Research Methodology

Research methodology has been considered as a movement from the unknown to the known where it can actually be called as a voyage of discovery. This chapter has been regarded as the backbone of this research because it elaborates the methodology and overall approach of the research. It includes research philosophy, procedures of data collection and the justification behind the choices made from the available options (Jonker & Pennink, 2010). This section further elaborates the research design in terms of the research philosophy and research approach followed. Further, data collection procedures in terms of sampling size, questionnaire development and administration of the questionnaire have been presented. At the end of the chapter, data analysis procedures, data reliability, validity and ethical consideration have been presented. Research Philosophy refers to the opinion beliefs and outlook of the researcher.

Saunders & Tosey (2012) identified three main philosophies namely positivism, constructivism and realism. Realism research philosophy relies on the idea of independence of reality from the human mind. Positivism refers to the facts related to the results, which cannot be changed. Constructivism philosophy asserts that realities are mere constructions of the mind and as many constructions exist as there are respondents (Guba & Lincoln, 1994). This philosophy is mainly used where social perceptions are required to be done. The philosophy of positivism has been used in this research so as to help the researcher obtain concrete conclusions by creating experimental proof thereby proving theories. Positivism philosophy helped the researcher in
arriving at a definite conclusion derived from the facts obtained from the quantitative analysis by studying the usage pattern of mobile data services and determining the effect of mobile companies’ performance on customer loyalty, retention and satisfaction. Research Approach describes the process that is to be used to approach a theory on the topic of interest. According to Trochim (2006), the research approach is of two types: deductive and inductive. The deductive approach uses an existing hypothesis or theory for the purpose of research, contrarily, inductive approach principals to the growth of a whole new theory or a model. The primary and secondary objective of the research along with the literature review determines the theory or hypothesis and the method of data collection. This research uses a deductive approach wherein; the key hypothesis is to determine the influence of mobile data service providers’ performance on customer satisfaction and loyalty. Research strategy, a plethora of studies on methodologies has identified different methods of application to answer the research question based on the belief and study aim of the researcher. Ormrod (2013) has categorized these methods into field experiments, surveys, case studies, theorem, proof, laboratory experiments, forecasting, simulation and subjective/argumentative reviews action research case studies and role/game playing. This research has used the survey method in order to obtain data using the close-ended questionnaire. Survey strategy is in-sync with research philosophy and research approach wherein, the main aim is to test the existing hypothesis on the sample population and also to generalize the findings to a larger audience. Data collection procedures to meet the study aim, both primary and secondary data has been collected wherein primary data has been collected from respondent
using close-ended quantitative questionnaire (See Appendix I). Further, secondary data has been collected from reputed journals, books, magazines and newspaper articles. Sampling technique and sampling plan are the process of selecting a sample of respondents from the entire population who will represent the whole population in the study. For the purposes of this study based on some inclusion criteria i.e. they were supposed to have data network service were part of one of the following networks i.e. BSNL, Airtel, Vodafone, Jio and Idea and were living in Delhi NCR region (Delhi Noida Gurugram and Faridabad). Further, purposive sampling was applied to the sample selected to pick respondents. Several stages in the sampling process are as follows: 1. Define the population - The population for data analysis consists of all the users of mobile data services in the Delhi NCR region. Since the number of respondents in the sample population is very high it is practically difficult to collect statistics on the entire population on a personal approach, therefore; only a small part of it has been taken into consideration. 2. Identifying the sampling frame – “The sampling frame usually is absolute and indicative of the entire population for the analysis” (Saunders, 2011). It is imperative that the sample representative should be perfectly descriptive of the characteristics, of the population, of the customers and of the telecom companies specified in the table below.
Table 1: List of telecom Operators Included in the study

1. **Specify the sampling method**: Purposive sampling methods have been used for the purposes of this research. The sample was approached based on the inclusion criteria defined in the research.

2. **Identify the sample size** - After dividing the respondents according to the mobile data service provider, researchers have selected 200 respondents from each category of high Average Revenue per User (ARPU) segment, moderate ARPU segment, average ARPU segment and low ARPU segmenting order to ensure that respondents from all income groups are included for the purposes of the research.

\[
\text{Sample Size (n)} = \frac{\text{Confidence level}^2 \times \text{Standard deviation}^2}{\text{Confidence interval}^2}
\]

\[
\text{Sample Size} = 0.05 \times 0.05 \times 853.8 \times 853.8 / 1.35 \times 1.35 = 1000
\]
Out of these 1000 respondents, 250 respondents for each category mentioned above were selected. However, responses were gathered from a total of 800 respondents reflecting a response rate of 80% for the present research.

Questionnaire design

The questionnaire has been designed with the purpose of collecting primary data from actual users of mobile data in India. It has been divided into four sections i.e demographic profiles, general backgrounds, mobile data service performances and outcomes of the effectiveness of mobile data services. Questions in section A collect data for analyzing the demographic profile of the respondents. Section B seeks to determine the actual usage and dependency of the selected respondents on the service providers and section C and D seek to gauge the effectiveness of mobile data services and the satisfaction level of the users of data services.

Experts’ view in questionnaire:

After preparing questionnaire, the same has been circulated among industry experts. Two responses have been received on the same from IT Head of Ericsson and Operations Head of Telenor. Their feedback is really good with minor changes, the same has been taken into consideration and their feedback is incorporated into the questionnaire.
Profile of Industry Experts (Questionnaire Validation)

<table>
<thead>
<tr>
<th>Sl no</th>
<th>Name</th>
<th>Designation</th>
<th>Industry Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tamal Chakrabarty</td>
<td>Head IT – Ericsson</td>
<td>Telecom</td>
</tr>
<tr>
<td>2</td>
<td>T Mohammed</td>
<td>COO</td>
<td>Telecom</td>
</tr>
<tr>
<td>3</td>
<td>Malay Nandy</td>
<td>Head IT</td>
<td>Logistic</td>
</tr>
<tr>
<td>4</td>
<td>Partha dey</td>
<td>Head - Business Development</td>
<td>Healthcare</td>
</tr>
<tr>
<td>5</td>
<td>Sanjay Banerjee</td>
<td>Head – Sourcing</td>
<td>BPO</td>
</tr>
</tbody>
</table>

Table 2: List of Expert Who Reviewed Questionnaire

Questionnaire, the purpose of developing a questionnaire was to extract information regarding the subject as per the research questions from the respondents. Before collecting the information, the respondents were briefed about the purpose of getting the questionnaires filled from them. The questionnaire was developed on Google Forms and the link was the same for sharing with the participants on email and different social networking sites. It took nearly 7-8 weeks to collect the final data. This data was further processed and missing values were identified before the final analysis procedure. Cronbach’s alpha $\alpha$ (or coefficient alpha) developed by Lee Cronbach in 1951 measures reliability or internal consistency. Reliability test means when same results observed in repeated test.

Cronbach’s alpha (1951) is most commonly used when you want to assess the internal consistency of a questionnaire (or survey) that is made up of multiple Likert-type scales and items.
Cronbach’s alpha is treated to be a measure of scale reliability. A "high" value for alpha does not mean that the measure is uni-dimensional. If in addition to measuring internal consistency, you wish to provide evidence that the scale in question is one-dimensional, additional analyses can be performed. Cronbach’s alpha is a coefficient of reliability (or consistency) test not a statistical test.

The formula for Cronbach’s alpha is:

\[ \alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N - 1) \cdot \bar{c}} \]

Where:

- \( N \) = the number of items.
- \( \bar{c} \) = average covariance between item-pairs.
- \( \bar{v} \) = average variance.

Cronbach’s alpha – Thumb Rule

<table>
<thead>
<tr>
<th>Cronbach’s alpha</th>
<th>Internal Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha \geq 0.9 )</td>
<td>Excellent</td>
</tr>
<tr>
<td>0.9 &gt; ( \alpha ) &gt;= 0.8</td>
<td>Good</td>
</tr>
<tr>
<td>0.8 &gt; ( \alpha ) &gt;= 0.7</td>
<td>Acceptable</td>
</tr>
<tr>
<td>0.7 &gt;( \alpha ) &gt;= 0.6</td>
<td>Questionable</td>
</tr>
<tr>
<td>0.6 &gt;(( \alpha ) &gt;= 0.5</td>
<td>Poor</td>
</tr>
<tr>
<td>0.5 &gt;( \alpha )</td>
<td>Unacceptable</td>
</tr>
</tbody>
</table>

Table 3: Cronbach's Test Score- Lee Cronbach(1951)
Data Analysis Procedures

The data collected from the primary, as well as secondary sources need to be analyzed in order to derive meaningful information out of it. For this research paper, both descriptive and inferential analysis methods have been used to determine the effect of mobile data service on customer satisfaction and loyalty in the Indian market. Descriptive method is used to analyze the demographic profile of the respondents using frequency analysis the data using simple statistical methods like the mean and standard deviation. Further, inferential analysis has been used to test the hypothesis using statistical method including Cronbach’s alpha test to check the reliability of the data collected. Further, correlation analysis was conducted to determine the extent of the relation between dependent and independent variables and regression analysis to find the statistical significance of the model and how much the dependent variable is affected by independent variables. Reliability and validity of the study is the ability of an instrument to measure what it is designed to measure (Saunders et al., 2009). In the current study, validity in terms of face and content validity of the research instrument (the questionnaire) was recognized (Brink et al., 2006). The content and face validity of the questionnaire were established by sharing the questionnaire with industry expert supervisors and colleagues who pointed at repetitive questions language problems and transitional errors in the questionnaire. Based on the insight, the questionnaire was changed before the final administration. Reliability of the study has been tested using the Cronbach alpha test. On conducting the test it was found that the data was reliable and can be used in the study. The results of reliability analysis have been presented
in the subsequent section. Ethical considerations collecting data from respondents affects sample population and hence the author is required to have an ethical framework to deal with it and minimize the impacts on the respondents (Patton, 2002). Adherence to ethical issues was ensured while undertaking this research. Data in this research was collected as well as presented in an honest and transparent manner. The respondents were informed in advance about the reason for the questionnaire being filled by them. Respondents’ participation in the study was voluntary and the data collected was used only for establishing the research observations shared with the University Board and Mentor and not used for external purposes. The anonymity of the respondents has been strictly maintained during the entire process of data collection and research.

Regression Analysis

Regression analysis is applied to examine the link within two or more variables. Furthermore, the regression analysis is applied to inspect variance in the dependent variable with variance in the independent variables. The attributes in the regression analysis are calculated by using the square method.

Independent variable:

Inputs are represented by independent variable in regression analysis and make the variation in the dependent variable.

Dependent variable:

Outputs are represented by dependent variable in regression analysis on the basis of the value of dependent variable.
Regression analysis – Assumptions:

1. The error term follows distribution with mean 0 and constant variance.
2. There is no correlation between independent variables and error terms.
3. The error term is same for all values of variable.

Regression techniques are two types:

✓ Linear Regression
✓ Non-Linear Regression

Concluding Remarks

The methodology considered for this research study is conferred in this chapter. Data collected from eight hundred respondents those who’ve used mobile data service from various telecom operators and study were done on that in this paper. By using a standard instrument data was collected. The instrument covered specific questions on telecom mobile data service quality and customer behavioral aspects. The collected primary research data was analyzed by applying appropriate statistical tools to achieve the objectives and examine the hypothesis formulated.