4.0 AN OVERVIEW

Chapter 4 outlines the methodology used in the research process to achieve the pre-defined goals required for the purpose of the study. It gives an idea of the research design used to conduct the present study and the approach adopted to reach the results of the study. It also comprises of the methodology, sample population, sample size and sampling technique used for collection and analyzing the data.

4.1 Research Methodology

Approach and Design

To understand the nature of the research problem during the course of study, the research process involves both quantitative and qualitative methods. To achieve the objectives and results of the research questions, the research design used to gather information at a specific point of time (18th April 2015 to 27th May 2016) depends upon many factors such as willingness of the respondents, the time of data collection, ethical considerations, number of refusals to cooperate in data collection process, area taken for research study, time limitation etc.

To carry out the research study, the design used in Fig 4.1 is as follows:

Research Design : Fig 4.1

The present study was carried out using Random Sampling Method comprising of semi-structured interview followed by a Questionnaire with some close-ended and some open-ended questions.
Sample Population

- Service Users (Passengers of Northern Railways)
- Service Providers (Railway Officials)

Area of Study

North India (Ambala, Panchkula, Chandigarh, Mohali, Patiala, Kurukshetra, Karnal, Delhi, Yamunanagar)

Sampling Technique

Random Sampling Method (Questionnaire with some open-ended and some close-ended questions)

Sample Size

- Service Users N=400
- Service Providers N=50

Data Collection

Data Analysis

- Distribution-free methods both descriptive and statistical (frequency, percentage, tables, graphs etc.)
- Inferential Statistical (Chi-Square & Rank Order Correlation)

Inferential statistical methods (Chi-Square and Rank Order Correlation)
The **Open-ended questions** included:

- What does Citizen’s Charter mean to you?
- Reasons for Procedural delays
- Suggestions to be added in the existing services to increase satisfaction of respondents
- Reasons for dissatisfaction of respondents etc

The **Closed-ended questions** included:

- Have you heard about Citizen’s Charter in context to Indian Railways?  

<table>
<thead>
<tr>
<th>Response</th>
<th>Service users</th>
<th>Service Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not heard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not sure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- In which language is it available in context to Indian Railways? And so on

<table>
<thead>
<tr>
<th>Language</th>
<th>Service users</th>
<th>Service Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4.1.1 Questionnaire Preparation

Questionnaires give a high degree of data regulation and taking on of generalized information within any population. They become important in a descriptive study whereby there tends to be a need to quickly and easily obtain information from people in a non-threatening manner (*Chandran 2003*)

Questionnaire is the main instrument for data collection in this study (*Annexure 2*). It was used to collect data from the passengers who seek
services from Indian Railways in general and Northern Railways in particular. The Questionnaire\textsuperscript{113} has been prepared with the help of various sources such as:

1. Based on Search of Literature on the subject and Test Manuals
2. Discussions with my Guide Prof Pardeep Sachdeva
3. Interview with experts in the field of Test Construction and Standardisation (Dr S K Verma, Former Additional Professor of Clinical Psychology, Department of Psychiatry, PGIMER, Chandigarh, Dr Dwarka Pershad Former Additional Professor of Clinical Psychology, Department of Psychiatry, PGIMER, Chandigarh etc) and University Faculties and Research Institutes
4. Discussion with Railway Officials and Passengers on the subject
5. Published and unpublished thesis available in the university library

4.2 SAMPLE POPULATION (Target Population)

According to Mugenda and Mugenda (1999), a target population is one which intends to simplify the outcomes of the study. Target population is a world-wide set of any study of all associates of real group of individuals, happenings, or items to which a researcher intends to generalize the results. Population refers to the whole group and sample of the sample population represents the population as it possesses common features of the population required for the research study.

Indian Railways are used as one of the common modes of transportation by a large population for various purposes. In this regards, Sample Population includes the Service Users (Passengers) and Service Providers (Railway officials) of Northern Railways. Tha area taken for the study is confined to North India (mainly Ambala, Panchkula, Chandigarh, Mohali, Patiala, Kurukshetra, Karnal, Delhi, and Yamunanagar). Thus, the sample population

taken includes:

- Railway service providers (RSP) - *Railway employ*
- Railway service users (RSU) - *Mainly Railway passengers*
- *Educated* (14 plus years of schooling)
- *Adults* (18 plus years; male and female)

4.3 SAMPLING TECHNIQUE

*Random sampling* technique was used to collect the sample from the targeted population for the research study.

4.4 SAMPLE SIZE

A sample is a fraction of the target population that is symbolic of the entire population from which it is obtained so as to generalize the research findings (*Orodho 2003*). The benefit of sampling is that it is hard to keep watch of the large population due to many constraints such as time, money, etc. It enables the researcher to obtain information concerning some characteristics of the population. The sample size taken is:

- **Railway service providers (RSP):** Railway employees from Railway station
  
  \((N=50)\)

- **Railway service users (RSU):** Railway passengers
  
  \((N=400)\)

4.5 DATA COLLECTION

Primary and Secondary data was collected and analyzed (*both qualitatively and quantitatively*). The primary data was collected by approaching the respondents on random basis at the railway stations who were willing to cooperate and understand the purpose of the study and some known people who have been using this mode of transportation along with its services. The tools used in the research study for analyzing the response of the users and providers of the services delivered by the Indian Railways are Chi-Square test
and Rank Order Co-relation. The secondary data includes journals, books, government reports, quarterly issues, published or unpublished dissertations, educational research studies etc.

### 4.6 DATA ANALYSIS

According to Wellington (2002) a researcher must use techniques which provide high precision and descriptive power with minimum management demand.

Data analysis procedure will involve the process of packaging the gathered information, placing it in order and writing it in components especially in a way that results are easily and effectively be communicated (Gay, 2008).

Data was obtained using semi-structured interview followed by a Questionnaire. All these instruments supported and thus supplemented each other to reduce the gap which would have been left if one of the instruments was used. The researcher was guided by research objectives when constructing these instruments.

Based on the qualitative analysis method and relying on secondary sources, the data collected from the passengers as Service Users and Railway officials as Service Providers is analysed using following tools:

- **Distribution-free** methods both descriptive and statistical (frequency, percentage, tables, graphs etc.)

- **Inferential statistical methods (chi-square, rank order co-relation)** depending upon the type of data obtained used.

**Chi-square** is used for comparison of two variables e.g service providers and service users.

**Rank order co-relation** is used to find relationship between any two variables; suggestions by providers and users.
4.7 The Chi – Square Test

The Chi–Square test is the most important and most commonly used method in statistical tests. The purpose of Chi-Square test is to know the difference between an observed frequency and expected frequency. It represents a useful method of comparing experimentally obtained data with those expected theoretically. The value can be calculated by using the given observed frequency and expected frequency.

The following formula used to calculate the value of Chi-Square:

\[
\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}
\]

Where,

* Degree of freedom df = (c-1)(r-1)

\(f_o\) = Frequency obtained

\(f_e\) = Frequency expected

Level of Significance (Annexure: 11)

At 0.05 level, Chi-Square \(X^2 = 3.841\)

At 0.01 level, Chi-Square \(X^2 = 6.635\)

* Significant for value obtained at \(p > 0.05/0.01\) level

* * Highly significant for value obtained at \(p > 0.05/0.01\) level

NS - Not Significant

If the calculated value is greater than the table value at a particular significant level, say 0.05 or 0.01 levels, it concludes that the factor is dependent on variable for which Chi–Square is computed. If the calculated value is less than the table value, it reflects that the factor is independent on the variable.
4.8 Rank Order Correlation

In statistics, Spearman's rank correlation coefficient ($r_s$) or Spearman's rho ($\rho$) is the non-parametric version of the Pearson Correlation coefficient. Spearman’s value ranging from -1 to 1, where:

+1 = a perfect positive correlation between ranks

-1 = a perfect negative correlation between ranks

0 = no correlation between ranks

Formula for the Spearman’s rank correlation coefficient (In case ranks are not repeated)

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

Where,

$n$ = number of observations

d$_i$ = difference between the two ranks of each observation

Also, correlation lies between -1 < $r$ < 1

For repeated ranks, a correction factor is required in the formula. If ‘$n$’ is the number of times an item is repeated then the factor $n(n^2 - 1)$ is to be added to $\sum d_i^2$. For each repeated value, this correction factor will be added.

4.9 Reliability and Validity

For any questionnaire to have useful outcome, it must contain validity and reliability. Reliability is the capability of the tool to bring the same answer after recurrent administration.

Validity is stated as the precision and significance of inferences, which are founded on the research outcome. Validity therefore is related to how accurately the information gained from the study denotes the variables of the study. For this study, validity refers to the content validity (Mugenda & Mugenda; 1999)
4.10 Ethical Considerations

According to Sommer and Sommer (2007), ethical concerns like as privacy, secrecy and averting of dishonesty are key issues in social research.

The data collected from the Service Users and Service Providers is only for the academic purpose to know the problem areas faced by them and provide suggestions and hence make an effort to revive the trust of the citizen’s on administration. For this, a questionnaire has been formulated and attached (Annexure 2). This gave the researcher a go to proceed in the research process to collect data. Participant’s on voluntary basis cooperated and participated in the research process.