Chapter 3
THE RESEARCH METHODOLOGY

In this chapter, research framework of the study is presented and an outline is given regarding the approach adopted in the study. Research framework of the present study is developed to examine the following three objectives.

1) To study the nature and extent of diversification in Indian banking sector.
2) To examine the determinants of diversification in banks in India.
3) To analyze the effect of diversification on financial performance of banks.

To study these three objectives, different methodologies and research approach is required, which is discussed as follows.

3.1 The Research Framework Scheme

The research framework scheme adopted for studying the above stated three objectives is given below in Table 3.1.

Table 3.1 The Research Framework Scheme

<table>
<thead>
<tr>
<th></th>
<th>Objective I</th>
<th>Objective II</th>
<th>Objective III</th>
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<tbody>
<tr>
<td>Research Question</td>
<td>To study the nature and extent of diversification in Indian banking sector</td>
<td>To examine the determinants of diversification in banks in India</td>
<td>To analyze the effect of diversification on financial performance of banks</td>
</tr>
<tr>
<td>Literature Used</td>
<td>Strategic, Managerial and Financial Literature</td>
<td>-do-</td>
<td>-do-</td>
</tr>
<tr>
<td>Sample and Data Source</td>
<td>Public and Private Sector Banks in India</td>
<td>-do-</td>
<td>Public and Private Sector Banks in India</td>
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<td></td>
<td>Primary and Secondary Data</td>
<td></td>
<td>Secondary Data</td>
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<td>Research Methodology</td>
<td>Factor Analysis, Entropy Measure</td>
<td>Factor Analysis</td>
<td>Ratio Analysis, Coefficient of Variation, Simple Regression</td>
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<tr>
<td>Variables Used</td>
<td>Different Dimensions of Diversification</td>
<td>External Determinants Internal Determinants</td>
<td>Degree of Diversification Profitability and Performance Measures</td>
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<tr>
<td></td>
<td>-Nature of Diversification</td>
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<td></td>
<td>-Extent of Diversification</td>
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<td>-Degree of Diversification</td>
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<tr>
<td>Empirical Analysis</td>
<td>Chapter 4</td>
<td>Chapter 5</td>
<td>Chapter 6</td>
</tr>
</tbody>
</table>
3.2 Purpose of the study

The purpose of this study is to provide insights into the different aspects of diversification in banking sector in India. Due to de-regulation and liberalization, there have been a lot of policy changes that might affect diversification and other expansion strategies of banking business. Moreover, the disintermediation in commercial banking in combination with new capital adequacy rules has put an increased pressure on the banks profitability. Therefore, banks have to diversify and look for other sources of profits, preferably without increasing their necessary solvency level. This brings to the need and subject of this study. An attempt is made to investigate the impact of diversification on financial performance of banks in India, besides studying the nature and extent of diversification and determinants of diversification in banking sector in India.

Another reason for the study is that most of the empirical literature which has been reviewed has concentrated on corporate diversification and focused mostly on developed countries. The concept of diversification in financial service industry in general and in banking sector in particular is of recent origin in developing countries like India. Therefore, there is a need to study the implication of diversification in banks in India.

Therefore, an attempt is made to study the following research objectives:

1. To study the nature and extent of diversification in Indian banking sector.
2. To examine the determinants of diversification in Indian banking sector.
3. To analyze the effect of diversification on financial performance of banks.

3.3 Sample Description

The present study is focused on Indian banking sector only and analysis is restricted to all the scheduled commercial public and private sector banks in India excluding foreign sector and regional rural sector banks. Foreign sector banks are excluded from the study because most of these banks are already well diversified and they have a very minor presence in India in the form of a representative office or a branch office. For instance, Bank of America has a maximum of only 13 branches operating in
India. Regional rural banks are kept beyond the scope of study as they basically provide traditional services aimed at priority sector lending. In order to study the nature and extent of diversification, it is required to differentiate between diversified banks from non-diversified banks. Those banks are included in the definition of diversified banks, which have at least one insurance subsidiary or investment institution or both. These may be in the form of a subsidiary, joint venture or in any other mode such as alliance distribution etc. For the purpose of analysis, only business diversification is taken into consideration. Diversified banks are compared with non-diversified banks.

3.4 Period of the study

The study has been conducted for the time period of 15 years from 1994 to 2008. This time period is selected because prudential ratios are available for all banks on a uniform basis from 1994 onwards coinciding with the operations of the new private banks. Data was required mainly to study the impact of diversification process of banks. The banks started diversification moves after the implementation of economic and financial sector reforms of 1991. Moreover, new generation private sector banks emerged only after the year 1994.

3.5 Data Source and Sample size

Sources of Data

For the purpose of study, both primary and secondary data have been used.

Primary data

Primary data required to serve the objectives of this research study is collected by means of a questionnaire. Surveys and questionnaires are the most commonly used method of data collection in the study of organizations (Hinkin, 1995). The universe of the study, for the purpose of collecting data consists of all diversified private and public sector banks in India. Questionnaires were got filled through personal visits, mails and contacts. A total of one hundred and twenty questionnaires were got filled from area managers, zonal managers and branch managers of different diversified banks selected on the basis of convenience sampling technique. Out of these one hundred and twenty questionnaires, one hundred questionnaires completed in all aspects were finally selected.
for the purpose of analysis. The details of the sample selected for the purpose of analysis are presented in the Table 3.2 below.

### Table 3.2

**Sample Distribution of the Diversified Public and Private Sector Banks**

<table>
<thead>
<tr>
<th>City</th>
<th>Nationalized Bank (Diversified Banks)</th>
<th>SBI Group (Diversified Banks)</th>
<th>Private Sector Banks (Diversified Banks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amritsar</td>
<td>Bank of Baroda (4) Punjab National Bank (6) Bank of India (1) Canara Bank (2) IDBI Ltd. (1)</td>
<td>State Bank of India (5) State Bank of Patiala (2)</td>
<td>HDFC Bank Ltd (4) ICICI Bank Ltd (4) Kotak Mahindra Bank Ltd (1)</td>
</tr>
<tr>
<td>Jalandhar</td>
<td>Bank of Baroda (3) Allahabad Bank (1)</td>
<td>State Bank of India (7) State Bank of Patiala (1)</td>
<td>HDFC Bank Ltd (4) ICICI Bank Ltd (4) Kotak Mahindra Bank Ltd (1)</td>
</tr>
<tr>
<td>Ludhiana</td>
<td>Punjab National Bank (3)</td>
<td>State Bank of India (4) State Bank of Patiala (1)</td>
<td>HDFC Bank Ltd (2) ICICI Bank Ltd (2)</td>
</tr>
<tr>
<td>Mumbai</td>
<td>Bank of Baroda (2) Canara Bank (2) Bank of India (1)</td>
<td>State Bank of India (5)</td>
<td>HDFC Bank Ltd (2) ICICI Bank Ltd (2) Kotak Mahindra Bank Ltd (1) ING Vysya Bank Ltd (1)</td>
</tr>
<tr>
<td>Chandigarh</td>
<td>Bank of Baroda (1) Punjab National Bank (1)</td>
<td>State Bank of India (4) State Bank of Patiala (1)</td>
<td>HDFC Bank Ltd (2) ICICI Bank Ltd (2) AXIS bank Bank Ltd (1)</td>
</tr>
<tr>
<td>Chennai</td>
<td>Bank of Baroda (2) Canara Bank (1)</td>
<td>State Bank of India (3)</td>
<td>HDFC Bank Ltd (3) ICICI Bank Ltd (2)</td>
</tr>
</tbody>
</table>

*Note: The figures in parenthesis represent the number of questionnaires got filled from each bank in the respective city.*
Secondary Data

Secondary data is collected from several sources, which include database provided by Reserve Bank of India, Indian Bankers Association, Prowess and Capitaline Software’s. The data on bank-specific variables have been extracted from the statistical tables relating to banks in India, annual publications of the Reserve Bank of India (RBI), which provides bank-wise information on balance sheet as well as profit and loss indicators. The journals like The Banker and The Reserve Bank of India Bulletin Journal, IIBF-Vision (Indian Institute of Banking and Finance), Bank Quest have also been referred. Secondary data collected for the sample encompasses of all public and the private sector banks in India. Public sector banks are further categorized into nationalized banks and the SBI Group. Table 3.3 gives an overview of the sample size by year basis.

Table 3.3 Sample size

<table>
<thead>
<tr>
<th>Year</th>
<th>Public Sector Banks</th>
<th>Private Sector Banks</th>
<th>Total Banks</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Nationalized Banks</td>
<td>State Bank of India Group</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>19</td>
<td>8</td>
<td>29</td>
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<tr>
<td>1995</td>
<td>19</td>
<td>8</td>
<td>34</td>
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<td>8</td>
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</tr>
<tr>
<td>2008</td>
<td>20</td>
<td>8</td>
<td>26</td>
</tr>
</tbody>
</table>
3.6 Sampling Technique and Questionnaire Design

For the purpose of collecting primary data, convenience sampling technique has been used. The validity of questionnaire was checked through pilot survey. Questionnaires offer an objective means of collecting information about people's knowledge, beliefs, attitudes and behaviour (Boynton, 2004). A well-designed questionnaire is a pre-requisite to effectively gather information on both the overall performance of the test system as well as information on specific components of the system. Major source used to develop the questionnaire is review of literature. To frame out the relevant questionnaire to study the diversification process in banking sector, the questionnaires developed in earlier studies viz., Verweire (1999); Datta and Grant (1990) and Stimpert and Duhaime (1997) were analyzed and various variables were identified to be incorporated in the questionnaire. Based on the literature, a questionnaire was specifically developed for the purpose of collecting primary data.

3.7 Statistical Techniques

For the purpose of studying the set objectives, following statistical techniques have been used.

1. Entropy Measure

Dispersal of activities can be measured using the "entropy method", a way of quantifying the distribution of a particular activity across several segments, be they business or country segments (Raghunathan, 1995). The entropy measure of a firm's diversification is defined as "a weighted average of a firm's diversification within sectors" (Jacquemin & Berry, 1979), "a weighted average of the shares of the segments" (Palepu, 1985). The weight is assumed to be the logarithm of the inverse of the proportion of total business in each segment (Chatterjee & Blocher, 1992).

Entropy Measure of Diversification

\[ \text{Entropy measure} = \sum_{i=1}^{n} P_i \ln \left( \frac{1}{P_i} \right) \]

where, \( P_i \) is the proportion of total operations within the ith industry segment, 
\( n \) is number of segments in which the bank operates, 
\( \ln \) is natural logarithm of the inverse of the proportion of total operation in each segment, 
\( (1/P_i) \) is the relative weight of each segment i.
2. Factor Analysis

Factor Analytical Technique has been applied on the responses provided by respondents. Factor analysis is a good way of identifying latent or underlying factors from an array of seemingly important variables (Nargundlkar, 2008). Factor Analysis identifies common dimensions of factors from the observed variables that link together the seemingly unrelated variables and provides insight into the underlying structure of the data (Dillion and Goldstein, 1984). The main purpose of factor analysis is data reduction, while retaining the underlying structure of data set. It groups all the variables, which are highly correlated. In this study Principal Component analysis has been used since the objective is to summarize most of the original information (Variance) in a minimum number of factors for prediction purposes. A principal component analysis is a factor model in which the factors are based upon the total variance.

In the present study, Factor Analytic technique has been used to find out the factors which are driving banks to diversify their operations and services and the type of relatedness aimed to be driven from diversification. The purpose of the factor analysis is to analyse interrelationships among a large number of variables and to explain these variables in terms of their common underlying dimensions (factors). The statistical approach involving finding a way of condensing the information contained in a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information (Hair et al., 1992). All the highly correlated variables are grouped. First step involves the calculation of correlation matrix, which shows intercorrelation among the observed variables. Intercorrelation matrix is further used to apply R or Q-factor analysis. R factor analysis involves extracting latent factors from among the variables. Q factor analysis involves factoring the subject’s vis-à-vis the variables. The next step involves selecting the factor analysis model to be used. Two main types of factor analysis model are Principal component analysis and Common factor analysis. This choice depends upon the objective of the study. In this study Principal Component analysis has been used to summarize most of the original information (Variance) in a minimum number of factors for prediction purposes. In the study orthogonal factors have been used. In this the factors
are extracted in such a way that factor axes are maintained at ninety degrees, meaning that each factor is independent of all other factors. Next stage is of rotation and interpretation. Varimax rotation is one of the most popular algorithms for orthogonal rotation. In the present study varimax rotation has been used to simplify the factor structure by maximizing the variance of a column of the pattern matrix. Next step is to Extract the initial solution and decide the number of factors to be extracted. From the initial solution, the appropriate number of factors to be extracted in the final solution are determined. The most commonly used technique is referred to as the latent root criteria. Under this method only the factors having latent roots (eigen values) greater than one are considered. An eigen value is the column sum of squares for a factor. It represents the amount of variance in data. If necessary, rotate the factors to clarify the factor pattern in order to better interpret the nature of the factors. Now from the rotated factor matrix, the factors are interpreted i.e., decisions are made as to which factor loading was worth considering. A factor loading is the correlation between the original variables and the factors and the key to understanding the nature of a particular factor. Squared factor loadings indicate what percentage of the variance in an original variable is explained by a factor. Those factor loadings are chosen, which were greater than .50 (ignoring the signs) and loaded them on the extracted factors. The final step in factor analysis is naming the factor. This labeling is intuitively developed by the factor analyst based upon its appropriateness for representing the underlying dimensions of a particular factor. Variables with higher loadings are considered more important in this type of factor interpretation. They strongly influence the name or label selected to represent a factor (Hair Anderson and Tatham, 1987).

**Sample adequacy test**

Kaiser-Meyer-Olkin (KMO) and the Barlett’s test of sphericity are used to examine sample adequacy in relation to the number of variables. The values of Barlett’s test of sphericity and Kaiser-Meyer-Olkin (KMO) showed that data was fit for factor analysis. KMO value as a measure of sampling adequacy is 0.685. Generally, KMO
value greater than 0.5 is desirable. If a KMO value is more than 0.5, it makes the data fit for factor analysis and Barlett’s test which is a chi square test tells whether R matrix (Correlation matrix R) is significant enough to be worthy of further processing in factor analysis.

3. **Ratio Analysis**

Ratio analysis is one of the techniques of financial analysis to evaluate the financial condition and performance of a business concern. According to Myers (1984), “Ratio analysis of financial statements is a study of relationship among various financial factors in a business as disclosed by a single set of statements and a study of trend of these factors as shown in a series of statements”. Generally, the financial performance of banks and other financial institutions has been measured using a combination of financial ratios analysis, benchmarking, measuring performance against budget or a mix of these methodologies (Avkiran, 1995). In the present study, the following performance indicators will be used:

i) Ratio of Interest Income to Total Assets

\[
\text{Ratio of interest income to total assets} = \frac{\text{Interest earned}}{\text{Total assets}}
\]

It is defined as ratio of Interest income of banks to total assets. It include interest income consisting of interest earned, interest/discount on Advances/Bills and interest on balances with RBI And other Inter-Bank adjustments.

ii) Ratio of Non-Interest Income to Total Assets

\[
\text{Ratio of non-interest income to total assets} = \frac{\text{Other income}}{\text{Total assets}}
\]

It is defined as a ratio of non-interest income to total assets of a bank. Non interest income of a bank includes income from other sources other than interest income. For example, income from commission, exchange and brokerage, income from sale of investment, lease rentals, exchange transactions etc.
iii) Return on Assets (ROA)

Return on Assets (ROA) = Net Income / Total Assets (NI/A).

Return on assets (ROA) is measured by dividing net (operating) income by total assets. It reflects the efficiency with which banks deploy their assets.

iv) Efficiency ratio

Efficiency ratio = Total operating income / Total assets

Efficiency ratio is used to calculate a bank's efficiency. The efficiency ratio gives us a measure of how effectively a bank is operating. Generally, the concept of efficiency is regarded as the relationship between outputs of a system and the corresponding inputs used in their production (Tarawneh, 2006).

4. Simple Regression

Regression analysis is used to understand the statistical dependence of one variable on other variables. The technique can show what proportion of variance between variables is due to the dependent variable and what proportion is due to the independent variables. A simple regression analysis can show that the relation between an independent variable X and a dependent variable Y is linear, using the simple linear regression equation Y = a + bX (where a and b are constants).

By the use of regression line or equation, we can predict scores on the dependent variable from those of the independent variable. The regression model is given by

\[ Y = \alpha + \beta X + \varepsilon \]

Where \( Y \) is the dependent variable, \( \alpha \) is the y intercept, \( \beta \) is the gradient or slope of the line, \( X \) is independent variable and \( \varepsilon \) is a random term associated with each observation.

\( R^2 \) (coefficient of determination) - The strength of association is measured by the coefficient of determination, \( R^2 \). It varies between 0 and 1 and signifies the proportion of the total variation in \( Y \) that is accounted for by the variation in \( X \).
Beta coefficient (standardized regression coefficient) - This is the slope obtained by the regression of Y on X when the data are standardized. Beta is the average amount the dependent increases when the independent increases one standard deviation and other independent variables are held constant.

‘t’ statistic- The ‘t’ statistic with n-2 degree of freedom, a two tail test with its value \( \alpha = 0.05 \) is 2.228 is used to test the null hypothesis that no linear relationship exist between X and Y or \( H_0: B_i=0 \) where \( t = \frac{b}{SE_b} \).

5. **Coefficient of Variation (C.V.)**

It is a measure of dispersion used to compute the magnitude of the deviation relative to the magnitude of the mean of income sources. The coefficient of variation is the standard deviation of a data set, divided by the mean of the same data set or in other words it relates the standard deviation and the mean by expressing the standard deviation as a percentage of the mean.

\[
\text{Coefficient of Variation (C.V.)} = \frac{\text{Standard Deviation}}{\text{Mean}}
\]

For the purpose of data analysis, SPSS software and Microsoft Excel has been used.

3.8 **Objectives of the study**

**Objective 1: Nature and extent of diversification in banking sector.**

To study the nature and extent of diversification and type of relatedness across the various business lines from diversification in Indian banking sector, following framework (Fig. 3.1) has been followed.
To study the Nature and Extent of Diversification in Banks, the approach developed by Ramanujam and Varadarajan (1987) is used which is based on work of Berry (1971) and Wood (1971). In their study, the authors have used a two dimensional, categorical measure of firm diversity namely NSD (Narrow Spectrum Diversification)-related diversification and BSD (Broad Spectrum Diversification)-unrelated diversification. These two types of categorizations are used with little variation along with a third category that is AD (Alliance Diversification), which may be in the nature of related or unrelated business. Relatedness and Unrelatedness concepts are used to highlight the nature of diversification in banks. Further, another sub-objective of the study that is to measure the degree of diversification in banks is analysed. The degree of diversification is a measure of the diversity status of the bank and gives an indication how diversified a bank is. The entropy index prescribed by (Jacquemin & Berry, 1979) has been used to measure the degree of diversification.

To study the nature of relatedness, across the various business lines from diversification, a standardized questionnaire was drafted in which managers of different banks were asked as to how they perceived the relatedness of their banking business with
other line of business like insurance, investment and other non-banking business. Factor Analytical technique has been used to extract the factors from a set of variables showing the nature of relatedness of business in diversified banks.

**Objective 2: To examine the determinants of diversification in banks in India.**

In this part, the focus is given on the identification of factors that have profoundly influenced the banks decision to diversify i.e, to find out the reasons, why banks are diversifying towards non-banking business besides their traditional business. Various determinants for diversification of banks are categorized into internal and external determinants. External determinants such as economies of scale and scope, technological progress, dynamics of bank competition, regulations, laws and economic conditions are discussed theoretically. These external factors are general and quite subjective in nature, so it is difficult to objectively quantify them. Internal determinants for diversification in banks and their significance in making banks to diversify their operation is analyzed. An explorative study is made to analyze various motives based on primary data. A standardized questionnaire was used to analyze the motives for diversification of banks. For the purpose of analysis, factor analytical technique has been used.

**Objective 3: To analyze the effect of diversification on financial performance of banks.**

In this part, financial performance of diversified banks is empirically examined to analyze the relationship between diversification and profitability of banks. The relationship between diversification of a bank and performance has been investigated to know to what extent differences in implementation of diversification result in performance differences.

In order to study the abovesaid purpose, following three hypotheses are set:

**Ho:** There is no difference between financial performance of diversified and non-diversified banks.
H₁₀: Degree of diversification has no significant impact on total income of diversified banks.

H₂₀: Degree of diversification has no significant impact on non-interest income of diversified banks.

For the purpose of analyzing the three hypotheses stated above, simple regression technique is used. The dependent variable in most diversification studies has been performance in terms of interest and non-interest income, generally defined as a measure of firm profitability (Datta E.A., 1991). Independent variable stated is degree of diversification measured by entropy measure.

3.9 Limitation of the study

Major limitation of the study is geographical restriction i.e, the study is limited to Indian banking sector only. There are several reasons for this, firstly as financial sector is changing very rapidly all over the world so it is difficult to follow these reforms. Secondly there is no official data available on the number of financial conglomerates operating in each country. Moreover, there is lack of legal definition of a financial conglomerate and official guidelines concerning the financial conglomerates. Further as pointed out by (Verweire 1999) that although there is a strong tendency towards international harmonization, the financial markets of the different countries all have their own peculiarities and characteristics.

Another limitation of the study is that regional rural banks and foreign sector banks are not included in the scope of study. Reason for excluding regional banks is that these banks concentrate more on traditional banking with the aim of serving mainly to priority sector. Foreign banks are excluded because these banks have marginal presence in terms of their asset size and business expansion. Most of the foreign banks are already well-diversified entities in their home country and in India. Moreover, they keep their scope of activities to retail and micro banking segments.
Another limitation is of the availability of data. The data was required mainly to study the impact of diversification process of banks. Banks have started diversification moves after the implementation of economic and financial sector reforms of 1991 and new generation private sector banks emerged only after the year 1994. So, prudential ratios and other financial performance indicators are available for all banks on a uniform basis only from 1994-95 onwards coinciding with the operations of the new private banks.