
<td>Bangalore Stock Exchange Ltd.</td>
<td>Permanent</td>
</tr>
<tr>
<td>3</td>
<td>Calcutta Stock Exchange Ltd.</td>
<td>Permanent</td>
</tr>
<tr>
<td>4</td>
<td>Delhi Stock Exchange Ltd.,</td>
<td>Permanent</td>
</tr>
<tr>
<td>5</td>
<td>Madhya Pradesh Stock Exchange Ltd</td>
<td>Permanent</td>
</tr>
<tr>
<td>6</td>
<td>Madras Stock Exchange Ltd.</td>
<td>Permanent</td>
</tr>
</tbody>
</table>

*Source: Securities and Exchange Board of India (Intermediaries - Exchange List)*
The above table shows that of the 22 registered stock exchanges, only 6 have permanent affiliation. The Bangalore stock exchange is one of the regional stock exchanges in India which has permanent membership with SEBI. Moreover, Bangalore city has a population representative of the larger national population of India. It has a population of educated and computer literate citizens which makes its epithet of being ‘silicon valley of India’ very apt. These factors were seen to be appropriate to test the research objectives and hypothesis of the current study. Hence, investors and brokers from Bangalore stock exchange, located in Bangalore, Karnataka was selected as the universe of the study.

2.4.2 Sampling and sample size:

Population:

In any empirical research two matters are of profound importance - sampling and measurement. Both represent potentially acute problems when the intention is to use them for analysis of a network. Determining the sample frame is a baffling issue when it comes to social network studies.

Many network studies focus on small collectivities, such as classrooms, offices, social clubs, villages, and even, occasionally, artificially created and manipulated laboratory groups. All of these have clearly defined actor set boundaries: however, recent network studies of actors such as elite business leaders in a community (Laumann, 1976), inter organizational networks in a community, and inter organizational networks across an entire nation (Knoke & Kuklinski, 1982) have less well-defined boundaries (Frank O., 1987).

In several applications, when the boundary is unknown, special sampling techniques such as *snowball sampling* (Goodman, 1949, 1961:}
Erickson, 1978) and *random nets* (first proposed by Rapoport, 1949a, 1949b, 1950, and especially 1963; recently resurrected by Fararo, 1981, 1983; Fararo and Skvoretz, 1984) are used to define actor set boundaries. Examples of social network studies using snowball sampling include: Johnson (1990) and Johnson, Boster and Holbert (1989) on commercial fishermen: Moore (1979) and Alba and Moore (1978) on elite networks. Such sampling techniques are used for the purpose of this study.

The basic solutions to the problems that arise when the entire actor set is not sampled is discussed in the most widely known work of Frank (1981, 1987, 1991) on social networks. He reviews the problems that can arise with network sampling based on a large-scale application of the standard procedures to a network of over 700 actors.

Goodman (1961) suggests a method where snowball network sample begins when the actors in a set of sampled respondents report on the actors to whom they have ties of a specific kind. All of these nominated actors constitute the “first order” zone of the network. The researcher then will sample all the actors in this zone, and gather all the additional actors (those nominated by the actors in the first-order zone who are not among the original respondents or those in this zone). These additional actors constitute the “second-order” zone. This snowballing proceeds through several zones. This method has been adopted in this study for the collection of data.

When Sampling of Networks in Large Populations as in case of this research, it is necessary to make statements about members of a large population such as a stock exchange’s participants. In this instance, a complete enumeration of the network is impossible and necessitates sampling. An important concern in these studies is the question concerning
which actors to include in the sample frame. That is, who are the relevant actors and which actors are in the population? When dealing with small, closed sets of actors this issue not a problem to deal with.

But while focusing on studies which involve a large network and a transient one in that, as in the case of this research work which deals with the trading and mediating actors of the stock market, the task of determining boundary of the set of actors is difficult.

The research is set in the backdrop of Bangalore Stock Exchange located in Bangalore, Karnataka, India. Bangalore is the capital city of Karnataka. The uniqueness of the city lies in the fact that it has a large number of literate populations and is representative of the developing Indian economy. Hence, Bangalore becomes an apt setting for the purpose of the research work which seeks to understand the dynamics of trading.

The difficulty in sample selection arises because of the fact that the exact size of the number of investors in Bangalore stock exchange is not available. The only figures available are the national estimate which pegs the number of demat account holders to be 18 million. This figure does not give any indication about the geographical spread of the investor base. Since the exact figures is not disclosed to the public, in order to overcome this structural hurdle with respect to calculation of the sample, the total population of India was taken into account. The population of India, according to the 2011 census is 1.241 billion. Of this, 18 million represents 20% of the national population.

The second step was calculation of investor base in Bangalore. According to The census of India 2011 statistics, the population of Bangalore city is 8425970. Based on the national estimate of investors to total
population ration, the investors in Bangalore were also estimated to be 20% of the total population of the city. Around 50 percent of population would be working after excluding young and old as dependents within that 20 percent would be the potential universe.

The significance of using appropriate sampling method has been explicitly stated above. It can be seen that sampling is the right and inductive method used in understand any new as well as already explored groups or sections. Though there is an established an standardized pattern statistically, the same method cannot be applied for the unknown universe, especially where money matters are involved.

Financial market is in a way secret market. As the investors do it more secretly and at times the money which are not accounted are also invested, it could be black money which is unaccounted for and not taxed.

Hence, a detailed account of investors, amount, time and profit and loss will not be easily available. Even though Demat account is made mandatory in order to streamline the process and bring in accountability. However, an approximate number and formula to calculate sample could be used. Statistically, the formula used with the aid of software for computing is discussed below.

**FORMULA USED TO COMPUTE SAMPLE SIZE:**

The need for an efficient method of determining sample size that is representative of the given population and is not just an guesstimate, necessitates the use of a scientific method. For this purpose, a formula for determining sample size published by the research division of the National Education Association (National Education Association, 1960), was used. The
formula has also been used in different studies similar to the current work (Krejcie & Morgan, 1970; Magnani, 1997).

**Sampling Method and Structure:**

Sampling is the right and inductive method used in understanding any new and unexplored groups or societies.

Statistically the following is used with the help of software.

\[
x = z \frac{c}{100} r (100 - r)
\]

\[
n = \frac{N x}{N - 1} E^2 + x
\]

\[
E = \sqrt{\frac{N - n}{n N - 1}} \frac{X}{n N - 1}
\]

In this equation,

- \(N\) is the population size
- \(R\) is the fraction of responses required for the study
- \(z \frac{c}{100}\) is the critical value for the confidence level \(c\)
- \(E\) is the margin of error.

**Calculation of sample:**

Margin of error \hspace{1cm} 5%

Confidence level \hspace{1cm} 96%

Population size \hspace{1cm} 8425970

Response distribution \hspace{1cm} 20%
The rationale for parameter selection with reference to the formula used:

a) Margin of error:
The margin of error was calculated at 5%. This means that the amount of error tolerated is just 5%. The normal standard is 10%, but 5% was selected because the actual split of investors to the general population is just 20%.

b) Confidence level:
Confidence level is an indicator or the tolerated percentage of uncertainty. A confidence level of 95% is the accepted standard. But to ensure further accuracy, for the purpose of this study, a confidence level of 96% was taken for computation.

c) The population size:
The population size indicates the total population of the study universe. In this case, it is the population of Bangalore city. The statistics available from the census of India 2011 which estimated the population to be 8425970 was taken for working out the sample size.
d) Response distribution:

The response distribution is indicative of the population that actually invests in stocks. This was taken to be 20% in lieu with the national estimate.

After the estimation of the sample size, the task of defining a network and its boundary is essential. In order to arrive at an appropriate method for this, an inspection of the past studies on different kinds of networks was taken up. These studies reveal that network researchers often define actor set boundaries based on the relative frequency of interaction, or intensity of ties among members as contrasted with non-members. Laumann, Marsdena and Prensky (1992 ), describe two different approaches to boundary specification in social network studies. The first way, which they refer to as the “realist” approach, focuses on actor set boundaries and membership as perceived by the actors themselves.

The second way of specifying network boundaries is the “nominalist” approach. This is based on the theoretical concerns of the researcher. This list is constructed for the analytical purposes of the researcher, even though the scientists themselves might not perceive the list of people as constituting a distinctive social entity.

In this regard, the researcher, before collecting data, decided on the most relevant type of social organization and the units within that social form that comprise the network nodes. Ordered in a roughly increasing scale of size and complexity are the brokers working with different firms from which samples of investors (both buyers and sellers) may be drawn. This design involves some higher-level system (that of the stock broker) whose network is to be investigated with one or more lower-level units as the nodes, as well as meso Levels of analysis centering on the investors.
Mapping Ego centric networks to identify the Opinion leaders and opinion followers represents a potentially more powerful strategy for understanding the process by which trading ideas move among investors. It involves initially choosing a random sample of stock market participants asking them to indicate the persons from whom they receive trading information and to whom they give it. This is also called as “Snowball sampling outward” (Goodman, 1961), the researcher might then interview each of the named persons (“first zone” respondents) as well as those persons the first zone respondents name.

The universe of this study is comprised of all the trading members of the Bangalore Stock Exchange. Those who are listed as broker and those trading securities listed in the exchange. The process of procuring the sample through snow ball method was initiated with “first order” respondents (brokers) and then moved on to the second order comprising the investors (named by brokers). Further these investors suggest the names of the third zone members. This method is also called as the ‘realist’ approach as it focuses on the actor set boundaries as perceived by the actors themselves. The names were collected through name generator questions which are discussed in later chapters.

**Practical Sampling Method:**

30 brokers have been identified keeping the north, south, east, west and central part of Bangalore city in terms of the Brokers location. Though, by strict parlance the equal distribution could not be achieved as many brokers refused to help us in this regard.

Even then there is a representation from small to big time brokers and ranging from least number of investors to large number of investors. In
addition, some representation is given to the new comers and old timers those who are there in the market for quite some time.

The figure is logically deduced and is the starting point for exploring investors which multiplies in geometric ratio in two levels. The following potential and probable highest and lowest investors range is explained.

The ratio would be 142 members listed on the exchange. 30 brokers from the exchange were randomly chosen and the selections of investors were done on the basis of name generators elicited. $1:5:25 = \text{highest 30 total investors total from one broker network, the highest}$

Probable investor’s references can be obtained up to a maximum of 30.

However, with the lowest probability investors references can be obtained is only one.

\[
\begin{array}{c|c|c}
\text{Broker} & \text{Investors} & \text{References} \\
1 & 1 & 0 \\
\end{array}
\]

Ratio=1:1:0

Hence, here the link does not grow. As $I_A$ would be 30 only if all fails to respond and cooperate and the highest probable investors would be 900.
<table>
<thead>
<tr>
<th>Broker</th>
<th>Investor</th>
<th>Investor</th>
<th>Total Investor</th>
<th>Total Brokers</th>
<th>Grand Total Investors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 +</td>
<td>25 =</td>
<td>30 x</td>
<td>30</td>
<td>900</td>
</tr>
<tr>
<td>1</td>
<td>5 +</td>
<td>0 =</td>
<td>5 x</td>
<td>30</td>
<td>150</td>
</tr>
</tbody>
</table>

With mechanism the sampling method is evolved and the same was executed while approaching the respondent the practical different there was faced by the researchers was time. Though many were overwhelmed by the concept and study many were reluctant to provident information on the spot and in the broker’s area. Hence, it was observed that emailing to their references was ideal and hence majorities were approached through email.

The response to the direct interview with many brokers was good with limited responses as well. As it involved many crucial information regarding their network, connection and people known to them. They were afraid of many things. As a result the brokers circulated exceeded the sample size. Never the less, the research ethics and framework of wide of research were never compromised.

While approaching the respondents, the magical figures 10’s and 100’s were kept as a soft target whereas the real picture of final respondents came to be sometimes above (Brokers) and sometimes below (Investors). The volume of response is not as expected and even among the responded the data on all parameters were not complete there were several incompletequires which had to be discarded largely.

The present study has identified 270 individuals, non-repetitive investor respondents, excluding multiple name groups. If other groups have mentioned XYZ names the question is not administered again.
Socio Geographical significance of the study area

The map gives a representation of the stock exchange firms located in Bangalore. These brokering firms could have affiliation with any of the exchanges spanning from the regional BgSE to any international exchanges also.

The map also points out the significance of locations. It can be observed that most the exchanges are concentrated in the heart of Bangalore city which is considered to be a commercial hub. As any other market establishment would aspire to be in the heart of a commercial once where the prospects of attracting the customer are high.
2.4.3 Research tools:

Data Collection:

Data for the study is primarily collected through primary research and augmented by secondary resources. Preliminary interviews with the investors and brokers were conducted based on which, a survey in form of two questionnaires one for investors and another for brokers were formulated. The two methods complimented each other to procure a wealth of information from the respondents.

Preliminary In-Depth Interviews:

An unstructured preliminary interview method was in the first stage of data collection. The focus of the preliminary interviews was to identify a comprehensive set of factors that are likely to influence investor sentiment and investment decisions. A group of 25 participants, 20 individual investors and 5 brokers in stock market were interviewed on face-to-face basis. The format was mostly open-ended allowing the participants to free associate. A “funnel technique” (Morgan, 1988) was used to elicit information and to generate a list of factors and anecdotal information that was used to develop a survey that was tested on a large sample. These preliminary interviews and discussions were used to identify recurring themes. Recurring themes were identified and were sorted into major categories. These preliminary interviews with individual investors and brokers proved to be of great help for the development of the research instruments used in the study, related to individual investors and brokers.
Final Questionnaires:

Two sets of questionnaires were prepared based on the input from the preliminary interviews with brokers and investors and also with the help of existing research work done on the issue. These questionnaires was so designed that it consisted of both open ended questions as well as close ended questions with multiple choice options. The questionnaires were formulated in keeping with the required parameters of face validity and content validity (Goode & Hatt, 1962).

The questionnaires were designed giving due consideration to the easy of questionnaire wording, the logical flow of questions by using an appropriate mix of closed multiple choice questions and open ended questions. The questionnaires were then uploaded on google docs application and the link was provided to the respondents.

The questionnaires were e-mailed to the respondents with whom the researcher had conducted preliminary meetings. The mail contained the link to the online questionnaire. The questionnaire was self-administered by the respondents. This method is called as the Computer Aided Self Administered Method (CASA). Given the sensitivity of the data collected and considering the busy schedule of the respondents, this method was thought to be most apt under the given circumstances. The links were then forwarded by the respondents to other members of their network.
Figure 2.1: SCHEMATIC REPRESENTATION OF SNOWBALL SAMPLE METHOD USED

Boundary specification becomes a crucial part of defining the network. Specifying boundaries become difficult in case of large networks such as a stock market. In order to tackle this, the snowball sampling method proved to be of great use. This is because people in the study population themselves define the boundaries of their network. This becomes possible when the processes of data collected are started with individuals in central positions. In this case, the stock brokers as they are the first contacts in a trading process. The second stage is to ask for their contacts i.e the information regarding their clients. The next stage is to approach the individuals cited by the brokers, asking for their contacts. This process is continued until some proportion of the individuals cited as key contacts have already been interviewed.

There are virtues and drawbacks to this method (Goodman, 1961) but, for the purposes of this study, the self-defining boundaries of a snowball sample proved to be a useful way to measure the core of a large network like
the stock markets. Saturation and snowball sampling method were used, but the usual sociometric questions used in case of network studies were replaced with survey network questions (Burt & Ronchi, 1994). The primary difference in these involves eliciting data on the relations with and among people cited by the respondents on the presumption that it will not be possible to interview all the people cited by the respondents.

**Data from Brokers:**

A questionnaire was designed to collect responses from the brokers regarding their networks; investment behavior and decision making style of their clients. The underlying objective was to probe into the role of the stock brokers and their perception about the characteristics and behavioral aspects of the individual investors and that how they reach and their decision making dynamics.

The questionnaire also included "Name generators" to aid in mapping the social networks of the brokers and the clients. Name generators are questions used to elicit responses in the form of names of the members of an individual's network. In this case, the brokers were requested to give the names of 5 of their clients. The survey gave insight about different heuristics adopted by most of the individual investors. The survey was conducted also to get insight of brokers' view point about the performance of the stock market and probe into social causes for stock market volatility.
The survey network of the study was chosen with due care to ensure proper representation of the universe. The brokers were selected from different brokering firms. In terms of the firms also different kinds were included. Firms which were started recently to firms running from more than 2 decades form a part of this study. Also, variations in terms of ownership
and management also can be seen. Firms which are professionally run and firms where the family members manage all the affairs with minimal professional support are a part of the study. The age, gender, religion and language variables are also representative of the universe of the study. The most significant aspect in selection of this sample is that, the brokers were reached using the snowball sample method. Hence, a network of brokers is achieved.

**TABLE 2.2: LIST OF RESPONDENTS (BROKERS)**

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Name of the brokerage firm</th>
<th>No. of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aditya Trading services</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Arcadia Share &amp; Stock Brokers P Limited</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>BgSE</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Bonanza Online</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Emkay Share &amp; Stock Brokers Private Limited</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Farooq Stock &amp; Securities</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Fidelity</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>H Kantilal Pawn Brokers</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Inspire India Financial Solutions Pvt Ltd</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Karry Stock Broker Limited</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Manipai Stock &amp; Share Brokers Limited</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Networth Stock Broking Limited</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Reliance Money</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Religare enterprises</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Shantilal Pawn Brokers</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>Thomson Reuters</td>
<td>2</td>
</tr>
</tbody>
</table>

The list of firms to which the stock brokers belonged to is presented in table 2.2. Brokers from 16 stock broking firms established in Bangalore participated in the data collection process. The names of the firms and the number of brokers from each of the firms who form the respondents are listed.
Figure 2.3 is a graphical representation of the stock brokers network. This is the network obtained by the outward snowball sample method used for data collection process. The vertices of the graph are represented by the brokers and the firms to which they belong to.

**FIGURE 2.3 CIRCLE ALGORITHM REPRESENTATION OF VERTICES (BROKERS)**
The investors sample for the research work was procured by snowball sampling method. The first zone of respondents (the 30 stock brokers) provided the names of at least 5 of their clients. The brokers were provided the link to the online questionnaire formulated for the investors and asked to circulate it among 5 of their clients. For the choice of clients, the brokers were requested to provide the names of clients who were trading with them for different periods of time. Also, they were requested to provide names of both male and female clients. This formed the second zone of respondents’ network data. (30 brokers×5 investors = 150 respondents)

The third zone comprised of the names provided by the investors. For this purpose two name generators were used. The respondents were asked to provide the names of people who also invested with the same stock broker. Along with this, they were asked to name the people with whom they discussed trading related aspects. If the names provided for both these questions were the same, then these people formed the next set of respondents for the research. Error! Reference source not found. is a representation of one such network where the number of names generated.
was more than five. In some other cases, the investors did not provide even a single name for the name generator questions. In such cases the reference stops at that stage and the link does not grow further. If this becomes the case with all 30 brokers, then that scenario would provide a network of just 30, and on the other hand, if all of the respondents provided five names each then the highest possible investors sample would be 900. By following the outward snowball sample method, the required sample of 270 respondents was reached.

With mechanism explained above, the sampling method evolved for the purpose of this study was executed. While approaching the respondents the practical difficulty that was faced by the research was time. Though many were overwhelmed by the concept of the study, some of them were reluctant to provide information

**FIGURE 2.6: REPRESENTATION OF A INVESTOR NETWORK**

Data on investors comprised of their socio economic profile, social influences for entering into the market, the choice of stock broker, the social
support circle in times of distress and various investment-related questions to measure the experience, propensity for conformity, the role other investors in their social networks decision-making process. The data comprised of both numerical as well as several descriptive variables.

2.5 Data analysis and presentation:

Statistical analysis of network ties is both important and difficult. It is important because it can allow us to distinguish discernible social pattern from random instances, and also because it enables an assessment of variety of hypotheses about the structures that underlie or generate the network data that we observe. It is difficult because the units of observations i.e. the social actors are not independent they have multiple social affiliations which is fluid in nature.

The methodology required and analyses that need to be carried out are not conventional in this type of research.

Since the conditions of researched action and interactions are volatile and keeps changing very frequently the structure and functioning patterns also change similarly. However, the ultimate goal of this market and through what means and through whom is a big issue so the concept of trust, network, we feeling loyalty, long relationship, and all other affinities needs to be checked.

Hence, the study aims at collecting data, both secondary and primary from all setting and through various means.

Secondary – studies of many societies and markets and primary through structured questionnaire and frequent interactions and observations.
Will be a more complicated analysis of data and interpretation and final confirmation.

From a social network perspective, a stock market may be defined as a specific set of trading relationships, represented by linkages formed by a defined set of brokers and market makers. A link is a recorded transaction between two actors. Links in the market context are also formed when two actors interact to seek advice, support or information. The strength of a relationship is represented by the total volume exchanged in the relationship.

The data collected through this research work includes a wealth of information about the stock market players. The data collected here involves three types:

i. Attribute Data: Variable pertaining to attributes like age, income, education, gender, occupation etc.

ii. Relational Data: Network data analysis of relations between contacts, ties, connections, group attachments, frequency of meetings

iii. Ideational Data: Meanings, motivations, typifications

This section presents the discussion and analysis of the questionnaires administered to brokers and individual investors. It also includes statistical analyses of the questions. The purpose of each question as well as the results obtained from individual investors and brokers are described in upcoming chapters. The data collected for the study comprised of two distinct sets of information. One part of the data concerned with the investment behavior and decision making style of individual investor at the micro level i.e., the individual level. The data pertaining to this part is analyzed using software packages SPSS and Spread Sheet. The other major constituent of this data
collection process is the social network data which was collected to discern the role of social factors and their influences in the decision making process.

There are many ways to describe social network data mathematically - Graph theoretic notation, sociometric notation and Algebraic notation. Depending on the form of data, and ensuring that the method can be adapted to represent the range of network data collected here, Graphs are used to represent the network data. This is because its appropriateness, clarity, and efficiency.

The graph theoretic notation scheme can be viewed as a way to represent actors and relations. It is the basis of the many concepts of graph theory used since the late 1940's to study social networks. The notation provides a straightforward way to refer to actors and relations, and is completely consistent with the notation from the other three schemes. Mathematicians and statisticians such as Bock, Harary, Katz and Luce were among the first to view networks as directed and undirected graphs.

Social network data consist of measurements on a variety of relations for one or more sets of actors. In the network data set collected through this research process, information on various attributes of the actors has been recorded. These attributes comprise of the set of actors, the relations between themselves, and the actor attributes.

The social network data was processed using UCINET - an social network analysis software (2002) which allows for the computational aspects of analysis, including calculating various measures like centrality, cohesion, brokerage, as well as hypothesis testing is used to analyze the network data. NodeXL (http://nodexl.codeplex.com/) social network visualization software.
which enables a graphic representation of networks including relations and attributes is used for graphs.

The amount of information that needs to be described to get a accurate picture of even small social networks can be quite great. This is more so in case of a vast network like a stock market trading arena. The context here imposes several challenges when it comes to understanding the form of the network. Managing the data, and manipulating them in order to see patterns of social structure is both tedious and complicated. In order to augment the understanding of these network forms, tools from mathematics and statistics are used. These tools aid in the manipulation of network data, and the calculation of indexes describing networks.

Further, information on networks is recorded as matrices, which aids in the better representation of the network data in a comprehensive way. Another reason for using mathematical and graphical techniques in social network analysis is to represent the descriptions of networks compactly and systematically. Also, for visualizing patterns graphs are used to augment the explanations.

The social network data collected for this research purpose is represented in a matrix which is then represented in graphical forms as directed and undirected graph these are further categorized as whole networks and Ego networks. In order to identify the strength of the ties an adjacency matrix with added weights was prepared with a graphical illustration of the same.

The edge weights represent the relationship strength. Where, the edges represent interactions, and flow of information. The frequency of interaction and reciprocity is attributed as edge weights. The use of
questionnaire allowed for establishing the existence of mutual or one-sided strength with greater certainty than what would be possible in case proxies were used for the same.

2.6 Limitations:

The embeddedness of individuals within the larger context of a social setting like the stock market creates special challenges for research. This is because social network analysis is neither a study of individuals nor a study of groups, organization and institutions. It is all of this combined. In such a study, research about an individual has implications for all the persons he or she is connected with. Network information can expose individuals who did not answer a network questionnaire in a survey and also has implications for any organizations that person is connected with. Likewise, data on particular organization like the BgSE has implications for the individuals networked to it.

Social network data have one troublesome and distinctive attribute: his collection of names about who relates to whom is not confined to the names of the respondents within the study, for they may give the names of others who have no idea that they are being named (Borgatti & Molina, Ethical and strategic issues in organizational network analysis, 2003).

Apart from the social network related limitations, since the study concerns a sensitive area regarding investors and brokerage firms’ trading which causes suspicions, some vital information may be concealed due to lack of trust.

In the next chapter Review of Literature reveals the vast collection of secondary data related to this study.