CHAPTER IV

DATA BASE AND RESEARCH METHODOLOGY

This chapter deals with the universe of the study, selection of the sample, techniques of data collection and the statistical techniques used in analysing the data.

UNIVERSE AND SAMPLE OF THE STUDY

The annual reports of companies are the main source of information regarding the various activities carried on by them during the relevant accounting period. Therefore, the annual reports of the selected companies have been used for the collection of data for the purpose of this study.

The top two hundred and fifty Indian companies as rated most valuable by the Business Today magazine for the year ended 31st March 2005 were selected for the study. Out of these two hundred and fifty companies, the annual reports of fifty companies could not be obtained inspite of our best efforts. Therefore, the annual reports of 200 companies were considered. We selected the top rated companies because it is a common belief that better the company, better are the reporting practices. The annual reports were considered for one year only because the environmental reporting is of recent origin in India.
As the Chartered Accountants are the preparers, users and attestors of the annual reports, an attempt was made to seek their opinion regarding various issues relating to corporate environmental accounting and reporting. The opinions of 142 Chartered Accountants were collected with the help of a structured questionnaire.

DATA COLLECTION

To collect the annual reports of the selected companies various means were used. First of all, the correspondence addresses of the two hundred and fifty companies were downloaded from the National Stock Exchange Website (NSE). A letter of request for the supply of annual reports was sent to the Managing Directors of each of these companies. However, the responses rate was very discouraging. Only 63 (32.5 per cent) respondents responded at the first instant. A reminder was despatched to the remaining companies after one and half month of the first letter. In response to the first reminder only 21 companies responded with their annual reports. The second reminder was sent to the remaining companies. This time the response rate was very discouraging and only seven annual reports could be
obtained in response to the second remainder. In all, annual reports of only 91 companies could be received through mail.

To collect the annual reports of the remaining companies, the libraries of the Department of Company Affairs (DCA), New Delhi; the Institute for Studies in Industrial Development (ISID), New Delhi; the Indian Institute of Public Administration (IIPA), New Delhi; the Institute of Chartered Accountants of India (ICAI), New Delhi; the Federation of Indian Chambers of Commerce and Industry (FICCI), New Delhi; were visited by the researcher. Some of the annual reports were also collected from friends, chartered accountants, shareholders and other researchers. The registered offices of some companies were visited by the researcher for the collection of annual reports personally.

To study the perception of chartered accountants, the names and addresses of around 500 chartered accountants were obtained from the topographical list of chartered accountants prepared by the Institute of Chartered Accountants of India (ICAI). A questionnaire regarding environmental accounting and reporting issues was designed. This questionnaire was tested by getting it filled from 20 chartered accountants of different years of experience. This pre-testing exposed some weaknesses in the questionnaire, which were removed. The questionnaire as rectified was sent
the selected 500 chartered accountants. The Chartered Accountants to whom the questionnaire was sent belonged to New Delhi, Kolkata, Mumbai, Chennai, Tiruchy and Coimbatore. Finally, 145 responses were obtained, 3 of these responses were not considered for analysis. Hence the views of 142 chartered accountants were considered for analysis. The chartered accountants covered within the scope of this study belonged to different age groups and occupations. The age-wise and occupation-wise distribution of chartered accountants is given in the table 1.
TABLE 1

AGEWISE AND OCCUPATIONWISE DISTRIBUTION OF CHARTERED ACCOUNTANTS

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Practising</th>
<th>In service</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 30</td>
<td>14</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>30 - 35</td>
<td>23</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td>35 - 40</td>
<td>14</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>40 - 45</td>
<td>8</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>45 - 50</td>
<td>11</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>Above 50</td>
<td>10</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>95</td>
<td>47</td>
<td>142</td>
</tr>
</tbody>
</table>

Source: Primary Data

ANALYSIS OF DATA

For analysing the corporate voluntary environmental reporting practices an "Index of Disclosure" consisting of items related to environment which should ideally be reported in the annual reports was constructed. This index was divided into two main categories i.e. voluntary items of environmental disclosure and the statutory items of environmental disclosure. The items included in the Index of Disclosure were based on:
- The Review of Literature on Corporate Environment Reporting Practices.
- The Environment Protection Act, 1986
- The Scanning of Annual Reports
- The views of Academicians, Chartered Accountants and Environmentalists.
- The criteria laid down on environmental reporting by various international agencies, e.g., FEE, GERI and Accounting Advisory Forum (AAF) of European Commission
- The Companies Act, 1956

In all, the 20 voluntary items of environmental information and one item of statutory environmental information were included in the disclosure index. These voluntary items were classified into the following three categories as stated below:
- Regulatory Environmental Information
- Accounting Environmental Information
- General Environmental Information

This classification was done on the basis of earlier studies and keeping in view the opinion that users of annual reports may be interested in knowing the performance in these areas. Table 2 presents the number of items of environmental information included in these categories.
TABLE 2

CATEGORISATION OF INDEX OF DISCLOSURE

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory Environmental Information</td>
<td>7</td>
</tr>
<tr>
<td>Accounting Environmental Information</td>
<td>4</td>
</tr>
<tr>
<td>General Environmental Information</td>
<td>9</td>
</tr>
<tr>
<td>Statutory Environmental Information</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>

Source: Primary Data

Since the large majority of the items of environmental disclosure included in the index were of voluntary in nature, therefore the main focus of this study was the status of disclosure of these voluntary items of environmental disclosure.

SCORING OF ITEMS

Several studies have been conducted in the past on the different aspects of corporate reporting practices in India as well as abroad. In these studies, different methods of scoring were adopted. In some studies, the scores to different items were assigned on the basis of relative importance of items (Hasseldive, 1982). In some other studies, the scores were assigned on the basis of quality of
information disclosed, while in some other studies equal scores were assigned to different items. (Jawaharlal, 1985).

In our study, we assigned the scores in the range of 0-3 depending upon the quality of disclosure. If an item was disclosed in monetary terms, a score of three was assigned, if an item was disclosed in quantitative terms, a score of two was assigned to it, if an item was disclosed in descriptive terms, a score of one was assigned and a score of zero was assigned if the item was not disclosed at all.

We also analysed the length of disclosure of environmental information. The length of disclosure was measured in terms of numbers of lines. In many earlier studies, the length of disclosure per company was measured in numbers of pages, paragraphs etc. Since the firms in India still give a few lines of environmental information in their annual reports, the number of lines was considered appropriate for measuring the length of disclosure.

To study the association between company characteristics and status of environmental disclosure four forms of multiple regression were used:
FORM ALGEBRAIC EQUATION

Linear
\[ y = a + \sum_{i=1}^{n} b_i x_i \]

Power
\[ \log y = \log a + \sum_{i=1}^{n} b_i x_i \]

Semi log (x)
\[ y = a + \sum_{i=1}^{n} \log b_i x_i \]

Semi Log (y)
\[ \log y = a + \sum_{i=1}^{n} b_i x_i \]

Where:
- \( a \) = intercept
- \( b \) = Independent variable
- \( y \) = dependent variable
- \( x \) = coefficient of independent variable
- \( n \) = number of dependent variables

The elasticity among the dependent and independent variable was also calculated.

To analyse the perceptions of Chartered Accountant the statistical techniques such as percentages, weighted average and Factor analysis were used. To calculate the weighted average, the weights of 2, 1, 0, -1 and -2 were assigned respectively to strongly agree, agree, can't say, disagree and strongly disagree.
FACTOR ANALYSIS

Factor analysis is a generic name given to a class of multivariate statistical methods whose primary purpose is data reduction and summarisation. Factor analysis, thus, seeks to reduce a large set of measured variables in terms of relatively few categories known as factors. It is by far the most often used multivariate technique of research studies, especially in studies pertaining to social and behavioural sciences (Kothari, 2000, p.376). This technique is a very powerful technique of multivariate analysis and has been described as the queen of analytical methods (Dwivedi, 1997, p.199). This technique minimises the multiplicity of measures to the utmost simplicity.

The basic functions which factors analysis can perform are to (i) identify a set of dimensions which are latent in a large set of variables, (ii) devise a method of combining or condensing large numbers of people into distinctly different groups within a larger population (iii) identify appropriate variables for subsequent regression, correlation or discriminate analysis; (iv) create an entirely new set of smaller number of variables to partially or completely replace the original set of variables for inclusion in subsequent regression, correlation or discriminate analysis (Hair, et al., 1995, p.235).
In this study, the technique of factor analysis was used to summarise the views of chartered accountants regarding the contents of environmental disclosure.

**DATA SUITABILITY TEST**

The first step, before an analyst proceeds to apply the factor analysis, is to check whether the data is fit for factor analysis or not. Data stands fit for factor analysis, if it meets the following criteria.

- The number of observations should be at least fifty and there should be at least four or five times as many observations as there are variables to be analysed.
- The correlation matrix is required to be calculated to see whether enough correlation exists among the variables or not.
- Anti-image correlation matrix shows the negative values or the partial correlation among the variables. True factors exist if the partial correlation is low among the variables.
- Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (MSA) is used as an index for comparing the magnitudes of the partial correlation coefficients. The index ranges from 0-1. The KMO should be sufficiently high for individual variables and also for overall MSA.
Bartlett's test of sphericity indicates statistically significant number of correlations among the variables.

The two most commonly used models of factor analysis are the Principal Component Analysis model and the Common Factor Analysis model. In this study, to summarise the views of respondents regarding the contents of environmental disclosure the Principal Component model of factor analysis also referred to as R-Factor analysis was used. The Principal Component analysis model was used because our purpose was only to summarise the large number of variables in a minimum number of factors. After the selection of factor analysis model, the researcher has to decide about the factor extraction technique. We, out of orthogonal and oblique factor extraction techniques, selected the orthogonal technique for the extraction of factors. The oblique factor extraction technique was not used because an entirely satisfactory analytical procedure has not been devised for it and it is still the subject of considerable experimentation and controversy (Hair, et al, 1995, p.238). After the selection of factor extraction technique, the researcher has to decide about the criterion for the selection of factors to be retained for analysis. The different criteria available for this purpose are, the Eigen value also referred to as the latent root or characteristic
root, Priori Criterion, Percentage of Variance Criterion and Scree Test Criterion. However, the most frequently used criterion for this purpose is the Eigen value greater than one (Ibid., p.247). In this criterion, if the Principal Component model is used then all the factors with Eigen value greater than one are retained for further analysis and if Common factor analysis is used then the Eigen value requires a little downward adjustment. Since we used the Principal Component model, the Eigen value greater than one Criterion was followed for the retention of factors. Eigen value, variances of the factors, is the column sum of squares for a factor. It represents the amount of variance accounted for by a factor.

**FACTOR ROTATION**

Rotation of factors is considered must in case of factor analysis. The unrotated factor solution may or may not provide a meaningful pattern of variables. The unrotated factor solution does not provide information that offers the most adequate interpretation of the variables under examination. Generally, the rotation is desirable because it simplifies the factor structure and in most cases improves the interpretation by reducing some of the ambiguities that often accompany the initial unrotated factor solution. A number of orthogonal and oblique rotation approaches are
available. We have to focus on the orthogonal approaches because of the non-availability of the oblique rotational procedures. Three main rotation procedures used in orthogonal rotational approaches are QUARTIMAX, VARIMAX and EQUIMAX. The objective of the QUARTIMAX rotation is to simplify the rows of a factor matrix. It focuses on rotating the initial factor so that a variable loads high on one factor and as low as possible on all other factors. The VARIMAX criterion focuses on simplifying the columns of the factor matrix. EQUIMAX criterion is a compromise between the QUARTIMAX and VARIMAX.

In this study, the orthogonal rotation with varimax was run because the VARIMAX seems to give a clearer separation of the factors. Kaiser's experiment (2) also conveyed that the factor pattern obtained by VARIMAX rotation tends to be more invariant than that obtained by the QUARTIMAX criterion. The VARIMAX has proved to be very successful as an analytical approach to obtain an orthogonal rotation of factors (Ibid., 1995, p.247).

NAMING OF FACTORS

After the selection of factors, the names were assigned to them. The process of naming the factors is not very scientific and is based on the subjective opinion of the researcher. However, whatever little guidelines are
available for naming the factors, they were taken care of.

COMPUTER SOFTWARE

MS Excel, Lotus 1-2-3 and SPSS 7.5 version of computer softwares were used in this study.

LIMITATIONS OF THE STUDY

Though every effort was made to get the accurate data and results, yet this study may be suffering from the following limitations:

- Though every effort was made to make the list of contents of environmental disclosure the exhaustive one yet some items may have been left out.

- The data obtained from the respondents may have inaccuracy because of misinterpretation and misunderstanding on the part of the respondents.

- The present study was restricted to the annual reports of top 200 Indian companies. Therefore, the findings regarding the status of environmental disclosure may not be applicable to all of the large and small companies operating in India.

- The views of chartered accountants were obtained from the big cities of Tamilnadu. These views may not be attributed to the chartered accountants of the whole of the country because of economic, social and cultural differences in the attitude and preferences.