Chapter 4 **Research Methodology**

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4.1 Introduction

Telecom Industry is and has always been very dynamic, thanks to the new technologies which forces the whole industry to get to the next level every now and then. Advent of Mobiles has just poured more fuel to the fire. Radical growth has been witnessed by the industry after Mobile communication revolution. Mobile Telephony has penetrated so deep into human lives that they have become part and parcel of the every human life. So, study of Telecom Industry can give us brighter idea about the customer perspectives on Brand Image and Consumer Perception about Quality of Services. If we consider Telecom Industry, then firms’ Market Performance can be observed by measurement of certain parameters such as Market Share, Average Revenue per User (ARPU) etc.

Some research works have been carried out to study the implication of Brand Image and Quality of Service from the perspectives of the customer, wherein for measuring Quality of Service, SERVQUAL factors Tangibility, Reliability, Responsiveness, Assurance and Empathy are studied. Telecom Regulatory Authority of India (TRAI) has developed pro-forma to report the Quality of Service by measuring some parameters for monitoring Industry’s Quality. No attempts have been made to study these aspects from Regulator’s (TRAI) angle. Also, no efforts have been done to see individual attention to the Company Market Performance. Sometimes it does happen that Market Performance of certain company may be very good but still customers may not be regarding the brand image to be of same intensity and the same level of satisfaction may not be there too. So, in this study, the attempt is to test whether there is any relationship among Brand Image, Consumer Perception and Company Market Performance or not.

4.2 Statement of the Problem

In this Information Age, managers at all levels feel the insatiable thirst for latest of information and updates on their respective industries, be it related to Markets, Finances and Accounting, Operations, Human Resource, Information Technology or any other management dimension. Gone are the days when customers were happily accepting whatever was made available to them. Now is the time when they are aware
of latest happenings through means of faster communications, spread of internet and power of media to reach across the segments, be it poor or rich. They understand what they need; want do they want and what should be demanded. That is where sound managerial acumen is most sought after quality from management fraternity.

Telecom Industry, as we know, touches almost all human lives, is pulsating with changes at policy level and thereby at market level and therefore it is also necessary to study the important variables such as Brand Image, Consumer Perception about Quality of Services and Company Market Performance from Regulator’s angle to gain the insight into the possibility of relationships among these variables. The research is limited to the mobile telecom service providers functioning in Gujarat State for the last seven years and hence includes BSNL, Vodafone, Airtel and Idea for individual study. The statement of the work under study is as:

“A Study of Brand Image, Consumer Perception vis-à-vis Company Performance in Telecom Industry”

4.3 Research Objectives:

The broader objective is to study the relationship among Brand Image, Consumer’s Perception about Quality of Services and Company Market Performance which is subdivided and extended to the following individual objectives.

1) To study the relationship between brand image and consumer perception about quality of services.
2) To study the relationship of brand image and company market performance.
3) To study the relationship between consumers perception about quality of services and company market performance.
4) To study the relationship of brand image and consumer perception about quality of services with company market performance.
5) To know the important factors considered by consumers for choice of service provider
6) To understand the association of subscriber’s current provider and variables under study
7) To understand the service preference and demographic variables connection

4.4 Research Hypothesis

- **BSNL: Relationship Significance**
  - $H_0^{1}$: There is no significant relationship between brand image and consumer perception about quality of services
  - $H_0^{2}$: There is no significant relationship between brand image and company market performance
  - $H_0^{3}$: There is no significant relationship between consumer perception about quality of services and company market performance
  - $H_0^{4}$: There is no significant relationship of brand image and consumer perception about quality of services with company market performance

- **Vodafone: Relationship Significance**
  - $H_0^{5}$: There is no significant relationship between brand image and consumer perception about quality of services
  - $H_0^{6}$: There is no significant relationship between brand image and company market performance
  - $H_0^{7}$: There is no significant relationship between consumer perception about quality of services and company market performance
  - $H_0^{8}$: There is no significant relationship of brand image and consumer perception about quality of services with company market performance

- **Airtel: Relationship Significance**
  - $H_0^{9}$: There is no significant relationship between brand image and consumer perception about quality of services
  - $H_0^{10}$: There is no significant relationship between brand image and company market performance
  - $H_0^{11}$: There is no significant relationship between consumer perception about quality of services and company market performance
H012: There is no significant relationship of brand image and consumer perception about quality of services with company market performance

- **Idea: Relationship Significance**
  - H013: There is no significant relationship between brand image and consumer perception about quality of services
  - H014: There is no significant relationship between brand image and company market performance
  - H015: There is no significant relationship between consumer perception about quality of services and company market performance
  - H016: There is no significant relationship of brand image and consumer perception about quality of services with company market performance

- Service Providers: Factor Analysis

- Cross-tabulation: Service Provider * Study Variables including Demographic Variables

- Service Preference * Demographic Variables

### 4.5 Stimulus for the study

Opening up of Indian economy has led to rapid growth of the Telecom Industry with many players in the field compared to earlier few established players. Now bargaining power of the customers has increased as we say that now its buyers’ market. In India, current tariffs are believed to be lowest of all countries of the world. Second largest population and majority share of youth group in the population are some of the attractive reasons to the global Telecom Service Providers to do business in India. Adopting customer-centric approach is becoming indispensable for all the companies operating in the sector.

Given the policy changes, shifting focus of the industry from call to data services and pressures on generating more revenue from Value Added Services (VAS) are keeping Telecom Companies on their toes to not to lose the grip on the market and not losing
customers to competitors due to Mobile Number Portability (MNP). In wake of these developments it is important to study the very crucial part of this industry that is service user from the angle of regulatory authority and try to explore their implications on the selection of service provider, so that providers can fine tune their services to adjust to the service users and make the best of it.

4.6 Research Design

A research design is a backbone for carrying out any research project at hand. It constitutes the structure for the collection, measurement and analysis of the data. For the work at hand descriptive research design is used to study the cause and effects through possible relationships among variables under study. Primary data have been collected through structured questionnaires and secondary data have also been collected from various sources.

4.7 Sampling Element

All individuals who are using Mobile services in the state of Gujarat have been identified as sampling elements.

4.8 Sampling Design & Data Collection

The universe of the study for the research consists of all Mobile services consumers in the state of Gujarat.

Sample Size : 500
Sampling Method : Convenient Sampling Method
Data Type : Primary Data & Secondary Data
Data Collection Tool : Structured Questionnaire
Scope of Research : Gujarat state
4.9 Data Analysis Techniques

4.9.1 Reliability Analysis

Reliability refers to the extent to which a scale produces consistent results, if the measurements are repeated a number of times. The analysis on reliability is called reliability analysis. Reliability analysis is determined by obtaining the proportion of systematic variation in a scale, which can be done by determining the association between the scores obtained from different administrations of the scale. Thus, if the association in reliability analysis is high, the scale yields consistent results and is therefore reliable. There are many ways to handle this situation. One of them is by using Reliability Analysis with Cronbach’s Alpha. Item Analysis tells how well a set of questions (or items) measures one characteristic (or construct) and helps to identify questions that are problematic.

Item Analysis helps to evaluate the correlation of related survey items with only a few statistics. Most important is Cronbach's alpha, a single number that tells how well a set of items measures a single characteristic. This statistic is an overall item correlation where the values range between 0 and 1. Values close to 0.7 and more are often considered to be acceptable.

4.9.2 Spearman’s rho Correlations

Whenever it is interested to know if two variables are related to each other, a statistical technique known as correlation is used. If the change in one variable brings about a change in the other variable, they are said to be correlated.

A well known measure of correlation is the Pearson product moment correlation coefficient which can be calculated if the data is in interval/ ratio scale.

The Spearman Rank Correlation Coefficient is its analogue when the data is in terms of ranks. One can therefore also call it correlation coefficient between the ranks. The correlation coefficient is sometimes denoted by rs.
A product moment correlation coefficient of scores by the two judges hardly makes sense here as it is not intended to examine the existence or otherwise of a linear relationship between the scores. What makes more sense is correlation between ranks of contestants as judged by the two judges.

4.9.3 Factor Analysis

Factor analysis attempts to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables. Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables. Factor analysis can also be used to generate hypotheses regarding causal mechanisms or to screen variables for subsequent analysis (for example, to identify collinearity prior to performing a linear regression analysis).

There are three stages in factor analysis:

- First, a correlation matrix is generated for all the variables. A correlation matrix is a rectangular array of the correlation coefficients of the variables with each other
- Second, factors are extracted from the correlation matrix based on the correlation coefficients of the variables
- Third, the factors are rotated in order to maximize the relationship between the variables and some of the factors

4.9.3.1 Data

The variables should be quantitative at the interval or ratio level. Categorical data (such as religion or country of origin) are not suitable for factor analysis. Data for which Pearson correlation coefficients can sensibly be calculated should be suitable for factor analysis.

4.9.3.2 Kaiser-Meyer-Olkin (KMO) Test

It measures strength of the relationship among variables. The KMO measures the sampling adequacy which should be greater than 0.5 or more for a satisfactory factor analysis to proceed with. If any pair of variables has a value less than this, consider
dropping one of them from the analysis. The off-diagonal elements should all be very small (close to zero) in a good model.

4.9.3.3 Bartlett's test

It is another indication of the strength of the relationship among variables. This tests the null hypothesis that the correlation matrix is an identity matrix. An identity matrix is a matrix in which all of the diagonal elements are 1 and all off diagonal elements are 0. This null hypothesis should be rejected so as to say that correlation matrix is not an identity matrix.

4.9.3.4 Communalities

Communalities indicate the amount of variance in each variable that is accounted for. Initial communalities are estimates of the variance in each variable accounted for by all components or factors. Extraction communalities are estimates of the variance in each variable accounted for by the factors (or components) in the factor solution. Small values indicate variables that do not fit well with the factor solution, and should possibly be dropped from the analysis.

4.9.3.5 Eigen value

It is the standardized variance that associates with a particular factor. The sum of the Eigen values can not exceed the number of items in the analysis, since each item contributes one to the sum of variances.

4.9.3.6 Total Variance Explained

It shows all the factors extractable from the analysis along with their Eigen values, the percent of variance attributable to each factor, and the cumulative variance of the factor and the previous factors.

4.9.3.7 Scree Plot

The scree plot is a graph of the Eigen values against all the factors. The graph is useful for determining how many factors to retain. The point of interest is where the curve starts to flatten.
4.9.3.8 Factor matrix

This matrix shows the loadings of the variables on the factors extracted. The higher the absolute value of the loading, the more the factor contributes to the variable. Each number represents the correlation between the item and the unrotated factor. These correlations can help formulate an interpretation of the factors or components. This is done by looking for a common thread among the variables that have large loadings for a particular factor or component.

It is possible to see items with large loadings on several of the unrotated factors, which can make interpretation difficult. In these cases, it can be helpful to examine a rotated solution.

4.9.3.9 Rotated Component (Factor) Matrix

The idea of rotation is to reduce the number factors on which the variables under investigation have high loadings. Rotation does not actually change anything but makes the interpretation of the analysis easier. The identified factors can be used as variables for further analysis.

4.9.4 Cross-tabulation

Cross-tabulation is one of the most useful analytical tools and is a main-stay of the market research industry. One estimate is that single variable frequency analysis and cross-tabulation analysis account for more than 90% of all research analyses.

Cross-tabulation analysis, also known as contingency table analysis, is most often used to analyze categorical (nominal measurement scale) data. A cross-tabulation is a two (or more) dimensional table that records the number (frequency) of respondents that have the specific characteristics described in the cells of the table. Cross-tabulation tables provide a wealth of information about the relationship between the variables. Cross-tabulation analysis has its own unique language, using terms such as “banners”, “stubs”, “Chi-Square Statistic” and “Expected Values.”

The Chi-square statistic is the primary statistic used for testing the statistical significance of the cross-tabulation table. Chi-square tests whether or not the two variables are independent. If the variables are independent (have no relationship), then
the results of the statistical test will be “non-significant” and that null hypothesis cannot be rejected meaning that it can be believed there is no relationship between the variables.

If the variables are related, then the results of the statistical test will be “statistically significant” and the null hypothesis can be rejected, meaning that it can be stated that there is some relationship between the variables.

The chi-square statistic, along with the associated probability of chance observation, may be computed for any table. If the variables are related (i.e. the observed table relationships would occur with very low probability, say only 5%) then it can be said that the results are “statistically significant” at the “.05 or 5% level”. This means that the variables have a low chance of being independent.

4.9.5 Test of Normality

An assessment of the normality of data is a prerequisite for many statistical tests because normal data is an underlying assumption in parametric testing. There are two main methods of assessing normality: graphically and numerically.

The approaches can be divided into two main themes: relying on statistical tests or visual inspection. Statistical tests have the advantage of making an objective judgment of normality, but are disadvantaged by sometimes not being sensitive enough at low sample sizes or overly sensitive to large sample sizes. As such, some statisticians prefer to use their experience to make a subjective judgment about the data from plots/graphs. Graphical interpretation has the advantage of allowing good judgment to assess normality in situations when numerical tests might be over or under sensitive, but graphical methods do lack objectivity.

The Kolmogorov-Smirnov Test and the Shapiro-Wilk Test can be used as means of assessing normality. The Shapiro-Wilk Test is more appropriate for small sample sizes (< 50 samples), but can also handle sample sizes as large as 2000. For this reason, Shapiro-Wilk test can be used as numerical means of assessing normality along with the Kolmogorov-Smirnov Test.
4.9.6 Kruskal-Wallis test

The Kruskal–Wallis one-way analysis of variance by ranks is a non-parametric method for testing whether samples originate from the same distribution. It is used for comparing more than two samples that are independent, or not related. The parametric equivalent of the Kruskal-Wallis test is the one-way analysis of variance (ANOVA). When the Kruskal-Wallis test leads to significant results, then at least one of the samples is different from the other samples.

4.10 Limitations of the study

1) This research is limited to the mobile telecom service provider companies operating for last seven years in Gujarat and the primary data collection is done from Gujarat state only and so, the result of the work may not be applicable in other regions of the nation.

2) The quality of the research depends on the quality of the primary data provided by the respondents.

3) The sample size may not give accurate picture of the total population.

4) Selection of few companies for the study may not allow extrapolating the conclusion to other companies.

5) The study is limited to only calling services utilized by the users and therefore the results may change if the same study is repeated for other services such as data services by the providers.

6) Other variables besides brand image, consumers’ perception about quality of services and company market performance may affect customers’ selection of service provider.