4.1 Design of the Study

Some of the time-tested definitions of research design are given below so that it forms a backdrop for the various aspects like the research approaches, sampling plan, questionnaire design, data collection methods and data analysis approaches used in this study and that which are going to be discussed in this chapter.

According to Kerlinger (1986: 279), ‘a research design is a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problem. The plan is the complete scheme or program of the research. It includes an outline of what the investigator would do from writing the hypothesis and their operational implications to the final analysis of the data’. Aaker et al. (1998) define it as the detailed blue print which guides a research study toward its objectives.

From these two definitions it is clear that research design entails the type of evidence that is to be collected and analysed to arrive at acceptable answers to the research questions. This is guided by the underlying philosophies of science, the epistemology concepts and the schools of thought in the area of study under consideration. Even though attempt is not made here to look into
these aspects in detail a brief mention is made here as these have a bearing on
the methodology of research used in the study.

4.1.1 Research paradigm

The research methodology used depends on the kind of research
approaches used in the earlier related studies and the kind of research problem
and questions to be addressed.

From the review of literature it is found that there are two main research
philosophies or paradigms, the positivist paradigm and phenomenological
paradigm. Positivist studies generally use quantitative methods for empirical
testing of formulated hypothesis (Buttery and Buttery, 1991). These types of
studies usually involve obtaining data through surveys with relatively large
samples and analyzing the structured data using statistical methods. The
positivistic approach or paradigm explores the facts or the reasons for the social
phenomenon without the subjective interpretation from the researcher and the
stress is on logical reasoning applied to the research so that precision,
objectivity and rigour are the guiding forces rather than hunches, experience
and intuition for investigating research problems (Collis and Hussey, 2003).
However, the phenomenological paradigm is concerned with the understanding
and exploration of the phenomenon from participant’s own frame of reference.
The research is based on unstructured data obtained through mainly qualitative
methods like field work studies and case research methods.

In the case of this particular research a positivistic approach has been
used as it relies mainly on quantitative data, using relatively large samples and
is concerned with hypotheses testing, structured research design and objective
method using cross-sectional study.
4.1.2 Deductive and inductive reasoning

The scientific method used in research involves logical reasoning for drawing inferences from the finding of a study or for arriving at conclusion (Krishnaswami, 1993). The logical reasoning could be either inductive or deductive. Inductive reasoning moves from specific observations to broader generalizations and theories. In this the researcher begins with various observations and measures and continues by finding patterns and regularities, formulating tentative hypothesis that can be observed. Finally the researcher may develop some general conclusions and theories. These conclusions and theories are subject to further confirmation based on subsequent evidence.

On the other hand, deductive reasoning is the process of applying a generally accepted principle to a specific individual case falling under the general principle. Hence in this case the reasoning is from the more general to the more specific. This method is useful for testing or confirming hypothesis but it is not of use for arriving at new truth. The inductive process overcomes this limitation.

Usually in a social research both the logical process of induction and deduction are used together in a complimentary way. Both the deductive and the inductive reasoning process are applied in scientific investigations (Sekaran, 2003). This is true of this particular research too.

4.1.3 Research approach

Two basic approaches used in social sciences are quantitative and qualitative research approaches. Quantitative research (Muijs, 2004) is ‘explaining phenomena by collecting numerical data that are analysed using mathematically based methods, especially statistical methods’. Quantitative method is objective in nature and is focused on measuring phenomena.
Qualitative research approach is concerned with qualitative phenomena and involves non-numerical observations and examination for finding out the underlying relationships and meanings. Through these researches which mainly use methods such as depth interviews, focus groups and projective techniques the various factors which motivate people to behave in a particular way or which make them like or dislike a particular thing are being analysed (Kothari, 2004).

Though this study’s main stay is quantitative research approach, qualitative method is also being used here especially during the exploration phase of the study for problem formulation and the research instrument development.

4.2 Type of Research Designs used

Examination of the literature shows that most of the authors have commonly categorised the types of research designs into exploratory research, descriptive research and causal research based on the type of information required (Tull and Hawkins, 1998; Malhotra, 2004; Zikmund, 2003).

Exploratory research deals with the process of finding out of the general nature of the problem and the related variables. Descriptive research is concerned with the accurate description of the variables in the problem formulated and causal research specifies the functional relationship between the variables in the problem formulated. Each of these methods has different characteristics and methods of conducting research.

4.2.1 Exploratory Phase

This is a preliminary study or search about which the researcher has little or no knowledge, the objectives of which could include formulation of the
problem, to increase familiarity with the problem, developing hypothesis, isolation of key variables and their relationships for further examination.

Thus the exploratory research provides a basis for the subsequent conclusive research.

The usual methods used for the exploratory phase of the research are (Kothari, 2004):

1) Survey of the related literature. This is the simplest means for formulating the exact research problem and developing hypothesis.

2) Experience survey, which means interviewing experts in the relevant area who are having practical experience with the problem to be studied

3) Analysing of ‘insight-stimulating cases, intensive study of some selected cases will give insights regarding the phenomenon.

The present study has an exploratory phase in which a thorough examination of the literature is made regarding the studies done in similar areas. These studies cover a range of topics such as the adoption studies of technology-enabled banking delivery self-services, studies on customer satisfaction and service quality perception of the services offered through these channels, theoretical frameworks pertaining to adoption of innovation, service quality and so on. Detailed reviews of these are given in chapter 3.

In addition to this, experience survey was done during the problem development stage by way of interviewing and discussing the issues concerning the area of study with about ten practising banking professionals, who had specific experiences dealing with the electronic banking channels in their day-to-day work. These banking professionals were from different categories of banks such as private sector, nationalized and foreign banks. Banking professionals from different categories of banks were consulted as it was
anticipated that the usage and adoption patterns of these delivery channel varied from one bank group to another. Academicians who had prior experience in doing research in the banking related and services marketing areas were also consulted.

The input so obtained during the exploration phase through the literature survey and experience survey was used in questionnaire/research instrument development. Additional insights were also gained in the exploration phase through interviews with some of the regular users and non-users of these technology-enabled banking services such as ATMs, internet banking, tele banking and mobile banking.

Two focus group discussions, one consisting of a group of academicians numbering nine and the other consisting of a group of ten students were also conducted to deliberate on the aspects of the usage and non-usage aspects of these services. The outcome from these focus group discussions were also used to refine the problem and develop the questionnaire.

4.2.2 Descriptive study

The dominant methodology used in this work is descriptive research. According to Cooper and Schindler (2003) descriptive studies are used to “make descriptions of the phenomena or the characteristics associated with a subject population: who, what, when, where and how of a topic” (p. 161). It also finds out the proportion of the population having certain characteristics and discovers association among variables. This method can also be used for making specific predictions, according to Malhotra (2004: 78). Another characteristic of descriptive study is that it could contain hypothesis that are formulated during the exploration phase which are to be tested.
The methods typically used in a descriptive study could be surveys, panels, observations or secondary data analysed in a quantitative manner (Malhotra, 2004).

The current study, using a survey method, employing a structured questionnaire which was administered through personal contact method, tries to identify the characteristics of the users and non-users of technology-enabled banking self-services such as ATM services, internet banking, tele banking and mobile banking. Further, an attempt is made to estimate their usage patterns pertaining to technology-enabled banking self-services and their relationships with demographic, attitudinal and perceptual factors of bank customers.

Hence this research uses a two-stage design as proposed by Cooper and Schindler (2003: 160), with exploration as the first stage which aims at clearly defining the research question and developing the research design followed by description and diagnosis as the second stage.

Finding out relationship among variables in the descriptive research process is labeled as correlation study which, according to Cooper and Schindler (2003), is a subset of descriptive study. Since in this study relationship among variables especially for the adoption of technology-enabled banking self-services is examined, this study is also a correlation type of investigation.

4.2.2.1 Cross-sectional design

The present study has a cross sectional time horizon which involves the collection of the information from the sample of population elements only once. The other option would have been to use a longitudinal design in which a fixed sample of population is measured repeatedly on the same variables over a period of time. Although a longitudinal study would have provided a greater
wealth of information, the lack of time and funds and the possibility of unanticipated changes in the unit of analysis or sampling elements and the research environment precluded the use of this design.

According to Bryman and Bell (2003: 52) because of time and cost involvement longitudinal designs are relatively little used in business and management research.

The primary data was collected using a structured questionnaire from the sampled respondents between the period from July 2007 to November 2007 with the response collected only once thus making the study a cross sectional or a one-shot study.

4.2.3 Data sources

The present study utilizes both primary and secondary data sources. The secondary data sources primarily consisted of the following:

- Published studies in various international and national journals and conference proceedings, those studies which deal with topics such as the adoption studies on electronic banking services, studies on customer satisfaction and service quality perception of these channels, theoretical frameworks pertaining to adoption of innovation, service quality and so on.

- Articles published in periodicals relating to the above subjects.

- Information contained in websites such as RBI website, websites of various banks in India, website of Banknet India and so on.

- Unpublished studies pertaining to the above topics.

The primary data was collected through a sample survey using structured pre-tested questionnaire from bank customers residing in the following cities of
Karnataka namely Bangalore (metro banked centre) and Mangalore and Udupi (urban banked centres).

4.2.3.1 Survey research

The descriptive part of the study was carried out using a survey research method which involves a structured questionnaire given to respondents for eliciting information regarding their behaviour, intentions, attitudes, awareness and motivations pertaining to the electronic banking self-services and along with their demographic and lifestyle characteristics.

Survey methods could be classified depending on the mode of administration; whether it is through telephone interviews, personal interviews, mail interviews, or electronic interviews (Malhotra, 2004). The questions could be asked verbally, in writing or via computer depending on the above modes. Usually the questions are structured in the sense that they are arranged in a standardized sequence to enable easier coding, analysis and interpretation of data.

The present study uses a self-completion questionnaire delivered personally to the respondents to be filled up at a later stage and returned to the researcher or his representative either collected by hand or mailed back as the case may be. A personal contact method was used so that the respondents could be selected for the survey depending on their usage of the services through the electronic banking delivery channels and to brief them regarding the filling up of questionnaire, in addition to give them the assurance of anonymity and confidentiality. A brief introductory note was also included along with the questionnaire stating the purpose of the study and giving assurance of confidentiality and anonymity as recommended in the literature (Bryman and Bell, 2003).
4.3 Sampling Design

A multi-phase sampling design has been done for the study in which the geographical locations was first fixed, followed by the banks from which the respondents were sampled and finally the sampling of the population of interest in the study.

4.3.1 Geographical extent of the study

The study required the inputs from users of these electronic banking along with those from non-users, the various parameters explored in this study like customer satisfaction, usage patterns, adoption levels (extent of usage) and so on could be had only from the users of these services. Hence when selecting the geographical locations care was taken so that the locations selected had an adequate representation of the users of internet banking, tele banking and mobile banking. Such locations had to be selected so that it had the probability of having a fairly good segment of users of these services. Therefore the study was limited to metros and urban banked centres.

Karnataka state which was selected for conducting the study has been the breeding ground for many a bank that has attained excellent reputation in the Indian banking sector. Seven of the country’s leading banks- Canara bank, Syndicate bank, Corporation bank, Vijaya bank, Karnataka bank, Vysya bank and the State Bank of Mysore had their origins from this state. Of these banks the first five were from the coastal districts of Dakshina Kannada and Udupi, this area is called by some as the ‘cradle of banking’ in the country (Shanker, 2005).

The state of Karnataka is located in the southern part of India towards the western side. It has a population of about 52.7 million as per the 2001 census of India. It is one of the relatively heavily banked states having a total
of 4767 bank branches with average population per bank branch being 11,000 as per the data given in RBI’s Branch Banking Statistics, vol. 3, which shows the branch status as on 31st March 2002 available at the RBI website. The population per bank branch in Karnataka was found to be more than the national average of India which according to the same statistics was about 16,000. As per the same report about 81 banks are operating in this state which includes 27 public sector banks, 29 private sector banks, 11 foreign banks and 13 regional rural banks. The report also shows that Karnataka has 2353 ‘banked centres’ which consists of one metropolitan centre, 15 urban centres, 278 semi-urban centres and 2059 rural centres.

The RBI classifies the banking centres into metro, urban, semi-urban and rural centres based on the population in the respective banking areas. Those centres with a population of 10 lakh and above are classified as ‘metropolitan centres’, those with a population of 1 lakh and above but less than 10 lakh classified as ‘urban centre’, the ones with less than 1 lakh and above 10,000 population as ‘semi-urban centres’ and finally centres with less than 10,000 population as ‘rural centres’. (Ref Appendix-3, sec 3.1)

4.3.1.1 Geographical scope of the study

Since the study planned to cover the adoption, usage and perceptions regarding electronic banking channel services and such services are mostly offered in the metropolitan centres and urban centres by the banks, only metropolitan and urban areas are considered for the study. It is also found that users of these services are more in the metro and urban centres since the customers tend to be better educated and more aware of these services.

Bangalore (Bengaluru) city is an obvious choice as it is the only metropolitan centre in Karnataka state. Out of the 15 urban banked centres in
Karnataka Mangalore city and Udupi town were selected on a random basis for the study purpose.

Udupi and Dakshina Kannada districts of which Mangalore is the headquarters were unified prior to 1997, and this region as mentioned earlier is known as the ‘cradle of banking industry’ with as many as five leading banks in the country originating from here. Hence traditionally this region has been a heavily banked area with well-developed economic activity and highly educated population.

Some of the relevant details of the areas selected are given below:

Bangalore city was having a population of 6.8 million (http://www.bmponline.org, Bengaluru city corporation website). It had (http://yellowpages.webindia123.com) 808 bank branches approximately, excluding co-operative banks. About 62 scheduled commercial banks excluding the regional rural banks had their branches here. Bangalore or Bangaluru as it is currently called, is known as the silicon valley of India with a host of IT and ITes companies, third most populous city in the country and fifth largest urban conglomerate.

Mangalore city had a population of 4.19 lakhs (www.mangalorecity.gov.in, official website of Mangalore city corporation). About 170 bank branches were present in the Mangalore city and its suburbs (http://yellowpages.webindia123.). Approximately 54 scheduled commercial banks excluding the regional rural banks were operating in this city.

Udupi town had a population of 1.19 lakhs (www.udupicity.gov.in the official website of the Udupi city municipal council), it had about 31 bank branches from about 14 scheduled commercial banks operating here (http://yellowpages.webindia123.com).
4.3.2 Universe/Population of the study

C.R Kothari (2004) defines the term *universe* ‘as the total of the items or units in any field of enquiry’, while the term *population* refers ‘to the total of items about which the information is desired’.

In this research the investigation is about the adoption, consumer behaviour, perceptions and satisfaction about the services offered through technology-enabled banking self-services such as the ATMs, internet banking, tele banking and mobile banking services and the study is confined to the state of Karnataka in India. A metro banked centre (Bangalore city—the only metro city in Karnataka) and two randomly selected, urban banked centres (Mangalore and Udupi cities) were the geographical limits of the study.

Accordingly *universe* in this research could be taken as the set of all bank consumers in the selected geographical locations, while the *population* for the study can be defined as all the banking customers in the selected cities who had an annual income of more than rupees one lakh and above, who were using at least one of the electronic banking channels and aged above eighteen years. The income condition was not kept applicable for the student category as they could be non-income earners but at the same time represent a potential group of electronic banking users. The income condition was kept because for utilizing banking services extensively a reasonable earning capacity is a prerequisite. The condition that the respondents should be using at least one of the self-service banking delivery channel is because the domain of the study was primarily on adoption, satisfaction levels and usage patterns of the respondents with respect to the services offered through these electronic banking channels. Now-a-days ATMs are widely adopted by the average bank customer as evident from the Banknet India’s ATM User Survey Report 2006 which states that 95
percentage of the respondents preferred banking via ATMs over the conventional branch banking.

Even though this study examined the usage and perceptions pertaining to all the four banking channels mentioned, the main focus of this study was on the services offered through ATMs and internet banking.

The reasons for this study focusing mainly on the services offered through ATMs and Internet banking were:

1) To make the study more manageable.
2) Telebanking services were not that widely adopted and this service was offered by the scheduled commercial banks only in a few select branches located in the metros and major urban centres. Only some banks were offering this service.
3) Though mobile banking has tremendous potential, the service provisioning was only in the initial phases by most of the banks and hence it was yet to gain widespread awareness and acceptance.

4.3.3 Sampling procedure

The units of analysis or sampling elements were the bank customers of the nine selected banks in the chosen geographical locations, who were satisfying the income criteria and using at least one of the electronic banking channel services.

Of the nine banks whose customers were sampled four were from the public sector (State Bank of India, Canara Bank, Syndicate Bank and Corporation Bank), three were from the private sector (ICICI Bank, HDFC Bank and AXIS Bank) and two were from the foreign bank group (Citi Bank and ABN Ambro Bank). Among the public sector banks, SBI was selected for the study as it was the largest bank in this sector; Canara Bank was selected as
it was the ‘lead bank’ in Bangalore area and was also headquartered here; Syndicate Bank was the ‘lead bank’ in Mangalore as well as Udupi area, headquartered in Udupi; Corporation Bank was selected since it was headquartered in Mangalore. ICICI bank, HDFC bank and AXIS bank were number one, number two and number three banks respectively, in terms of business in the private sector. Citi Bank was the largest foreign bank operating in the country, while ABN Ambro bank was the only foreign bank which had branches both in the selected metro and urban ‘banked centres’. It was presumed that through the selection of the largest bank in the respective sectors and the banks which were the ‘lead banks’ and those having headquarters in the geographical locations selected for the study, maximum coverage of the population of interest can be had. Major branches of these banks located in the prominent centres in the selected cities were approached for sampling the population of interest. 

From the discussions with the bank officials and pilot study results it was found that adoption of ATMs among the bank customers were not a problem and that almost everyone had opted for it. The intention of the sampling was to get a representative sample of users and non-users of those technology-enabled banking self-services, such as internet banking, tele banking and mobile banking for which the adoption among bank customers were a problem. The percentage of bank customers using these self service technology delivery channels was limited. From the discussions with the banking executives it was learned that only about 12-15 percentage of the average bank customers used services such as internet banking in a city like Bangalore and in the other cities like Mangalore and Udupi the percentage of such users out of average bank customers were only 6 to 8 percentage. From the Internet & Mobile Association of India’s (IAMMAI) Report on Online Banking
2006 only about 12% of the internet users avail internet banking facility, which shows that the internet banking has not really picked up in India. In a more recent report of a survey jointly conducted by IMRB and IMMAI ‘I-Cube, 2008’ the percentage of internet users using internet banking has gone up to only 20%.

In order to get representative samples of users and non-users the cooperation and assistance from the bank officials of the nine participating banks were obtained. With their help partial customer lists from the banks were obtained. The samples of users of internet banking were obtained randomly from the partial list of bank customers who had applied for internet banking, which were provided by the participating bank officials. Many respondents were found to be using multiple electronic banking modes. The probability of users of tele banking and mobile banking using the internet banking were found to be high. From the partial list of customers who had abstained from applying for internet banking the sample of non-users of internet banking were obtained. From these two groups of sampled respondents tele banking and mobile banking users and non users emerged.

A personal contact method was adopted to approach these respondents so that their usage status could be verified and they could be briefed regarding the need for the survey and assured about the confidentiality of the responses given by them. Those who agreed to participate in the survey were given the questionnaires which were either collected back on the spot after filling in a few cases and the rest of the cases were given the questionnaire so that it could be collected back after being filled at a later point of time either in person or by post. Those respondents who agreed to sent back the questionnaires by post were given postage paid envelops with address.
4.3.4 Sample size

The sample size was determined based on aspects such as:

- the budgetary constraints,
- the time limitation,
- sample size taken in similar studies,
- the adequacy for statistical tests and
- adequacy of numbers obtained from all sub-samples in the population under consideration.

An examination of the sample sizes and methods of sample selection in similar empirical studies pertaining to technology-enabled banking self-services are looked into and results shown in table 4.1.

From the table it can be found that:

- The sample sizes ranged from 128 to 801.
- Both non-probability and probability sampling methods have been used. The sampling methods used were convenience sampling, random sampling, branch intercept method, cluster sampling, mall intercept methods, purposive sampling and so on.
- The contact methods used were mail survey, online survey, telephonic survey and branch/mall intercept methods.
### Table 4.1: Research methods and sample size from similar studies

<table>
<thead>
<tr>
<th>Authors (Journal)</th>
<th>Services &amp; Distribution Channels studied</th>
<th>Data Gathering instrument/method</th>
<th>No of Responses &amp; Country</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rugimbana R (1995) (International Journal of Bank Marketing)</td>
<td>ATMs</td>
<td>Branch-floor intercept questionnaire</td>
<td>430, Australia</td>
<td>Convenience Sampling, Likert scale, 14 statements, Response rate 71.7%</td>
</tr>
<tr>
<td>Lockett and Littler (1997) (Journal of Marketing Management)</td>
<td>ATM and Phone banking</td>
<td>Mailed Questionnaires</td>
<td>593, U K</td>
<td>Mail Survey</td>
</tr>
<tr>
<td>Tan and Teo, (2000) (Journal of the Association for Information Systems)</td>
<td>Internet banking</td>
<td>Online Questionnaire Survey</td>
<td>454, Singapore</td>
<td>Personalized e-mails sent, Incentives for eliciting responses, pilot study</td>
</tr>
<tr>
<td>Thornton and White (2001) (Journal of Services Marketing)</td>
<td>Human Teller, ATMs, EFTPOS, Telephone banking, Cheques &amp; Credit cards</td>
<td>Mailed Questionnaires</td>
<td>801, Australia</td>
<td>Focus groups, Cluster Sampling, Response rate 31%</td>
</tr>
<tr>
<td>Howcroft et al. (2002) (International Journal of Bank Marketing)</td>
<td>Telephone &amp; Internet banking (Home based banking)</td>
<td>Mailed Questionnaires</td>
<td>286, U K</td>
<td>Focus groups, Pilot study, Mail survey, Response rate of 7.5%</td>
</tr>
<tr>
<td>Wan, et al. (2004) (International Journal of Bank Marketing)</td>
<td>Branch banking, ATM, Telephone banking &amp; Internet banking</td>
<td>A combination of Mail intercept method and Telephonic interviews using questionnaires</td>
<td>314, Hong Kong</td>
<td>Convenience sampling for mail-intercept method and random sampling for telephonic interviews</td>
</tr>
<tr>
<td>Pikkarainen et al. (2004) (Internet Research)</td>
<td>Internet banking</td>
<td>Survey using questionnaire</td>
<td>288, Finland</td>
<td>Questionnaires collected using mail-intercept method &amp; from university class rooms, Response rate 63%</td>
</tr>
<tr>
<td>Laforet and Li (2005) (International Journal of Bank Marketing)</td>
<td>Internet Banking &amp; Mobile Banking</td>
<td>Street intercept method using a structured questionnaire</td>
<td>128, China</td>
<td>questions asked verbally &amp; recorded by interviewers, Response rate 43%</td>
</tr>
<tr>
<td>Thamaraivalsan and Raja (2008) (The Journal of Contemporary Management Research)</td>
<td>ATMs</td>
<td>Standardised questionnaire</td>
<td>263, India</td>
<td>Purposive sampling method, seven point likert scale, mainly SBI &amp; ICICI Bank customers of Tiruchirappalli, T N State</td>
</tr>
</tbody>
</table>
The suggestion which Sudman, (1976) gave about the sample size cited by Thronton and White (2001) was used as a guideline for determining sample size. This suggestion states that the sample size should be large enough so that each major category of breakdowns should have 100 units or more and minor categories of breakdowns should have 20 to 50 units. The major categories of breakdowns for this study were:

1. The number of respondents from two types of banked centres considered.
2. The number of respondents who are the users of each of the electronic banking services (except ATMs) such as internet banking, tele banking and mobile banking.
3. The number of respondents who were non-users of internet banking, tele banking and mobile banking services.
4. The number of respondents from the various bank categories such as public sector banks, private sector banks and foreign banks.

The minor categories of breakdowns in this study are the demographic categories. Another guideline followed in selecting the sample size for this particular study is that given by Alreck and Settle (2004) which states that for a survey research if the population is 10,000 or more usually a sample size of between 200 to 1000 respondents are considered adequate by most experienced researchers to give reasonable results.

The final usable sample size obtained in the study was 553 of which 300 were from the metro banked centre and 253 were from the urban banked centres. The responses from the public sector, private sector and foreign banks were 254, 228 and 71 respectively. These were deemed to be, as per the before mentioned guidelines, adequate for the study.
Incidentally this sample size is also higher than when calculated using the formula by C. R. Kothari (2004) for the estimation of sample size for infinite population.

\[ n = \frac{(z^2 \times \sigma^2)}{e^2}, \]

where \( n \) = size of the sample, \( z \) = standard variate at a given confidence level, \( \sigma \) = estimate of standard deviation of the population given the range, \( e \) = acceptable error

Given that the most of the measures are using 5-point scales in the research instrument the range = 5-1 = 4, so \( \sigma = 4/6 = 0.67 \), \( z = 1.96 \) (as per the table area under normal curve when the confidence level is at 95%), \( e = 0.1 \) (assuming estimate to be within 10% of the true value) the sample size obtained \( n = 172 \)

### 4.4 Research Instrument

The survey instrument/questionnaire was designed and developed after an extensive literature review, close consultation with experts in the banking area (both practitioners and researchers) and inputs from two focus group discussions.

The literature survey covered mostly the following areas:

- Adoption studies pertaining to electronic banking channel services
- Service quality and customer satisfaction studies pertaining to them
- Theoretical frame works pertaining to the adoption of innovations especially technology enabled self services
- Research on service quality.

The detailed reviews of the literature pertaining to the above areas are given in chapter three.

### 4.4.1 Pre-testing / pilot study

The questionnaire so developed was subjected to **pretesting**, during the pretesting the questions were analysed to check the readability and
comprehensibility of the questionnaire. The pretesting was done using five students who were bank customers, three academicians, three banking professionals and another sample of ten respondents. Necessary corrections were made to the questionnaire from the feedback so obtained. The corrections mainly pertained to some of the wordings and instructions provided.

The questionnaire contained seven parts, each part of the questionnaire is described below.

4.4.2 General questions

*Part one* is containing questions regarding the ‘most frequented bank’, the term *most frequented bank* is used because the respondents might be having accounts in multiple banks, the usage pattern and perceptions are asked in the questionnaire with respect to the services of a single bank. The customers are asked about the services offered by their primary bank’s services as they would have maximum transactions and frequency of transactions with their primary bank. Hence the term most frequented bank. Moreover, sector-wise comparisons of banks are done in the study. The reasons for selecting their most frequented bank are asked and their overall satisfaction level with services offered by their respective most frequented bank is asked using a multi-item scale. A five-item scale as shown below is used for satisfaction measurement as multi-item scales are better to capture the richness of the construct of customer satisfaction (Suresh Chander et al., 2002a; Danaher and Haddrel, 1996).

1. Bank Products
2. Staff Interactions
3. Physical Surroundings
4. Bank Fees
5. Automated Services (ATMs, Internet, Telephone, Mobile Banking etc.)
Overall customer satisfaction level with the bank was measured using a five point Likert scale with 5 equals highly satisfied to 1 equals highly dissatisfied across the following aspects of banking service, which covers almost all aspects of a banking service.

The frequency of branch visits is asked as it is assumed that customers using electronic banking services visit bank branches less frequently.

Core service construct, a multi-item scale used to measure the crucial contents or attributes of the banking service has been also included in part one. This has been adopted from Al Hawari et al (2005) and Sureshchandar et al (2002a). The perceptions of the core service have been included as it has a key role to shape the overall quality perception and customer satisfaction. It also differentiates one service provider from another. The measure was done using the following statements:

1. My bank provides wide range of services (retirement’s account, loans for vehicles, foreign exchange, fund transfers, home loans etc.)

2. My bank provides diverse service features (different interest rates, service options etc.)

3. My bank follows the most advanced technology.

Price perception is important for determining service quality in technology-enabled services (Al-Hawari et al., 2005). Price saving motivates the customers to use these services and also forms a basis for comparison among different modes of service delivery (Surjadjaja et al., 2003). So a three item scale for measuring price value perception modified and validated by Al-Hawari et al. (2005) adopted from studies by Bahia and Natali (2000) and Colgate and Hedge (2001) has been included in this part. The measure was done using a five point Likert scale in which 5 was equal to strongly agree and 1 strongly disagree.
1. My bank adequately explains the service charges associated with each transaction.

2. The banking services of my bank are having acceptable fees.

3. My bank’s service charges are competitive.

One single item scale five point Likert scale is also included to know the respondent’s perception regarding whether ‘the electronic banking services provided have improved the quality of their bank’s overall services’.

Part two of the questionnaire contains questions pertaining to the respondents’ accessibility to computers and internet, plus the hours that they spent using the computer and browsing the internet. These questions are included as working knowledge of computers and internet access are prerequisites for using services provided through internet banking. The need for computer proficiency and prior experience with computers and technology being major drivers for internet banking usage and adoption are found out in the studies done by Gerrard and Cunningham (2003), Minna Mattila (2001), Karjaluoto et al. (2002), Laforet and Li (2005) and many other studies.

4.4.3 Variables pertaining to Determinants of Technology-Enabled Banking Self-Services Adoption Levels.

The independent variables which are the determinant constructs of the adoption levels of technology-enabled banking self-services are perceived self-efficacy/capacity, relative advantage/perceived benefits, perceived innovativeness, perception of risk and need for personal contact. The dependent variable is the Total Electronic Banking Channel Adoption Level which is a composite measure of the total adoption by the respondents of all the electronic banking self-services such as ATMs, internet banking, tele banking and mobile banking.

The second part of the questionnaire additionally contains 16-item multi-dimensional scale which is designed to measure the respondents’ perceived self-efficacy/capacity, relative advantage/perceived benefits, perceived
innovativeness, perception of risk and need for personal contact as far as the aforementioned banking self-services are concerned.

The item pools of the scale are explained in chapter 7, table 7.13 along with the findings and results of this part.

This part also contained questions to gauge the awareness, frequency of usage and the duration of usage if using of the ATM services, internet banking services, tele banking services and mobile banking services offered by their respective “most frequented banks”.

The adoption levels of each technology-enabled self-service such as ATM services, internet banking services, tele banking services and mobile banking services are measured using a composite variable which is a summated score of the frequency of usage and duration of usage of the respective services as mentioned in the section 3.8 of chapter 3. The Total Electronic Banking Channel Adoption Level is computed by adding up the individual adoption levels of all the four services.

All the banks may not be providing all the four services mentioned however ATM services and internet banking services are provided by most of the scheduled commercial banks. The tele banking and mobile banking services are provided by only select banks that too only in certain branches.

4.4.4 Questions related to ATM services

Part three of the questionnaire is exclusively pertaining to ATM services. It is having questions regarding the services commonly used through ATMs by the respondents. The respondents have to tick those services which they are using out of the following services.
Cash withdrawal, balance enquiry, cheque/cash deposit, transferring funds, ordering cheque books, bill payments and recharging of prepaid cards are the options provided.

These services provided through ATMs by banks are selected after studying the most commonly provided services through ATMs provided by various banks in India obtained from their respective websites.

In order to measure the customer satisfaction of the ATM services a three-item scale is given in this section. The items include overall satisfaction with the ATM of the respondent’s bank, the respondent’s satisfaction with the reliability of the ATM to provide transactions and the satisfaction with the accessibility of the ATMs.

4.4.4.1 ATM quality perception

As mentioned in chapter 3 service quality is measured on a performance only basis, which means the overall evaluation of excellence in service performance on the key parameters of the ATM services as perceived by the respondents. So the ATM service quality is measured on a performance based seven item scale which consists of the customer perception regarding easiness of usage, usefulness of the functions provided, easiness to use and operate, security of operation, convenience of location, safety of location, and its complaint resolution. The performance of the items are rated using a five-point Likert type scale with 1 equals strongly disagree and 5 equals strongly agree. These items given below have been modified and adapted from studies by Al-Hawari et al. (2005):

1. Learning to use ATM was easy for me
2. Functions provided by the ATM of my bank are very useful for doing my banking
3. ATM machine is easy to use and operate
4. I feel secure in conducting my banking business through ATMs
5. ATM is conveniently located
6. ATM is located in safe locations
7. The complaint resolution of my bank’s ATM is fast and satisfactory.

4.4.4.2. Measurement of Beliefs, Attitude and Intention to Use ATMs

In order to measure customer perceptions and beliefs towards ATM service offered by the respondent’s most frequented bank a 11-item scale has been used the items are as shown in the chapter 9, table 9.1 in order to measure the independent variables ease of use, usefulness and security of usage.

A 3-item scale is used to measure the attitude towards ATM adapted from Curren & Meuter (2005) & Barki & Hatwick (1994) on a five point likert scale with end points 5 (strongly agree) and 1 (strongly disagree) . The statements are as shown below.

1. I feel good about ATM Service of my bank
2. I feel pleasant about the ATM Service of my bank
3. I like the ATM service of my bank

The intention to use the ATM is measured using a single item five point scale adapted from Curren & Meuter (2005) which asks the respondent the likelihood of using ATM for a routine transaction.

4.4.5 Questions related to internet banking services

Part four of the questionnaire consists of questions pertaining to the internet banking services of the respondent’s “most frequented bank”. The respondents are asked to tick from among the following services those which are used by them. The services option provided are:

statement enquiry, bills payment, funds transfer, cheque book request, loan applications, DD requests, online shopping, mutual fund transactions and
investments advice. The services mentioned here are by no means an exhaustive list of services offered by banks through internet banking channels, but are representative of the major services offered and are selected after studying the websites of the selected banks.

A three-item scale is included to measure the satisfaction of the users of internet banking regarding the internet services offered by their most frequented bank. The items are as shown below measured on a five point scale with 5 being highly satisfied and 1 being highly dissatisfied.

1. Overall satisfaction with internet banking of your bank
2. Satisfaction with the website contents
3. Satisfaction with the accuracy of services.

**4.4.5.1 Internet banking quality perception**

The customer perception regarding the service quality of the internet banking services offered by the respondents’ “most frequented bank” has been measured using the following items modified and adapted from the studies by Jun and Cai (2001), Al-Hawari et al (2005) and Jayawardhena (2004)

1. The bank’s website contains all the required information to conduct my banking.
2. The bank’s internet transactions are secure.
3. The Internet banking is reliable as it provides error free transactions.
4. The bank’s website is attractive with clear instructions
5. The bank’s internet banking facility enables me to carry out a wide range of transactions.
6. The complaint resolution of my bank’s internet banking is fast and satisfactory.
7. The bank is very accurate in their responses to my queries/requests.
8. Navigating the Bank’s website is easy and it can be downloaded fast

A five point scale is used with 1 being strongly disagree and 5 being strongly agree is used to measure the perceptions of the respondents. The
responses to the questions from the above part of this section were to be answered by only the users of internet banking.

4.4.5.2 Measurement of Beliefs, Attitude and Intention to Use Internet Banking

The next part of this section was to be answered by both users and non-users of internet banking to measure their perceptions, beliefs, attitude and intention to use internet banking services. Four antecedent beliefs are proposed as predictors of attitude towards internet banking services. These beliefs are proposed after an extensive review of the literature (Curran and Meuter, 2005; Davis et al., 1989; Igabria, 1996, Walker and Johnson, 2006; Dabholkar, 1994 and Tan & Teo, 2000). These independent variables are ease of use, perception of usefulness, compatibility and security concerns. The constructs are measured using a 14-item five point scale as shown in chapter 9, table 9.8.

The explanations of the constructs ‘ease of use’ and ‘perception of usefulness’ is the same as in the model used for analyzing the attitude and behavioural intentions of ATM services used in this study. However, two new constructs have been introduced in this model in view of the nature of internet banking services which is quite different from the operational aspects of ATM services. These constructs are compatibility and security concerns.

Compatibility is a construct adopted from the original work of Rogers (1962) Diffusion of Innovation. It is defined as the degree to which an innovation is perceived as being consistent with the existing values, past experiences and the needs of potential adopters. From the literature it is found that those customers who were having prior experience with computers (Mattila et al., 2001; Karjaluoto et al., 2002), high P C proficiency (Jayawardhena and
Foley, 2000), comfortable with internet usage (Black et. al., 2001) would take to internet banking faster.

Several researches (Allen et al, 1992; Dabholkar, 1994a; Taylor and Todd, 1995; Curran and Meuter, 2005) have shown attitudes towards self service technologies such as internet banking as antecedent to behavioural intention and certain beliefs as antecedents to these attitudes.

As mentioned in the case of ATM services the attitude towards internet banking services is also measured using a 3-item Likert type scale shown in chapter 9, table 9.10.

The Intention to Use internet banking services is measured using a single item five point scale adapted from Curran and Meuter (2005) in which 5 is extremely likely to use and 1 is extremely unlikely to use.

The usage of internet banking services is measured as the percentage of the banking transactions done by the respondent using internet banking out of their total banking transactions.

4.4.5.3 Reasons of Non-Usage of Internet banking

The common reasons for non-usage of internet banking are identified from the literature as well as from the discussions with the experts and the bank customers. The perceptions of the non-users of the internet banking were obtained on a five point scale with 1 being 'strongly agree’ and 5 being 'strongly disagree’. The reasons for non-usage of internet banking included in the questionnaire are as shown below.

1. Happy with other mediums of services such as branch banking & ATMs
2. Concern about security
3. No training provided by the banks in using the internet banking services
4. Don’t know the procedure for using internet banking
5. Concern about the pricing of transactions using internet banking
6. Don’t trust the internet banking services provided by the bank
7. Benefits of using internet banking not clear
8. Lack of confirmation of transactions through paper receipts
9. Not aware about the services available through internet banking
10. Not happy with the speed of internet connection

4.4.6 Questions pertaining to Tele banking services

Part five of the questionnaire consists of questions pertaining to the tele banking services of the respondent’s “most frequented bank”. The respondents are asked to tick from among the following services those which are used by them. The services option provided are:

balance enquiry, account statement request, cheque status enquiry, cheque book request, funds transfer and utility bill payments.

The services mentioned here are by no means an exhaustive list of services offered by banks through tele-banking channels, but are representative of the major services offered and are selected after studying the websites of the various banks.

Tele-Banking satisfaction was measured using a single-item five point scale with 1 being ‘highly satisfied’ and 5 being ‘highly dissatisfied’.

4.4.6.1 Tele banking quality perception

Tele banking service quality perception was measured using a 6-item scale to capture the tele-banking services provided in an automated interactive response system mode as this type of tele-banking is the one which come under the self-service categorization.

These items were adapted from the studies of Al-Hawari et al., (2005) and Joseph and Stone (2003).
1. The bank’s tele banking service has pleasant musical background.
2. The bank’s tele banking service has reasonable number of voice prompts.
3. The bank’s tele banking service has short waiting time.
4. The bank’s tele banking service provides clear instructions.
5. The bank’s tele banking service is reliable.
6. The bank’s tele banking service provides ample options.

4.4.6.2 Reasons of Non-Usage of Tele banking

The reasons for the non-usage of telebanking services were also given in this section and responses of non-users of telebanking services obtained using a five point scale with 1 being ‘strongly disagree’ and 5 being ‘strongly agree’. The reasons included in the questionnaire to elicit responses regarding the non-usage of tele banking services are as shown below.

1. Comfortable with other modes of accessing banking services
2. Unfamiliarity with the service
3. Not clear about the benefits of using telebanking services
4. Don’t know the procedure for using tele banking
5. Bank does not offer training to use tele banking services
6. Don’t trust the tele banking services provided by the bank.
7. Pricing concerns because of high telephone charges

4.4.7 Questions pertaining to Mobile Banking Services

Part six of the questionnaire consists of questions pertaining to the mobile banking services of the respondent’s “most frequented bank”. The respondents are asked to tick from among the following services those which are being used by them which include both alert and request services. The services option provided are:

- balance enquiry,
- account statement request,
• cheque status enquiry,
• cheque book request,
• funds transfer
• utility bill payments.

Drivers and Inhibitors of Mobile banking services

The respondents were asked to indicate their perception regarding the factors that enable or aid the adoption of mobile banking services. Five factors were identified through literature review (Souranta et al., 2005), which aided the adoption of mobile banking services. The respondents were asked to give their degree of agreement/disagreement on a five point Likert scale with 5 as ‘strongly agree’ and 1 as ‘strongly disagree’.

1. Mobile is always with you
2. Mobile is a familiar device
3. Sufficient guidance from bank given
4. Conducting banking is fast and efficient
5. Quality of service does not change as it is standardized

Some of the common inhibitors of mobile banking services were identified from the literature (Souranta et al, 2005) and the respondents were asked to give their degree of agreement/disagreement on a five point Likert scale with 5 as ‘strongly agree’ and 1 as ‘strongly disagree’.

1. Possibility of errors
2. Lack of familiarity with the service
3. Use is complicated
4. Slow data transmission
5. Feel more comfortable with other means of transaction
4.4.8 Perception regarding banking transactions conducted through various channels

Finally this section has a question requesting the respondents to indicate the approximate percentage of banking transactions done by them through various modes of banking such as branch banking, ATMs, internet banking, tele banking and mobile banking.

The seventh and the final part of the questionnaire contained demographic details.

4.5 Reliability and Validity of the scales

Reliability and validity are two main criteria for measuring the goodness of measures used in a research instrument. Validity tests how well an instrument that is developed measure the particular concept it is supposed to measure and reliability tests how consistently a measuring instrument measures whatever concept it is measuring. Reliability is a necessary but not a sufficient condition for the validity of an instrument.

Different multi-item scales are used in the questionnaire of the study; the multi-item scales have been adapted with suitable modifications from related literature. These scales have shown reliability and validity in the respective studies from which they have been adapted.

However to verify the suitability of the measurements used with the data in the study the multi-item scales have been subjected to reliability and validity tests in the study. Cronbach alpha which is a measure of reliability based on internal consistency of the constructs used have been calculated for all the multi-item variables as recommended by (Hair et al., 1998). Only those items having Cronbach alpha coefficient of 0.7 or more have been used for measurement in this study.
Content validity has been ensured by adapting the measures of the constructs from prior studies based on well accepted theoretical backing and the consultation with experts during the pre-testing stage. The construct validities are established through factorial validity test involving factor analysis. The reliability and validity tests are shown in the relevant chapters along with the findings and results from respective multi-item scales used.

4.6 Statistical Techniques

The primary data collected from the respondents were tabulated and analysed using the Statistical Package for Social Sciences (SPSS. 10). Descriptive statistics were used to know about the characteristics of the respondents.

The statistical tools such as the weighted means, independent sample t-test and one way ANOVA test were used to test the differences in adoption levels of the electronic banking channels among various demographic categories, respondents belonging to different bank groups and cities. The same tools were used to find the differences in the satisfaction levels and perception levels pertaining to the electronic banking channels among these groups.

Correlation tests were used to find out the pairwise relationships between adoption and use percentage of transaction through these channels, the pairwise relationships between adoption levels, customer satisfaction, service quality and so on.

Reliability and validity of the various scales used in the study are tested by computing the Cronbach’s alpha and by conducting exploratory factor analysis using principal component analysis with varimax rotation respectively. In some cases confirmatory factor analysis (CFA) using AMOS.16 statistical package has also been done.
Logistic regression was done to identify the predictors of adoption/usage of internet banking services. Multiple regression analysis using enter method was used with total electronic banking channel adoption as the dependent variable for to understand the effect of various independent variables like perceived relative advantage, self efficacy, need for personal contact, innovativeness and perceptions regarding risks.

Structural Equation Modeling (SEM) using AMOS.16 package was employed to find the relationship among antecedent beliefs, attitudes, intention to use and usage in case of ATMs and internet banking.

The reasons for non-usage of internet banking and tele banking were analysed using weighted means.

4.7 Conclusion

The chapter outlined the principles underlying the design of the study and the research methodology used. The details regarding the research approaches used, data sources, sampling method used, research instrument, and the statistical tools that are made use of are also brought out in this here. The chapter shows that the study endeavors to adhere to the scientific principles of research.