CHAPTER 4
RESEARCH METHODOLOGY

4.1 PREVIEW OF RESEARCH METHODOLOGY CHAPTER
This chapter on research methodology establishes the logic of the research design for the primary data collection – including type of investigation; sampling decisions involving sampling unit, geographical area of study, time of study, sample size and sample design; independent and dependent variables, operational definitions and tools used, scales employed; the questionnaire design, data collection method; testing the reliability of the scales through pretesting of the structured questionnaire; the level of significance desired, and the data analytic techniques used.

4.2 RESEARCH DESIGN FOR PRIMARY DATA COLLECTION

4.2.1 TYPE OF INVESTIGATION
The literature review led to clear definition of the problem of study, identification of constructs (variables) as also hypotheses needed to be tested, Hence a quantitative (descriptive study) and inferential (hypothesis testing) study has been chosen.

The type of investigation undertaken is correlational analysis to establish associations between various variables under study (independent and dependent) and regressional analysis to test the various hypotheses explaining variance as also analysis of mean differences to test segmental differences.

Since the investigation is a field study, conducted in the natural environment, the study setting is non-contrived with no interference by the researcher. Also, the study is a one shot or cross-sectional study.
4.2.2 SAMPLING DECISIONS

4.2.2.1 UNIT OF ANALYSIS (SAMPLING UNIT)

The sampling units are individual customers of Cellular Mobile Services (mobile phone service) in the age group of 15 years to > 65 years, using either prepaid or postpaid cellular mobile services.

4.2.2.2 GEOGRAPHIC AREA OF STUDY

The study was chosen to be conducted in the city of Mumbai,

The rationale for using Mumbai as the data collection centre was that the city is representative of an urban metropolitan culture that is universal and cosmopolitan in nature and has relatively low cultural bias.

Mumbai is the financial capital of India and one of the major metros. Since metros are ahead of other markets in terms of usage of cellular mobile services, the first ones to receive newly launched services (e.g. 3G and Mobile number portability), are highly competitive and dynamic market, have highly demanding and vocal customers; study done in Mumbai on Cellular Mobile Service Quality will be representative of metros, and allow for corrections to be made based on research findings in the first stage itself in the major markets.

4.2.2.3 TIME OF STUDY

The data was collected from the city of Mumbai among customers of cellular mobile services in the months of August 2010 to November 2010.

4.2.2.4 SAMPLE SIZE AND SAMPLE DESIGN

Since many demographic variables were identified for segmental analysis (type of service – prepaid v/s post-paid, age, gender, education, occupation, and average bill per month), larger sample size was desirable.
Hence, 1000 respondents was chosen as sample size (Sekaran, 2006, pg 293-based on Krejcie and Morgan (1970), Cohen (1969), Roscoe (1975) for decision on sample size).

Purposive sampling method was chosen as willingness of the respondent was a key factor in collecting data.

4.2.3 MEASUREMENT VARIABLES, TOOLS AND SCALES

4.2.3.1 MEASUREMENT VARIABLES (CONSTRUCTS)

The following constructs (variables) are studied in this thesis.

a) **Independent Variables or Predictor Variables**

1) Ten Individual Service Quality (SQ) dimensions of Network Quality (NQ), Reliability (Relb), Responsiveness (Resp), Empathy (Emp), Assurance (Ass), Tangibles (Tang), Convenience (Conv), Complaint Handling (CH), Value Added Services (VAS) and Price Competitiveness (PC).

2) Overall Switching Costs (OSC)

b) **Dependent Variables or Criterion Variables:**

1) Overall Service Quality perceptions (OSQ)

2) Five Behavioral Intentions (BI) dimensions of

a) Word of Mouth (WOM)

b) Repurchase intentions (RI)

c) Price Increase Tolerance (PIT)

d) External Response to Complaints (ERC)

e) Internal Response to Complaints (IRC)
4.2.3.2 OPERATIONAL DEFINITIONS AND TOOLS USED

For the purpose of study, popular definitions and tools are used.

1. Service Quality – as defined by Parasuraman, Zeithaml and Berry (1988) is used.

SERVQUAL scale (Parasuraman, Zeithaml, Berry, 1994) which measures Perceived Service Quality(SQ) on five dimensions of Reliability(Relb), Responsiveness(Resp), Empathy(Emp), Assurance(Ass) and Tangibles(Tang) through the 22 items scale has been used. The SERVQUAL scale is used as it is found to be most popular and also reliable and validated across industries. The SERVQUAL scale is also found to have been widely used in evaluation of Service Quality of Cellular Mobile Services (as indicated in the literature review of Cellular Mobile Services papers). However, literature review showed that SERVQUAL needs to be adapted for study of specific industry. Hence, for this study, apart from SERVQUAL five dimensions, of Reliability (Relb), Responsiveness (Resp), Empathy (Emp), Assurance (Ass) and Tangibles (Tang), five additional dimensions of Network Quality (NQ), Convenience (Conv), Complaint Handling (CH), Value Added Services (VAS) and Price Competitiveness (PC) are added which have been compiled from other researches in Cellular Mobile Service quality area. (Seth, Momaya and Gupta, 2008; Negi, 2009; Chadha and Kapoor, 2009). The total number of items making the ten dimensions is 42.

Though initially, the computed difference score format was decided to be employed, the direct score format (as opposed to computed difference score) has been finally chosen based on the feedback received from the pilot study (details mentioned later under pilot study). Also literature review showed that this direct score format is also reliable and valid while reducing number of items. (Parasuraman, Zeithaml and Berry, 1994-)
comparision of direct versus computed score format-literature review findings presented earlier).

2. **Overall Service quality (OSQ)** is operationalised as the Overall Service Quality perception based on perceptions of Service Quality of each of the ten Service (SQ) dimensions.

   “Overall Service Quality” (OSQ) is measured through a single item measure (Boulding et al, 1993; Babukas and Boller, 1992).

3. **Switching Cost (SC)** items are based on instrument developed by Burham, Frels and Mahajan (2003) measuring the various dimensions of switching costs (attractiveness of alternatives, customer confusion, monetary, evaluation, set up, learning, uncertainty, benefit loss cost etc.). Additionally, items on inertia and indifference have been added. Inertia item is based on definition by Huang and Yu (1999) and indifference item is based on definition by Lambert (1998).

   The Overall Switching Cost (OSC) score is an aggregate score of all 13 switching cost items.

4. **Behavioral Intentions (BI)** – is operationalized based on definition by Parasuraman, Zeithaml, and Berry (1996) through five dimensions of Word of Mouth (WOM), Repurchase Intentions (RI), Price Increase Tolerance (PIT), External Response to Complaints (ERC) and Internal Response to Complaints (IRC) measured through the 13 item behavioral intentions battery (Parasuraman, Zeithaml, and Berry, 1996) to which an additional item has been added making for 14 items in all.

   **This researcher has additionally defined the following**

5. **Churn (Churn number or Switching number)** has been defined as number of service providers that the respondent has subscribed/used till date.
6. **Stayers** are defined as those respondents who have subscribed / used only one service provider to date. “**Switchers**” are those respondents who have subscribed / used more than one service provider to date.

7. **Referral customers** are those respondents who are subscribing / using the current service provider based on references.

8. **Years with Service provider** - is the number of years the respondent has been with the current service provider.

4.2.3.3 SCALES USED

1) The **SERVQUAL** scale as also the Switching Costs items scale and Behavioral Intentions battery are interval scaled. The SERVQUAL scale (Parasuraman, Zeithaml and Berry, 1994) is a 9 point scale ranging from one for lowest / poorest performance to 9 for highest / best performance.

2) Switching costs uses a Likert 9 point scale for 1 strongly disagree and 9 for strongly agree.

3) The Behavioral Intentions scale uses 7 point rating of 1 extremely unlikely and 7 extremely likely.

4) 7 point or 9 point scale does not make a difference to reliability of ratings (Sekaran, 2006, pg 199 on Elmore and Beggs, 1975).

5) The Importance of Service Factors is measured on a fixed or constant sum scale, which is an ordinal scale.

6) Other items like churn (indicating number of service providers used till date); Stayers vs Switchers, Referral customers v/s Others (sources of information for choosing current service provider); Years with current service provider; as well as demographic variables are measured on nominal scale.
4.2.4 QUESTIONNAIRE DESIGN, DATA COLLECTION AND TESTING

4.2.4.1 QUESTIONNAIRE DESIGN

The researcher decided to use popular instruments rather than laboriously develop own measures and used the most popular instrument namely SERVQUAL when more than one instrument was available (as in case of choosing SERVQUAL over SERVPERF).

Since the questionnaire has popular instruments (SERVQUAL, Switching Cost, Behavioral Intentions battery) the validity of the scales (content validity, criterion related validity – both concurrent and predictive validity; construct validity – convergent and discriminant validity) have already been established earlier.

A structured questionnaire has been used for administering to the respondents. The structured questionnaire had additional questions (nominal scale) for items such as Churn, Stayers vs Switchers, Referral customers versus Others, Years with current service provider, as well as demographic variables.

4.2.4.2 DATA COLLECTION METHOD

Since the questionnaire was quantitative and structured, it was a self-administered questionnaire distributed at random to various respondents all over Mumbai, of course keeping in mind the willingness to answer the questionnaire.

4.2.4.3 TESTING THE RELIABILITY OF THE SCALES

The stability of the scales has been tested earlier as standardized scales have been used. For internal consistency of measures, Cronbach’s coefficient alpha (Sekaran, 2006, Pg307-on Cronbach, 1946) was used for multipoint scaled items.

4.2.4.4 PRETESTING OF THE STRUCTURED QUESTIONNAIRE

The structured questionnaire had originally 170 items (mostly owing to studying desired expectations and perceived performance separately – based on computed difference format). The computed difference score format asks respondents to
separately rate on an interval scale, the Desired Service Expectations and Perceived Service Quality and then manually computes the difference.

In the pretest conducted on 50 respondents, the following important insights emerged.

1. The 170 items took 40 minutes to answer. An analysis of the answers revealed that most respondents blindly ticked 9 on the desired expectations score. Also they conveyed their boredom/tiredness. Some mentioned the obvious nature of expectations score and still others refused to fill the questionnaire or skipped this part of the questionnaire owing to the lengthy nature.

2. There was no ambiguity in the questions and there were no problems with the wordings.

3. The pretesting resulted in changing to direct score format (as opposed to computed difference format). The direct score format involved asking respondents to rate their perceptions of service quality in comparison with their desired service expectations. The structured questionnaire was re-administered to another 50 respondents. This new questionnaire took 20 minutes to complete and respondents found it to be interesting. Thus, the direct score format was retained for collecting data for the purpose of the thesis.

4. Cronbach alpha for the 3 scales indicated high reliability (.60 to .80).

The Cronbach coefficient alpha scores, for the ten service quality factors showed extremely high interim consistency reliability as the Cronbach alpha scores for each of the ten service quality factors ranged from the lowest of .816 for value added services to highest of .901 for responsiveness.

Cronbach for overall switching costs was .79, again indicating very high inter-item consistency reliability.
The Cronbach alpha scores for behavioral intentions, showed a score of .739 for overall behavioral intentions (BI). For each of the Behavioral Intentions dimensions, the Cronbach scores indicated very high inter-item consistency reliability for Word of Mouth (WOM) (.886), Repurchase Intentions (RI) (.737) and Internal Response to Complaints (IRC) (1.00) though for External Response to Complaints (ERC) (.649) and Price Increase Tolerance (PIT) (.612), Cronbach Alpha was slightly lower. However, since the Behavioral Intentions Battery used is a standardized battery (Zeithaml, Berry and Parasuraman, 1996), it was desired to be retained in its entirety.

Discussions with experts in the field of Research Methodology by this researcher, as also referencing books on research methodology (Sekaran, 2006) established the fact that while Cronbach alpha of > 0.80 is definitely desirable, Cronbach alphas in the range of 0.60 and 0.80 are also acceptable.

Based on the above, the researcher decided to go ahead with the modified questionnaire (using direct score method for service quality gaps) as the Cronbach scores had proved the questionnaire to be reliable.

4.2.5 HANDLING OF DATA

4.2.5.1 SIGNIFICANCE LEVEL

The study sought to have a 95% confidence (conventionally accepted level for business and social research) and hence significance level of p ≤ 0.05.

4.2.5.2 HANDLING BLANK RESPONSES:

From the 1000 respondents, only 959 completed questionnaires were retained for analysis. The remaining were left out as > 25% of the items had been left unanswered.
4.2.5.3 DATA ANALYTIC TECHNIQUES USED

Apart from descriptives (mean, frequency etc.), the data has been analyzed using various relevant statistical tools to test the inferential hypotheses. The following relevant tests are used.

- Pearson Correlation Matrix to find out the degree and direction of association/correlation between two interval scaled variables.
- Multiple regression analysis(to find out extent of variance in dependent variable explained by multiple independent variables)
- “t” test (to test mean differences when two groups are involved),
- “F” test (ANOVA) (to test the mean differences when more than two groups are involved),
- Chi-Square test to find out relationships between nominal and ordinal groups.

Hence, as seen from above, the type of alternate hypothesis formulated has been used to determine the relevant data analytic technique to be used.
### 4.3 HYPOTHESES SUMMARY TABLE WITH TESTS USED

**TABLE 4.1 – LIST OF 32 ALTERNATE HYPOTHESES (INCLUDING SUBHYPOTHESES) FORMULATED FOR TESTING AND RELEVANT TESTS USED**

**SERVICE QUALITY**-

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis</th>
<th>Tests Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1A</td>
<td>At least one of the Service quality (SQ) dimensions significantly explains variance in Overall Service Quality (OSQ)</td>
<td>Multiple Regression</td>
</tr>
</tbody>
</table>

**BEHAVIORAL INTENTIONS (BI) DIMENSIONS**-

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis</th>
<th>Tests Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2.1A</td>
<td>At least one of the Service Quality (SQ) dimensions significantly explains variance in Word of Mouth (WOM)</td>
<td>Multiple Regression</td>
</tr>
<tr>
<td>H2.2A</td>
<td>At least one of the Service Quality (SQ) dimensions significantly explains variance in Repurchase Intentions (RI)</td>
<td>Multiple Regression</td>
</tr>
<tr>
<td>H2.3A</td>
<td>At least one of the Service Quality (SQ) dimensions significantly explains variance in Price Increase Tolerance (PIT)</td>
<td>Multiple Regression</td>
</tr>
<tr>
<td>H2.4A</td>
<td>At least one of the Service Quality (SQ) dimensions significantly explains variance in External Response to Complaints (ERC)</td>
<td>Multiple Regression</td>
</tr>
<tr>
<td>H2.5A</td>
<td>At least one of the Service Quality (SQ) dimensions significantly explains variance in Internal Response to Complaints (IRC)</td>
<td>Multiple Regression</td>
</tr>
</tbody>
</table>
SWITCHING COST AND BEHAVIORAL INTENTIONS DIMENSIONS

H3A  There is positive association between Overall Switching Costs (OSC) on one hand and Repurchase Intentions (RI) and Price Increase Tolerance (PIT) on the other.

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis</th>
<th>Tests Used</th>
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</thead>
<tbody>
<tr>
<td>H3.1A</td>
<td>There is positive association between Overall Switching costs (OSC) and Repurchase Intentions (RI)</td>
<td>Pearson Correlation</td>
</tr>
<tr>
<td>H3.2A</td>
<td>There is positive association between Overall Switching Costs (OSC) and Price Increase Tolerance (PIT)</td>
<td>Pearson Correlation</td>
</tr>
</tbody>
</table>

CUSTOMER TYPE DIFFERENCES AND BEHAVIORAL INTENTIONS DIMENSIONS

H4A  There are significant mean customer type differences in behavioral intentions dimensions of Word of Mouth (WOM), Repurchase Intentions (RI) and Price Increase Tolerance (PIT).

STAYERS VERSUS SWITCHERS AND BEHAVIORAL INTENTIONS DIMENSIONS

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis</th>
<th>Tests Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>H4.1A</td>
<td>There are significant mean differences between Stayers and Switchers on Word of Mouth’ (WOM)</td>
<td>t test</td>
</tr>
<tr>
<td>H4.2A</td>
<td>There are significant mean differences between Stayers and Switchers on Repurchase Intentions (RI)</td>
<td>t test</td>
</tr>
<tr>
<td>H4.3A</td>
<td>There are significant mean differences between Stayers and Switchers on Price Increase Tolerance (PIT)</td>
<td>t test</td>
</tr>
</tbody>
</table>
### REFERRAL CUSTOMERS VERSUS OTHER CUSTOMERS AND BEHAVIORAL INTENTIONS DIMENSIONS

<table>
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</thead>
<tbody>
<tr>
<td>H4.4A</td>
<td>There are significant mean differences between Referral customers and other customers on Word of Mouth (WOM)</td>
<td>t test</td>
</tr>
<tr>
<td>H4.5A</td>
<td>There are significant mean differences between Referral customers and other customers on Repurchase Intentions (RI)</td>
<td>t test</td>
</tr>
<tr>
<td>H4.6A</td>
<td>There are significant mean differences between Referral customers and other customers on Price Increase Tolerance (PIT)</td>
<td>t test</td>
</tr>
</tbody>
</table>

### YEARS WITH CURRENT SERVICE PROVIDER AND BEHAVIORAL INTENTIONS DIMENSIONS

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis</th>
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<tbody>
<tr>
<td>H4.7A</td>
<td>There are significant mean differences between, groups of ‘years with current service provider’ on Word of Mouth (WOM)</td>
<td>ANOVA</td>
</tr>
<tr>
<td>H4.8A</td>
<td>There are significant mean differences between, groups of ‘years with current service provider’ on Repurchase Intentions (RI)</td>
<td>ANOVA</td>
</tr>
<tr>
<td>H4.9A</td>
<td>There are significant mean differences between, groups of ‘years with current service provider’ on Price Increase Tolerance (PIT)</td>
<td>ANOVA</td>
</tr>
</tbody>
</table>
### PRIOR CHURN AND BEHAVIORAL INTENTIONS DIMENSIONS

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis</th>
<th>Tests Used</th>
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</thead>
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<tr>
<td>H4.10&lt;sub&gt;A&lt;/sub&gt;</td>
<td>There are significant mean differences between groups displaying prior churn behavior on Word of Mouth (WOM)</td>
<td>ANOVA</td>
</tr>
<tr>
<td>H4.11&lt;sub&gt;A&lt;/sub&gt;</td>
<td>There are significant mean differences between groups displaying prior churn behavior on Repurchase Intentions (RI)</td>
<td>ANOVA</td>
</tr>
<tr>
<td>H4.12&lt;sub&gt;A&lt;/sub&gt;</td>
<td>There are significant mean differences between groups displaying prior churn behavior on Price Increase Tolerance (PIT)</td>
<td>ANOVA</td>
</tr>
</tbody>
</table>

### DEMOGRAPHICS VERSUS CHURN BEHAVIOR AND REASONS FOR SWITCHING

**H5<sub>A</sub>** There is a relationship between demographics on one hand and churn behavior and reasons for switching on the other

### DEMOGRAPHIC ANALYSIS OF CHURN

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis</th>
<th>Tests Used</th>
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</thead>
<tbody>
<tr>
<td>H5.1&lt;sub&gt;A&lt;/sub&gt;</td>
<td>There is a relationship between User type (Prepaid and Post-paid users) and their churn behavior</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>H5.2&lt;sub&gt;A&lt;/sub&gt;</td>
<td>There is a relationship between Age groups and churn behavior</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>H5.3&lt;sub&gt;A&lt;/sub&gt;</td>
<td>There is a relationship between Gender and churn behavior</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>H5.4&lt;sub&gt;A&lt;/sub&gt;</td>
<td>There is a relationship between Education groups and churn behavior</td>
<td>Chi-Square</td>
</tr>
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</table>
### DEMOGRAPHIC ANALYSIS OF CHURN- CONT'D

<table>
<thead>
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<th>Tests Used</th>
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<tr>
<td>H5.5&lt;sub&gt;A&lt;/sub&gt;</td>
<td>There is a relationship between Occupation groups and churn behavior</td>
<td>Chi-Square</td>
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<tr>
<td>H5.6&lt;sub&gt;A&lt;/sub&gt;</td>
<td>There is a relationship between groups of average bill per month and churn behavior</td>
<td>Chi-Square</td>
</tr>
</tbody>
</table>

### DEMOGRAPHIC ANALYSIS OF REASONS FOR SWITCHING

<table>
<thead>
<tr>
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<th>Tests Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>H5.7&lt;sub&gt;A&lt;/sub&gt;</td>
<td>Reasons for switching differ for Prepaid or Post paid users</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>H5.8&lt;sub&gt;A&lt;/sub&gt;</td>
<td>Reasons for switching varies for different age groups</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>H5.9&lt;sub&gt;A&lt;/sub&gt;</td>
<td>Reasons for switching differ for Males and Females</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>H5.10&lt;sub&gt;A&lt;/sub&gt;</td>
<td>Reasons for switching differ for different education groups</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>H5.11&lt;sub&gt;A&lt;/sub&gt;</td>
<td>Reasons for switching differ for different occupation groups</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>H5.12&lt;sub&gt;A&lt;/sub&gt;</td>
<td>Reasons for switching differ for different groups of average bill per month</td>
<td>Chi-Square</td>
</tr>
</tbody>
</table>
4.4 CONCLUSIONS OF RESEARCH METHODOLOGY CHAPTER

From this chapter the following conclusions emerge:

1. The researcher decided to use descriptive and inferential study.
2. Sampling unit is individual customers in age group of 15 years to greater than 65 years from city of Mumbai.
3. Data was collected from 1000 respondents in months of August 2010 to November 2010 using a structured self administered questionnaire.
4. Independent and dependent variables are defined
5. Popular definitions of Service Quality, and Behavioral Intentions as also popular tools and scales are used besides defining other constructs like Churn, Stayers, Switchers, Referral customers, Years with Service provider, especially for the purpose of this study.
6. The SERVQUAL scale (Parasuraman, Zeithaml and Berry, 1994) which originally has five dimensions of Reliability (Relb), Responsiveness (Resp), Empathy (Emp), Assurance (Ass) and Tangibles (Tang), has been modified and adapted to include five additional dimensions of Service Quality namely Network Quality(NQ), Price Competitiveness(PC), Value Added Services(VAS), Complaint Handling (CH) and Convenience (Conv), to evaluate Service Quality of Cellular Mobile Services making for ten dimensions in all and 42 items.
7. The behavioral intentions battery has 14 items in all covering the five behavioral dimensions of Word of Mouth (WOM), Repurchase Intentions (RI), Price Increase Tolerance (PIT), External Response to Complaints (ERC) and Internal Response to Complaints (IRC) while the Switching Cost battery has 11 Switching Cost items.
8. Overall Service Quality (OSQ) is measured through single item measures.
9. Being standardized scales, the reliability of the scales was tested through Cronbach alpha which indicated high reliability of greater than .80 for most items and between .60 and .80 for two items.
10. The pretesting also resulted in changing to direct difference score format (also considered valid and reliable) instead of the computed difference score format originally chosen by this researcher.

11. 95% confidence level and hence significance levels of $p \leq .05$ has been chosen.

12. Of the 1000 respondents only 959 completed questionnaires were retained.

13. Various relevant data analytic techniques like “t” test, “F” test (ANOVA), multiple regression, Pearson correlation and “Chi square” has been used for analysis of the hypotheses.