CHAPTER 4

RESEARCH METHODOLOGY

This chapter discusses the research design and the methodology adopted in the present study. It also outlines the development of tools while standardising them scientifically establishing validity and reliability. Quantitative analysis of data was done using statistical tools wherever applicable. This chapter further elaborates on the research design used in the present study including details of sample, development of research tools, extraction of variables, instruments, data collection procedure and the statistical techniques employed for data analysis. In succeeding chapters, data analysis, results of the study, implications for the industry and stakeholders along with future areas of research are discussed in detail.

4.1 RESEARCH DESIGN

A 2x2x2 factorial design was used as the research design. The research design is presented in Figure 4.1. In this study, three structured questionnaires A, B, C were developed to identify and assess perceived quality of employees and wider choice through e-recruitment, resources utilized for e-recruitment, and employee job search behaviour respectively. Detailed procedure for developing tool is explained in ensuing discussion.

General Information on E-recruitment, Company website and Job boards (Survey Questionnaire Aa and Ca) were used as a measure of the dependent variables. Based on literature survey Indian service industry organisations were classified on the basis of sector and organizational size as impact of these criteria is evident on recruitment in general and recruitment through internet in particular (refer to Figure 4.1). Data was collected form HR Managers/professionals, and employees. Details are enlisted subsequently in this chapter. A Third category of respondents (sample) was taken which constituted people who do not influence or participate in the process of recruitment directly but are significant stakeholders. They consisted of General
Managers, and other senior functional managers of the organisation (refer to Figure 4.2).

4.2 THE DATA AND THE SAMPLE

4.2.1 THE DATA

The research is analytical and empirical in nature and makes use of secondary and primary data. The secondary data was sourced from Emerald, Jstor, Ebsco host, etc. Primary data was collected from HR managers/professionals, and employees. A third category of respondents (sample) was taken which constituted people who do not influence or participate in the process of recruitment directly but are significant stakeholders. They consisted of General Managers, and other senior functional managers of the organization.

4.2.2 THE SAMPLE

As derived from the literature Indian service industry were classified using two criteria, one sector, if the organisation operates in Hospitality or in Healthcare services and organizational size, if the organisation is individual/small size or chain/large size. Size is measured in terms of the number of people employed by the company (Steward and Knowles, 2000). Respondents included employees, HR managers of the organisations and other general/senior managers to test different facets of e-recruitment and its impact on human resource supply chain management in terms of various sources. In the present study, data was collected from the organisations located in National Capital Region of India.

4.2.3 SAMPLING CRITERIA

The criteria used for selection of sample originated from research objectives. Only those organisations were chosen which had at least Rs. 100 crore turnovers during last financial year. Equal distribution of respondents between Indian Hospitality organisations and Healthcare organisations as well as between small/individual and large/chain organisations was ensured. All efforts were made to ensure that the organisations included in the present study met with the above criteria. Among respondents only those HR managers/professionals were selected who were
responsible for the recruitment activity of the organization. Employees were the persons from the same organizations working at the level of 0-5 years of experience, as majority of internet users falls under this category. However this condition was waived off for HR managers. General and other senior managers were those senior managers who do not have links with HR department, however may involve in recruiting activities especially in case of small organizations where no separate HR department exists.

Figure 4.1: Research Design

Figure 4.2: Category of Respondents for Impact of E-recruitment in Indian Service Industry
4.2.4 PROFILE AND SIZE OF THE SAMPLE

For the purpose of this study various sources listing the companies in National Capital Region of India, were used to compile the sampling frame (such as Kothari Industrial Directory, National Association of Software and Services Companies (NASSCOM, 2004, 2005, 2007). In addition, online data were also sourced from capital online and prowess research data base. The use of multiple lists ensured that there was a high degree of correspondence between the sampling frame and the sampling population (Nachmias and Nachmias, 1996).

Data was collected with the help of questionnaires survey from different types of respondents to get views from a cross section of stake holders. Total eight hundred respondents were identified and reached in sixty four companies who had with at least two years of experience with the organisation and fulfilling other criteria as specified earlier. However, this condition was waived off for HR managers as they were the appropriate persons to give desired information. This was done to ensure informed view about the e-recruitment and its impact on human resource supply chain management practices of an organisation reflected in their responses. As per the design, efforts were made to collect three hundred and sixty responses through personal intervention and explanation. Objectives of the study and research design mandated use of stratified random sampling for the present work. Distribution of different types of respondents is given below (refer to Table 4.1).

<table>
<thead>
<tr>
<th>Sample Category</th>
<th>No. of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR Managers/Professionals</td>
<td>120</td>
</tr>
<tr>
<td>General/ Entrepreneurs/Senior Functional Managers</td>
<td>part of 120</td>
</tr>
<tr>
<td>Trainee Employees</td>
<td>240</td>
</tr>
</tbody>
</table>
4.3 DEVELOPMENT OF RESEARCH TOOLS

As the present study aims at making a comparative analysis of e-recruitment and its impact on human resource supply chain management in terms of various sources, one of the major tasks associated with the study was the development of questionnaires to be administered. The detailed procedure used for developing standardised questionnaires is explained in following discussion. The purpose and nature of questionnaire is explained in Table 4.2. The rationales behind the use and development of the Questionnaire A, B, and C are detailed in ensuing discussion.

4.3.1 SURVEY QUESTIONNAIRE A - PERCEIVED QUALITY OF EMPLOYEES AND WIDER CHOICE THROUGH E-RECRUITMENT

As the availability of valid tool for measuring perceived quality of employees and wider choice through e-recruitment being nil and research available in Indian context being minimum, items for quality of employees and wider choice through e-recruitment were consulted from various related articles and literature (Bishop and Dunkelberg, 1985; Barron, Rynes, Bretz, and Gerhart, 1991; Russo, Rietveld, Nijkamp, and Gorter, 1994; Mencken and Winfield, 1998; Bolles, 2001; Kumar, 2003; Chapman and Webster, 2003; Stone, Lukaszewski, and Isenhour, 2005) as the basic framework. The questionnaire was divided into three parts corresponding to general information about e-recruitment, quality of applicants and wider choice through e-recruitment. For part (a) of the questionnaire, a new thirty one items questionnaire including all aspects related with general information on e-recruitment, company website, and job boards was formulated on the basis of literature review. The questionnaire had high face validity. The content validity (which concerns the relevance of the questions asked to the quality being measured) of the questionnaire was ensured through the use of judges at different stages during its development.

Based on literature review, a list of twenty item statements describing different dimensions of quality of applicants (part (b)) were prepared. This was sent to thirty experts in the field of HR/recruiting including five senior academicians and twelve managerial recruiters and thirteen senior HR managers in big organisations. Eleven items were deleted and six were nominally changed on the basis of expert opinion.
Finally a nine item questionnaire which was approved by all thirty experts was prepared.

For part (c) of the questionnaire, twenty five items describing different dimensions of wider choice of candidates through e-recruitment was developed based on the literature framework. This was also sent to thirty experts in the field that included senior and managerial positions in big organizations. A fifteen items questionnaire which was approved by all the experts was finally prepared.

The questionnaire was then pre tested on a sample of 100 respondents. These respondents did not form a part of the sample of the main study. The questionnaire was also validated by conducting factor analysis and appropriate parameters were identified which are discussed in detail in the subsequent chapter. The questionnaire was found to be reliable with reliability coefficient of 0.711 for part (a), 0.916 for part (b), and 0.821 for part (c) (refer Table 4.3).

4.3.2 SURVEY QUESTIONNAIRE B - RESOURCES UTILIZED FOR E-RECRUITMENT

Questionnaire B was divided in two parts corresponding to time and cost involved in recruiting. Twenty items were framed to get responses about cost involved and fifteen items were framed for time involved in recruiting by the organizations. Questionnaire was based upon items discussed in various related articles and literature (Gorter, Nijkamp, and Rietveld, 1993; Redman and Mathews, 1995; Mencken & Winfield, 1998; Smith, 1999; Galanaki, 2002; Chapman & Webster, 2003; Boswell, Roehling, LePine, & Moynihan, 2003; Stone, Lukaszewski, & Isenhour, 2005; Dineen, Ling, Ash, & DelVecchio, 2007; Williams, 2008).

Questionnaires were sent to thirty judges to elicit their opinion. Only those items were retained on which there was consensus among experts. Total ten items were retained in cost part, and six items were retained in time part. Modification (language) and deletion of the questions was done as per the suggestions of the experts.
As both the parts were supposed to measure time and cost, their reliability was established separately by a pilot study among 100 participants who were not part of the main study through test-retest. Questionnaire was validated by using factor analysis and appropriate parameters were identified. Details of the factor analysis are discussed subsequently in next chapter. Questionnaires were found to be reliable as reliability coefficient was estimated to be 0.789 for cost, and 0.756 for time factors of the questionnaire (refer Table 4.3).

4.3.3 SURVEY QUESTIONNAIRE C - EMPLOYEE JOB SEARCH BEHAVIOUR

The questionnaire has used the basic framework of above two questionnaires for measuring employee job search behaviour for e-recruitment. The purpose is to gather factual information about e-recruitment in general, quality, wider choice, time and cost involved in e-recruitment as well as to compare the same items responded by employers of the organizations. Experts’ views are also incorporated in framing of questions. In all thirteen items for e-recruitment and thirty items for quality, wider choice, cost and time were retained for getting opinion about the employee job search behaviour. Questionnaires were found to be reliable as reliability coefficient was estimated to be 0.810 for e-recruitment, 0.687 for quality, 0.831 for wider choice, 0.817 for cost, and 0.715 for time factors of the questionnaire (refer Table 4.3).

4.4 SCORING OF THE QUESTIONNAIRES

Survey Questionnaire A was rated on five point scale where strongly disagree was coded as ‘1’, disagree was coded as ‘2’, neutral was coded as ‘0’, agree was coded as ‘3’, and strongly agree was coded as ‘4’. Survey Questionnaire B was also scored on five point scale where very high was coded as ‘1’, high was coded as ‘2’, neutral was coded as ‘0’, low was coded as ‘3’, and very low was coded as ‘4’. Survey Questionnaire C was again rated on five point scale where responses were coded from 0 to 4 in order of their desirability.
4.5 PILOT STUDY

A pilot study was performed for all the three questionnaires on a sample of 100 respondents. A pilot, or feasibility study, is a small experiment designed to test logistics and gather information prior to a larger study, in order to improve the latter’s quality and efficiency. A pilot study can reveal deficiencies in the design of a proposed experiment or procedure and these can then be addressed before time and resources are expended on large scale studies. For the purpose of the present study, the questionnaire was pre tested on a sample of 100 respondents. These respondents did not form a part of the sample of the main study. The aim of pre-testing was:

(i) To ascertain the time required to complete the questionnaire
(ii) To check the adequacy of response categories formulated and
(iii) To check the overall appropriateness of the questions.

The questionnaire was discussed with respondents as well. Thereafter, the same sample was approached after three months to establish the consistency of the questionnaire. The questionnaire was also validated by conducting factor analysis and appropriate parameters were identified.

Table 4.2: Tools Used In the Present Study

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Survey Questionnaire A: Perceived quality of employees and wider choice through e-recruitment.</td>
<td>Measurement To measure perceptions about quality of employees that can make sure a good fit with the company as well as getting ample number of applications from diverse geographical locations.</td>
</tr>
<tr>
<td>2</td>
<td>Survey Questionnaire B: Resources utilized for e-recruitment.</td>
<td>Measurement To measure all costs that are involved in acquiring applications from the prospective employees and the duration involved in acquiring applications from the prospective employees.</td>
</tr>
<tr>
<td>3</td>
<td>Survey Questionnaire C: Employee job search behaviour.</td>
<td>Measurement To measure employee job search behaviour about e-recruitment in terms of quality, wider choice, time and cost involved in e-recruitment</td>
</tr>
</tbody>
</table>
4.6 DATA COLLECTION PROCEDURE

The questionnaires were filled by identified respondents in person by visiting offices of various selected organisations during the period corresponding to January-August 2010. Clarifications required by the respondents were addressed in person. The questionnaires were administered in groups and in some rare cases individually. For this, first of all rapport was established with subjects and then the purpose of the study was explained to them. The instructions for each test were given separately either in groups or individually depending on availability of subjects. For senior managers, the questionnaires were handed over explaining the instructions in detail and were collected later on.

4.6.1 SURVEY QUESTIONNAIRE A: PERCEIVED QUALITY OF EMPLOYEES AND WIDER CHOICE THROUGH E-RECRUITMENT

The subjects were instructed that “below are given some statements related to e-recruitment and perceived quality of employees and wider choice through e-recruitment. Choosing an appropriate option indicate to what extent you are in agreement with them; (1) Strongly Disagree, (2) Disagree, (0) Neutral, (3) Agree, (4) Strongly Agree.” Subjects took approximately fifteen to twenty minutes to complete the questionnaire.

4.6.2 SURVEY QUESTIONNAIRE B: RESOURCES UTILIZED FOR E-RECRUITMENT.

The subjects were instructed that “below are given some statements related to resources utilized for e-recruitment practices in your organisation. Choosing an appropriate option indicate the cost and time involved in recruiting practices in your organisation; (1) Very High, (2) High, (0) Neutral, (3) Low, (4) Very Low.” Subjects took approximately ten to fifteen minutes to complete the questionnaire.
Table 4.3: Reliability Scale

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Mean</th>
<th>Variance</th>
<th>Standard Deviation</th>
<th>Reliability Coefficient (Alpha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Questionnaire:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - Part (a)</td>
<td>43.7350</td>
<td>41.261</td>
<td>6.4234</td>
<td>.711</td>
</tr>
<tr>
<td>Survey Questionnaire:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - Part (b)</td>
<td>30.6333</td>
<td>19.275</td>
<td>4.3903</td>
<td>.916</td>
</tr>
<tr>
<td>Survey Questionnaire:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - Part (c)</td>
<td>59.3077</td>
<td>61.231</td>
<td>7.8250</td>
<td>.821</td>
</tr>
<tr>
<td>Survey Questionnaire:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B - Part (a)</td>
<td>30.4800</td>
<td>18.622</td>
<td>4.3153</td>
<td>.789</td>
</tr>
<tr>
<td>Survey Questionnaire:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B - Part (b)</td>
<td>19.2333</td>
<td>9.633</td>
<td>3.1037</td>
<td>.756</td>
</tr>
</tbody>
</table>

4.6.3 SURVEY QUESTIONNAIRE C: EMPLOYEE JOB SEARCH BEHAVIOUR

The subjects were instructed to kindly go through each item with five alternatives and tick the most appropriate one only. Subjects could refer to any of the data available with them as the questionnaire pertained to collection of factual information about recruiting practices in organisation.

4.7 VALIDATION AND STANDARDISATION

Nature of data and requirements of analysis dictated that data should be standardized. As survey questionnaire A and B are about the perception of people towards e-recruitment, quality, wider choice, cost and time involved in recruiting, it was imperative to use data reduction methods to identify significant differentiating components/variables. Factor Analysis was used for this purpose.
4.8 RESEARCH TECHNIQUES

4.8.1 AN OVERVIEW OF THE FACTOR ANALYSIS AND MULTIPLE LINEAR REGRESSION ANALYSIS

A two-step multivariate procedure is employed where the data is first subjected to a Factor Analysis and then Multiple Linear Regression is performed on extracted factors. Factor Analysis is the technique which is primarily used for data reduction or structure detection. The purpose of data reduction is to remove redundant (highly correlated) variables from the data and replacing with a smaller number of uncorrelated variables. The purpose of structure detection is to examine the underlying (or latent) relationships between the variables.

Factor analysis provides a set of “latent” dimensions or factors from observable variables. It also facilitates the need for a simultaneous investigation of alternative theories because the chosen set of factors represents combinations of several variables that may be interrelated. Furthermore; the use of factor analysis overcomes some of the problems associated with traditional regression analysis, especially multicollinearity. Factor analysis tries to simplify complex and diverse relationships that exist among a set of observed variables by uncovering common dimensions of factors that link together seemingly unrelated variables and consequently provides insight into underlying structure of data (Dillion and Goldstein, 1984).

Factor analysis has been carried out through the use of SPPS 17 software. Factor analysis simplifies the complex and diverse relationship among variables by uncovering the common dimensions that link them together, thus providing insight into the structure of the data. The technique of Principal Component analysis has been used to extract factors. The basic principal is to seek orthogonal; linear composites of the original variables whose scores display maximal variance. That is, the observable variables are grouped into factors based on their correlations (or associations). Variables that are highly correlated are formed into a factor with the condition that this factor is not related to the second factor and so on. The Factors also exhibit maximum sequential variance in that the first factor accounts for highest amount of variance, the second factor accounts for second highest, and so on.
To improve the interpretation of the results from factor analysis, a subsequent orthogonal rotation is performed to obtain a simple structure. This reduces the problem associated with too many variables loadings on more than one factor. The simple structure is obtained through Varimax orthogonal transformation.

### 4.8.2 FACTOR IDENTIFICATION AND SELECTION

Generally, the identification of the factors is determined by the factor loadings, and the relationship of the factor with the variable is based on the signs of factor loadings. A factor loading is simply the correlation of an original variable with factor. As suggested by Dillion and Goldstein, variables with factor loadings greater than absolute value of 0.30 or more are considered significant and thus used in labelling of factors. The present study has interpreted the factors loaded by variables having significant loadings of magnitudes of 0.40 and above.

The Scree plot method has also been used. In scree plot method, eigen values are plotted in a descending order against the number of factors. The eigen value represents the variance explained by each factor and is equal to the sum of squared loadings.

Questionnaire Aa (Perceived quality of employees and wider choice through e-recruitment - E-recruitment), Questionnaire Ab (Perceived quality of employees and wider choice through e-recruitment - Quality), Questionnaire Ac (Perceived quality of employees and wider choice through e-recruitment - Wider choice), Questionnaire Ba (Resources Utilized for e-recruitment - Cost), Questionnaire Bb (Resources Utilized for e-recruitment - Time) are separately treated for extraction purpose.

Categorization of the key determinants of e-recruitment, quality, cost, time, and wider choice through Factor analysis has been done on the basis of data collected during the pilot study; the following key variables have been identified.
Factors of E-recruitment

\( F_1 = \) Advantage of e-recruitment
\( F_2 = \) Effectiveness of e-recruitment
\( F_3 = \) Information through e-recruitment
\( F_4 = \) Efficiency of e-recruitment

Factors of Quality

\( F_1 = \) Suitability of Candidates
\( F_2 = \) Talented Database
\( F_3 = \) Targeting Right Candidate

Factors of Cost

\( F_1 = \) Annual Cost
\( F_2 = \) External Cost

Factors of Time

\( F_1 = \) Overall Time
\( F_2 = \) Processing Applications Time
\( F_3 = \) Recruitment Cycle Time

Factors of Wider Choice

\( F_1 = \) Wider Choice for Entrants
\( F_2 = \) Wider Choice for International Candidates
\( F_3 = \) Accessibility of Candidates
\( F_4 = \) Qualified Pool

Once the factors have been extracted the next step involves the estimation of the relationship between the extracted factors and the E-recruitment dimensions. Since the factors are derived through orthogonal transformations, there are no multicollinearity problems.

The relationship between dimensions of quality, cost, time and wider choice and dimensions obtained for e-recruitment was estimated using regression analysis with dummy variables. Where, Suitability of Candidates, Talented database, Targeting
right people, Annual Cost, External Cost, Overall Time, Processing Applications Time, Recruitment Cycle Time, Wider Choice for Entrants, Wider Choice for International Candidates, Accessibility of candidates, Qualified Pool are dependent variables and Advantage, Effectiveness, Information and Efficiency are independent variables.

The dummy variable has been used to take care of the levels to be tested. The dummy variable measures the two opposite options at three levels. Value 1 means the practice coincides with that and value 0 means the opposite case. For the present study, for sector the dummy variable has taken the value 1 for Hospitality services and 0 for Healthcare services. Similarly for organization size the dummy variable takes the value 1 for large size and 0 for small size. For respondent category the dummy variable has taken the value 1 for HR Managers and 0 for employees.

\[ Y = \text{E-recruitment (Advantage, Efficiency, Information, Effectiveness)} \]
\[ X_1 = \text{Suitability of Candidates} \]
\[ X_2 = \text{Talented Database} \]
\[ X_3 = \text{Targeting Right Candidate} \]
\[ X_4 = \text{Annual Cost} \]
\[ X_5 = \text{External Cost} \]
\[ X_6 = \text{Overall Time} \]
\[ X_7 = \text{Processing Applications Time} \]
\[ X_8 = \text{Recruitment Cycle Time} \]
\[ X_9 = \text{Wider Choice for Entrants} \]
\[ X_{10} = \text{Wider Choice for International Candidates} \]
\[ X_{11} = \text{Accessibility of Candidates} \]
\[ X_{12} = \text{Qualified Pool} \]

4.8.3. MULTIPLE ANALYSIS OF VARIANCE

Another technique used for the study was Multiple Analysis of Variance (MANOVA) that is similar to analysis of variance (ANOVA). MANOVA is used when the design involves more than one dependent variable. The technique is used to explore the effects of one or more independent variables. Advantage, effectiveness, information and efficiency are the dependent variables and sector,
organizational size and respondent category are the fixed factors for the present study. MANOVA allows us not only to look at the effect of different independent variables and see if these interact; it also tells us if there is any relationship between the different dependent variable. Because all of these are analysed simultaneously, MANOVA can check whether the different levels of the factors not only differ from one another on one dependent variable but whether they differ along a combination of several dependent variables. It does this by creating a new dependent variable which is the linear combination of each of the original dependent variable. It also tells whether the mean differences among groups on the combined dependent variable are larger than the expected by chance.

MANOVA has been carried out through the use of SPPS 17 software. While performing MANOVA there is a possibility of committing Type I error, therefore one way of avoiding is to apply a Bonferroni correction. Normally, a result is regarded as “significant” if the $p$ value is less than .05. Our design involves four dependent variables, therefore we apply the following corrections: $0.05 ÷ 4 = 0.013$, and for our result to be significant $p$ now has to be less than .013. So, .05 is divided by the number of dependent variable in the study.

This chapter concentrated on the research methodology used in the present study. In next chapter findings of the study and discussion about their implications is presented.