Chapter 4

Research Methodology

In this chapter, need of the study, objectives, scope of the study, hypothesis, sampling, sources and instruments of data collection and limitations of the study have been discussed systematically.

4.1 NEED OF THE STUDY

Electronic banking (e-banking) reduces transaction costs of banking for both the customers and for the banks. Customers need not visit banks for banking transactions, They can apply for loans and do other banking services online. Despite these benefits, a very little research has been conducted on factors affecting e-banking adoption by customers’ and banks in developing countries. E-banking has been discussed from a retail point of view (B2C) (Wan and Chow, 2005; Celik, 2008), however financial services to customer have so far received limited attention. (Gehling et al., 2007). Nonetheless, online financial services represent a critical issue for the survival of SMEs (Wright and Ralston, 2002). As financial services are data intensive and require no physical delivery (Zekos, 2004) e-banking grows taste than other e-commerce sectors. Literature on SMEs in developed countries has mostly focused on e-commerce issues (Bunker and MacGregor, 2000), as unlike in developing countries, financing does not seems to be a critical issue (Guglani, 2001). Khalifa and Davison (2006) mention that existing literature on the adoption of information technology can be grouped into two approaches. One focuses on the rationalistic goal oriented behavior of firms and the other focuses on external forces of institutions. These theories, however, are not mutually exclusive as both firms’ related and institutional forces together determine adoption. Hence, there is a need to study an adoption and diffusion of modern technology basically on public and private sectors banks operating in developing countries that incorporate both the goal-oriented behavior of the firms as well as institutional pressure on technology adoption. E-banking services have been available in India since 2000. However, the adoption of online banking channels by banks has been rather slow when compared with
the developed countries. It has been reported that Indian banking lags behind in the use of ICTs. Research has been done on electronic commerce issues, computer usage, Internet usage, telephone and electronic banking but, no research has been done on adoption and diffusion of modern technology based upon public and private sectors banks. Banks in India have invested huge amounts of money in offering financial services online. However, customers are slow in adopting e-banking services. In order for the Banks to effectively integrate customer's segments with e-banking systems, it is important to identify the factors responsible for this. The aim of this research is to extend the existing adoption models and to propose an integrated and eclectic conceptual framework of factors which influence e-banking adoption behavior by customers in Indian banking in both public and private sector. To accomplish this, there is the need to start with a critical understanding of e-banking adoption behavior and factors that could drive or inhibit wider adoption and use of e-banking and also to examine the roles of institutions in e-banking adoption and how effectively they can play a role in expediting the adoption of e-banking. One of the reasons of the study is to help the banks in increasing productivity, controlling cost while providing quality of services to different customers. Good ambience of banks is the symbol of status that would increase the goodwill of general public.

An analytical review of existing literature has brought to light significance of IT in banks. But No comprehensive study on this area is conducted during the period of post-economic reforms and financial sector reforms in India. Which e-delivery channel is most popular and cost effective? What is the Impact on efficiency in terms of productivity and profitability of banks, which are using e-delivery channels? What are the advantages reaped by the banks and which are the most beneficiaries? Whether new competition has enhanced the overall efficiency of the banking system? Whether IT is cost effective to manage recent bank transformation? What are the perceptions of bank customers and bank employees regarding electronic services? To what extent IT is accepted in banks and customers? What are the problems and prospects for the banks due to adoption of IT in banks?
Keeping in view the hitherto unanswered questions, there is an apparent need to undertake a study which could evaluate the adoption and diffusion of technology in banking, in an appropriate manner.

4.2 OBJECTIVES OF THE STUDY

Keeping in mind the rationale behind this study, the following objectives have been spelled out as under:

- To study the origin, growth and performance of banking industry in India.
- To analyse the status and extent of adoption and diffusion of modern technology in selected public and private sector banks.
- To evaluate the impact of modern banking technologies on the efficiency and productivity of public and private banks selected for the study.
- To assess the satisfaction level of customers regarding the adoption and diffusion of modern banking technologies and also to examine the effectiveness of adoption of modern technology in banking operations and banking services.
- To examine the perceptions of bank employees relating to the use of various products/services, delivery channels and their acceptability with regard to adoption and diffusion of modern banking technologies.
- To identify the flaws and the reasons for not using different banking channels and advance suggestions to make the banking industry more technology friendly and result oriented.

4.3 HYPOTHESIS

Hypothesis is simply a statement about the universe. It is a statement of the tentative solution of the problem. This statement may or may not be true; the research is designed to ascertain the truth. In view of the above objectives of the study, a number of research questions arise. On the basis of these research questions and review of related literature the following hypotheses have been formulated:
- **Ho1**: Demographic variables have no significant relationship with variables providing banking services satisfaction
- **Ho2**: Socio-economic variables have no significant relationship with variables providing banking services satisfaction
- **Ho3**: Age has no significant relationship with awareness about banking channels
- **Ho4**: Education has no significant relationship with awareness about banking channels
- **Ho5**: Occupation has no significant relationship with awareness about banking channels
- **Ho6**: There is no significant difference in the opinions of respondents.
- **Ho7**: Employee Productivity is not significantly correlated with e-channels in pre and post-e-banking period.
- **Ho8**: Profitability is not significantly correlated with each e-channel in pre and post e-banking period.
- **Ho9**: Demographic variables have no significant relationship with the purpose of modern technologies usage.
- **Ho10**: Demographic variables have no significant relationship with the purpose of modern technologies usage.
- **Ho11**: Demographic variables have no significant relationship with the frequency of use of e-banking services.
- **Ho12**: The perceptions of bank employees regarding e-banking services are not significantly different.
- **Ho13**: There is no significant difference in the opinions of respondents towards the attitude of official working public and private banks.
- **Ho14**: There is no significant difference between the services offered by different banking sectors.
- **Ho15**: Respondent profile was not significant in case of product characteristics satisfaction.
4.4 STATEMENT OF THE PROBLEM

The study focuses on the evaluation of the adoption of technology in banking. The problem is titled as below:

"Adoption and Diffusion of Modern Banking Technology–A Study of Public & Private Sector Banks"

4.5 SAMPLING

The present study is based on sampling method. Two sets of questionnaires have been prepared. First questionnaire is related to customers, dealing directly & indirectly with banking industry and the second is related to bankers at different level of management. The sample for the study is consisted of 300 customers, who have been selected from public and private sector banks operating in the states of Punjab and Himachal Pradesh. At the first stage 10 banks (five from public sector and five from private sector) have been selected on the basis of their market share in business. While adopting quota sampling 30 respondents have been selected from each bank selected for the study. The bank customers from different socio-economic background (age, income, occupation, education and gender) were surveyed from different branches. In order to get the information from the bank officials, another questionnaire has been developed and administered to the bank officials to get the requisite information. A sample of 100 respondents @ 10 respondents from each bank (Public & Private sector) has been collected.

4.6 RESEARCH DESIGN

Research design refers to blue print for the research. It is a plan through which observations are made and data is assembled. It provides an empirical and logical basis for drawing conclusions and gaining perfect knowledge. To accomplish the above objectives of the study both primary and secondary data has been applied.
4.7 PARAMETERS OF THE STUDY

The performance of a bank can be measured by a number of indicators. Profitability and productivity are the most important and reliable indicators as they give a broad indication of the capability of a bank to increase its earnings. For measuring the profitability and productivity of Indian banking industry, various parameters were selected to analyze overall efficiency of the banks.

Productivity

The study addresses the objectives by making analysis on the basis of two indicators. These sets of indicators are as follows:

- Business per employee: (BUS/E)
- Profit per employee: (P/E)

Profitability

For measuring the profitability of commercial banks, the study employs three types of ratios:

Spread Ratios

1. Interest earned as percentage of total assets
2. Interest expended as percentage of total assets
3. Spread as percentage of total assets

Profitability Ratios

1. Net Profit as percentage of assets
2. Gross Profit as percentage of total assets
3. Operating expenses as percentage of total assets

4.8 TIME PERIOD FOR THE STUDY

Time period for the study was taken from post second banking sector reforms i.e. from 1996-97 to 2010-11, because the true impact of liberalization and globalization can be studied only after second banking sector reforms period as competition has increased, IT Act, 2000 is implemented, free entry
of foreign and private sector banks, implementation of WTO with new facilities etc. Effect of these mixed factors on banking industry has been studied in the selected time period. The time period was divided into three part pre e-banking period (1996-97 to 2000-01) and first phrase of post e-banking period (2001-02 to 2005-06) and second phase of post e banking period (2006-07 to 2010-11) to better explore the impact of modern technology on the banks' efficiency in terms of different parameters.

4.9 SOURCES OF DATA

The research plan can call for gathering secondary data as well as primary data. Secondary data are data that are collected for other purpose and already exist somewhere. Primary data are data gathered for a specific purpose or for a specific research project. Secondary data provides a starting point for research and facilitates the comparison of the research with the existing data. The analysis of present study has been based on primary as well as secondary data. More emphasis has been laid on primary data.

A. Primary Data

Primary data are original in character and are collected afresh for some specific purpose. The primary data was collected through under mentioned methods.

i) Questionnaire: A well structural schedule of questions containing different aspects of the study was developed and circulated to persons concerned.

ii) Interview: The permission of departmental heads of different banks was sought for the purpose of conducting personal interview.

iii) Observation: Certain information has been collected through personal observations. There are some incomplete questionnaires, which give ambiguous information. Therefore, personal observation has been made to reveal the data.

B. Secondary Data

Secondary data was collected for the analysis of profitability and productivity from the following publications;
Performance Highlights, Various Issues, IBA (Mumbai) 1996-97 to 2010-11

IBA Bulletin (Special Issues), 1996-97 to 2010-11

Report on Trend and Progress of Banking in India, 2000 to 2011

Indian Banking at a Glance, 2006

Annual Reports of these Banks.

Various other RBI publications, The Financial Express, The Economic Times and the Monthly Review of the Banks have also been consulted for the required data.

**4.10 TOOLS OF ANALYSIS**

The data collected from different sources has been classified and arranged in tables in one or more forms according to the requirements of the analysis. For the analysis of results, the following techniques have been applied:

**A. Mathematical Tools**

In the present research work, mathematical tools viz. percentage and simple average have been used to analyse the collected data.

**i) Tabular Analysis**

In tabular analysis, percentages are calculated to draw the inferences. It is very scientific and perfect analysis. In the present study, it is used to support the inferences drawn from the above statistical analysis as non-parametric analysis is not as powerful as parametric test. For the respondents, the responses had been solicited on the five parameters of 'I strongly agree, I agree to some extent, no opinion, I do not agree, and I do not agree at all'. For ranking purposes where the sum total of a row is equal, those higher either in response to fully agreed or very likely have been placed higher. For data calculation, "strongly agree" was given 5 points, "agree" was given 4 points, "undecided" was given 3 points, "disagree" was given 2 points and "strongly disagree" was given 1 point.
ii) Ranking

A checklist of the possible reasons was prepared in the form of multiple choice questions. The aggregate of responses was taken & then ranked to find out which is the most important reason/factor.

B. Statistical Method

Statistics is an imposing field of mathematics. It is the aggregate of facts affected to a marked extent by multiplicity of causes, numerically expressed, enumerated or estimated according to a reasonable standard of accuracy, collected in systematic manner for a predetermined purpose and placed in relation to each other. In the present study following statistical methods have been used:

i) Mean

One of the most useful and widely used techniques for doing this—one which you already know—is the average, or, as it is known in statistics, the mean. And you know how to calculate the mean: you simply add up a set of scores and divide by the number of scores. Thus we have our first and perhaps the most basic statistical formula:

\[
\bar{X} = \frac{\Sigma X}{N}
\]

Where:
\(\bar{X}\) (Sometimes call X-bar) is the symbol for mean.
\(\Sigma\) (The Greek letter sigma) is the symbol for summation.
\(X\) is the symbol for the scores.
\(N\) is the symbol for the number of scores.

So this formula simply says you get the mean by summing up all the scores and dividing the total by the number of scores—the old average, which in this case we’re all familiar with, so it’s a good place to begin.

ii) Standard Deviation

It is the most important and widely used measure of studying dispersion. Standard deviation is also known as root mean square deviation for the reason that it is the square root of the mean of the squared deviation.
from the arithmetic mean. The standard deviation measures the absolute variability of distribution. The greater the standard deviation, the greater will be the magnitude of the deviations of the values from their arithmetic mean. A small standard deviation means a high degree of uniformity of the observation as well as homogeneity of the series or vice-versa. Standard deviation has been calculated as under:

\[ \sigma = \sqrt{\frac{\sum x^2}{N}} \]

Where

- \( \sigma \) = Symbol of standard deviation
- \( x \) = \( (X - \bar{X}) \)
- \( N \) = Number of observations

iii) Co-efficient of Skewness

The co-efficient of skewness, as a statistical tool, helps in the study of the degree and direction of variation from the centre value. It also shows that a particular distribution is positively or negatively skewed. This method is useful in studying the concentration of responses of the respondents either on the lower side or on the higher side of mean score with respect to their opinion on different statements. In the case of normal distribution, the value of skewness will be zero. The positive skewness is denoted by Mode < Median < Mean and in case of the negative skewness we find Mean < Median < Mode. It has been calculated with the help of the following formula:

\[ SK_p = \frac{\bar{X} - Z}{\sigma} \]

Where:

- \( SK_p \) = Karl person’s co-efficient of skewness
- \( \bar{X} \) = Mean
- \( Z \) = Mode
- \( \sigma \) = Standard deviation

1) Kurtosis

In statistics, kurtosis refers to the degree of flatness or peakedness in the region about the mode of a frequency curve. The measurement of kurtosis
tells us the extent to which a distribution is more peaked than the normal curve. It is leptokurtic. If a curve is called flat-topped than the normal curve, it is called platykurtic. The normal itself is known as mesokurtic.

\[ \gamma^2 = \beta^2 - 3 \]

For a normal distribution \( \gamma^2 = 0 \)

If \( \gamma^2 \) is positive, the curve is leptokurtic, and

If \( \gamma^2 \) is negative, the curve is platykurtic.

**Chi-square Test**

This test is a non-parametric test. Non-parametric data does not follow the normal curve of probability and has unequal or un-measurable scale intervals between categories. Chi-square test is a test, which describes the magnitude of difference between observed frequencies and the frequencies expected under certain assumptions. With the help of Chi-square test, it is possible to find out whether such differences are significant or insignificant and could have arisen due to fluctuations of sampling. The information gathered through questionnaires from different categories of voters, media personnel and managers of political parties is in the form of nominal data. Hence, Chi-square test is considered more appropriate in the present study. In the chi-square test, the only problem is to decide as to how the expected frequencies have to be arrived at. There is no hard and fast rule of it and the method of arriving at the expected frequencies would depend upon the nature of the problem. Once the expected value has been arrived at, the calculation of chi-square and its interpretation are very easy. In the present research work, \( \chi^2 \) test is applied to study the relationship between quantities variables and for analyzing the opinion of respondents regarding different factors.

**\( \chi^2 \)- test of Independence**

This test has been used to study the relationship between demographic variables of respondents and purpose of loan taken, recovery mechanism, etc. It describes the magnitude of differences between observed frequencies and expected frequencies under certain hypothesis.

**\( \chi^2 \)- test of Goodness of fit**
This test enables us to ascertain how appropriately the theoretical distribution such as Binomial, Poisson, Normal etc. fits into empirical distribution. It is used to know the impact of the RRBs' credit in the development of rural areas of the state. The static of $\chi^2$ is calculated as:

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Where

$\chi^2$ = Chi-square  
O = Observed frequencies  
E = Expected frequencies

i) Calculate the expected frequencies (denote them E).

ii) Find out the differences between observed frequencies (denoted by O) and expected frequencies. In other words find (O-E).

iii) Square up the various values of (O-E) or find out (O-E)$^2$ and divide each value of (O-E)$^2$ by the respective value of E or the expected frequency. In other words find all values (O-E)$^2$/E.

iv) The total of all the values of (O-E)$^2$/E i.e. $\sum [(O-E)^2/E]$ will be the value of $\chi^2$.

v) Compare the calculated value of $\chi^2$ with the independent value of chi-square (available in tables) for the desired level of significance.

If the calculated value of $\chi^2$ is more than the relevant table values, the difference between observed and expected values is significant. If the calculated value of $\chi^2$ is less than the table value, the difference between observed and expected frequencies is not significant and could have arisen due to fluctuations in sampling.

### 4.11 SIGNIFICANCE OF THE STUDY

The present study focuses on the features, benefits, perceptions, knowledge, beliefs and preferences in banking services in a liberalized global economy. The chief objective of this study is to explore the problems and prospects of technology in banking in India.
The present study is a significant attempt to make an in-depth study of adoption and diffusion of technology in banking. The study seeks to provide insight into awareness, satisfaction and problems regarding different banking channels with a view to suggest framework for effective utilization of technology in banking channels and creation of desirable relationship among the customers.

The present research work is distinct and has never been undertaken until now. The present study has identified the problems and has recommended suggestions to improve the service of banks. The suggestions will also be helpful for banks to make their existing services more consumer-oriented and also for future technology adoption in their services for better results.