

**“A STUDY OF CUSTOMER SATISFACTION OF CORPORATE
CUSTOMERS OF TELECOM SERVICE OPERATORS - WITH
SPECIAL REFERENCE TO PUNE CITY”**

(Period Mar-2011 to Mar-2013)

A Thesis Submitted to

Tilak Maharashtra Vidyapeeth, Pune

For the Degree of

Doctor of Philosophy (Ph. D.)

Under the Faculty of Management

By

MAHAJAN MILIND VIVEK

Under the Guidance of

DR. ANWAR SHAIKH

February - 2014

DECLARATION

I hereby declare that the thesis entitled “**A Study of Customer Satisfaction of Corporate Customers of Telecom Service Operators - With Special Reference To Pune City**” (Period Mar - 2011 to Mar-2013) completed and written by me has not previously been formed as the basis for the award of any Degree or other similar title upon me of this or any other Vidyapeeth or examining body.

MAHAJAN MILIND VIVEK

Research Student

Place: Pune

Date: 01/02/2014

C E R T I F I C A T E

This is to certify that the thesis entitled “**A Study of Customer Satisfaction of Corporate Customers of Telecom Service Operators - With Special Reference to Pune City (Mar-2011 to Mar-2013)** ” which is being submitted herewith for the award of the Degree of Vidyavachaspati (Ph.D.) in Management to Tilak Maharashtra Vidyapeeth, Pune is the result of original research work completed by Shri. Mahajan Milind Vivek under my supervision and guidance. To the best of my knowledge and belief the work incorporated in this thesis has not formed the basis for the award of any Degree or similar title of this or any other University or examining body upon him.

Dr. Anwar Shaikh

Research Guide

Place: Pune

Date : 10/02/2014

ACKNOWLEDGEMENT

I am blessed with invaluable guidance of **Dr. Anwar Shaikh** for this research work. His advice, step by step guidance, ideas, insights and motivation are instrumental in making this thesis possible. Despite his very busy schedule of professional commitments, he was always available to me, whenever needed, for consultation, discussions on the various aspects of my research work. He has given breakthrough in the project whenever I was stuck up. This provided me an excellent and rare opportunity to do value addition to my personality by learning, understanding and assimilating the concepts and knowledge of management. **I have no words to express my gratitude and just salute him for his valuable contributions.** Sir, I am really thankful to you.

The researcher is deeply indebted to **Dr. Rajan Dhamdhare**, Department of Management, Tilak Maharashtra Vidyapeeth Pune, for the smooth facilitation of this study with all necessary guidance about administrative formalities. He was always source of energy for me since last three years.

The next figure who stands before me to thank is **Shri Vishwanath Kendurkar** General Manager, BSNL. All through the period of my research work, he remained concerned and caring. I wish to convey my heart felt thanks and “SADAR PRANAM” for his selfless help.

I would like to thank **Dr. Mehmood Sayyad** for his support. He extended all help in analysis, understanding and interpreting results. I am thankful to him for giving critical inputs from time to time.

I am also thankful to Tilak Maharashtra Vidyapeeth , Pune and its faculty, for putting a lot of efforts and care through out the course tenure. All the staff was always ready to help with a smile. I am thankful to librarian of Tilak Maharashtra Vidyapeeth, Pune and the respective staff for their great help to me in securing reference.

I am indebted to that all personalities working in different organizations to which I have visited for data collections. It has not been possible for me to mention their names individually here but without their support this work was not possible.

Finally, I take this opportunity to thank my wife, Sau. Jyotsna and my son Master Hrishikesh, who made contributions in their own way during the entire period of my research. I missed the time that I could have spent with them. Although I had little time for them but they always welcomed me with smiles and never created any hindrances for my research work.

In the end, I am thankful to all the persons who have helped me in fulfilling my dream but whose names may not be appearing here.

MAHAJAN MILIND VIVEK

ABSTRACT

1. INTRODUCTION

Prior to the liberalization, Telecom services were provided by the Department of Telecommunication, Government of India. After liberalization the Government opened the telecom sector for the private participation. Due to opening of Telecom Sector for private participation different telecom service operators entered in the telecom market and Indian Telecom Market became a multiplayer telecom market. The multiplayer scenario has reduced the cost of the Telecom services and this has also resulted into a tremendous growth in telecom subscriber base.

Telecom service operators divide their customer base mainly in two groups namely Corporate Customer and General Customers. The Telecom service operators earn lot of revenue from these two groups of customers but the major part of this revenue comes from Corporate Customers. The Corporate customers mainly include the Banks, Educational institutes, Public & Private Limited Companies, Government organizations and Public Sector Units. The telecom service operators call these corporate customers with different names like Commercially Important Customers, Platinum Customer, Gold Customers, etc. In our study we will call these customers as corporate customers, as named by Bharat Sanchar Nigam Limited, a Government owned Telecom Service Operator. (BSNL, 2011)*¹

These corporate customers are difficult to be delighted. They are price conscious. The corporate customers of one Telecom Service operator are attracted by number of other service operators with better offers. Now a days Customer's expectations from telecom service operators are also increased. Earlier the customer was happy with the voice communication only, but at present he is expecting the high-speed data connectivity. The needs of customers are becoming more and more high technology oriented and world-class infrastructure is needed to satisfy their needs. Here the things get tricky and gives rise to problem. The problem of this study is driven by the need to assess customer satisfaction.

In the view of above mentioned facts the problem statement of this study is **“A Study of Customer Satisfaction of Corporate Customers of Telecom Service Operators - With Special Reference to Pune City ”**. The research period is from Mar 2011 to Mar 2013.

2. Significance of Study:

The Study is very much important in number of ways to Telecom Service Operators, Corporate Customers, policy makers and regulating authority.

2.1 Significance for Telecom Service Operators: Revenue generated from Corporate Customers is on higher side than general customer so it is very much important to retain them. Customer retention is possible only if customer is satisfied with the delivered services. The present study measures the customer satisfaction level in respect of different Parameters of service quality. Depending on the results of the study, suggestion will be given to the Telecom Service Operator to improve customer satisfaction which is most important in multiplayer market.

Sometimes Top level management does not get the customer feedback properly as it is suppressed at lower level Management. The results of the study will be useful for top level management as these results represent the voice of customers. The study will bridge the gap between the Customers and Top level Management.

The study will find out the important parameters of service quality (Factors) which drives the customer satisfaction. With the help of these parameters Telecom service operators can judge the level of customer satisfaction. Study will also find out which Parameters of service quality (Factor) are most important in customer's perspective. This will be useful for operators to set the priority to address issues related to different factors.

The study will provide the reliable support to the management to take the strategic decision for improvement of service quality. It will also highlight the customer switching intensions. It will help the management to improve the customer satisfaction and build a long term customer relationship.

2.2 Significance for policy makers & regulating authority: The study shall help the policy makers to decide various policies related with control of Telecom Sector. TRAI (Telecom Regulatory Authority of India) has set the bench mark for the Telecom service quality. The results of the study will be useful for TRAI to find out whether the customer is receiving the service quality as per benchmark. With the help of results of the study TRAI will be guided to draw the new road map for improvement of service quality in Telecom Sector.

2.3 Significance for Corporate Customers: With this study corporate customers will also be benefited as their expectations and satisfaction level will be effectively

conveyed to the Telecom Service Operators. Based on the result of the study, Regulator as well as Telecom Service Operators may take some steps which will be beneficial to the customers.

3. Scope and Limitations of the Study:

Due to continuous Research and Development work, telecom technology becomes obsolete at a rapid speed. The telecom technology is very dynamic in nature. This issue can dramatically alter the customer opinion. Hence scope of the study does not include the technology variation in short term and long term basis.

This study has also got geographical limitation. Study is limited to corporate customers in a specific geographical area; in this case Pune city. Hence the needs and preferences of all India customers are not likely to be captured. This study is carried out in Pune City and it is assumed that results of this study will be relevant for other similar cities.

Scope of study includes providing recommendations for competitive offerings of telecom Services to the Corporate Customers. Although, telecom market is dynamic, it is assumed that market will not change drastically in short term and the offerings will remain relevant.

As Study is limited to suggest the competitive offering of services, for actual implementation of suggestions a study on larger scale has to be undertaken covering all aspects like cost benefit analysis in long term and its technical feasibility.

4. Objectives of the Research: The Objectives of study were as follows.

- A. To study and assess the level of satisfaction of Corporate Customers: -** Customer satisfaction is the key performance indicator. Telecom customer satisfaction is influenced by a complex interplay of different factors leading to the customer satisfaction. It is very much important to study the level of customer satisfaction as customer satisfaction leads to customer retention.
- B. To find out the different factors leading to customer satisfaction and also to judge the scale of importance of those factors: -** “A factor is an underlying dimension that account for several observed variables. There can be one or more factors depending upon the nature of the study and number of variables involved in it.” (C.R. Kothari, 2004)^{*2}. Every Telecom Service has got different types of attributes. These attributes are grouped together to

form different factor. It was also decided to find out which is most important factor that drives the customer satisfaction.

- C. To study the correlation between the overall customer satisfaction and the individual factors influencing the customer satisfaction:** - This correlation study is important because those factors which are strongly correlated with overall customer satisfaction can be improved on priority to achieve immediate improvement in overall customer satisfaction.
- D. To find out whether the level of satisfaction changes according to the amount of the billing:** - The amount of the billing depends on the needs of the customers. The efforts have been made to find out if there is any difference in the level of satisfaction across the groups of customers having high and low monthly billing. The voice and data services are having different sets of attributes and drivers which lead to customer satisfaction. The efforts have been made to find out whether there is difference in the level of satisfaction with respect to voice and data services also.
- E. To study the various causes leading to the interruption of the services:** - Understanding importance of corporate customers, Telecom Service Providers might be trying their level best to provide uninterrupted service to the Corporate Customers. But there are some factors, which are beyond the control of the Telecom Service operators like continuity in Electricity supply, maintenance of Outdoor Network etc.

For example Telecom operators had laid Optic fiber cable for establishing the network. This network may be disturbed by road digging work done by the various agencies like Municipal Corporation, MSEDCL Company, Highway authorities, Gas supplying agencies etc. This is beyond the control of Telecom Service Operators. **To study the trends in the communication needs of the Corporate Customer:** - The telecom needs of the corporate customers are changing and becoming more and more high technology oriented. Attempt has been made to find out the current trend in the telecom needs.
- F. To find originating point of congestion of Voice Traffic at peak hour**

- G. To find most preferred medium of advertisement:** - There are different Media of the advertisement. Efforts have been made to find out which medium of advertisement is most preferred by the Corporate Customers.
- H. To give suggestions to the Telecom Service Operators to improve the quality of the service.**

5. Hypothesis of the study

Main Hypothesis of Study: - After extensive literature survey and advice from Respected Guide researcher has designed the hypothesis as follows, those were tested in the later part of study.

- A. **Hypothesis I:** Network Quality followed by Uninterrupted Services are the most important drivers leading to the Customer satisfaction.
- B. **Hypothesis II:** - The inter-operator congestion (at Point of Inter connection) is higher than intra-operator congestion.
- C. **Hypothesis III:** Satisfaction in Cost of Service for Voice is more than Cost of Service for Data.
- D. **Hypothesis IV:** Satisfaction in Provision of Services is better in voice services than data services.
- E. **Hypothesis V:** The level of customer satisfaction on the individual factor is different for low billing customers and high billing customers.

6. Methodology & Source of Data

6.1 Data Collection Tool: - A structured Questionnaire was used to collect the primary data. This primary data is used to answer the research objectives and to prove the hypothesis.

6.2 Access Strategy: - The questionnaire was accompanied with the covering letter (See Appendix I) addressed to the respondent in which the purpose of data collection was clearly explained. This has made the informant free and open. The respondent was also assured the confidentiality and anonymity of their responses.

6.3 Selection of the person to fill the questionnaire: To have the accuracy in data collection questionnaire is needed to be filled up by the senior person who has been employed by Corporate Customer to take care of the communication needs of the organization. These senior level persons are very busy, but these persons have

complete idea of the communication network of their organization. Hence these persons are selected to fill up the questionnaire. If this person is not available, person who is next junior to him was approached.

6.3 Personal handing over of the Questionnaire: It was decided to handover the questionnaire personally. In most of the cases all the time the Researcher was with the respondent when he was filling the questionnaire. This was done to settle the doubt of the respondent across the table. Personal visit avoided delay in the receipt of filled questionnaire and reduced the chances of misinterpretation of questions. Due to personal visit Researcher has also got the chance to observe the working of person who is looking after the telecom needs of the organization.

6.4 Sample Size: The different service operators were approached for obtaining the list of the corporate customers. The operators were ready to provide the list after assuring them that the use of the list will be done for educational purpose only. The operators provided the list only after lot of pursuance. The researcher merged the lists received from different Telecom Service Operators and prepared a single list with total **3792** corporate customers. The researcher has gone for sample size **385** Corporate Customers which is **more than 10 % of the Total Population of Corporate Customers.**

Researcher has also given the well thought to the two research papers **Cochran, 1963:75 Cited by Glenn D Israel, PEOD6^{*3}** and **Robert V. Krejcie & Daryle W. Morgan^{*4} 1970** which also advocates the sample size of 385.

6.5 Sampling Universe and Unit: - The Universe for this study is all Corporate Customers of Telecom Service Operators in the Pune city. The individual Corporate Customers who is responding the questionnaire is a sampling unit for the study.

6.6 Sampling Technique: - The researcher has gone through the list of Corporate Customers. It was noticed that most of the operators had classified customers mainly into four categories; this classification is shown in Table No A.1.

To make the sample representative of each categories researcher has selected 10 % customers from each category of Customers. Care has been taken to make the sample representative by including customers from different industries. This **proportionate stratified sampling** has resulted in more reliable information.

Then the elements of each strata are selected for inclusion in the sample based on the ease of access and on the basis of their preparedness to respond without any bias. This sampling technique is called **convenience sampling**. Thus researcher has used the mixed sampling technique for gathering the desired sample. This sampling can be called as proportionate **stratified convenience sampling**.

Table No: A.1 Classification of Sample as per Core Business Area

Sr. No.	Category (Core Business Area of Corporate Customer)	Population	Sample Size	Percentage
1	Banks, Insurance, Financial Services companies	341	35	10.26 %
2	IT , ITES , Data processing centers	531	54	10.17 %
3	State and Central Government organization, Local Bodies, Public Sector Units, Educational Institutes, colleges & Universities	455	46	10.11 %
4	Private Limited, Public Limited companies and others (Excluding Categories mentioned in Sr. No. 1, 2, and 3 of this table)	2465	250	10.14 %
Total		3792	385	10.15 %

(Source: - List of Corporate Customers provided by Telecom Service Operators)

6.7 Period of Data Collection: Primary data was gathered by filling the questionnaire during the period of Mar 2011 to Mar 2013.

6.8 Response Rate: - Total 512 Corporate Customers were contacted. Out of the 512 Corporate Customers 468 customers have accepted questionnaire. Out of 468 questionnaires those were administered only 414 were received back.

6.9 Screening of Responses: - In received 414 responses there were some responses in which some of the questions were left unanswered by respondent. However those responses were excluded from data analysis. After screening process 29 responses found unusable and rest 385 constituting the response rate 82.26 % were considered valid for data analysis and hypothesis testing.

6.6 Reliability Analysis:-

Results of the reliability tests has given an **overall Cronbach Alpha value of 0.8869 with standardized item alpha of 0.8875**, which is theoretically large enough. Hence one can say that questionnaire and data collected through it **is statistically reliable**.

7. Statistics of the Research

7.1 Coding used by Researcher:-

The Primary data collected with the help of questionnaire has been coded so that it can be entered in the computer for further analysis. The attributes related to customer satisfaction in respect of various factors such as customer service related issues, billing related issues, Network issues etc were coded using Likert scale having 5 points starting from very satisfied to the very dissatisfied. Five points were allotted to the very satisfied level and 1 is allotted to very dissatisfied level. The composite scores are calculated for the individual sub categories of different factors.

7.2 Use of Computer in Research: - For this study Researcher has used a Computer with software **SPSS** version 11.5 for MS Windows and **Microsoft Office Excel 2007**.

- A. SPSS:** - SPSS has been used for the Chi-square analysis, Correlation test (spearman rank), Reliability analysis, t-test, Analysis of Variance (ANOVA).
- B. Microsoft Excel:** - Microsoft Excel was used for the data management. Microsoft Excel is also used to draw several bar graphs & frequency distribution charts and Calculation of Mean, Variance & Standard Deviation.

7.3 Statistical Tests Used by Researcher

- A.** To assess the statistical significance of difference in satisfaction level across the groups of low and high billing customers researcher has used independent sample t-test, after confirming underlying normality assumption as necessary. P-value is obtained using independent sample t test. P-value < 0.05 is considered to be statistically significant.
- B.** To study the correlation between the overall satisfaction and the individual factors researcher has used The Spearman rank correlation method (Spearman's Method). This analysis aims at finding the extent of linear relationship between overall satisfaction and several individual factors.

- C. The average importance score of ten different factors leading to customer satisfaction has been compared statistically using the F-Test. P-value is obtained using Analysis of variance (ANOVA) technique this test. P-value < 0.05 is considered to be statistically significant.
- D. To find out the distribution of problems faced by the customers and distribution of communication needs researcher has used the Chi-Square Test.

8. Testing of Hypothesis

Factor of Service Quality: - Parasuraman et al proposed that “Service quality is a function of the differences between expectation and performance along the quality dimensions. They developed a service quality model based on gap analysis. The focus group interviews taken by Parsuraman and others revealed that regardless of the type of service, consumer used basically similar criteria in evaluating service quality.

These criteria seem to fall into 10 key categories which are labeled service quality determinants. These criteria namely are Reliability, Responsiveness, Competence, Access, Courtesy, Communication Credibility, Security, Understanding, and Tangibles.” (Parasuraman et al, 1985)^{*5}

Above mentioned research was again refined by **Parasuraman et al** in 1988. In their study they reduced original ten dimensions of service quality to five dimensions namely **reliability, responsiveness, tangibles, assurance** (communication, competence, credibility, courtesy, and security were clubbed together) and **empathy**. (Parasuraman et al, 1988)^{*6}

In this study of Satisfaction of Corporate Customers, researcher has used a modified version of the SERVQUAL instrument provided by Parasuraman et al. In this study some of the factors (Parsuraman labeled those as Service Quality Determinants) from Parasuraman et al SERVQUAL model were renamed and some were newly generated as an outcome of interviews and discussions with 25 numbers of Corporate Customers. Researcher has prepared list of the 12 Numbers of factors which represents the number of attributes.

There are twelve different factors which drives the customer satisfaction. These factors are named as Provision of services, billing convenience, Cost of

services, Customer care access, Customer care, Tangible (Physical Evidence of Services) Responsiveness, Redressal of Customer Grievances, Network Quality Mobile, Network Quality Broadband, Network Quality Landline and Uninterrupted Services.

These factors represents number of attributes (Parasuraman and others called those as Statements) which will be used to measure customer satisfaction. Before finalizing the list of attributes care has been taken that list meets the expectations of most of the customers. Although, the list can never be exhaustive as each customer has got his own opinion, the list has been made nearly exhaustive, with a limited number of attributes for all practical purposes by understanding requirements of the customers. The list also needs to be numerically manageable to get proper response.

Hypothesis I: Network Quality followed by Uninterrupted Service are the most important drivers leading to Customer satisfaction.

Null Hypothesis (H0): - All the individual factors are equally important drivers leading to customer satisfaction.

Alternative Hypothesis (H1): - Network Quality followed by Uninterrupted Service are the most important drivers leading to Customer satisfaction. (One tailed hypothesis)

Importance Score of the Factors: - Perceived values of Factors are different for different customers; hence, they attach different importance to these Factors. This serves the purpose of determination of relative importance of different factors. Respondents were asked to rate these Service Quality Dimensions (Factor) on scale of 1 to 5, with 1 being Not at all Important and 5 being Very Important. As there are 385 customers the total score allotted to each factor is 1925 (As $385 \times 5 = 1925$).

For rating of Importance purpose, the factors Network Quality Landline, Network Quality Broadband and Network Quality Mobile are clubbed together into a single factor named Network Quality. Hence, for purpose of rating Importance of Factors there are only Ten Factors. The **Table No A.2** list score received by each factor along with the Standard deviation.

Table No A.2 Importance scores received to different factors of service quality

Sr. No.	Factor	Score Received	Total Score	Importance Score in % (Mean \pm SD)
1	Provisioning of Service	1336	1925	69.4 \pm 8.9
2	Billing Convenience	1282	1925	66.6 \pm 7.3
3	Cost of Service	1500	1925	77.9 \pm 6.8
4	Customer Care Access	1471	1925	76.4 \pm 5.1
5	Customer Care	1494	1925	77.6 \pm 6.9
6	Tangibles (Physical Evidence of Services)	462	1925	24.0 \pm 5.0
7	Responsiveness	1330	1925	69.1 \pm 7.4
8	Redressal of Customer Grievances	537	1925	27.9 \pm 6.3
9	Network Quality	1883	1925	97.8 \pm 3.1
10	Uninterrupted Service	1777	1925	92.3 \pm 5.9

(Source: Primary Data Collected by the Researcher)

(Values in **Table A.2** are Mean \pm Standard Deviation of scores. Higher mean score indicate higher Importance and vice-versa. P-value is obtained using Analysis of variance (ANOVA) technique. P-value $<$ 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.)

F-value (ANOVA Test) = 1357.17, P-value = 0.001 (Significant) (Decision: - Accept H1 Alternative Hypothesis).

The P-Value is less than 0.05, so Alternate hypothesis accepted. Hence, it is proved that Network Quality followed by Uninterrupted Service are the most important drivers leading to Customer satisfaction.

Comment: - As Network Quality and Uninterrupted service are most important factors as per customers, Telecom Service Operators should try to improve satisfaction on these two factors on priority basis so as to achieve immediate improvement in overall Customer Satisfaction.

Hypothesis II: -- The inter-operator congestion (at Point of Inter connection) is higher than intra-operator congestion.

Null Hypothesis (H0): -- The inter-operator congestion (at Point of Inter connection) is similar to intra-operator congestion.

Alternative Hypothesis (H1): -- The inter-operator congestion (at Point of Inter connection) is higher than intra-operator congestion (One tailed hypothesis).

(Inter and Intra Operator Congestion :- The Inter operator congestion means if BSNL customer calls Airtel customer and if he gets the network busy message then it is Inter operator congestion. The Intra-operator congestion means if BSNL customer call another BSNL customer and if he gets the network busy this congestion is intra operator congestion)

Table A.3 Satisfaction score on inter & intra-operator congestions

Sr. No.	Description	Services	Services
1	Services	Mobile	Landline
2	Inter-operator Congestion (n=385)	3.29 ± 0.59	3.31 ± 0.57
3	Intra Operator Congestion (n=385)	4.08 ± 0.60	4.13 ± 0.59
4	T-value	-18.386	-19.506
5	P-value (One-tailed Significance)	0.001	0.001
6	Decision	Accept H1	Accept H1

(Source: Based on Primary Data Collected and processed by the researcher)

[Values in **Table A.3** are Mean ± Standard Deviation of scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample ‘t’ test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.]

As per the **Table No.A.3**, the Alternative Hypothesis is accepted. Hence it is proved that the inter-operator congestion (at Point of Inter connection) is higher than intra-operator congestion in Mobile as well as Landline Services.

Comments: - The average satisfaction score for intra-operator congestion is significantly higher than the inter-operator congestion for mobile and Landline services. The telecom Service Operators should try to reduce the Inter-operator Congestion to improve overall customer satisfaction.

Hypothesis III: Satisfaction in Cost of Service for Voice is more than Cost of Service for Data.

Null Hypothesis (H0): -- Satisfaction in Cost of Service for Voice is similar to the Cost of Service for Data.

Alternative Hypothesis (H1): -- Satisfaction in Cost of Service for Voice is more than Cost of Service for Data (One-tailed hypothesis).

(Cost of Service: - Cost of service is a price for a service based on the costs incurred in providing that service. In case of telecom services customer has to pay the cost at the time of registration that is cost of installation. Afterwards customer has to also pay monthly recurring charges (Rentals) or charges depending on usage. The usage in respect of voice calls is calculated on the pulse rate basis and charges in case of data services are calculated on basis of amount of downloading.)

Table A.4 Satisfaction score on cost of services Voice & Data

Sr. No.	Description	Values
1	Factor	Cost of Services
2	Voice Services (n=385)	4.12 ± 0.35
3	Data Services (n=385)	3.59 ± 0.43
4	T-value	18.825
5	P-value(One-tailed Significance)	0.001
6	Decision	Accept H1

(Source: Based on Primary Data Collected and processed by the researcher)

(Values in Table A.4 are Mean ± Standard Deviation of scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample 't' test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.)

Decision: - As per Table No A.4, Alternative Hypothesis H1 is accepted. Hence it is proved that Satisfaction in Cost of Service for voice is more than Cost of Service for data.

Comment: - The Telecom Service Operator as well as Government Regulators should do the needful to reduce the cost of Service for data to improve overall customer satisfaction.

Hypothesis IV: Satisfaction in Provision of Services is better in voice services than data services.

Null Hypothesis (H0): -- Satisfaction in Provision of Services is similar in voice services and data services.

Alternative Hypothesis (H1): -- Satisfaction in Provision of Services is better in voice services than data services. (One-tailed hypothesis)

(Provision of Service: - In telecom, provisioning of services is the process of preparing of Telecom equipment to provide the desired services to the end users. The time taken for provision of new connection of mobile, landline and data circuit are considered under the provisioning of services Factor. Less the time taken by the operator to provide new service customer satisfaction will be on higher side)

Table No. A.5 Satisfaction score on provision of services for Voice & Data

Sr. No.	Description	Value
1	Factor	Provision of Services Score Mean \pm SD
2	Voice Services (n=385)	3.89 \pm 0.89
3	Data Services (n=385)	3.33 \pm 0.72
4	T-value	9.619
5	P-value (One-tailed Significance)	0.001
6	Decision	Accept H1

(Source: Based on Primary Data Collected and processed by the researcher)
(Values in **Table No A.5** are Mean \pm Standard Deviation of scores. Higher mean score indicate higher satisfaction & vice-versa. P-value is obtained using independent sample 't' test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.)

Decision: P-Value is less than 0.05 hence Alternative Hypothesis is accepted. The average satisfaction score for provision of services for voice is significantly higher than the provision of services score for data.

Comment: - The Telecom Service operators have to work hard to reduce the time required for provisioning of Data Services. In case of provisioning of Data services operators has to lay physical wire (Either Copper or Optic fiber) connectivity from customer premises to the Telephone Exchange. This takes a lot of time as operator has to take permission from Local Authorities

H5: The level of customer satisfaction on the individual factor is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the individual factor is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on the individual factor is significantly different for low billing customers and high billing customers.

Test Procedure for Hypothesis No. 5: -

Researcher had prepared list of the 12 Numbers of factors on which level of customer satisfaction depends. **To test hypothesis No. five the Twelve sub hypothesis (One for every factor) were tested by grouping the customers on the basis of their Monthly Expenditure (Monthly Billing) on Telecom Needs.** The customers those are spending more than Rs. 10,000/- per month on telecom needs are considered as **High Billing Customers** and those are spending less than Rs. 10,000/- per month are considered as **Low Billing Customers**. The Table No A.6 shows the classification of customers as per telecom Billing.

Table No A.6 Classification of Sample as per Monthly Telecom Billing Amount

Sr. No.	Expenditure	Group Name	Customers Count
1	Less Than Rs. 10,000/-	Low Billing Customers	268
2	More Than Rs.10,000/-	High Billing Customers	117
	Total	Total	385

(Source: Primary Data Collected by the Researcher)

Researcher has analyzed the customer satisfaction on 12 different Factors and checked whether customer satisfaction varies according to the amount of billing. To assess the statistical significance of difference in the level of satisfaction the researcher has used independent sample t-test, after confirming underlying normality assumption as necessary. P-value is obtained using independent sample 't' test. P-value < 0.05 is considered to be statistically significant.

This procedure has been carried out for all the twelve Factors which lead to customer satisfaction. Researcher has tested 12 Sub-hypothesis i.e. one for each factor. The Table No A.7 shows the results of hypothesis testing.

Table No. A.7 Results of Testing of Hypothesis No. Five

Factors	Low Billing Customers	High Billing Customers	T-value	P-value	Decision
Provisioning of Services Overall (Voice & Data)	3.82 ± 0.77	3.81 ± 0.77	0.149	0.882	Accept H0
Billing Convenience	3.58 ± 0.70	3.58 ± 0.71	0.073	0.942	Accept H0
Cost of Services Overall (Voice & Data)	3.86 ± 0.36	3.84 ± 0.38	0.667	0.505	Accept H0
Customer Care Access	3.35 ± 0.76	3.36 ± 0.77	-0.199	0.842	Accept H0
Customer Care	3.43 ± 0.67	3.42 ± 0.67	0.205	0.838	Accept H0
Tangible Aspects	4.33 ± 0.25	4.30 ± 0.23	1.194	0.233	Accept H0
Responsiveness	3.46 ± 0.63	3.42 ± 0.66	0.483	0.629	Accept H0
Redressal of Customer Grievances	3.86 ± 0.53	3.86 ± 0.53	0.056	0.955	Accept H0
Network Quality Mobile Overall (Voice & Data)	3.47 ± 0.77	3.42 ± 0.75	0.545	0.586	Accept H0
Network Quality Broadband Data	3.95 ± 0.77	4.01 ± 0.81	-0.658	0.511	Accept H0
Network Quality Landline Voice	2.88 ± 0.51	2.86 ± 0.52	0.363	0.716	Accept H0
Uninterrupted services	3.47 ± 0.68	3.45 ± 0.69	0.317	0.751	Accept H0

(Source: Primary Data Collected and Processed by Researcher)

(Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction & vice-versa. P-value is obtained using independent sample t test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.)

Comment:- From the Table No. A.7, Null hypothesis (H0) is accepted for all twelve factors. Hence one can say that “The level of customer satisfaction on the individual factor is **not significantly different** for low billing customers and high billing customers”. It shows that customer satisfaction does not vary with the amount of the telecom billing.

5.9.1. Analysis Reason for Failure in services as reported by Service Providers

Whenever there are fault conditions, corporate customers report the faults to the Telecom Service Providers. Customers were asked that what answer generally they get from the service provider whenever they report the faults. Survey revealed that 76.88 % customer were told that reason behind the fault is the cable cut happened due to the excavation work done by the different authorities in the city. (These different authorities may be Municipal Corporation, Electricity Board, and Gas Authorities etc). The underground cable faults are also the one of the reason of failure as reported by the 8.57 % customers. These cable faults normally occur in the rainy season. The power failure is also a one of fault area as reported by 8.57 % customers.

The failure of the equipments and Stores unavailability (Spares not available to replace faulty instruments or cables) does not have significant contribution for the occurrence fault conditions. The **Table no A.8** shows the classification of the reasons behind occurrence of faults.

Table No A.8 Reason for Failure in services as reported by Service Providers

Sr. No.	Reason for failure	Customer Count	%
1	Cable cut due to digging work	296	76.88 %
2	Underground Cable Fault	33	8.57 %
3	Equipment Failure	17	4.42 %
4	Power Failure	33	8.57 %
5	Spares not available to replace faulty equipments or cables	3	0.78 %
6	Any Other	3	0.78 %
	Total	385	100 %

(Source: Primary Data Collected and processed by the Researcher)

Chi-Square value= 1019.2, P-value= 0.001 (Significant).

Comment: - The most common problem faced is ‘Cable cut due to digging work’. This shows that there is there is lack of coordination between the telecom service operators and different Authorities involved in road digging work. The least common problem faced is ‘Store not available to replace faulty equipment or cable’. The Telecom Service operator should enhance coordination with the different authorities involved in digging work to avoid the occurrence of fault conditions due to road digging work. This will improve overall customer satisfaction.

8.7 Objectives: - To study the correlation between the overall satisfaction and the individual factors (Spearman's Method).

To study the correlation between the overall satisfaction and the individual factors researcher has used The Spearman rank correlation method or (Spearman's Method). This analysis aims at finding the extent of linear relationship between overall satisfaction and several individual factors.

Table No A.9 Correlation between the overall satisfaction and Individual factors.

	Individual Factors		Overall Satisfaction Score
Spearman's S rho	Billing Convenience Score	R	0.893(**)
		P-value	0.001
	Cost of services (Voice) Score	R	0.659(**)
		P-value	0.001
	Cost of services (Data) Score	R	0.701(**)
		P-value	0.001
	Cost of services (Overall Voice + Data) Score	R	0.717(**)
		P-value	0.001
	Customer Care Access Score	R	0.886(**)
		P-value	0.001
	Customer Care Score	R	0.826(**)
		P-value	0.001
	Tangible Aspects Score (Physical Evidence of Services)	R	0.050
		P-value	0.330
	Responsiveness Score	R	0.859(**)
		P-value	0.001
	Redressal of Customer Grievances Score	R	0.804(**)
		P-value	0.001
	Network Quality Mobile-Voice Score	R	0.891(**)
		P-value	0.001
	Network Quality Mobile-Data Score	R	0.891(**)
		P-value	0.001
	Network Quality Mobile (Overall Voice +Data) Score	R	0.892(**)
		P-value	0.001

	Individual Factors		Overall Satisfaction Score
	Network Quality Landline- Data (Broadband) Score	R P-value	0.876(**) 0.001
	Network Quality Landline-Voice Score	R P-value	0.881(**) 0.001
	Network Quality Landline – (Overall Voice + Data Score)	R P-value	0.882(**) 0.001
	Uninterrupted Services Score	R P-value	0.896(**) 0.001
	Billing Transparency Score	R P-value	0.766(**) 0.001
	Provision of Services (Voice) Score	R P-value	0.780(**) 0.001
	Provision of Services (Data) Score	R P-value	0.885(**) 0.001

(Source: Based on Primary Data Collected and processed by the researcher)

** Correlation is significant at the 0.01 level (2-tailed).

Comments:

- 1) The overall satisfaction score is significantly correlated with all the individual factors except tangible aspects score.
- 2) The overall satisfaction score is significantly and strongly correlated with Uninterrupted Services Score.
- 3) The overall satisfaction score is significantly and relatively weakly correlated with Cost of services (Voice) Score.

9. Major finding

- A. There are twelve different factors those drives the customer satisfaction. These are namely Provision of services, Billing convenience, Cost of services, Customer care access, Customer care, Tangible (Physical Evidence of Services), Redressal of Customer Grievances Responsiveness, Network Quality for Mobile, Network Quality Broadband, Network Quality Landline and Uninterrupted Services.

- B.** Network Quality followed by Uninterrupted Service are the most important drivers leading to Customer satisfaction. The average importance score of tangibles is significantly lower than all other individual factors.
- C.** Satisfaction in Cost of Service for Voice is more than Cost of Service for Data.
- D.** The average satisfaction score for provision of services for voice is significantly higher than the provision of services score for data.
- E.** The level of customer satisfaction on the individual factor is not significantly different for low billing customers and high billing customers.
- F.** The average satisfaction score for intra-operator congestion is significantly higher than the inter-operator congestion. Hence it can be concluded that inter-operator congestion is higher than intra-operator congestion.
- G.** The most common problem that leads to occurrence of fault conditions is Cable cut due to digging work done by different authorities.
- H.** The overall satisfaction score is significantly correlated with all the individual factors except tangible aspects. The overall satisfaction score is significantly and strongly correlated with Uninterrupted Services Score. The overall satisfaction score is significantly and relatively weakly correlated with Cost of services (Voice) Score.
- I.** Most common type of fault in case of landline network is phone dead as 72.47 % customers face it. In case of broadband services 60 % of customers are facing the complete disconnection problem.
- J.** Most common problems in case of Mobile services are Call Drop and Poor Coverage. 26.9 % customers reported call drop as major problem and 22.76 % customer reported that Poor coverage of Network is major problem area.
- K.** It is found that speed of provisioning of Mobile Services is higher than speed of provisioning of Landline Voice and Landline Broadband services.
- L.** As per survey most preferred medium of advertising is Internet as 50.65 % customer preferred it.
- M.** Customers were asked to rate their overall satisfaction on Likert five point scale. (Very Satisfied to Very dissatisfied level) considering all the areas is like billing, customer care, network quality, cost of service etc. Out of 385 customers, 60 customers (15.58 %) rated as Very Good, 221 customers (57.40 %) rated good. It means $(15.58 + 57.40 = 72.98 \%)$ customer are

satisfied about the overall services. 79 customers (20.52 %) were neutral , 25 (6.49 %) customers are dissatisfied.

- N. The customer was asked a simple question that “To what extent the services meet to your expectations?” 11.43 % customer said that services are much better than expected, 50.13 % customer said that those are better than expected. In summary 61.56 % customer feel that the services are better than expected. 23.64 % customer said that services are as per expectations and 10.91 % said that services are worse than expectation. The survey further reveals that 3.9 % customers felt that services are much worse than expected.
- O. **City Coverage:** - In a Survey, 25.7 % customers said that they are very satisfied about the city coverage, 52.2 % customers are satisfied about the city coverage. 17.9 % customers were neutral about their opinion on City coverage. 3.4 % Customers are dissatisfied about the City Coverage and 0.8 % customers are very dissatisfied about the City Coverage.
- P. **On Road Coverage:** - In a Survey, 22.6 % customers said that they are very satisfied about the On Road coverage, 50.7 % customers are satisfied about the On Road coverage. 20.8 % customers were neutral about their opinion on Road coverage. 4.9 % Customers are dissatisfied about the On Road Coverage and 1.0 % customers are very dissatisfied about the On Road Coverage.
- Q. **Rural Coverage:** - In a Survey, 18.5 % customers said that they are very satisfied about the Rural coverage, 40.0 % customers are satisfied about the Rural coverage. 22.3 % customers were neutral about their opinion the Rural coverage. 14.5 % Customers are dissatisfied about the Rural Coverage and 4.7 % customers are very dissatisfied about the Rural Coverage.

10. Suggestions:

- A. **Important drivers to Customer satisfaction:** - The Network Quality followed by Uninterrupted Services are the most important drivers leading to Customer satisfaction. **(Reference Section No 5.8 of Chapter 5)** The Telecom Service operators should try to improve the level of satisfaction on these two factors on priority basis. This will improve overall satisfaction. The operators should put efforts to improve the satisfaction on all the attributes related to these factors.

- B. Inter Operator Congestion:** Not providing sufficient connectivity between the operators leads to inter-operator congestion and customer dissatisfaction. The result of the survey reveals that the degree of congestion in between the operators is on higher side. It is suggested that sufficient connectivity should be provided in between two telecom service operator to reduce congestion.
- C. Poor Satisfaction on Cost of Service for Data:** - It is found that Satisfaction in Cost of Service for Voice is more than Cost of Service for Data. The Telecom Service should take efforts to reduce cost of service for data. The Government of India has formed the two Companies named NOFA and SOFA which will install robust optical Fiber network in the country. The Telecom Service operator can rent this optical fiber network in future from these companies. This will reduce the cost of installation of data network.

Secondly Telecom service operator has to lay underground Telecom Cables for providing data connectivity. For laying of underground cables telecom service operators has to dig the roads. The reinstatement charges charged by local authorities for the digging of roads are on higher side. These charges need to be reduced. These efforts will help operators to reduce the data service charges.

- D. Provision of Services Data:** - Satisfaction in Provision of Services is better in voice than data. The speed provision of data services needs to be improved. The provision of data services is done from the central locations like Bangalore, Delhi. The regional centers for data provisioning need to installed in major cities of India.
- E. Level of Satisfaction and amount of Billing:** - The level of Customer Satisfaction on different Factors does not vary according to the amount of billing. It seems that the Telecom Service operators do not differentiate between the high billing and low billing customers as their satisfaction on different factors does not vary. It is suggested that high billing customers should be treated differently considering the high revenue which company is earning from them. It is suggested to provide the preferential treatment to High Billing customers while maintaining their Network.
- F. Correlation of Overall Satisfaction:** - The overall satisfaction score is significantly correlated with all the individual factors except tangible aspects

score. It is suggested that operator should improve on all factors so that the overall satisfaction will be improved.

- G. Mobile Network Coverage Issues:** The coverage area is a geographical area where the network of the Mobile service operator is available. The survey reveals that rural coverage is poor than the city coverage. There are pockets with zero or poor coverage in city area also. It is suggested to increase the number of BTS sites (Popularly called as Towers) as per the coverage requirement in City, Rural and along highways. The sharing of towers between the Telecom Service Operators is recommended. To improve the customer satisfaction it is suggested to install the Tunnel solutions for continuity of coverage along highways. (Tunnel solutions are devices which improves the network coverage in Road as well as in Railway Tunnels)
- H. In building Mobile Network Coverage issues:** - Where it is not possible to install BTS (Tower) is suggested to install indoor solutions. (The indoor solutions are the devices which receive the signal from the nearby Tower and amplify it so that all the Mobile customers in the said area get the proper signal.) Efforts should be taken to improve the Coverage in Parking lots, Basements, Airports, Shopping malls and high rise Buildings.
- I. Call Drop (Mobile Network):** The call drop in the network can not be reduced to zero. It is suggested to keep it within limit. The Poor Coverage is one of the reasons behind call drop. The planning and adding the BTS (Towers) site is continues process during the expansion of network. This will solve the call drop problem to some extent. It is suggested to plan the BTS (Popularly call as towers) sites in anticipation of the future traffic.
- K Broadband Service Network Quality issues:-**
- 1. Problem in Login:** - In case of wireless broadband it is found that customer has to make number of attempts to get access to the internet. The Poor capacity of the backhaul equipment is the reason behind it. Service operators should install the modern equipment of sufficient capacity considering the sharp increase in data traffic in near future.
 - 2. Problems in Speed:** - In case of broadband network there is an issue of poor speed. Customer is of the opinion that the promised bandwidth

is not delivered by the operators. In the advertisement operators mentions the maximum speed that customer will get but operator normally do not mention minimum speed that customer will get. This creates confusion. It is suggested to mention both minimum and maximum speed available in different plans subscribed by the customers. To provide higher and consistent speed it is suggested to robust backhaul Network.

3. **Consistency in Speed:** - It is suggested to provide the consistent downloading speed on 24 Hours and 7 days basis.
4. **Problems in Customer care:-** It is needed to have a qualified support staff for customer care in respect of data services.

L. Uninterrupted Service: To avoid the faults happening due to road digging work it is suggested to take following care.

1. Conduct frequent meetings with the officers of the different authorities involved in digging work to have better coordination. Handover the cable route index diagram to them. (Route index diagram shows exact position of the underground cable and includes details about the depth at which cable is laid and distance of the cable from edge of the road)
2. Telecom service operator can depute the official at the site where the digging work is in progress so that this official can guide them about the exact location of underground cables.
3. Telecom service operator can provide the alternate route of the Optic fiber cable so that there should not be complete failure even when cable is cut due to digging work.
4. Have constant vigil on the circuits of corporate customers and attend their faults on priority basis

M. Fault repair duration: The actual fault repair duration is higher than expected. Following care can be taken to reduce fault repair duration

1. **Depute special person:** The operator can divide corporate customers in small group say 25 each according to geographical area. Special person can be appointed to take care of the fault reported by this group of 25 corporate customers. All customers in his area can directly call him in case of fault incidences. He can analyze the nature of the fault and here

afterwards he will coordinate with the corporate customer and Telecom service operator's engineer till the fault settles down. This will avoid the need of contacting different level of engineer working with service operators for settlement of faults.

2. Provide the **alternative means of communication** in case of prolonged failures. (For example fixed wireless telephone in case of cable faults.)

N. Recommendations for Provision of Services (Wire-line):- For providing wire-line services (Landline and Wire-line Broadband) Telecom service operator has to lay the underground cable from Telephone Exchange to Subscriber premises. For laying the physical wires Telecom Service operators has to take the permission from Local authorities to dig the road. Some delay is involved in it. It is suggested that there should be separate agency available with the service operator for taking follow up with the local authorities for road digging permissions. This will reduce the delays in grant of permissions and in turn will improve speed of provisioning.

O. Customer Care

1. The Service centers should be easily accessible. It is suggested to increase the count of the customer care centers. The number of cash counters at service center should be adequate. No customer has to wait more than 10 Minutes to pay the bill in cash. The business hours of the customer care centers should be from 0800 AM to 0800 PM. The cash as well as cheques should be accepted within these hours. Customer care centers should be open on Holidays also.
2. The call center executives should be able to speak in English, Hindi and as well as in regional language. Service Operators should employ the sufficient number of Call center agents so that at any time they should not be too busy to respond customers
3. It is required to reduce the amount of the bureaucratic requirement and service operator should extend the all possible help to complete the bureaucratic requirement.
4. The sufficient information should be available on website. This will reduce the number of calls made to the customer care for the want of information. Customer care portal should be mobile friendly.

P. Billing Related Suggestions:

1. **Billing:** - Detailed bills should be provided to customers even if it has not been demanded. This will reflect the transparency. Bills should be error free. Provide the transparent bills. Explain the rental & usage charges properly at the time of new connection.
2. **Provide Alert:** Alert about the billing amount should be provided in between the billing cycles as per the threshold set by the customer. This will help the customer to control expenditure on telecom as per their budgetary provisions.
3. **Recharge coupons:** - Recharge coupons of all the denominations should be available in case of prepaid services.
4. **Billing Complaints (Time and Process):** - The process of solving seems to be complicated and time consuming. The service operator should carry out a root cause analysis for each complaint. The operators should also form mechanism to avoid the same type of complaint to arise again. If there are mistakes in the bill it suggested that the settlement of the billing complaints should be at the earliest.
5. **Provide Discount:** - Discount in the billing should be provided in proportion of usage. For higher uses higher discounts can be offered. This will utilize the spare capacity of the network.

11. Directions for future studies: - This study can be used for further research. Some of the suggestions for further studies are as follows.

- A. There should be detailed techno commercial study on the recommendations generated from this work. The cost benefit analysis can be carried out as an extension of this work.
- B. The study covers only Corporate Customers. The other customer segment not considered in this study. Study of other segments can be carried out as these segments also have considerable impact on the Telecom Industry.
- C. Another study of the similar kind can be done with taking samples from different cities.

12. Organization of Thesis

Chapter 1: Introduction: - Chapter one is an introductory chapter that covers the background of the study, Problem statement, Importance of the study, scope of the study and definitions of the important terms used in the study. This chapter also covers Major Landmarks in the developments of Telecom in sector before and after liberalization. It takes the review of NTP-1994 as well as NTP-1999. It also covers Broadband Policy 2004 and NTP-2012. The Functions of TRAI and other regulators are also covered in this chapter.

Chapter 2: Literature Survey: - This chapter develops the idea about different theoretical concepts used in the study. This chapter also covers the study of different research papers and study of Doctoral Thesis in the field of Telecom.

Chapter 3: Telecom Sector Review: - This chapter discusses about the different telecom services like Landline, Broadband, Mobile, RABMS, Web Hoisting, Centrex, Managed Network Services, Ethernet Leased Line, Leased line, ISDN and MPLS Broadband Services. This chapter takes review of the Telecom Sector in India. The profile different telecom service operators like BSNL, Idea, Airtel, Aircel, Tata Indicom, Reliance, Vodafone and Uninor are discussed in brief. This chapter also discusses the present status Cellular Mobile sector, Landline (Wireline) sector and Broadband sector in India.

Chapter 4: Research Methodology: - This chapter covers the complete research methodology used in the study. The research process beginning with the gathering data, data analysis and hypothesis testing is explained in this chapter. Designing of questionnaire, Pilot testing of questionnaire, Access Strategies are explained in detail in this chapter. This chapter describes the different factor of customer satisfaction which mainly includes Network Quality, Customer care, Cost of Services, Provision of Services etc. The chapter also discusses different attributes under different factors. The Sampling Plan, Sample size calculation, and sampling technique are discussed in detail in this chapter. The Statistical methods used for analysis of the Data are also explained in this chapter.

Chapter 5: Data Analysis: - This chapter focuses on the Data Analysis. The data is gathered with the help of the Questionnaire is analyzed in this chapter. The data

editing, coding, validating and representing it graphically is done in this chapter. The different hypotheses are tested in this chapter.

Chapter 6: Conclusion: - This chapter presents findings, conclusion, suggestions & limitation of the study. This chapter provides a summary of all the findings and results. Relevant suggestions are conveyed in this chapter which will be useful for the regulator as well as Telecom Service Operator. The chapter also provides the guideline for further research.

Appendices: - Different annexure like Questionnaire, Abbreviations, Acronyms, List of different TRAI Releases and Explanation of different terms used in this study are included in **Appendices**.

13.Reference:

1. BSNL, 2011, Enterprise Business, [online], available at: http://www.upe.bsnl.co.in/index.php?option=com_content&view=article&id=138&Itemid=84 [Accessed on 24 Aug,2011]
2. C. R. Kothari, 2004, Research Methodology : Methods & Techniques, New Age International Publishers, Second Revised edition, New Delhi, Page No. 323
3. Glenn D Israel, PEOD6, Institute of Food and Agricultural Sciences, University of Florida. Original publication date November 1992. Reviewed April 2009, available at: <http://www.gobookee.net/search.php> [Accessed on 12 January 2012]
4. Robert V. Krejcie & Daryle W. Morgan, 1970, Determining Sample Size for Research Activities, [online], Available on: <http://home.kku.ac.th/sompong/guest_speaker/KrejcieandMorgan_article.pdf> [Accessed on 10 July 2011]
5. Parasuraman, Zeithaml and Berry, 1985, "A Conceptual Model of Service Quality and Its Implications for Future Research," Journal of Marketing, fall 1985, Page No. 41-50. Available at : < <http://areas.kenan-flagler.unc.edu/marketing> > [Accessed on 12 Dec 2011]
6. Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1988), "SERVQUAL: a multiple item scale for measuring consumer perception of service quality", Journal of Retailing, Vol. 64 No. 1, pp. 12-37.

TABLE OF CONTENTS

Chapter No	Description	Page No
	Title Page	i
	Declaration by Student	ii
	Certificate of the Guide	iii
	Acknowledgement	iv
	Abstract	vi
	Table of Contents	xxxiv
	List of Tables	xxxviii
	List of Figures	xliii
1	Introduction	1-28
1.1	Introduction	3
1.2	Problem Statement	4
1.3	Significance of study	5
1.4	Scope and Limitation of the Study	6
1.5	Definition of the Important Terms	6
1.6	History of Indian Telecom Sector	8
1.7	Review of Government Policies for Telecom Sector	14
1.8	Telecom Regulatory Authorities in India	22
1.9	Road Ahead for Telecom Sector	25
1.10	References	26
2	Literature Survey	29-77
2.1	Service Concept	31
2.2	Characteristic of Services	31
2.3	Concept of Service Expectation	33
2.4	Two Level of Expectations	34
2.5	Concept of Zone of Tolerance	34
2.6	Sources of Desired & Adequate Service Expectations	35
2.7	Concept of Customer satisfaction	37
2.8	Rating of customer satisfaction	37

Chapter No	Description	Page No
2.9	Factors influencing the Customer Satisfaction	38
2.10	Concept of Customer Delight	39
2.11	The Concept of Service encounter	39
2.12	Physical Evidence of Service	40
2.13	Customer Loyalty	40
2.14	Need of Customer Retention	40
2.15	Concept of Service Quality	41
2.16	Determinants of Service Quality	41
2.17	Service Quality Model	43
2.18	Study of Research Papers in the field of Telecom	45
2.19	Study of Doctoral Thesis in the field of Telecom	64
2.20	References	67
3	Telecom Sector Review	78-111
3.1	Services Provided by Telecom Service Operators	80
3.2	Profile of Telecom Service Operator Companies	89
3.3	Current Status of the Telecom Sector	96
3.4	References	107
4	Research Methodology	112-158
4.1	Introduction	114
4.2	Broad groupings of Objectives of the Research	114
4.3	Time Horizon	115
4.4	Research Approach	115
4.5	Types of Research	115
4.6	Objectives of the Study	116
4.7	Hypothesis of the Research	118
4.8	Primary Data Sources	120
4.9	Design of Questionnaire	124
4.10	Data Collection	140
4.11	Variables of the Study	140
4.12	Secondary Data	141

Chapter No	Description	Page No
4.13	Steps taken to ensure Reliable Data Collection	143
4.14	Sampling Design	143
4.15	Period of Data Collection	147
4.16	Response Rate and screening of Responses	147
4.17	Reliability Analysis	147
4.18	Statistics of the Research	148
4.19	Organization of Thesis	154
4.20	References	155
5	Data Analysis	159-242
5.1	Analysis of Questionnaire's Section-I Part A	161
5.2	Analysis of Section- I Part B of Questionnaire	168
5.3	Analysis of Section-II of Questionnaire (Network Performance)	170
5.4	Analysis of Section- III of Questionnaire (Billing Information)	177
5.5	Analysis of Section-IV of Questionnaire (Provision of Services and Customer Care Information)	185
5.6	Analysis of Section V of Questionnaire (Miscellaneous Information)	193
5.7	Analysis of Section VI of Questionnaire (Attribute Table and Importance Score of Factors)	198
5.8	Testing of Hypothesis	204
5.9	Relating Objectives with Primary Data	238
5.10	References	242
6	Findings, Conclusions and Suggestions	243-269
6.1	Introduction	245
6.2	Finding and Conclusion of Section- I of the Questionnaire	245
6.3	Findings, Conclusion and Suggestions on Section- II of the Questionnaire	247

Chapter No	Description	Page No
6.4	Findings, Conclusion and Suggestions on Section No. III of the Questionnaire	251
6.5	Findings, Conclusion and Suggestions on Section No. IV of the Questionnaire	253
6.6	Findings, Conclusion and Suggestions on Section No. V of the Questionnaire	256
6.7	Findings and Suggestions to Improve Satisfaction on Different Factors	258
6.8	Results of Hypothesis Testing and Related Suggestions	267
6.9	Directions for Future Studies	269
6.10	References	269
	Bibliography	270-285
7	Appendices	286-310
7.1	Appendix I-Questionnaire	286-297
7.2	Appendix II- Mean score of the Attributes	298-304
7.3	Appendix III- Acronyms	305-307
7.4	Appendix IV-Glossary of terms	308-310
7.5	Appendix V- List of TRAI Press Releases Referred	311

LIST OF TABLES

Table No.	Description	Page No.
A.1	The Classification of Sample as per Core Business Area	xii
A.2	Importance scores received to different factors	xvi
A.3	Satisfaction score on inter & intra-operator congestions	xvii
A.4	Satisfaction on cost of services Voice & Data	xviii
A.5	Satisfaction score of provision of services for Voice & Data	xix
A.6	Classification of Sample as per Monthly Telecom Billing Amount	xx
A.7	Results of Testing of Hypothesis No. Five	xxi
A.8	Reason for Failure in services as reported by Service Providers	xxii
A.9	Correlation between the overall satisfaction and Individual factors	xxiii
1.1	Important Milestones achieved by the Indian Telecom Sector	9
2.1	Level of Performance and Customer Response	34
2.2	Determinants of Service Quality & their relevance in Telecom	42
3.1	Staff Strength of BSNL	91
3.2	Losses of BSNL	92
3.3	Metros and States under different circle	97
3.4	Wireless Subscriber Base and Tele-density as on 31/03/2013	98
3.5	Distribution of Subscriber Base between PSU & Private operator	99
3.6	Service Provider wise Wireless Market Share as on 31/3/2013	100
3.7	Trends in the Wireless Tele-density	101
3.8	Operator wise Wire-line Market Share as on 31/03/2013	102
3.9	Showing the Subscriber base of Wire-line as on 31/03/2013	103
3.10	Trends in Tele-density for wire-line subscribers	104

Table No.	Description	Page No.
3.11	Operator Wise Broadband Market share	105
4.1	List of Factors for which separate opinion about the voice and data services were sought	128
4.2	List of Factors for which combine opinion about the voice and data services were sought.	128
4.3	Attribute of the Factor Provision of Service	130
4.4	Attribute of the Factor Billing Convenience	131
4.5	Attribute of the Factor Cost of Service	131
4.6	Attribute of the Factor Customer Care Access.	132
4.7	Attribute of the Factor Customer Care	133
4.8	Attribute of the Factor Responsiveness	133
4.9	Attribute of the Factor Redressal of Grievances	134
4.10	Attribute of the Factor Network Quality Landline	134
4.11	Attribute of the Factor Network Quality Mobile	135
4.12	Attribute of the factor Network Quality Broadband	135
4.13	Attribute of the Factor Uninterrupted Service	136
4.14	Attribute of the Factor Tangible	137
4.15	Table for seeking opinion on Importance of the Factors	137
4.16	Classification of Sample as per Core Business area	146
4.17	Reliability Analyses	148
4.18	Answer of Respondent and Assigned codes	149
4.19	Calculation of Maximum Score allotted to the Factor	149
4.20	Maximum Score allotted to the factor where separate Opinion about the Voice and data services were sought	150
4.21	Maximum Score allotted to the factor where combine opinions about the Voice and data services were sought	150
5.1	Sector-wise Classifications of Sample	161
5.2	Classification of Customers on the basis of Monthly Expenditure on Telecom Needs (Monthly Billing)	162
5.3	Distribution of Services Used By Corporate Customers	164
5.4	Distribution of Sample according to Mobile Service Provider	165
5.5	Distribution to Present Broadband Service Provider	166

Table No.	Description	Page No.
5.6	Period of Association with the different Service	167
5.7	Gender-wise Distribution of the Respondents	168
5.8	Classification of Respondent according to Age	169
5.9	Classification of Respondent as per Educational Qualification	170
5.10	Yearly Fault incidences faced by Customers	171
5.11	In General Fault Repair duration	172
5.12	Distribution of type of Fault in case of Landline Services	173
5.13	Distribution of Network problems in Broadband Services	174
5.14	Distribution Network Problem in case of Mobile Networks	175
5.15	Satisfaction on Network Performance for different services	177
5.16	Expectation about the detailed bill	178
5.17	Mistakes in the billings	179
5.18	Requirement of Alert about billing amount	180
5.19	Awareness on availability of detailed Bill in Prepaid Services.	181
5.20	Willingness to pay premium charges	182
5.21	Transparency in Billing	183
5.22	Satisfaction on the Billing service	184
5.23	Comparative Activation time for different Services	186
5.24	Preferred Fault booking medium	187
5.25	Awareness about the contact details of higher authorities	188
5.26	Expectation about want of the single person for fault reporting	189
5.27	Expectation about the conveying time needed to restore faults	190
5.28	Expectation about the alternative means Communications	190
5.29	Registered customers with Do not call Registry	191
5.30	Satisfaction on the after sales service	192
5.31	Publicity of the Products / Services	193
5.32	Preferred Medium of Advertising	194

Table No.	Description	Page No.
5.33	Expectation about the Direct Communication Need	195
5.34	Overall Rating given by Customers	196
5.35	Customer Expectation and actual service delivery	197
5.36	Composite Scores received for different Factors (Where the Separate opinion about Voice and Data is sought)	199
5.37	Composite Scores received for different Factors (Where the Combine opinion about Voice and Data is sought)	200
5.38	Customer satisfaction on the coverage	202
5.39	Importance scores received to different factors.	203
5.40	The distribution of average importance score of all the individual factors studied.	204
5.41	The comparison of average score of inter and intra-operator congestions for mobile and landline services.	206
5.42	The comparison of average score of cost of services on voice and data services.	208
5.43	The comparison of average score of provision of services on voice and data services.	210
5.44	Classification of Customers on the basis of Monthly Expenditure on Telecom Needs	212
5.45	The comparison of average score of satisfaction on Provision of services across the groups of Low Billing & High Billing Customers	213
5.46	The comparison of average score of satisfaction for the factor Billing convenience across the groups of Low Billing Customers and High Billing Customers	215
5.47	The comparison of average score for Cost of services across the groups of Low Billing & High Billing Customers.	217
5.48	The comparison of average score of Customer care access across the groups of Low Billing & High Billing Customers.	219
5.49	The comparison of average score of Customer care facilities between the groups of Low Billing Customers & High Billing Customers.	221

Table No.	Description	Page No.
5.50	The comparison of average score of Tangible (Physical Evidence of Services) aspects across the groups of Low Billing and High Billing Customers.	223
5.51	The comparison of average score of Responsiveness aspects across groups of Low Billing Customers and High Billing Customers.	225
5.52	The comparison of average scores for the factor Redressal of Customer Grievances across the groups of Low Billing Customers and High Billing Customers.	227
5.53	The comparison of average satisfaction score on the factor Network quality (Mobile) across the groups the of Low Billing Customers and High Billing Customers.	229
5.54	The comparison of average satisfaction on Network Quality Broadband across the groups of Low Billing Customers and High Billing Customers.	231
5.55	The comparison of average satisfaction on Network quality Landline (Voice services) across the groups of Low Billing Customers and High Billing Customers	233
5.56	The comparison of average satisfaction on Uninterrupted services across the groups of Low Billing Customers and High Billing Customers	235
5.57	Reason for Failure in services as reported by Service Providers	238
5.58	Correlation between the overall satisfaction and Individual factors.	240

LIST OF FIGURE

Figure No.	Description	Page No.
2.1	The zone of Tolerance	35
3.1	Structure of Indian Telecom Industry	90
3.2	Losses of BSNL	92
3.3	Wireless Subscriber base in millions as on 31/03/2013	98
3.4	Wireless Tele-density as on 31/03/2013	98
3.5	Distribution of Market Share between PSU and Private Operator	99
3.6	Service Provider wise Wireless Market Share	100
3.7	Trends in the Wireless Tele-density	101
3.8	Service Operator wise Wire-line Market Share	103
3.9	Rural and Urban Wire-line Tele-density	103
3.10	Trends in Tele-density for wire-line subscribers	104
3.11	Operator Wise Broadband Market share	105
5.1	Sector wise classifications of the Samples	162
5.2	Classification of Customers on the basis of Monthly Expenditure on Telecom Needs (Monthly Billing)	163
5.3	Distribution of Services used by Corporate Customers	164
5.4	Mobile Service Operator wise Distribution of the Customers	165
5.5	Classification according to Broadband Service operator	166
5.6	Period of Association with Service Provider	167
5.7	Gender-wise Distribution of Respondents	168

Figure No.	Description	Page No.
5.8	Age wise distribution of the Respondents	169
5.9	Classification of Respondent as per Educational Qualification	170
5.10	Distribution of Fault incidences faced by Customers	171
5.11	In General Fault Repair duration	172
5.12	Distribution of type of Fault in case of Landline phone	173
5.13	Distribution of Network Problems in case of Broadband Services	174
5.14	Network Problems (Type of Fault) in Mobile Service	176
5.15	Satisfaction about Network Performance for different services	177
5.16	Expectation about detailed Bill	178
5.17	Responses for Mistakes in the Billing	179
5.18	Customers opinion about the Requirement billing alert	180
5.19	Awareness about Availability of Detailed bill for Prepaid	181
5.20	Willingness to pay premium charges	182
5.21	Transparency in Billing	183
5.22	Satisfaction of Customers about the Billing Services	184
5.23	Comparative time of Activation of Different Services	186
5.24	Preferred Fault booking medium	187
5.25	Awareness about the contact details of higher authorities	188
5.26	Expectation about the want of single person for reporting	189
5.27	Expectation about the conveying time for restoration	190
5.28	Expectation about the alternative means of communication	191

Figure No.	Description	Page No.
5.29	Registration to avoid unsolicited commercial Calls and messages	192
5.30	Customer in Satisfaction about After Sales service	193
5.31	Publicity of the Products / Services	194
5.32	Preferred media of Advertising as per Customers	195
5.33	Expectations about the Direct Communication Need	196
5.34	The Overall Rating of the services	197
5.35	Customer Expectation and actual service delivery	198
5.36	Composite Scores received for different Factors	199
5.37	Composite Scores received to different Factors	200
5.38	Coverage in Rural, City and on Road	202
5.39	The distribution of average importance score of all the individual factors studied.	205
5.40	The comparison of average score of inter and intra-operator congestions for mobile and landline services.	207
5.41`	The comparison of average score of cost of services on voice and data Services.	209
5.42	The comparison of average score of provision of services on voice and data services.	211
5.43	The comparison of average score of overall satisfaction on Provision of services across the groups of different Telecom Expenditure.	214
5.44	The comparison of average score of satisfaction for Billing convenience across the groups of Low Billing Customers and High Billing Customers.	216
5.45	The comparison of average score of Cost of services across the groups of Low Billing Customers and High Billing Customers.	218
5.46	The comparison of average score of Customer care access the groups of Low Billing & High Billing Customers.	220

Figure No.	Description	Page No.
5.47	The comparison of average score of Customer care facilities across the groups of Low Billing Customers and High Billing Customers.	222
5.48	The comparison of average score of Tangible aspects the across groups of Low Billing & High Billing Customers.	224
5.49	The comparison of average score of Responsiveness across the groups of Low & High Billing Customers.	226
5.50	The comparison of average score of Redressal of Customer Grievances aspects across the groups of Low Billing Customers and High Billing Customers.	228
5.51	The comparison of average satisfaction on Network quality Mobile across the groups of Low Billing Customers & High Billing Customers.	230
5.52	The comparison of average satisfaction on Network quality Broadband across the groups of Low Billing Customers and High Billing Customers.	232
5.53	The comparison of average satisfaction on Network quality Landline Voice services across the groups of Low Billing Customers and High Billing Customers.	234
5.54	The comparison of average satisfaction on Uninterrupted services across the groups of Low Billing Customers and High Billing Customers.	236
5.55	Distribution of Reasons behind the Fault Occurrence	239

CHAPTER I

INTRODUCTION

CHAPTER I
INTRODUCTION
CONTENTS

Chapter No	Description	Page No
1	Introduction	1-28
1.1	Introduction	3
1.2	Problem Statement	4
1.3	Significance of study	5
1.4	Scope of Study	6
1.5	Definition of Important Terms	6
1.6	History of Indian Telecom Sector	8
1.7	Review of Government Policies for Telecom Sector	14
1.8	Telecom Regulatory Authorities in India	22
1.9	Road Ahead for Telecom Sector	25
1.10	References	26

Chapter 1

Introduction

1.1 Introduction

Government of India decided to liberalize the economy of India with the announcement of New Economic Policy in 1991. This was done for the economic development of the country. The economic growth is directly proportional to availability of good Telecom infrastructure. The Telecom infrastructure is high technology oriented hence heavy investment is needed to develop it. It was not possible for the Government to make financial resources available at such large scales so need of the private participation in Telecom Sector surfaced up. Hence Government of India decided to open Telecom sector for private participation and exposed telecom sector to the competitive environment.

Prior to the liberalization, Telecom services were provided by the Department of telecommunication owned by the Government of India. After opening the telecom sector for private participation it was felt that there should be fair competition between various players. Hence Government decided to convert the Department of Telecom in Public Sector Unit. Government split the Department of Telecom in two units. One unit to take care of Policy matters and other unit called as DTS was responsible for providing telecom services in India. Government converted Department of Telecom Services (DTS) into a Public Sector Unit named as Bharat Sanchar Nigam Limited (BSNL).

As a result of Liberalization different telecom service operators entered in the telecom market and Indian telecom market became a multiplayer telecom market. This has resulted in a tremendous growth in telecom customer base. Telecom service operators divide these customers mainly into two groups namely Corporate Customer and General Customers. The Telecom service operators earn lot of revenue from these two groups of customers but the major part of this revenue comes from Corporate Customers.

The Corporate customer mainly includes the Banks, Educational institutes, Public & Private Limited Companies, Government organizations, and Public Sector Units. The different telecom service operators call these corporate customers with different names like commercially important customers, Enterprises users, Platinum

customer, Gold customers etc. In this study we will call these customer as corporate customers as named by BSNL. (BSNL, 2011)*¹

1.2 Problem Statement

Since past 13 years, the telecom industry in India has displayed an extraordinary growth in subscriber base. This growth is driven by heavy investment done by public as well as private telecom service operators and tremendous network expansion carried out by them. In Multiplayer Telecom market customer has got wide choice. In case of mobile service if the customer is not satisfied with the delivery of services done by the current service operator he can switch to another service provider as the cost of switching over is too less. Case is also same for other services like wire-line (landline) voice, data, wireless broadband etc.

In multiplayer market it is very much important to understand the expectation of customer. If customer's expectations are met, customer is satisfied. Dissatisfaction about the delivery of services provided by the operator may lead to loosing of Corporate Customers, which are customers of prime importance. This will be major revenue loss to the Telecom Service Operator. So understanding level of satisfaction is task of prime importance. Telecom Service Operator should be wise enough to measure the customer satisfaction.

The corporate customers are difficult to be delighted. They are price conscious. Due to multiplayer scenario corporate customers of one Telecom Service provider are attracted by number of other service providers. Now a days Customer's expectations from service providers have increased. Earlier the customer was happy with the voice communication only, but presently he is expecting the high-speed internet connectivity.

The needs of customers are becoming more and more high technology oriented and world-class infrastructure is needed to satisfy their needs. Here the things get tricky and give rise to problem. The problem of this study is driven by the need to measure customer satisfaction as Customer satisfaction is the key to the customer retention.

In the view of above mentioned facts the problem statement of this study is **"A Study of Customer Satisfaction of Corporate Customers of Telecom Service Operators - With Special Reference to Pune City "**. The research period is **Mar 2011 to Mar 2013**.

1.3 Significance of Study:

The Study is very much important in number of ways to Telecom Service Providers, Corporate Customers, policy makers and regulating authority.

Significance for Telecom Service Operators: Revenue generated from Corporate Customers is on higher side than general customer so it is very much important to retain them. Customer retention is possible only if customer is satisfied with the services delivered. The study measures the customer satisfaction level in respect of different Parameters of service quality. Depending on the results of the study, suggestion will be given to the Telecom Service Operators to improve customer satisfaction which is most important in multiplayer market.

The study also takes the proper feedback from the customers. If there is no feedback company should not take it as there is no complaint. In this case company may loose non-vocal customer. So it is important to interact with customer and take proper feedback about the services.

Sometimes Top level management does not get the customer feedback properly as it is suppressed at lower level Management. The results of the study will be useful for top level management as these results represent the voice of customers. The study will bridge the gap between the Customers and Top level Management.

The study will find out the important parameters of service quality (Factors) which drives the customer satisfaction. With the help of these parameters Telecom service operators can find out the level of customer satisfaction on various services like Mobile, Broadband, and Landline. Study will also find out that which Parameters of service quality (Factor) are most important in customer's perspective. This will be useful for telecom service providers to address issues related to these factors on priority.

The study will provide the reliable support to the management to take the strategic decision for improvement of service quality. It will also highlight the customer switching intensions. It will help the management to improve the customer satisfaction and build a long term customer relationship.

Significance for Corporate Customers: With this study corporate customers will also be benefited as their expectations and satisfaction level will be effectively conveyed to the Telecom Service Operators. Based on the result of the study Regulator may take some steps which will be beneficial to the customers.

Significance for policy makers & regulating authority: The study shall help the policy makers to decide various policies related with control of Telecom Sector. TRAI (Telecom Regulatory Authority of India) has set the bench mark for the Telecom service quality. The results of the study will be useful for TRAI to find out whether at present the customer is receiving the service quality as per benchmark. With the help of results of the study TRAI will be guided to draw the new road map for improvement of service quality.

1.4 Scope and Limitation of the Study:

Due to continuous Research and Development work telecom technology becomes obsolete at a rapid speed. The telecom technology is very dynamic nature. This issue can dramatically alter the customer opinion. Hence scope of the study does not include the time variation in short term or long term basis.

This study has also got geographical limitation. Study is limited to corporate customers in a specific geographical area; in this case Pune city. Hence the needs and preferences of all India customers are not likely to be captured. This study is carried out in Pune City and it is assumed that results of this study may be relevant for other similar cities.

Scope of study includes providing recommendations for competitive offerings of telecom Services to the Corporate Customers. Although, telecom market is dynamic, it is assumed that market will not change drastically in short term and the offerings will remain relevant.

As Study is limited to suggest the competitive offering of services, for actual implementation of suggestions a study on larger scale has to be undertaken covering all aspects like cost benefit analysis in long term and its technical feasibility.

1.5 Definition of the Important Terms.

- 1. Communication: (Engineering Definition):-** According to George Kennedy “The term communication refers to sending, receiving and processing of information by electrical means. A modern communication system is first concerned with the sorting , processing and storing of information before its transmission” (George Kennedy, 1996)^{*2}
- 2. Pulse Rate:** Rate for minimum chargeable duration of Call.

3. **Telecommunications service:** “Telecommunications service is service of any description (including electronic mail, voice mail, voice service, data services, audio services, video services, radio paging and cellular mobile telephone services) which is made available to users by means of any transmission or reception of signals by wire, radio, visual or other electro-magnetic means but shall not include broadcasting services.” (TRAI, The Gazette of India No DL-33004/971997)^{*3}
4. **Private operator:** The Telecom Service provider other than the PSU operators like BSNL, MTNL are treated as private operator by TRAI (Telecom Regulatory Authority of India). The BSNL and MTNL are treated as Government operator or PSU operator.
5. **Value added Service:** “Value Added Services are enhanced services which add value to the basic telecom services and bearer services for which separate licence are issued”. (Internet and Mobile Association of India, 2008)^{*4}
6. **Coverage area:** The geographical area where the network of the Mobile service operator is available and customer can make a voice or data call from his cell phone.
7. **Detailed Bill:** The bill giving detailed information about the calls made by the subscriber mentioning charge for all calls, Number of SMS sent and the amount charged for such SMS. It also includes the amount charged for Value Added Services, Premium Rate Services, etc.
8. **Broadband:** The ITU Standardization Sector defines broadband as a “Transmission capacity that is faster than 1.5 or 2.0 Megabits per second” (ITU, 2011)^{*5}.

In the Press Brief on NTP-2011 Government of India proposes to revise the existing broadband download speed of 256 Kbps to 512 Kbps and subsequently to 2 Mbps by 2015 and higher speeds of at least 100 Mbps thereafter. (DOT, 2011)^{*6}
9. **Call Drop:** The Call Drop is “Unintended disconnection of a call by a mobile network, usually as a result of decreased radio signal strength, which may be due to the distance between the handset and the transmitter, reflections or ‘shadowing’ from large physical structures or tunnels.” (ACMA,2011)^{*7}

10. **SIM Card:** “The SIM card is smart card that identifies the Mobile Set. SIM card is Subscriber Identity Module card. As per Motorola SIM card is a smart card which is inserted into GSM phones which contains your phone account information.” (Motorola, 2003)^{*8}
11. **Bandwidth:** The difference between the highest and lowest frequencies available for network signals.
12. **Cellular service:** “Cellular service is a radio-based service for providing two-way communications. It is provided by dividing the serving area into sub-areas called as cells. Each cell has a Base Transceiver Station having transmitter and receiver.
13. **Third generation:** “Third generation (3G) systems promise faster communications services, including voice, fax and Internet, anytime and anywhere with seamless global roaming. Generally, wireless network technologies must be able to provide a mobile device with a downlink connection speed of 384 kbps in order to be considered a 3G technology.” (ITU , 2011)^{*9}
14. **Modem:** A modem is a device or program that enables a computer to transmit data over telephone or cable lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. (Webopedia, 2011)^{*10}
15. **BPS:** BPS is abbreviation of bits per seconds. It is a measure of the speed of data uploading or downloading of data. (Webopedia , 2011)^{*11}
16. **Congestion:** Congestion is a state occurring in part of a network when the traffic is so heavy that it slows down network response time. (Webopedia, 2011)^{*12}

1.6 History of Indian Telecom Sector: -

This section takes the review of the historical development in the Indian telecom sector. These developments can be classified into two broad categories namely Pre-liberalization developments and Post-Liberalization development.

1.6.1 Pre-Liberalization Developments in Indian Telecom Sector:-

Table No 1.1 briefs the Important Milestones achieved by India telecom sector prior to the liberalization.

**Table No.1.1 Important Milestones achieved by the Indian Telecom Sector
Prior to Liberalization**

Year	Developments
1902	First wireless telegraph station established between Sagar Island and Sandhead.
1910	Underground cables were introduced for the first time in India for Telecom connectivity. Earlier only overhead cable was used.
1932	Automatic time announcing machine installed first time in India.
1942	The charging meters introduced in Indian Telecom Network. Earlier metering was manual.
1943	Bombay Telephone Company is taken over by the Government with the 21000 Capacity.
1971-75	STD (Straight Trunk Drive) officially introduced. Telephone accounting computerized. Telephone directory (English) compiled for the first time.
1975	First PCM (Pulse code Modulation) system commissioned between Mumbai City and Andheri telephone exchanges.
1976	First digital Microwave Junction system came into function which was used to connect the telephone exchanges
1979	First Optical Fiber Cable system for local junction (Connectivity between Exchanges) was commissioned at Pune.
1980	First satellite earth station for domestic communications was established at Sikandarabad, U.P.
1983	First analogue Stored Program Control exchange for trunk lines was commissioned at Mumbai.

(Source: - http://en.wikipedia.org/wiki/Communications_in_India *13)

1.6.1.1 Development of Telecom in the Nineteenth Century: - In 1880, two telephone Companies viz. The Oriental Telephone Company Ltd. and The Anglo-Indian Telephone Company Ltd. approached the Government for permission to establish Telephone Exchanges in India. The permission was however refused on the grounds that the establishment of Telegraphs was a Government monopoly and that the Government itself would undertake the work in the event of sufficient demand.

By **1881**, Government changed their earlier decision and licence was granted to the Oriental Telephone Company Limited of England for opening Telephone Exchanges at Calcutta, Bombay, Madras, Karachi and Ahmedabad. In **1882**, Major E. Baring, Member of the Governor General's Council declared open the Telephone Exchange in Calcutta, Madras and Bombay. (**Calcutta Telephones, 2011**) *¹⁴

1.6.1.2: Indian Telegraph Act 1885

In **1885** Indian telegraph Act, 1885 came into force on the first day of October, 1885. This is the law which controls the use of telegraphy, phones, communication radio, telex, fax etc. It has offered the Government powers to install and maintain the communication network. It also authorizes the Government to tap the telephone line under some conditions. The law has got different amendments latest of which is in 2003. (**DOT, 2011**) *¹⁵

1.6.1.3:- Establishment of C-DOT

In 1984 The Centre for Development of Telematics (C-DOT) was established. This is the Telecom Technology development centre of the Government of India. It was established as an autonomous body. It was awarded with authority and flexibility to develop state-of-the-art telecommunication technology to fulfill Indian Telecom needs. In the initial years, C-DOT triggered a telecom revolution in the rural India. The state-of-the-art R&D facilities of CDOT are at its Delhi and Bangalore campuses. (**C-DOT, 2010**) *¹⁶

1.6.1.4:- Separation of Post and Telecommunication Departments: - In 1985 Department of Post and Telecommunication was separated into Department of Post and Department of Telecom. Department of Telecom was having monopoly in providing telecom services in India. (**DOT, 2011**) *¹⁷

1.6.1.5:- Formation of MTNL:-

MTNL (Mahanagar Telephone Nigam Limited) was setup on 1st April, 1986 by the Government of India to upgrade the quality of telecom services and to expand the telecom network. It was done to introduce new services and to raise revenue for telecom development needs of India in key metro cities of Delhi & Mumbai. MTNL is the principal provider of fixed-line telecommunication service in the two

Metropolitan Cities of Delhi and Mumbai. It offers mobile services in the city of Delhi and the Mumbai. (MTNL, 2012)^{*18}

1.6.1.6:- Formation of VSNL:- On April 1, 1986, the Videsh Sanchar Nigam Limited (VSNL) - a wholly Government owned corporation - was born as successor to OCS. (VSNL, 2003)^{*19}

1.6.2 Post-Liberalization Development in Indian Telecom Sector: - To liberalize the telecom sector Government initiated major policy changes. Government allowed the entry of private players in the telecom sector. Following section takes the review of the developments in telecom Sector after Liberalization.

1.6.2.1 Announcement of New Economic Policy and Opening of VAS for Private Sector: - The new Economic Policy of India was announced in **1991** which aimed at meeting India's competitiveness in global market and stimulating domestic investments. Policy recommended for the de-licensing of manufacturing of telecom equipment. The sub-sector of value added services was opened for private investment in July, 1992 for the services like electronic mail, Voice mail, data services, audio text services, video text services, video conferencing, paging and cellular mobile services.

1.6.2.2:- Formulation of National Telecom Policy 1994: - There was a clear declaration of the Government's intention of liberalizing the telecom sector in the National Telecom Policy-1994. The National Telecom Policy, 1994 was formulated for the purpose of opening up the Indian markets for foreign direct investment. (DOT, 2011)^{*20}

1.6.2.3:- Internet Services Launched by VSNL: - Internet services were launched in India on 15th August, 1995 by Videsh Sanchar Nigam Limited (VSNL).

1.6.2.4:- TRAI Act Established: - The entry of private service providers brought with it the inevitable need for independent regulation. The Telecom Regulatory Authority of India (TRAI) was, thus, established with effect from 20th February 1997 by an Act of Parliament, called the Telecom Regulatory Authority of India

Act, 1997, to regulate telecom services, including fixation of tariffs for telecom services which were earlier vested in the Central Government. **(TRAI, 2011)** *21

1.6.2.5:- National Telecom Policy-1999 :- National Telecom Policy 1999 was announced which allowed multiple fixed line services operators and opened long distance services to private operators. NTP-1999 seeks to make available telephone on demand by the year 2002 and sustain it thereafter so as to achieve a teledensity of 7 by the year 2005 and 15 by the year 2010. **(TRAI, 2011)** *22

1.6.2.6:- Amendment in TRAI Act: - On 24th January, 2000, TRAI Act was amended. The Amendment clarified and strengthened the recommendatory power of TRAI, especially with respect to the need and timing of introduction of new service provider. **(DOT, 2011)** *23

1.6.2.7:-Formation of BSNL: - Bharat Sanchar Nigam Ltd was incorporated on 15th September 2000. It took over the business of providing of telecom services and network management services. It is one of the largest & leading public sector units providing comprehensive range of telecom services in India. **(BSNL, 2012)** *24

1.6.2.8:- Formation TDSAT :- In May, 2000 under TRAI amendment act an Appellate Tribunal known as the “Telecom Disputes Settlement & Appellate Tribunal” has been set up to adjudicate disputes and dispose of appeals with a view to protect the interests of service providers and consumers. This was done to ensure orderly growth of the telecom sector. **(TDSAT, 2011)** *25

1.6.2.9:- Statutory status provided to the USOF: - The Universal Service Support Policy came into effect from 01.04.2002. The guidelines for universal service support policy were issued by DOT. Subsequently, the Indian Telegraph (Amendment) Act, 2003 giving statutory status to the Universal Service Obligation Fund (USOF) was passed in December 2003. The Fund is to be utilized exclusively for meeting the Universal Service Obligation by providing access to telegraph services to people in the rural and remote areas at affordable prices. **(DOT, 2011)** *26

1.6.2.10:-Announcement of Broadband Policy 2004: - Government has recognised the potential of Broadband service in growth of GDP. It was believed

that there is possibility of enhancement in quality of life through applications of broadband including tele-education, tele-medicine, e-governance, entertainment. Government has recognised that the current level of Internet and Broadband access in the country is low as compared to many Asian countries. Government has finalised a Broadband policy in 2004 to accelerate the growth of Broadband services. (DOT, 2011) ^{*27}

1.6.2.11:- BSNL launched Broadband Services: - BSNL launched Data One broadband service in January 2005 which was extended to 198 cities in India. The service is being provided on existing copper infrastructure. The minimum speed offered to the customer was 256 Kbps at that time.

1.6.2.12:- 2007-08:- Eleventh Five Year Plan announced keeping in view the targets for the telecom sector :- Keeping in view the targets for the telecom sector, the Eleventh Plan has been formulated. The broad objectives for the telecom sector during the Eleventh Plan period (2007–12) were being as follows:

- To reach a telecom subscriber base of 600 million. To provide 200 million rural telephone connections by 2012.
- To provide telephone connection on demand across the country.
- To reach a target of 20 million broadband connections and 40 million Internet connections by 2010 as envisaged in Broadband Policy 2004.
- To provide broadband connection on demand across the country by 2012.
- To provide Third Generation (3G) services in all cities/towns with more than 1 lakh population.
- To facilitate introduction of mobile TV.
- To provide broadband connectivity to every secondary school, health centre, Gram Panchayat offices on demand in two years.
- To make India a hub for telecom equipment manufacturing by facilitating establishment of telecom specific SEZs.

Basically, the approach of Eleventh Five year was to achieve faster, broader and inclusive growth of telecom. (Planning Commission of India, 2008) ^{*28}

1.6.2.13:- Third Generation Mobile Services Launched: - BSNL Launched 3G services in 12 cities in India in 2009. The 3G provides with data transfer rate up to

two Megabits per second. Beside this feature, 3G cellular phones also have conventional voice as well as video communication facility.

1.6.2.14:- Recommendations of Telecom Regulatory Authority of India: - In 2010 Telecom Regulatory Authority of India has given recommendation on National Broadband Plan. The Authority recommended fixing National Broadband Policy as follows.

1. 75.0 Million broadband connections to be provided by year 2012
2. 160 Million Broadband connections to be provided by 2014.

It is also proposed to establish A State Optical Fiber Agency (SOFA) as well as National Optical Fibre Agency (NOFA) to establish Fiber Optic Network in India. (TRAI, 2010) ^{*29}

1.6.2.15:- Launching of MNP in India:-In India MNP was launched all over the country from 20th January 2011. Mobile Number Portability (MNP) allows consumers and businesses to keep their existing telephone numbers when they switch operators. It, literally, means that numbers are portable from operator to operator in case of mobile services. (MNP, 2011) ^{*30}

1.6.2.16:- National Telecom Policy 2012 Announced: - NTP - 2012 endeavors to create an investor friendly environment for attracting additional investments in the sector apart from generating manifold employment opportunities in various segments of the sector. Availability of affordable and effective communications for the citizens is at the core of the vision and goal of the NTP-2012. (DOT, 2012) ^{*31}

1.7 Review of Government Policies for Telecom Sector: - This section takes the in depth review of Government Policies for telecom sector.

1.7.1 Liberalization of Telecom Sector: - The Government of India decided to liberalize the Telecom Sector in 1992 and invited private players in the telecom sector. Telecom equipment manufacturing was de-licensed in 1991 and this has resulted increase in telecom equipment manufacturing units. Value added services were declared open to the private sector in 1992. Government decided to call the private participation in the Electronic Mail, Voice Mail, and Data Services.

1.7.2 National Telecom Policy -1994:- (DOT, 2012) ^{*32} The Government has given highest priority to the Telecommunication and Introduced the NTP-1994.

1.7.2.1 Objectives of NTP-1994 and Revised Targets of Eighth Five Year Plan: -

The main objectives of the New Telecom Policy are as follows:

1. The focus of the Telecom Policy shall be telecommunication for all. This means ensuring the availability of telephone on demand.
2. The quality of telecom services should be of world class. Consumer complaints will receive special attention.
3. To provide widest permissible range of services to meet the customer's demand at reasonable prices.
4. To achieve universal service covering all villages as early as possible. The universal service is the provision of access to all people for certain basic telecom services at affordable and reasonable prices.
5. Taking into account India's size and development, it is necessary to ensure that India emerges as a major manufacturing base and major exporter of telecom equipment.
6. The defense and security interests of the country will be protected.

In the view of the growth of the economy and the reassessed demand, it was necessary to revise the Eighth Five Years Plan targets as follows:

- A. Telephone should be available on demand by 1997 and all villages should be covered by 1997. In the urban areas a PCO should be provided for every 500 persons by 1997.
- B. All value-added services available internationally should be introduced in India to raise the telecom services in India to international standard well within the Eighth Five Years Plan period, preferably by 1996.

1.7.2.2 Resources for revised targets: Following measures were taken to provide the resources for revised targets

- A. **Hardware Requirement:** - With the objective of meeting the telecom needs of the country telecom equipment manufacturing sector has been progressively de-licensed. Substantial capacity has already been created for the manufacture of the necessary hardware within the country. Manufacturing capacities for wireless terminal equipment, optical fiber

cables, underground cables etc. have also been established to take care of the requirements of the Eighth Five Years Plan.

- B. R & D:** - Encourage Research and Development in Telecom Sector.
- C. Value Added Services:** - In order to achieve standards comparable to the international facilities, the sub-sector of value-added services was opened to private investment.
- D. Basic Services:** - The companies registered in India have been allowed to participate in the expansion of the telecommunication network in the area of basic telephone services. These companies will be required to maintain a balance in their coverage between urban and rural areas.
- E. Technology and Strategic Aspects:** - Administration of the policy in the telecom sector in such a way that the inflow of technology is made easy and India does not lag behind in getting the full advantage of the emerging new technologies.

1.7.2.3:- Achievement, Shortfall of NTP-1994 and Need for New Policy (TRAI, 2011)^{*33}:- The NTP-1994 has achieved some of its objectives but all the objectives were not achieved. So there was need of New Policy.

Achievements of NTP-1994:- As part of NTP 94, Government announced a series of specific targets to be achieved by 1997. As against the NTP 1994 target of provision of 1 PCO per 500 urban populations and coverage of all 6 lakh villages, DOT had achieved an urban PCO penetration of 1 PCO per 522 and has been able to provide telephone coverage to only 3.1 lakh villages. As regards provision of total telephone lines in the country, DOT had provided 8.73 million telephone lines against the target of 7.5 million lines.

Shortfalls of NTP-1994:- The Government recognized that the result of the privatization was not entirely satisfactory. While there was a rapid rollout of cellular mobile networks in the metros with over 1 million subscribers, most of the projects were facing problems. The main reason, according to the cellular and basic operators, was the fact that the actual revenues realized by these projects have been far short of the projections and the operators were unable to arrange financing for their projects.

Basic telecom services by private operators had commenced in a limited way in two of the six circles where licenses were awarded. As a result, some of the targets as envisaged in the objectives of the NTP-1994 have remained unfulfilled. The private sector entry has been slower than what was envisaged in the NTP 1994.

Need for New Policy: - Need for a new telecom policy was felt due to following reasons:

In addition to some of the objectives of NTP 1994 not being fulfilled, there were also far reaching developments in the telecom, IT, consumer electronics and media industries. At one level, telephone and broadcasting industries were entering each other's markets, while at another level; technology is blurring the difference between different conduit systems such as wire line and wireless. As in the case of most countries, separate licenses had been issued in our country for basic, cellular, ISP, satellite and cable TV operators each with separate industry structure, terms of entry and varying requirement to create infrastructure.

However, this convergence now allows operators to use their facilities to deliver some services reserved for other operators. Convergence of both markets and technologies was a reality that was forcing realignment of the industry necessitating a relook into the existing policy framework.

1.7.3 National Telecom Policy 1999 (DOT,2012) ^{*34} :- It was also felt that the new telecom policy framework was also required to facilitate India's vision of becoming an IT superpower and develop a world-class telecom infrastructure in the country. Hence NTP-1994 announced with the following objectives.

1.7.3.1 Objectives and Targets of NTP 1999:- The objectives and targets of the NTP 1999 were as follows.

- A.** Availability of affordable and effective communications for the citizens is at the core of the vision and goal of the telecom policy.
- B.** Strive to provide a balance between the provision of universal service to all uncovered areas, including the rural areas, and the provision of high-level services to meet the needs of the country's economy.
- C.** Encourage development of telecommunication facilities in remote, hilly and tribal areas of the country.

- D.** Create a modern and efficient telecommunications infrastructure taking into account the convergence of IT, media, telecom and consumer electronics
- E.** Convert PCO's, wherever justified, into Public Tele-info centre, having capabilities like ISDN services, remote database access.
- F.** Strengthen research and development efforts in the country.
- G.** Achieve efficiency and transparency in spectrum management.
- H.** Protect defense and security interests of the country.
- I.** Enable Indian Telecom Companies to become truly global players.

Targets: - As per the above objectives, the targets of the NTP 1999 were as follows.

- Make available telephone on demand by the year 2002 and sustain it thereafter so as to achieve a tele-density of 7 by the year 2005 and 15 by the year 2010.
- Encourage development of telecom in rural areas and making it more affordable by suitable tariff structure. Making rural communication mandatory for all fixed service providers.
- Increase rural tele-density from the 0.4 to 4 by the year 2010 and provide reliable transmission media in all rural areas.
- Achieve telecom coverage of all villages in the country and provide reliable media to all exchanges by the year 2002.
- Provide Internet access to all district headquarters by the year 2000. Provide high-speed data and multimedia capability using technologies including ISDN to all towns with a population greater than 2 lakh.

1.7.3.2 New Policy Framework :- The New Policy focus on creating an environment, which enables continued attraction of investment in the sector and allows creation of communication infrastructure by leveraging on technological development. As per the NTP-99 Cellular Mobile Service Providers, Fixed Service Providers and Cable Service Providers, collectively referred to as 'Access Providers'

Access Providers

- A. Cellular Mobile Service Providers:** The operators shall be permitted to provide mobile telephony services including permission to carry its own long distance traffic within their service area.

- B. Fixed Service Providers:** The Service providers shall be freely permitted to establish 'last mile' linkages to provide fixed services and carry long distance traffic within their service area.
- C. Internet Telephony:** Internet telephony shall not be permitted at this stage. However, Government will continue to monitor the technological innovations and their impact on national development and review this issue at an appropriate time.
- D. National Long Distance Operator:** National long distance service beyond service area to the private operators will be opened for competition with effect from January 1, 2000.
- E. Electronic Commerce:** - On line Electronic Commerce will be encouraged so that information can be passed seamlessly.
- F. International Long Distance Services:** - The subject of opening up of international telephony service to competition will be reviewed by the year 2004.

1.7.3.3:- Restructuring of Department of Telecom (DOT):- The Government owned operator plays a major role in the development of the telecom sector. DOT is expected to continue to play dominant role in the development of the sector. Till year 2000 the licensing, policy making and the service provision functions were under a single authority. The Government has decided to separate the policy and licensing functions of DOT. The corporatization of DOT shall be done keeping in mind the interests of all stakeholders by the year 2001.

1.7.3.4:- Spectrum Management: - With the proliferation of new technologies and the growing demand for telecom services, the demand on spectrum has increased manifold. The Government decided to form a transparent process for allocation of frequency spectrum for different services.

1.7.3.5 Summary of NTP 99

- It replaced the high cost fixed licensing regime with a lower cost licensing structure through revenue sharing. Existing private cellular operators migrated to the new telecom policy regime with effect from August 1999.

- It also provides for greater degree of competition and more flexibility in choice of technologies.
- The amendments in the TRAI Act resulted in a considerable strengthening of the Regulator & greater clarity on its role and powers. It also put in place a separate dispute settlement mechanism in the form of the Telecom Dispute Settlement and Appellate Tribunal to expeditiously deal with issues relating to the telecom sector.

1.7.3.6 The key achievements of NTP-99 as on June 2011 are:

The New Telecom Policy 1999 has been a catalyst for growth of the telecom sector. The number of telephone connections, at the end of February 2012, was 943 million, as compared to 41 million at the end of December 2001. This growth has been fuelled by the cellular segment (mobile phones) which alone accounted for 911 million connections at the end of February 2012. The composition of the telecom sector too has witnessed a structural change, with the private sector accounting for 88 % of the total connections.

1.7.4:- National Telecom Policy-2012 (DOT, 2012) ^{*35}

Although there has been a rapid rollout of cellular mobile networks there has been relatively less penetration in rural areas. Besides huge gap between rural and urban teledensity, broadband penetration has lagged behind the growth of telephony in India. The contribution of telecom related R&D and indigenous manufacturing of telecom equipment has not measured up to the expectations. Government recognized the need to formulate a new telecom policy to bridge these gaps. The new Telecom Policy was announced by the Government in 2012.

1.7.4.1 Feature of NTP 2012

1. The Union cabinet has approved the National Telecom Policy 31/05/2012, which include different initiatives, including free roaming across the country.
2. The Department of Telecom (DOT) has been asked to start the procedures to implement the nationwide MNP system. Implementation of the NTP 2012, however, may take some time, as DOT will first work out modalities of the new scheme before bringing it into effect.

3. NTP-2012 incorporates framework for increasing the availability of spectrum for telecom services including triple play services (voice, video and data) for which broadband is the key driver.
4. A unique AADHAR Card based electronic authentication framework would be integral part of providing service to the people.
5. NTP-2012 recognizes that the rapid growth in the telecom sector requires to be supported by an enhanced pace of human capital formation and capacity building.
6. The government has also relaxed norms for Internet telephony. This will help subscribers to use the Internet to make local and STD calls.

1.7.4.2 The Objectives of NTP-2012

1. The Government aims to expand coverage of telecom services in rural area from the existing 39 percent to 70 percent by 2017.
2. Provide affordable and reliable broadband on demand by the year 2015 and to achieve 175 million broadband connections by the year 2017 and 600 million by the year 2020 at minimum 2 Mbps download speed and making available higher speeds.
3. Strive to create One Nation - One License. Achieve Full Mobile Number Portability and work towards Free Roaming.
4. Reposition the mobile phone from a mere communication device to an instrument of Empowerment that combines communication with proof of identity, fully secure financial and other transaction capability, multi-lingual services and a whole range of other capabilities that ride on them and transcend the literacy barrier.
5. Achieve substantial transition to new Internet Protocol (IP V6) in the country in a phased and time bound manner by 2020.
6. Put in place a simplified Merger & Acquisition regime in telecom service sector while ensuring adequate competition.

Availability of affordable and effective communications for the citizens is at the core of the vision and goal of the NTP-2012. It also recognizes the predominant role of the private sector in this field. The biggest gainer from the NTP 2012 will be users who travel a lot. With roaming charges abolished, users will get free incoming calls and outgoing calls at local tariffs across the country.

1.8 Telecom Regulatory Authorities in India: - With a view to provide an effective regulatory framework and to safeguard consumer interest the Government has formed Regulatory Network. This network also ensures fair competition among the various operators. There different Regulatory authorities like TRAI, Term Cell and TDSAT are discussed in following sections.

1.8.1 Telecom Regulatory Authority of India (TRAI, 2011)^{*36}:- The Telecom Regulatory Authority of India (TRAI) was formed in January 1997. The Government is committed to a strong and independent regulator with comprehensive powers and clear authority to effectively perform its functions.

1.8.1.1 Salient feature of TRAI Act are as follows.

1. This Act was called as the Telecom Regulatory Authority of India Act, 1997. It extended to the whole of India. It shall be deemed to have come into force on the 25th day of January, 1997
2. TRAI Act gives adequate powers to TRAI to issue directions to service providers. The TRAI has full judicial powers to resolve disputes between service providers.
3. TRAI will be assigned the arbitration function for resolution of disputes between Government (in its role as licensor) and any licensee.
4. The Government will invariably seek TRAI's recommendations on the number and timing of new licenses before taking decision on issue of new licenses in future.
5. The functions of licensor and policy maker would continue to be discharged by Government in its sovereign capacity.

1.8.1.2 Important Functions of TRAI

- a. Inspect the equipment used in the network and recommend the type of equipment to be used by the service providers.
- b. Recommend the need and timing for introduction of new service provider. Recommend the terms and conditions of license to a service provider and ensure technical compatibility. Ensure compliance of terms and conditions of license. Recommend revocation of license for non-compliance of terms and conditions of license.
- c. Settle disputes between service providers.

- d. Regulate arrangement amongst service providers of sharing their revenue derived from providing telecommunication services.
- e. Ensure the time period for providing local and long distance circuits of telecommunication between different service providers. Facilitate competition and promote efficiency in the operation of telecommunication services so as to facilitate growth in such services.
- f. Protect the interest of the consumers. Monitor the quality of service and conduct the periodical survey to check quality of service.
- g. Render advice to the Central Government in the matters relating to the development of telecommunication technology and any other matter related to telecommunication industry in general.

1.8.2 TRAI Amendment ACT 2000 (TRAI, 2012)^{*37}:- There has been lot of disputes of TRAI especially with DOT and MTNL. The verdict of courts regarding power of TRAI was as follows.

- The power of the Government (Licensor) to grant or amend a license is not subjected to the recommendation of TRAI.
- TRAI recommendations are not binding in nature.

These ruling restricted the power of TRAI. Thereafter in year 2000 the Government decided to bifurcate TRAI. TRAI (Amendment) act 2000 was passed. The highlight of the act is bifurcation of recommendatory functions and enforcement functions of TRAI.

Recommendatory Functions remained with TRAI are as follows.

1. Need & timing of New Service Provider
2. Facilitate competition & promote efficiency.
3. Efficient Management of Spectrum Enforcement Functions.
4. Revocation of License. - Ensure compliance with terms of license

1.8.3:- Telecom Enforcement, Resource and Monitoring (TERM) Cell (DOT, 2010)^{*38}:- With the increasing number of telecom operators in the country, the Government felt the need for presence of Telegraph Authority in the field at all the License Service Areas and Large Telecom Districts of the country, in order to ensure that service providers adhere to the license conditions and for taking care of telecom

network security issues. With the growth of private telecom and internet services, an increase in telecom operations was also observed.

To address these issues, the Government created initially four Vigilance Telecom Monitoring cells (VTM) in Nov-2004 at Delhi, Mumbai, Hyderabad and Chennai. Subsequently government added VTM cells at different locations taking the total number of VTM Cells to 34.

1.8.3.1:- Functions of TERM Cell: - The functions of TERM cell divided into three categories, mainly Vigilance, monitory and Security which are described below.

1. Vigilance Functions

- A.** Inspection of premises of Telecom and Internet Service Providers.
- B.** Curbing illegal activities in telecom services.
- C.** Technical arrangement for the lawful interception / monitoring of all communications passing through the licensee's network.
- D.** To ascertain that the licensee is providing the services within permitted area and Co-ordination with all service providers.
- E.** Analysis of traffic data of various licensees.

2. Monitoring Functions

- A.** Coordination with various network operators & monitoring of network parameters. To ensure optimum call completion ratio of inter operator calls.
- B.** Checking of the compliance by the licensee in respect of the license conditions. Matters related to national security.
- C.** **Disaster Management:** - Taking over of network in the events of natural calamities or other emergency situations.
- D.** Customer Document Verification with the objective to ascertain whether the mobile service operators are following the DOT guidelines for Customer verification before providing connections.

3. Security Functions: -

- A.** Term cell is a technical interface between security agencies and Telecom Service Providers.

1.8.3.2 Achievement of TERM cell

- A.** Mobile subscriber verification audit conducted by TERM Cells (VTMs) in the field has resulted in enhanced compliance to subscriber verification by the Service Providers, from 60% to more than 85%.
- B.** Raids conducted by TERM Cells on illegal set up have plugged losses to the tune of about 300 Crore Rupees for the exchequer.

1.8.4:-Telecom Disputes Settlement & Appellate Tribunal (TDSAT):-

The Telecom Regulatory Authority of India Act, 1997 was amended by the Telecom Regulatory Authority of India (Amendment) Act, 2000. By this Amendment Act an appellate tribunal known as the “Telecom Disputes Settlement & Appellate Tribunal” has been set up to adjudicate disputes and dispose of appeals with a view to protect the interests of service providers and consumers of the telecom sector.

The functions of the appellate tribunal are to adjudicate any dispute between a licensor and licensee, between two or more service providers, between a service provider and a group of consumers and to dispose of appeals against any decision or order of TRAI; the appellate tribunal consists of Chairperson and two Members. (TDSAT, 2011)^{*39}

1.9:- Road Ahead for Telecom Sector: - National IPv6 Deployment Roadmap Version-II (Ministry Of Communication and Information Technology, 2013)^{*40}:- The main recommendations for deployment of IPV6 (Internet Protocol Version 6) are as follow.

- A.** The Government organizations should prepare a detailed transition plan for complete transition to IPv6 (dual stack) by December 2017 based on the network complexity & equipment. The plan should be prepared latest by December 2013 and accordingly the required budgetary provisions should be made in their demand. For this purpose, it is recommended that a dedicated transition unit in each organization should be formed immediately to facilitate entire transition.
- B.** All new enterprise customer connections (both wireless and wire-line) provided by Service Providers on or after 01-01-2014 shall be capable of carrying IPv6 traffic either on dual stack or on native IPv6.

1.10 References:-

1	BSNL , 2011, Enterprise Business , [online], available on : http://www.upe.bsnl.co.in/index.php?option=com_content&view=article&id=138&Itemid=84 , [Accessed on 24 Aug,2011]
2	George Kennedy, 1996, Electronic Communication Systems, Tata McGraw Hill Publishing Company Limited, New Delhi, Third Edition, Pg No 1
3	TRAI, TRAI Act 1997, The Gazette of India No DL-33004/971997, [online] Preliminary Pages available on : http://www.trai.gov.in/WriteReadData/userfiles/file/Chapter-I.pdf , [Accessed on 16 Dec, 2011]
4	Internet and Mobile Association of India, 2008, Mobile VAS in India, Page No 18-19 , [online] available on : http://www.wpp.com/NR/rdonlyres7B6D761F-4DE6-4FEE-B0B7-B9862EAE0B0B/0/mobile_vas_report_aug08.pdf , [Accessed on 7 December,2011,]
5	ITU, 2004, ITU and its activity to related to Internet Protocol , available on: http://www.itu.int/osg/spu/ip/chapterseven.html , [Accessed on 23 July 2011]
6	DOT , 2011, Press Brief on NTP-2011, [online],Page No 14 from available on : http://dot.gov.in/NTP-2011/NTP2011.htm [Accessed on 19 /11/2011]
7	ACMA, 2011, Glossary C-D, [online], available on: http://www.acma.gov.au/WEB/STANDARD/1001/pc=PC_311127 , [Accessed on 21 November, 2011]
8	Motorola, 2003,Dealer glossary, [online], available at : http://www.motozone.com.au/motoglossary/motoglossary.asp , [Accessed on 22 /11/2011]
9	ITU, 2011, All about the Technology, [online], available at : http://www.itu.int/osg/spu/ni/3G/technology/index , [Accessed on 23/12/2011]
10	Webopedia, Modem, 2011,[online], available at : http://www.webopedia.com/TERM/M/modem.html , [Accessed on 25 July 2011]
11	Webopedia, BPS, 2011, [online], available at : http://www.webopedia.com/TERM/B/bps.html , [Accessed on 20/05/2011]
12	Webopedia, 2011, Congestion, [online], available at: http://www.webopedia.com/TERM/C/congestion.html , [Accessed on 22 Nov 2011]
13	Wikipedia, 2012, Communication in India, [online], available at : http://en.wikipedia.org/wiki/Communications_in_India [Accessed on 21/12/2012]

14	Calcutta Telephones, 2011, History and Development, [online], available on : http://www.calcuttatelephones.com/history_ctd.shtml , [Accessed on 23/11/2011]
15	DOT, 2011, The Indian Telegraph Act,1885, [online],available at: http://www.dot.gov.in/Acts/telegraphact.htm ,[Accessed on 25/12/2011]
16	C-DOT, 2011, Brief History,[online], available at : http://www.cdote.co.in/about_us/berif_history.htm , [Accessed on 11/08/2012]
17	DOT, 2011 , Accounts and Finance Manual , Page No 4,[online], available at: http://www.dot.gov.in/finstatus/Telecom%20Accounts%20&%20 Finance %20Manual_Oct.07.pdf , [Accessed on 13 December 2011]
18	MTNL, 2012, About us ,[online], available on : mtnlmumbai.in/index.php/about-us , , [Accessed on 16 April 2012]
19	VSNL (2003), About us ,[online], available at: http://idcdelhi.vsnl.com/aboutus/whoweare.html , [Accessed on 24 November 2012]
20	DOT, (Department of Telecom) , 2011, Telecom Policy 1994, available at : http://www.dot.gov.in/ntp/ntp1994.htm , [Accessed on 23 Jun,2011,]
21	TRAI, 2011, TRAI Act 1997,[online], available at : http://www.trai.gov.in/Content/act_1997.aspx , [Accessed on 15 Jun,2011]
22	TRAI, (2011),New Telecom Policy-1999, [online],available at : http://www.trai.gov.in/Content/ntp_1999.aspx , [Accessed on 25 June,2011]
23	DOT, (Department of Telecom),2011, TRAI Amendment Act, [online], available at : http://www.dot.gov.in/Acts/TRAI_amendment_ACT.pdf [Accessed on 09/08/2011]
24	BSNL, 2012, About BSNL,[online], available at : http://www.bsnl.co.in:9080/opencms/bsnl/BSNL/about_us/company/about_bsnl.html , [Accessed on 23 November 2011]
25	TDSAT, 2011, [online],available on : http://www.tdsat.nic.in/profile2.htm , [Accessed on 24 September ,2011]
26	DOT, 2011, Universal Service Obligation Fund, [online], available at: from http://www.dot.gov.in/uso/usoindex . [Accessed on 23 January 2012]
27	DOT, (Department of Telecom), 2011, Telecom Policy, [online], available on: http://www.dot.gov.in/ntp/broadbandpolicy2004.html [Accessed 3/06/2011]

28	Planning Commission of India, 2008, Eleventh Five Year Plan, Volume III : Agriculture, Rural Development, Industry, Services and Physical Infrastructure ,Oxford University Press, New Delhi, Page No 497 to 498
29	TRAI , 2010, Recommendation on National Broadband Plan ,2010, [online], http://www.trai.gov.in/Content/RecommendationDescription , Page 65 142 [Accessed from October 2012]
30	MNP India, 2011, What is number Portability, [online],available at : http://mnpindia.in/number-portability.html , [Accessed on 21 August 2012]
31	DOT, 2012, NTP-2012, [online], available at : http://www.dot.gov.in/ntp/NTP-06.06.2012-final.pdf [Accessed 21/01/ 2013]
32	DOT, (Department of Telecomm), 2012, Telecom Policy, [online],available at : http://www.dot.gov.in/ntp/ntp1994.html ,[Accessed on 30 July 2011]
33	TRAI, 2011, New Telecom Policy-1999, available at: http://www.trai.gov.in/Content/ntp_1999.aspx , [Accessed on 25 th July,2011]
34	DOT, 2012, National Telecom Policy-1999, [online], available at http://www.dot.gov.in/ntp/ntp1999.htm ,[Accessed on 25 th Aug 2011]
35	DOT, (Department of Telecom), 2012, National Telecom Policy-2012,[online], available at : http://www.dot.gov.in/ntp/NTP-06.06.2012-final.pdf , [Accessed on 25 th Aug 2011]
36	TRAI, 2011 , Gazette of India, Ministry of Law and Justice, New Delhi, the 29th March, 1997 ,Page No1- 25, [online],available on : http://www.trai.gov.in/Content/act_1997.aspx , [Accessed on 12 May 2012]
37	TRAI, 2012, Gazette of India, Ministry of Law and Justice ,TRAI (Amendment) 2000, [online] ,available at : http://www.trai.gov.in/Content/Act2001.aspx [Accessed on 23 March,2012]
38	DOT (Department of Telecom), 2010, VTM Cell, [online],available at : http://www.dot.gov.in/vtm/vtm.htm , [Accessed on 22 April 2012]
39	TDSAT, 2011, Profile, [online],available at : http://tdsat.nic.in/profile2.htm [Accessed on 11 August 2011]
40	Ministry of Communication and IT, 2013,Roadmap version II for IPV6, [online] available: from http://www.dot.gov.in/ , [Accessed on 12/04/2013]

CHAPTER II

LITERATURE

SURVEY

CONTENTS
CHAPTER II
Literature Survey

Chapter No	Description	Page No
2	Literature Survey	29-77
2.1	Service Concept	31
2.2	Characteristic of Services	31
2.3	Concept of Service Expectation	33
2.4	Two Level of Expectations	34
2.5	Concept of Zone of Tolerance	34
2.6	Sources of Desired & Adequate Service Expectations	35
2.7	Concept of Customer satisfaction	37
2.8	Rating of customer satisfaction	37
2.9	Factors influencing the Customer Satisfaction	38
2.10	Concept of Customer Delight	39
2.11	The Concept of Service encounter	39
2.12	Physical Evidence of Service	40
2.13	Customer Loyalty	40
2.14	Need of Customer Retention	40
2.15	Concept of Service Quality	41
2.16	Determinants of Service Quality	41
2.17	Service Quality Model	43
2.18	Study of Research Papers in the field of Telecom	45
2.19	Study of Doctoral Thesis in the field of Telecom	64
2.20	References	67

Chapter II

Literature Review

2. Introduction

A literature review is a body of text that reviews the methodologies and findings of the other authors. Literature reviews are the secondary sources and do not represent any new facts. In this Chapter, the researcher has made an attempt to study and understand the concept of Customer Satisfaction in service sector. This attempt includes understanding concept of Customer satisfaction by analysing research studies made by earlier researchers in respect of Customer Satisfaction in Telecom Industry. For this, the researcher has reviewed various books, Journals and websites. This Literature Survey has helped the researcher to get the insight of Customer Satisfaction in Telecom Industry.

2.1. Service Concept

Services have increasingly played an important role in the economic development of the many countries including India. Following are the definitions of service as defined by Management thinkers

“A service is any act or performance that one party can offer to another. It is essentially intangible and does not result in the ownership of anything. Its production may or may not be tied to physical product” (**Philip Kotler P. 2004**) *¹

“Services are the production of essentially intangible benefits and experiences, either alone or as part of a tangible product through some form of exchange, with the intention of satisfying the needs, wants and desires of the consumers.” (**C. Bhattachargee, 2006**) *²

“Services are economic activities that create value and provide benefits for customers at specific times and places” (**Christopher Lovelock, cited in C. Bhattachargee, 2006**) *³

2.2 Characteristic of Services (**K. Rama Mohana Rao, 2005**) *⁴

Services have basically distinct characteristics which influence the design of marketing program of organization. These characteristics are listed below.

- A. **Intangibility:** Services are intangible in nature. It is difficult to experience their benefits before they are bought. Services are not physical objects.

Those cannot be touched, smelled or tasted. While selling or promoting services one has to concentrate on benefits and satisfaction that consumer can derive for having spent for the services. Telecom services are also intangible in nature. For example Customer has to get the Telephone Connection to experience the communication service.

- B. **Perishability:** Services are perishable. Unutilized or underutilized services are economic waste. A building unoccupied, empty seat in cinema hall, vacant beds in hospitals, unused telecom lines are economically unviable. Services have high level of perishability and they cannot be stored or reused. Due to fluctuating demand service industries face a major challenge. Telephone Exchange with 10000 connections has been installed by Operator and there are only 500 working connections in the city, remaining 9500 lines will be waste of resources.
- C. **Inseparability:** Services are in general created and supplied simultaneously; this proves challenge to the managers of the Service industry. **Services can not be separated from the service provider.** In fact, the production, delivery and consumption of a service take place simultaneously in buyer seller interaction. Whenever service provider intends to offer services he should have a service production unit that offers the services. For Example to provide the Landline Telephone connection service provider has to install the telephone exchange.
- D. **Heterogeneity:** It is difficult to set standards for any services. The same type of services can not be sold to all consumers even if the price paid is same. The consumers rate these services in different ways as per their perception. In case of Telecom services the quality of voice in mobile services depends on the nearness of customer location from the transmitting tower. The customers staying away from towers may face quality issues even if they pay the same charges.
- E. **Ownership:** Whenever somebody purchases goods he becomes owner of it. When somebody purchases a flat, legally ownership of flat is transferred in

his name. In service industry consumer will experience a service but will not become owner. In the telecom services users are given only access to services. For Example mobile telephone user is not owner of Transmitting towers.

- F. **Simultaneity:** It is difficult to have different channels for service delivery. Services have limited geographic area. Services have to be individually accessed. For example services provided by train, taxis, telephone etc. has to be accessed individually.
- G. **Quality Measurement:** It is difficult to measure the quality of services. It is possible for a customer to quantify the size of the room but difficult to measure the hotel ambience, behavior of staff, interior of the hotel room etc. In telecom one can only measure the level of the satisfaction of customers.

Discussion: - Services are intangible activities that provide satisfaction. The demands of the services are fluctuating and its supply is inflexible. Ownership of any services is not possible. Customer involvement in the services is very high and physical presence of the customer is absolutely necessary. The quality of the services varies from time-to-time and person-to-person. In service industry, reaction of the customer is spontaneous. The channel of services is shorter. All these things are true for telecom services also.

2.3 Concept of Service Expectation: -

“Customer expectations are beliefs about service delivery that serve as standards against which performance is judged. Customers compare their perceptions of performance with these standards while evaluating service quality. Thorough knowledge about customer expectations is very important in services marketing. Knowing what the customer expects is the first and possibly most critical step in delivering good quality service. Being wrong about what customers want can mean losing a business, expending money, time and other resources on things that do not count to the customer. Being wrong about what customers want can even mean not surviving in a competitive market.

Successful marketing of services is only possible if Service providers know the answers of questions like what types of expectation standards do customers hold about services? Which factors most influence the formation of these expectations? What role do these factors play in changing expectations? How can a service company meet customer expectations?” (Valarie Zeithaml and Mary Jo Bitner, 2004)^{*5}

“Buyers form their expectations from past buying experience, friends advise competitor’s information and promises. If service providers raise expectations too high buyers are likely to be disappointed. However if the company sets expectations too low buyer will not get attracted. A customer’s decision to be loyal or not is the sum of many small encounters with the company.” (Philip Kotler, 2004)^{*6}

2.4 Two Level of Expectations (K. Rama Mohana Rao (2005) ^{*7}

According to **K. Rama Mohana Rao** the knowledge of customer expectations helps the marketers to design comprehensive service packages that are capable of delivering satisfaction. There are at least two levels of expectations of services one is Minimum level and other is Maximum level. In the process of service production and consumption, five levels of performance might result

Table No 2.1 Level of Performance and Customer Response

Sr. No.	Levels of Service Performance	Customer Response
1	Exceeding the Maximum expected level	Delighted
2	Maximum Service Level	Satisfied
3	Adequate Service Level	Indifferent
4	Minimum Service level	Dissatisfied
5	Below the Minimum service Level	Highly Dissatisfied

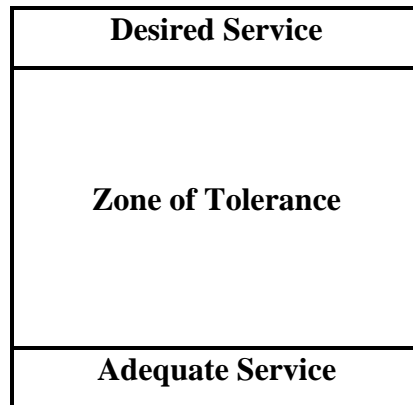
(Source: - **K.Rama Mohana Rao, 2005^{*7}**)

In case of Telecom if customer wants broadband connection he will expect the low rental, maximum speed, zero down time, immediate provision of services. These are maximum levels of expectation. At remote places where in building coverage of mobile network is not available customer is happy even if he gets the mobile network coverage outside the building. This is minimum level of exceptions.

2.5 Concept of Zone of Tolerance (Valarie A. Zeithaml and Mary Jo Bitner, 2004)^{*8} There are two levels of expectations called as desired service and adequate

service. The highest level of service can be termed as desired service. This is the level of service the customer hopes to receive. Desired service is blend of what the customer believes the services can be & should be. Adequate service represents the minimum tolerable expectation. This is bottom level of performance acceptable to the customer.

Fig. 2.1.The zone of Tolerance



(Source: - Valarie A. Zeithaml and Mary Jo Bitner, 2004)*⁸

The Zone of Tolerance is the extent to which customers recognize or are willing to accept the variation between the two levels of expectations, that is desired and adequate levels. If the performance of the service is below the adequate service level customer will be highly dissatisfied. On the other hand if the service performance exceeds the desired level, customer will be delighted. When the performance of the service falls in the tolerance zone, customers do not particularly notice the service performance. When the service performances are outside the tolerance zone, then only service gets the customer attention either in positive or negative way.

For example a telecom service provider has promised the broadband speed of 2 Mbps. If customer gets the speed 1.8 Mbps he will not notice and may tolerate the difference between the speeds. This is zone of tolerance. But if the speed falls below one Mbps he may surrender broadband connection. Tolerance zone would be low for important factors while the tolerance zone is high for not very important factors.

2.6 Sources of Desired and Adequate Service Expectations (Valarie A. Zeithaml and Mary Jo Bitner, 2004)*⁹

2.6.1 Sources of Desired Service: - Personal need and philosophies about the services are important factors those influence desired service.

- A. **Needs and wants of organization / person:** - The needs of a person may be physical, psychological, social or functional. For example in-service employee may have different expectation from mobile service provider than housewife. The in-service person may require roaming service from service provider and housewife may not require roaming. In Telecom services the needs of telecommunications changes from organization to organization.
- B. **Personal service philosophy:** - The personal service philosophy of consumer reflects the generic attitude about the meaning of the service and also proper conduct of the service providers. For Example The consumer may expect the employees at service centers of Telecom service provider should be well dressed and demonstrate courteous behavior.

2.6.2 Sources of Adequate Service: - There are five factors that influence the adequate level of service expectations. These are listed below.

1. **Transitory service intensifier:** - Consists of temporary, usually short term, individual factors that make a customer feel more of the need for service. A personal emergency situation in which service is urgently needed raises the level of adequate service expectation.
2. **Perceived service alternatives:** - Perceived service alternatives are other providers from whom the customer can obtain service. Customer expectation changes when multiple service providers are available.
3. **Predicted Service:** - This is typically an estimate of the service a customer will receive in an individual transaction rather than in the overall relationship with service providing organization.
4. **Situational Factors:** - There are some factors which are beyond the control of service provider are called situational factors. For example in case of natural calamity consumer expectation goes to minimum level. If there is a flood situation customer will understand that service will not up to the mark.

Customer expectations are created by previous experience, advertising, hearsay, awareness of competitors and brand image. A customer might expect to encounter to efficiency, helpfulness, and reliability. Today customers are more educated, they demand best from the provider. Customer knows all the details of the product. In case of discrepancy customer never forgives.

2.7 Concept of Customer satisfaction:

At present Customer satisfaction is becoming the prime concern in all business. Some of definitions of customer satisfaction given by different scholars are listed below.

1. “Customer satisfaction is the state of mind that customers have about a company when their expectations have been met or exceeded over the lifetime of the product or service.” **(Cacioppo, Kevin, 2000)***¹⁰
2. “Customer satisfaction is a measure of how your organization’s product performs in relation to a set of customer requirements”.**(Nigel Hill & Jim Alexander, 2006)***¹¹
3. “Customer Satisfaction is the extent to which a product’s perceived performance matches buyer’s expectations. If the product’s performance falls short of expectations, the customer is dissatisfied; if it matches with expectations, the customer is satisfied. If it exceeds expectations, the customer is highly satisfied or delighted.” **(Dr. K. Karunakaran, 2008)***¹²
4. “Customer Satisfaction is customer’s evaluation of product or service in terms of whether that product or service has met their needs and expectations. Failure to meet needs and expectation results in dissatisfaction with product or service.” **(Valarie A. Zeithaml and Mary Jo Bitner,2004)***¹³
5. “Satisfaction is the consumer’s fulfillment response. It is a judgment that a product or service feature, or the product or service itself.” **(R. L. Oliver, cited in Valarie A. Zeithaml and Mary Jo Bitner, 2004)** *¹⁴

2.8 Rating of customer satisfaction and Tools for measurement of customer satisfaction (Philip Kotler 2004) *¹⁵

2.8.1 Rating Satisfaction: - Although the customer expectation centered firm seeks to high customer satisfaction, it is not the ultimate goal of the company. If the company increases customer satisfaction by lowering its price, the result may be low profit. Company may increase the profit by other means like improving manufacturing process, investing in Research and Development. Company has many stakeholders including the employees, shareholder, dealers, and suppliers. Spending on customer satisfaction may divert the fund from increasing satisfaction of the

stakeholders. Ultimately company must operate on the philosophy that it is trying to deliver the customer satisfaction subject to the delivering the acceptable level of satisfaction to the other stakeholders.

When the customers rate their satisfaction every customer will rate it differently. For example if customer want to rate delivery system of the company then everyone will have his own opinion about the definition of good delivery. Some want delivery on time, some may want early delivery. The company should recognize that two different customers are highly satisfied for different reasons. Some will be satisfied easily and others may not be. Companies need to concern about the customer satisfaction level because with the help of Internet the bad words and good words are spread easily.

2.8.2 Tools for tracking and measuring Customer satisfaction

- A. Complaint and suggestion system:** A customer centered organisations makes it easy for customers to register their complaints and suggestions. Some of the companies provide Free Hotline for complaints, there is two way communications with the help of email and web-sites.
- B. Customer satisfaction surveys:** Responsive companies measure customer satisfaction by periodic surveys. While collecting data it is also useful to find out the buyers intension to repurchase and his desire to recommend the product to the others.
- C. Lost Customer analysis:** Company should contact customers who have stopped using the product to know why this has happened. It is very much important to monitor customer loss rate.
- D. Ghost Shopping:** Companies can hire the people to pose as buyers. This is to find out the plus and minus points in using the product of company and competitors product.

2.9 Factors influencing the Customer Satisfaction (Valarie A. Zeithaml and Mary Jo Bitner, 2004)^{*16}:- The different factors which influence the customer satisfaction are described below.

- A. Product and service features:** Customer satisfaction with a service is influenced significantly by customer's evaluation of service. Satisfaction is influenced by features like price, quality of service, etc.

- B. Customer Emotions:** - Customer emotions can also affect their perceptions of satisfaction with services. Positive emotions such as happiness, pleasure and a sense of warm heartedness can enhance customer's satisfaction
- C. Attribute for service success or failure:** - When somebody is surprised by an outcome (by much better or much worse service) he will tend to look for reasons. For example if a customer of weight loss program do not lose as per expectation, he will think what is wrong whether he has not followed instructions for diet before determining the satisfaction.
- D. Perceptions of fairness:** - Customers asks themselves: Have I been treated fairly compared with other customers? Did other customers get better treatment, better prices or better quality service than me? Did I pay a reasonable price for the service? With the answer of these questions customer satisfaction is influenced.
- E. Other Consumers, Family Members, and Coworkers:** - In addition to service features and one's own individual feelings and beliefs, consumer satisfaction is often influenced by other people. The satisfaction of individual in a group is influenced by group members.
- F. After Sales Service:** Customer satisfaction is also dependent on after sales service features like spare parts availability, feedback complaints, after sales guarantees.
- G. Culture:** Intrinsic values and beliefs of the firm as well as the tangible and intangible symbols influence customer satisfaction.

2.10 Concept of Customer Delight: - If the customer has got better than he expected he will be delighted. It is a positive surprise to the customer. It is the highest level of satisfaction. The customer satisfaction as well as customer delight is influenced customer expectations. The firm should try to find out the delight creating attributes to offer to the customers. Delight creating attributes needs to be checked with the financial viability. (Philip Kotler, 2004) *¹⁷

2.11 The Concept of Service Encounter (C. Bhattacharjee, 2005) *¹⁸: The Service encounter is can be defined as “Any episode in which the customer comes in contact

with any aspect of the organization and gets an impression of the quality of the service.” Few examples of service encounter

1. Seeing advertisement of the company.
2. Having Telephonic enquiry session with the firm.
3. Being greeted at the entrance.
4. The experience of the service.

The rude employee at the service center of the telecom company makes the customer to conclude that he is dealing with the rude company.

2.12 Physical Evidence of Service (K. Rama Mohana Rao, 2005) ^{*19}:- Most of the services can not be offered without help of Tangibles (Physical evidence of services). Though the customers can not see the services they can definitely see the tangibles associated with it, examine them and try to form an opinion about the services. When the customer visits the service centers of telecom service provider he will examine the furniture, appearance of the staff, modern equipments available in there. All these physical objects are used as evidence by the customer to assess and expect performance of telecom service provider. Hence physical evidence plays crucial role in shaping consumer perceptions and also expectations.

2.13 Customer Loyalty: The traditional role of the marketing has been to win customers. No emphasis was on retaining customers. Most of the companies lose their customer before or at the time of repurchase decision, mainly due to poor service. It proves that there are high number of customers who are not loyal to the company and searching for better options. Customer loyalty highlights issues of commitment, feeling of association and involvement from a service firms market. (C. Bhattacharjee, 2005) ^{*20}

2.14 Need of Customer Retention (Philip Kotler, 2004) ^{*21}

It is said that acquiring new customer is costlier than retaining old customer. At present there is lot of competition in the telecom sector. Customers are attracted by the competitors with different promises. So it has become very important to retain customers. Attracting new customer may cost five times as much as doing a good job to retain existing customers.

Highly satisfied customer stays loyal longer, buys more as company introduces new product and upgrades existing product, talks favorably about the company, pays less attention to competing products, becomes less sensitive to price. A company should be wise enough to measure the customer satisfaction regularly because the key to customer retention is customer satisfaction. Some companies think they are getting a sense of customer satisfaction by tallying customer complaints, but number of customer do not complaint they just stop buying. Listening to the complaint is not enough. The company must respond positively and constructively to the complaints. It requires a great deal of effort to induce satisfied customers to switch away from their existing suppliers.

2.15 Concept of service quality: - “Quality is the totality of features and characteristics of a service that bear on its ability to satisfy stated or implied needs. Today’s companies have no choice but to implement total quality management programs if they are to remain solvent and profitable. Total quality is the key to value creation and customer satisfaction.” **(Philip Kotler, 2004)** *22

Service Quality is a combination of two words, Service and Quality where we find emphasis on the availability of quality services to the ultimate users. The service quality satisfaction is the outcome of the resources and activities expanded to offer services against the expectation of user. **(Singh J. D. cited in S.M. Jha, 2008)** *23

Functional Quality: - The functional quality can be improved by strong emphasis on behavioral areas such as attitude, service mindedness, accessibility, inter-personal relations, appearance, and commitment. The top management and senior executives bear the responsibility of shaping the perception on service quality by promoting use of sophisticated technologies and increasing number of personally committed employees. **(S.M. Jha, 2008)** *23

2.16 Determinants of Service Quality (Parasuraman, Zeithmal, &Berry, 1985)*24

As per Parasuraman, Zeithmal, and Berry regardless of the type of service, consumers use basically similar criteria in evaluating service quality. These criteria seem to fall into 10 categories which are labeled by them as Service Quality determinants. These ten determinants may be overlapping. The Table 2.2 displays shows relevance of these Service quality dimensions **(Provided by Parasuraman, Zeithmal, and Berry)** with Telecom Service dimensions.

Table No 2.2 Determinants of Service Quality and their relevance in Telecom

Sr. No.	Service quality dimension and meaning	Relevance in Telecom
1	Reliability: It involves consistency of Performance and dependability. Providing right service at first time. It also means the firm keeps its promises.	<ol style="list-style-type: none"> 1. Consistent speed of Broadband data. 2. Provide accurate bills of telecom services used by customers. 3. Provisioning of services as per prescribed time. If the company has promised connection within 24 Hours company should activate connection within 24 hours.
2	Responsiveness: Timeliness of service and willingness or readiness of employee to provide service.	<ol style="list-style-type: none"> 1. Mailing a subscribed tariff plan immediately to the customers. 2. Updating him about the time required to restore the failure in services. 3. Giving prompt after sales prompt service.
3	Competence: Possession of required skills and knowledge to perform the service.	<ol style="list-style-type: none"> 1. Call Center employees should have the knowledge & skill about the services. 2. Maintenance person visiting customer should have sufficient technical skills.
4	Access: Approachability and ease of contact.	<ol style="list-style-type: none"> 1. Service Center should be easily accessible. 2. Waiting time at service center should not be extensive. Convenient timing of Customer Service Center.
5	Courtesy: Politeness and friendliness of contact person. Respect of consumer property	<ol style="list-style-type: none"> 1. Consideration of consumer's property. (No muddy shoes on customers carpet by maintenance person) 2. Courtesy , Politeness shown by call center and service center employees
6	Communication: Keeping customers informed in a language they understand.	<ol style="list-style-type: none"> 1. Call Center employees should be able to speak the language of customer's choice 2. Technically sound person should be available while dealing with the technical leader of the customer's technical team.

7	Credibility: Honesty, Trustworthiness and believability	<ol style="list-style-type: none"> 1. Company should prove that it has customer's best interest at heart. 2. Providing detailed bill of the calls. 3. Providing alert if the usages crosses to average monthly uses.
8	Security: Freedom from danger, risk or doubt	<ol style="list-style-type: none"> 1. Some of the customers of telecom company like banks, security agencies want high level of security. The generation of such atmosphere is necessary so that customers feel safe while dealing with company.
9	Understanding & knowing customers	<ol style="list-style-type: none"> 1. Making effort to know exact need of customers like providing custom built solutions. 2. Recognizing the regular / corporate customer and provide them individual attention.
10	Tangibles: Physical evidence of the service	<ol style="list-style-type: none"> 1. Furniture / Modern equipment at service center. 2. Modern tools used by the maintenance person. 3. Higher Quality of advertisement material like pamphlets, brochures, etc

(Source: - Based on Parasuraman, Zeithmal, and Berry, 1985) *24

2.17 Service Quality Model (Parasuraman, Zeithmal, and Berry, 1985) *24

As per Parsuraman, Zethimal and Berry service quality is more difficult to evaluate than goods quality. Service Quality perceptions result from comparison of consumer expectations with actual service performance. Service Quality is a measure of how well the service level delivered matches customer expectations. Delivering quality service means conforming to customer expectations consistently. Satisfaction with the services is related to confirmation or disconfirmation of expectations.

A set of key discrepancies or gaps exists regarding executive perceptions of service quality and task associated with the delivery of services to the consumers. These gaps can be major hurdles in attempting to deliver a service which consumers would perceive as being of high quality. Following are different Gaps as per Parsuraman, Zethimal and Berry

1. **Gap-1:- Customer Expectation and management perception gap:** - Many of the executive perceptions about what consumers expect in a quality service may not congruent with the actual consumer expectations.

Service firm executives may not always understand what features a service must have in order to meet consumer needs. The gap between consumer expectations and management perceptions of those expectations will have an impact on consumer's evaluation of service quality.

2. **Gap-2 Management perception & service quality specification gap:** The gap between management perceptions of consumer's expectations and the firm's service quality specifications will affect service quality from the consumer's view point. In short a variety of factors like resource constraints, market conditions, and management indifference may result in a discrepancy between management perceptions of consumer's expectations and actual specifications established for a service.
3. **Gap-3 Service quality specifications–Service Delivery Gap (Gap-3):** The gap between service quality specifications and actual service delivery will affect service quality from the consumer's standpoint. For example if the telecom service call center has a standard to answer the 90 % of calls within ten second practically it's difficult because of variability in employee performance.
4. **Gap-4 Service delivery & External communication gap (Gap 4):** Media advertising and other communications by a firm can affect consumer expectations. As expectations play a major role in consumer perceptions of service quality the firm must be certain not to promise more in communication than it can deliver in reality. Promising more than can be delivered will raise initial expectations but lower perceptions of quality when the promises are not fulfilled.
5. **Gap-5 Expected Service – perceived service gap (Gap 5):** Key to ensuring service quality is meeting or exceeding what customers expect from the service. It appears that judgments of high and low service quality depend on how consumers perceive the actual service performance in the context of what they expected.

The quality that a consumer perceives in a service is a function of the magnitude and direction of the gap between expected service and perceived service. The service quality as perceived by a consumer depends on the size and direction of Gap 5, which in turn depends on the nature of gaps associated with the design, marketing and delivery of services. Thus $Gap\ 5 = f(Gap1, Gap2, Gap3, Gap4)$

2.18 Study of Research Papers in Telecom Field: - Number of research papers are available on the subjects like Data Service Quality, Mobile service Quality, Customer Satisfaction in Telecom, etc. It was useful to know how the other researchers have identified, understood and analyzed different aspects of telecommunication services. This review has helped the researcher to understand the observation of different scholars regarding development in Telecom field and its impact on customers.

Shri. Manasa Bhattacharya (1998)^{*25} Author highlighted that once fixed line market is matured, mobile will crossover fixed line market. The case will be same for the data service connections also. In future the wireless data connections will cross to fix data lines. Author further said that future vision of telecom is a vision of Information Technology. Telecom will be the springboard of future expansion of Information Technology. Mobile will spread among the masses and will give rise to innovation, entrepreneurship and growth. Mobile will spread among all, the rich and the poor, the young and the old, the men and the women. The views, which were presented by Author in 1998, are very correct when we see the telecom scenario of the year 2013.

BCC Broadband survey (2003)^{*26} British Chamber of Commerce has conducted the national survey to find out how many broadband customers are satisfied about the services. BCC listed the different aspects of broadband services like One-time Installation cost, Monthly cost, Return on Investment, Consistency of speed, Quality of service, Technical support, Choice of service providers. On these aspects BCC has tried to find customer satisfaction.

TRAI (2010) Recommendation on National Broadband Plan^{*27}, TRAI (Telecom Regulatory Authority of India) has recommended that broadband growth has not only been slow but also biased in favour of urban areas. More than 60% broadband subscribers are in the top ten cities. More than 75% connections are in top 30 cities. TRAI further has recommended the modification in the definition of Broadband speed from 256 Kbps to 512 Kbps. It was also mentioned that broadband penetration is proportional to GDP growth in developed countries.

Shri. Govida Raj A (2009)^{*28} Author explained that the broadband growth process needs several catalytic drivers to gain scale which are on par with mobile. Author

further added that Broadband customer of today is confused with different tariff plans. He has recommended that tariff plans should be periodically reviewed by regulator.

Jupiter Research (2007) ^{*29} It was found that today's communications consumers have more choice and products have become increasingly complex. Telecom service providers should take note of attitudinal shift happened in the telecom field to improve the customer satisfaction.

Dr. Gagan Singh, (2011) ^{*30} Author said that Public Sector Enterprises occupy an important place in the national economies of most countries of the world irrespective of their political orientation. A notable revolution has occurred in the telecom sector. In the pre-reforms era, telecom services in India were entirely in the hands of the central government and due to lack of competition, the call charges were quite high.

The service rendered by the government monopoly was also very poor. Today, there are many players in the telecom sector. The ultimate beneficiary has been the consumer. Prices of services in this sector have fallen drastically. Author further said that by including telecommunications in their operations, businesses can provide better services and products to their customers.

Sheetal Singla (2011) ^{*31} Author highlighted that even though the service providers claim that their service is excellent, still there are uncovered area in the cities where mobile network coverage is not available. However, Indian Market has still not reached to its saturation level, but it has to still make inroads in rural areas. Author recommended that companies should divert their attention to rural areas to cater to the rural market. Author further added that the Government should also provide the companies secure environment so that they should invest in India. This will ultimately benefit the consumer.

In her research work the satisfaction level of users was analyzed on a five point scale ranging from 'not satisfied' to 'fully satisfied'. Author said that the major reasons cited for dissatisfaction are poor quality of signals and higher costs. Poor quality of signals means unavailability of signals, call failure, call drop downs etc.

William C. Johnson, Anuchit Sirikit, (2002) ^{*32} Authors conducted study on both landline & mobile users in Thai Telecom industry using the service quality

dimensions like reliability, assurance, empathy, and tangibles with a seven point scale of strongly agree to strongly disagree. They found that the telecommunication industry received excellent ratings on tangibles, particularly customer service staff's dress, and low ratings on empathy. Authors revealed that Tangibles are an aspect of service quality that is extremely important to the Thai telecommunication customer.

DR. G. Rama Krishna, M. Giridhar Kumar and DR. M. Madhu Lincoln (2011)^{*33} Authors mentioned that telecommunication industry is growing at a neck break speed with leading players lapping up mobile subscribers by millions. Telecom sector is growing at an unprecedented pace. The liberalized norms adopted by TRAI encouraged many private and foreign companies to enter in to telecom sector. Indian wireless telecom sector is benefiting from lowest call rates, large market base due to bigger population, considerably sizable untapped market and robust economic growth of the country.

Shri Jayanta Banerji and Indraneel Bose (2011)^{*34} Authors said that Technologies have significantly changed the transition mode and the way of delivery in education. The advancement in mobile networks, smart phones, 3-G technology and the privatization of the telecom sector have opened many avenues for mobile learning (M-learning).

Author further explained the concept of M-learning is still a concept at the very nurturing stage and more conviction strategy is required to make it popular. As the issues of developed technological platform, better telecommunication initiative integration with the service providers are still pending, much more is still to be done in the near future.

Mr. Sherah Kurnia, Heejin Lee and song Yang (2007)^{*35} in their study on Understanding Consumer's Expectations of Mobile data Services in Australia found that the Australian mobile telecommunication industry has experienced a significant growth in last few year. Authors study explored the current trend of mobile data services in Australia. The finding indicates that there has been a positive trend towards a wider use of mobile data services in Australia. Price, usefulness, and immediate availability of services have been identified as important factors that can further encourage the use of mobile data services in Australia.

Shri. G. Raghuram and Rekha Jain (2009) ^{*36} Authors found that the growth of the mobile services have remained limited to urban areas. This has further widened the existing urban and rural divide. Authors recommended that Policy makers and regulators to perceive the need for an effective regulatory and policy environment to reduce this gap. Authors further said that the recent policy initiative to increase the rural mobile penetration through creation of a Universal Service Obligation Fund (USOF) that impacted rural telephony positively.

USOF's most ambitious program is the design and deployment of mobile services in rural areas. Authors have analysed the outcomes of various programs, especially those of the mobile service provision component of USOF.

Sulekha Munshi (2011) ^{*37} said that there is a gap in the expectations and perceptions of the mobile service users. This indicates that there is scope for improvement. Study has taken into account variables such as gender, occupation, annual income and age.

Indian Brand Equity foundation (2007) ^{*38} found that India is very good place for investment because of reasons like availability of skilled man power, independent judiciary, untapped rural market, huge subscriber base. India host different opportunities to telecom companies like VAS, Infrastructural sharing, managed services, Enterprise telecom services.

Sahil Shah (2011) ^{*39} highlighted that an increasing number of Indians who are using cellular services are complaining about the quality of service. Author has studied to answer the question whether Mobile Internet is really growing in India? No doubt about the fact, that Indian telecom companies have been focusing on providing the best data services at the lowest possible rates but it is still not comparable with developed countries.

Pravin Prashant (2006) ^{*40} Author highlighted that mobile customer additions in Indian Telecom Market are fine but operators have not been able to retain subscribers. The next phase of consolidation will be on retention as future services would be costlier to rollout so retention will be the key of success. Author recommended that both operators as well as regulator need to educate the customers and see that overall satisfaction level increases.

Dr. Nagasimha Balakrishna Kanagal (2009) ^{*41} highlighted that there is significant potential for a VAS player in the Indian telecom market. However, the Indian context presents several challenges both regulatory and in terms of customer preferences. Proper understandings of these challenges are needed for any company that wants to enter this space.

Vivian Witkind Davis, Larry Blank, David Landsbergen and others (1996) ^{*42} mentioned that for telecommunications, the most important dimensions of quality are availability, reliability, security, flexibility or choice, simplicity and assurance. All of these dimensions of quality are affected by innovations in technology, the development of a competitive market structure. Companies with monopoly power are likely not only to provide less variety in the services they offer but to distort levels of quality and discriminate against low-end customers.

Ofir Turel, Alexander Serenko (2006) ^{*43} this study examined the antecedents of customer satisfaction and loyalty by adapting the American Customer Satisfaction Model in respect of Satisfaction with mobile services in Canada. Based on this model, the satisfaction index of young adult Canadians was calculated by authors. This study offers insights for service providers, policymakers and subscribers. Study reveals that highly satisfied customers tend to demonstrate a high likelihood of repurchase & higher tolerance to cost.

Mohammed Upal (2008) ^{*44} Author described that only telecom & very few other organizations are now providing customer service and support via call centers. The author has identified four dimensions of service quality as communication, discipline, & responsiveness, assurance. He has studied the gaps in Call Center Service Quality.

Sabbir Rahman, Ahasanul Haque, Mohd Ismail Sayyed Ahmad (2011) ^{*45} Authors examined the consumer's behavioral perceptions and choices in selecting mobile telecom service providers. They found that the Network quality is one of the important factors of overall service quality. The outcome of this research shows a comprehensively integrated framework to understand the vibrant relationships among several dimensions of service quality. The authors found that the price and service quality are more important than the brand image.

Jean Lam, Susy S. Chan, Xiaowen Fang, Jacek Brzezinski (2004)^{*46} in their study mentioned that the convergence of mobile Internet and wireless communication technology has promised customers anytime, anywhere access to wireless communication. However, they said that there are many constraints inherent in wireless handheld devices and mobile technology, such as small screen display and limited bandwidth. Authors said that mobile customization can minimize the impact of constraints limiting handheld devices and contribute to the more effective use of the mobile web.

Abraham Karimpanal (2003)^{*47} described that 'Network Coverage' needs to be improved for improving subscriber loyalty over time. More particularly, it was improvements in coverage, both within cities, rural areas and on highways that was most evident to the subscribers.

With all the big 'brands' in the cellular business, company image was, and continues to be a strong 'Motivator' with most service providers. Author further added that Value added Services are 'Hidden Opportunities'. Tariffs and pricing stated as being extremely important by subscribers. In spite of the drastic fall in the service charges, the customers are still seeking further discounts and cuts in service charges. However the service provider's ability to deliver accurate, easy to understand bills on time, are things taken for granted by subscribers.

R. Harish and Raman Kumar Sharma (2010)^{*48} in their paper named Use Of 3G & 4G Network For Marketing mentioned that higher downloading speed considerably more advantageous for both marketers and consumers. 3G and 4G Technology has shifted idea of marketing moved far ahead from SMS. Authors said 3G and 4G provides number of services like Location based service, Geo-Fencing (Virtual field that triggers mobile marketing message), Customized coupons, Mobile Website, TV on Mobile, MMS which are very useful for Mobile Marketing.

Amjad Iqbal, Mubashar Hassan Zia and others (2011)^{*49} focused on estimating and comparing the perceived expectation and the actual satisfaction level of prepaid cellular service users in Pakistan. Authors found that perceived quality, perceived value and perceived expectations are leading variables for customer satisfaction. In findings authors mentioned that customers have high expectations that are fulfilled by the cellular service providers to some extent.

Seema Gupta and others (2009) ^{*50} found that service providers give customers an incentive to talk to other users on same network by providing a lower call rate, using this strategy they increase their customer base. Authors said that plans with different rentals do not differ much from each other and though they seem to provide users specific benefits. In addition, the per-second billing plans, which have supposedly changed the face of Indian telecom industry, are not beneficial for the costumers as are hailed to be. They also found that these plans are beneficial to the customer only as long as the average duration per call is less than 50 seconds, and for longer calls, the customers actually end up paying more.

Sanjit Kumar Roy (2006) ^{*51} Author discussed the basics of mobile marketing and its conceptual model. Mobile marketing has emerged as one of the important tools of marketing. Author identified that Mobile marketing has four types of broad formats viz. messaging based, browser based, voice based, location based. He further revealed that a mobile network is characterized by the two factors first is ability to maintain communication between two non-static locations and second is ability to keep track of the location. Author identified the quantitative benefits of mobile marketing as efficiency, less processing time, less lead time. Author further added that this form of marketing has immense potential, it also has certain challenges.

Makam S. Balaji (2009) ^{*52} Author investigated the antecedents and consequence of customer satisfaction in context of Indian mobile services. The author examined the casual relationships among customer expectations, quality, value, satisfaction and loyalty. The author explained that perceived quality is an important predictor to customer satisfaction, which ultimately results in trust, price tolerance and loyalty.

Low call rates, affordable mobile hand sets, the changing socioeconomic status of customers and the regulatory reforms are mentioned as feature of Indian Telecom Market. The author described that mobile service providers have not been able to maintain or increase the customer satisfaction at the same rate as that of market growth. There is a rapid decline in quality of service due to poor network availability and lack of customer care.

Zainurin Dahari, Muhammad Sabbir Rahman & S. M. Ferdous Azam (2011) ^{*53} explained that Customer satisfaction is very important in telecommunication business

in Malaysia. The authors highlighted that the Malaysian customers are very much conscious of brand image, service quality and price. Authors further said that mobile phone operators in Malaysia need to be very careful about these factors.

Author further added that Mobile phone operators need to develop effective marketing strategies, upgrade their technological capabilities and develop their efficient marketing activities. Particularly for Malaysian customer's satisfaction the operators need to develop and maintain better service quality, minimize price and improve brand image.

S.K Chadha & Deepa Kapoor (2009)^{*54} highlighted that the current cellular market has become more competitive; consumers tend to become more and more demanding. Mobile telecom service sector in India has been experiencing the highest growth rate in terms of subscribers and revenues. The main condition for protecting the subscriber base is to win customer loyalty. The authors concluded that there is a positive relationship between the switching cost and customer perceived service quality, customer satisfaction and customer loyalty. The author also suggested that in order to increase customer loyalty the service providers should maximize service quality.

S. S. Agarwal (2009)^{*55} Author in his study of mobile company's Brand Ambassadors and their impact on consumer behavior said that a company has to revise its policies and has to make them attractive so as to comply with the image of the brand ambassador. Author further said that the popularity of a celebrity can attract the customer to use the product for the first time but after that, it all depends upon the customer satisfaction.

Dr. V. Mallikarjuna and Dr. G. Krishna Mohan (2010)^{*56} highlighted that the TRAI is in the process of finalizing the procedure for Mobile number portability (MNP). Customer switching behavior affects the market share and profitability of the firms. Authors classified customer's reason for switching services into eight general categories viz. pricing, inconvenience, core service failure, Service encounter failure, response to service failure, competition, ethical problems and involuntary switching. Authors suggested that the service providers need to build relationship with the customers to understand their changing needs and design appropriate strategies to meet these needs.

Ashish Das and Sukesh Kumar (2011)^{*57} Authors estimated the price and income elasticity of demand for mobile usage of rural subscribers. Further they attempted to understand and analyzed the factors affecting choice of mobile service providers and mobile subscriptions. Authors highlighted various factors affecting choice of mobile service providers as Network Coverage, Good customer care facility, Good brand image, Easy availability of recharge facility, Attractive plans.

Subhrajyoti Bora (2011)^{*58} Author concluded that if the telecom operators are able to efficiently utilize the infrastructure, it will not only be saving cost for the companies, but also will improve the aesthetic value of our cities and rural areas. It will at the same time reduce redundant use of electricity, combustion fuel etc. which will benefit the nation. Author said that sharing leads to low operational cost, no duplication of efforts and cost saving. The company also gets the time to focus on core business activities.

Malhotra Gunjan, Mukherjee Amitava, and others (2011)^{*59} studied the consumer behavior towards mobile number portability. They explained that with the introduction of MNP feature, India has joined other foreign countries literally freeing customers from any obligation towards service providers. MNP has a huge potential to make the whole mobile service industry more innovative, customer friendly and cost effective. The behaviors of the consumers towards mobile service providers are influenced broadly by two factors service quality and cost.

Hiren Patel, Jigar Makwana and Shailesh Desai (2011)^{*60} Authors described that entertainment as the strongest factor when it comes to taking decision regarding subscribing to 3G mobile services. The business application, quick information, video application are the next important aspect. Due to the cut throat competition, it becomes very much necessary for 3G providers to pitch themselves effectively against their competitors through distinct segmentation and positioning. Study revealed that there are two groups of the users. One is business application oriented and other is oriented towards variety and entertainment at minimal cost.

M. Muthuswami, Dr. Thangavel and Dr. Y. L. chaudhari (2007)^{*61} the study mainly focused on different attribute that contribute to the consumer preference on

mobile connections. Authors said that due to the growing competition a service company needs to undertake many steps to remain in the industry and being profitable. This study revealed the consumer preference towards the services offered by various mobile service providers and also their buyer behavior.

Shirshendu Ganguly (2008)^{*62} Author aimed at exploring the drivers of customer satisfaction among the Indian cellular service users. Author highlighted that the reliability, rational quality and competitiveness of service providers are driving all facets of customer satisfaction more than network quality, market reputation or convenience. When it comes to satisfaction from usage of the services competitiveness is the most important driver of satisfaction followed by reliability and convenience of service are the least important factor.

Chaitanya Vyas (2010)^{*63} Author explored the young consumers reactions to marketing communications they receive through live phone calls, prerecorded calls and SMSs. The results showed that the majority of customers find these communications irritating. Sometimes they also find such communications useful and interesting and do not favor banning them. Unwanted communications provoke negative response from customers because of the discomfort, irritation and disturbance caused by such messages.

The survey results showed that majority are aware of do not call registry. Frequency of marketing by SMS is higher than that of phone calls. There is greater inclination to stop marketing phone calls than SMS. Author suggested that marketers must get consumer's opinions about the type of marketing messages they would like to receive in whichever form on whatever products / services and how frequently.

Pravin Patil (2011)^{*64} has studied about the new era brought by 3G in India. Author highlighted that 3G has created new challenges and brought in bonanza of opportunities for telecom service providers. 3G was relatively slow to be adopted globally as the mobile operators had to build entirely new networks and license entirely new frequencies, especially in order to achieve high end data transmission rates. The advent of 3G services is expected to boost revenue figures. With the huge capital investment, the stakes are indeed high for the service providers.

Piotr Rzepakowski (2008)^{*65} Author mentioned deregulation brought new competition that forces telecommunication companies as well as other retailers to implement new sales strategies. As customer's loyalty depends on the satisfaction he gets from product and service usage, delivered goods should not only be of good quality but also should be well suited to user requirements. Customers should be sure that they do not pay extra money for not used additional features.

Raiyani Jagadish R. & Joshi Nilesh K.^{*66} Authors studied a brief overview of performance, prospects and problems encountered by the service sector in India. A number of sector specific measures have been taken up by the Government of India to promote Information Technology and Information Technology enabled Services as well as other sun-rise sectors like telecom, organized retail, hospitality, entertainment and financial services sector.

India has become the service hub for the world. The Author highlighted that the remarkable performance of India's economy is attributable in significant part to the spectacular dynamism shown by the telecom service sector.

S. G. Sureshraj and Dr. M. Selvachandra (2009)^{*67} Authors highlighted that based on the socio economic changes, the rural telecom consumers are aware of the aspects of purchase. They have the analyzing capacity during the pre-purchasing of the Cell phone. In recent times, there has been an improvement in the rural consumer's attitudes because of exposure to communication technology, education, job opportunities in town and abroad.

Rakesh Kumar Sharma & R.K. Yadav (2007)^{*68} Authors described that Telecommunications is one of the fastest-growing areas of technology in the world. Due to rapid growth, businesses and individuals can access information at electronic speed from almost anywhere in the world. By including telecommunications in their operations, businesses can provide better services and products to their customers.

Authors further added that deregulation and new technology have created increased competition and widened the range of network services available throughout the world. This increase in telecommunication capabilities allows businesses to benefit from the information revolution in numerous ways, such as streamlining their inventories, increasing productivity and identifying new markets.

Muhammad Mohsin Butt & Ernest Cyril de Run (2009) ^{*69} Authors Mentioned that measuring customer satisfaction is one of the key steps in improving service quality and retaining customers in cellular telecom industry. The study demonstrates that there are a few factors that affect satisfaction of cellular phone users. Price and network coverage are the two most important components contributing to the customer satisfaction. The service providers must realize that apart from competitive pricing, they should vigilantly monitor the service delivery in terms of signal quality & network coverage.

Vishwanath Kendurkar (2003) ^{*70} Author carried out the study of strategic positioning of BSNL brand Tarang. He found that there are many strengths possessed by BSNL, which give BSNL competitive strength to successfully exploit wireless voice communication market. Apart from having core competence in telecommunication services, it has got huge infrastructure like national long distance network. However, there are some problem areas including high internal comfort level among its employees, which emanates from its history of Government monopoly. There are some more issues, which it needs to address after corporatization particularly issues of organizational structure and autonomy of decision making.

Shanthi Venkatesh (2008) ^{*71} Author highlighted that privatization and subsequent opening up of the telecom sector to competition, have led to some very encouraging changes in the user behavioral pattern of telecom customers, since the users are given a choice, which was hitherto unavailable.

Variety coupled with value-additions offered by the players, is leading to switch-over and churn. The competitive environment is necessitating re-structuring the strategies of the players, to sustain in the market. Author further added that the telecom players are marching ahead by constantly luring delightful customers into their fold. The paper examined the expectations and satisfaction levels of the service users, using fixed-line telephone services and identified the service gaps.

Vivek Khattar, IMRB International (2006) ^{*72} Author provided useful insight in customer behavior. It was identified that the overall satisfaction was related negatively with behavior of service engineer. The root cause was that the service &

sales departments operated independently to the detriment of company image. The salesmen promised certain performance characteristics while the service engineer explained the flaw in the promise and seemed to help the customer by visiting often.

However, this led to greater dissatisfaction. (Customer was happier with the engineer than the company.) Author further described that the primary dimensions of product quality include Performance, Features, Reliability, Conformance, Durability, Serviceability, Aesthetics and perceived quality.

Dr Sandhya Joshi, Parveen Khurana and others (2010)^{*73} found that there are strong differences regarding service quality perception in different age groups, gender, education and income level. Thus the telecom managers can embark upon a strategy of targeting specific customers with specific educational and income levels. They can also make special packages for different age group, for different income group, etc. Authors also highlighted that the Network quality is very important factor in determining service quality.

TRAI, (2010)^{*74} TRAI said that the growth of mobile network is rapid and number of operators are available in the Indian Telecom Market. In order to ensure seamless Interconnection between the operators, TRAI has been monitoring the level of congestion at the Point of Interconnection (POI) between various service providers on monthly basis. This parameter also reflects that how effective is the interconnection between two networks. The benchmark notified by TRAI in the QOS Regulations for this parameter is < 0.5%. This means out of 200 calls between two operators only one call should face congestion. The result of the monitoring reveals that degree of congestion between the operators is far more than the benchmark in number of areas.

Aminu Ahmad, Tafawa Balewa and others (2008)^{*75} Paper has investigated the influence of marketing mix on client's satisfaction in Nigerian GSM market. Authors mentioned that rapid diffusion of mobile telephone services is accompanied with low satisfaction and high switching behavior.

IAMAI & e-Technology Group at IMRB, (2008)^{*76} Report highlighted that the declining ARPU (Average revenue Per User) and increasing competition among operators compels operator to focus on alternate revenue streams. Report mentioned

that there is a need for capitalizing on the Value Added Service Market. This report presented key issues in detail and provides a neutral perspective to the industry.

It provides a clear and precise definition of MVAS, its various categories existing in India. Report mentioned that the MVAS is still evolving in India. As ARPU declines, the challenge for operators is to increase revenues by differentiating their offerings and develop alternative revenue streams by offering more value added services to the existing subscribers. The decrease in average revenue can also be attributed to the structure of the Indian Mobility Market which is largely prepaid. This means that most of the subscribers added are from the bottom of pyramid with low usage resulting in low ARPU.

Yi Hao, Xiaoqin Yuan and Weiqing Zhang (2009) ^{*77} Author described that there are nine factors which have an important impact on customer loyalty in telecom industry in China. These factors are call quality, coverage of network, SMS quality, the convenience and reliability of Inquiring phone fee system, service quality of service center and rating price of given quality, customer's worry of troubles after change cell phone number, social responsibility, advertisements about corporate image. Author suggested that China Mobile can keep and increase its good preference by the use advanced techniques to improve the phone call quality and increase the network coverage especially in the rural areas.

Debrun Chakraborty (2013) ^{*78} Author studied to determine the customer satisfaction & expectation towards a telecom company. Results revealed that the dimensions which influence the of customer's satisfaction level are: Core services (like good coverage, good connectivity and network quality) and call rate. Hence, it has been recommended that telecom companies should focus on connectivity, call rate, coverage and network quality.

Anita Ramadass, Dr. C. Swarnalatha, (2012) ^{*79}, Researchers have identified and analysed five gaps as per the service quality gap model with reference to BSNL, Madurai. Authors revealed that Service Quality is dependent on the customer's perception. Customer's perception and expectation are variable but the expectation-perception gap can be narrowed down to a minimum by the service organizations. The service quality gap can be minimized by managing the management's perception gap,

the specification translation gap, the service delivery gap and the media communication gap which involves reducing the discrepancies at every stage.

After analyzing the gaps some suggestions for the improvement of service quality have also been summarized by the authors which emphasizes on trained and empowered man power, crisp and accurate advertisement, and treating every customer complaint as an opportunity to improve the system.

G. N. Satish Kumar (2011)^{*80} Author revealed that Service Accessibility, Service Affordability, Promotional Offers and Customer Service are four important factors which are influencing the customer in selecting the telecom service provider. Customer Service has the highest impact on selection of service provider. Author said that Service Accessibility is the second factor which influences the customer in selection of the service provider. Service Accessibility is availability of the network, SIM cards and customer service centre for customers.

Singh, Sanjeet, Sharma, Gagan Deep and others (2011)^{*81} Authors evaluated the customer perception and expectation from MNP. Paper revealed that the service providers have now started giving more beneficial schemes to the customers. On the other hand now customer is also looking for the better coverage and if he is not getting it from one provider he is ready to switch to other because there is no need to change the number. On the customer part the problem is with the time for switching, which is seven days if he opt MNP. The other problem is the paperwork, which is too much. The paper concludes with a remark that the MNP increased the competition among the service providers and given more choice to the customer.

M. Usharani and M Kavitha, (2012)^{*82} Study is based on the overall efficiency of Reliance Telecom Ltd. It stated that the company has to concentrate more on its profit position. The present business world is becoming more complex because of its dynamic future. Management should be more active and efficient in order to overcome the obstacles, which requires effective financial management in order to pinpoint the problems and adopt necessary steps for the smooth running of business. .

Shahzad Khan and Saima Afsheen (2012)^{*83} study explained that which independent variables can influence customer satisfaction in cellular industry. As per

authors customer satisfaction depends upon the category of customer. These customers can be divided according to their age, gender, profession, status, etc. The student category prefers service provider which offer better SMS packages, internet buckets and call packages.

It is concluded that price fairness and coverage are the key factors contributing towards customer satisfaction of University students. The study further revealed that the problem of coverage is generally in rural area where sometime customers are not able to gain services from any particular service provider.

Suthar B.K., Dr. Sharma J.K., Dr. Anant Gwal, (2012)^{*84} Authors recommended that cellular operators should try to retain their customer base on the first priority. They should improve the service quality. Authors highlighted that along with service quality, the second most important factor is value.

K Kumaresh, Dr. C. Sekar (2012)^{*85} Study focused on the mobile number portability among the mobile users in Coimbatore. Authors said that the most challenging job for the present day is to retain existing mobile customers. The mobile operator's ability to retain its customer has a direct impact on its profitability.

Study found that considerable share of the respondents was aware of MNP through Advertisement, friends and relatives. Major share of the respondents stated that poor coverage and no promotional offers as their major problem in their past service. Firms should concentrate more on sufficient coverage. The study further recommended that the sales person also should be trained to communicate the effectively to non-customers in a friendly manner and not as product pusher.

Anita Seth, K Momaya and H M Gupta (2008)^{*86} Research resulted in the development of a reliable and valid instrument for assessing customer perceived service quality for cellular mobile services. On the basis of the findings revealed during the exploratory investigations, convenience and customer perceived network quality dimensions were added in the original SERVQUAL scale by the authors.

Authors conducted study by incorporating both functional as well as network quality attributes for assessing customer perceived service quality. They gave seven dimensional structure of service quality namely reliability, assurance, tangibles, empathy, responsiveness, convenience, and customer perceived network quality.

Researchers have also studied the relative importance of service quality attributes. Study revealed that responsiveness is the most important dimension, followed by reliability, customer perceived network quality, assurance, convenience, empathy and tangibles.

Vaibhav Misra and Dr. R.K Shukla (2011) ^{*87} Author conducted this study in the rural areas of Lucknow district to understand the reasons due to which customer builds up his mind for changing the telecom service providers. He has identified reasons as tariff and schemes, brand image, call quality, subscription duration and customer service failures. Author further recommended that the telecommunication companies to understand the reasons of churn and make the suitable strategies to retain the customer. The churn also affects their position in the market; it affects the market share of the companies.

Jessy John, (2010) ^{*88} Author said that Trustworthiness, relationship, image, value added services and inconvenience in switching phone number were found to be the key factors that influenced the loyalty of the BSNL customers. Even though the service provided by BSNL is very cost effective it is still loosing its customer base. BSNL must look away from the issue of cost and must try to improve the network quality and the quality of customer services as per the expectations of the customers.

Author said that BSNL need to update itself with respect to these technologies as well as take the initiative to market itself as youth friendly. At the same time initiatives should be taken to improve the functional service quality. Attention should be given to improve reliability, assurance, empathy & satisfaction of the customers.

Vani Haridasan & Shathi Venkatesh (2011) ^{*89} this paper set out as a contribution to current practices of CRM by the mobile service providers for assessing the effectiveness on Customer Loyalty. Data pertaining to 7 Service Providers were collected from a sample of 490 mobile users in Chennai, Tamil Nadu, and India to analyze the effectiveness of CRM practices using Frontier analysis.

Dr. Amulya. M and Prof. D. Anand (2012) ^{*90} Authors highlighted that till the entry of the private companies it was a cake walk for the BSNL. Authors said that under utilization of human resources, have led to many problems in BSNL. Finally all the

problems resulted in pushing it down and recording negative growth. Delayed decision of launching services is the cause for losing the market share and the same opportunity is en-cashed by other private telecom companies.

Ashutosh Nigam, Rajiv Kaushik (2011)^{*91} this study highlighted a number of issues that are useful for aiding managers in the telecommunication sector. Study shows the importance of branding with respect to different attributes perceived by the users. It is important for manager to identify the needs of the customers and develop appropriate service quality strategies to meet such needs. The managers should focus on perceived service quality level to achieve higher satisfaction among consumers of the services. Authors recommended that significant focus has to be given on cost factor and better telecommunication infrastructure. The firms should focus first on availability of the network and recharge coupons, cost optimization in comparisons with the peer firms.

R.C.Upadhyaya & Vashundhra Sharma, (2012)^{*92} this paper is based on a survey which is done in Gwalior division on BSNL and AIRTEL service providers. The Researcher studied customer satisfaction on factors like provisioning of service, network performance, Reliability, maintainability, supplementary and value added services, redressal and overall service quality.

Mr. Sourabh P Chowdhuri; Dr. Shilpa K. Bendale (2013)^{*93} The study highlighted two aspects of Mumbai telecom market viz. an upsetting factor and a motivating factor. The biggest upsetting factor is poor connectivity. Since this issue does not suffice the basic reason of using a cell phone, it becomes a major factor in changing a mobile service provider. The biggest motivator for a Mumbai cell phone user is to buy a new connection is better call rates. Thus Mumbai may shift loyalties in telecom services if an operator is having bad network connectivity and there are available options of other operator services with better call rates.

Rajkumar Paulrajan and Harish Rajkumar, (2011)^{*94} A research study was conducted with an objective to understand the Indian consumer's perception choice in selecting cellular service providers. Consumer's perception is widely varied in accordance with the Communication quality, call service, facilities, price, customer care and service provider's attributes.

The outcome of this research is a comprehensively integrated framework to understand the relationships among several dimensions. The study shows communication and price were most influential and most preferential factors in selecting telecom service provider. However, product quality and availability has a significant impact on consumer perception choice in selecting cellular mobile service provider. The study revealed that call rates play the most important role in switching the service provider followed by network coverage, value added services.

M. Sathish , K. Santhosh Kumar K. J. Naveen, V. Jeevanantham , (2011) ^{*95} This Study revealed that call rates play the most important role in switching the service provider followed by network coverage, value added service and customer care while advertisement plays the least important role.

It is found that there is a relation between switching the service provider and the factors (customer service, service problem, usage cost, etc.) The findings also suggested that managers of these mobile operators should shift focus on building corporate image and analyse more carefully the reason for consumers to switch brands in this industry in order to increase loyalty among these consumers.

Yogesh K. Dwived and others ^{*96} This study empirically examined the factors affecting the adoption of broadband Internet in a developing country by focusing upon India. The findings of this research generate a number of issues that may assist both policy makers and ISPs for understanding consumer adoption of broadband. Study recommends that Policy makers may emphasize role of cost, content and last mile access for encouraging growth and diffusion of broadband in India. Research confirms and strengthens the view that the factors such as cost, speed of connections are important factors.

The cost of subscribing to broadband connection is emerged as an important and significant factor to adopt broadband connection. Furthermore, policy makers have to provide alternative places for broadband access for lower income groups, or those who cannot afford it. This may help to develop positive attitudes towards broadband amongst consumers and increase their behavioral intentions to adopt broadband which may, subsequently, encourage the overall adoption of broadband within India.

Naman Shah (2008) ^{*97} Study aimed to analyse consumer satisfaction and quality of service in cellular network. Author described that the supportive policy framework needs to be in place during period of rapid growth and transformation in telecom sector. He recommended that the telecom operators should take less time for solving customer queries. They should focus more on VAS like GPRS, Games, astrology and music for young people and business news for business people.

2.19 Study of Doctoral Thesis in the field of Telecom: - Following section briefly takes the review of Doctoral thesis in the field of telecom.

Mrs. Aruna Deoskar (2009) ^{*98}

The researcher has gathered data from 568 samples from Pune city for her study of Mobile Services from Customer's Perspective. Researcher found that for a majority of the mobile subscribers, network coverage is the top criteria when it comes to the selection of a service provider. Availing better network connectivity is the customer expectation. But service providers are not able to fulfill such expectation Customer also faces different network connectivity problems like network busy, not getting range, voice problems & frequent disconnection.

Author found that, in the cutthroat competitive market environment it has become the prime need of every service provider to satisfy the customer, so that they can attract more number of subscribers. This requires excellent customer care to be provided by operators. But study revealed that the customer is not very happy or satisfied with the after sales services provided by their service provider.

Author further adds that Customer satisfaction is directly affected by the customer care services like: Activation time, fault clearance, resolving complaints regarding unwanted messages & new scheme awareness. Survey shows that most of users are not aware of any promotional scheme. They are frustrated due to unwanted messages.

Merlin Thanga Joy A (2009) ^{*99} This study is an attempt to analyse the market structure of cell phone industry and customer's perceptions towards cell phones with special reference to Kanyakumari District.

Author highlighted that economy is the most influencing factor for mobile subscribers. Any rise or fall in tariffs directly affects mobile phone usage. Author

further added that more market can be tapped and usage of mobile phones can be enhanced, if tariffs decline further. Therefore, initiatives should come from service providers for tariff reduction. In today's largely competitive business environment, worldwide service providers should realize the need for focus on service quality as a measure to improve their competitive positions.

Users prefer to avail service from favorite service providers for various reasons like comfortable and profitable tariff rates, quality of voice , problem free connection, privileges like free SMS etc. Author said that as consumer is the King of any business, service provider should consider their grievances and demands.

Alpesh Nasit (2011)^{*100} Author of in his study titled “An Empirical Study on Marketing Strategy Of Telecom Sector In Gujarat State” highlighted that to reach out to new consumers in rural and remote areas, the sharing of infrastructure must be encouraged by the Government. It would, indeed, be wasteful for every operator to duplicate costly infrastructure. Infrastructure sharing on fair, transparent and commercial terms will ensure that consumers in rural areas get choice of service, quality as well as affordability. While the nation achieves aggressive rollout and improved tele-density, the operators get an attractive commercial proposition and an opportunity to expand the coverage and reach of their services.

The research revealed that marketing element is the significant determinant of marketing strategy. Marketing mix also leads to increased commitment from the customer. The customer looks for a better association with the telecom service provider it is dealing with. Marketing mix enhances the feeling of association, developing a bonding and nurturing an associative long-term relationship.

Author further revealed that network coverage area, transparency in billing, voice clarity, accessing speed, and reliability of service provider have major influence on satisfaction level of customers. Customer care service like queries resolution, humble and soft spoken peoples are major area to maintain for overall customer satisfaction. This study also shows that technology orientation is a significant factor of Telecom service users. Therefore, telecom service provider needs to ensure that it provides the best network quality and value added services.

Sharma, Kapil (2011)^{*101} Author in his research titled “Advertisement sensitivity in the promotion of cellular services: a comparative study of rural and urban areas in

Punjab” conducted his survey in three district of Punjab State. The study highlights advertisement sensitivity in the promotion of cellular services with a comparative study of Rural and Urban areas in the selected districts.

Author concludes that a substantial percentage of respondents having low income are using mobile phones. More than half respondents observe that they were not influenced by any advertisement during the course of buying their mobile service. Author said electronic and print media has its own say in the popularity of mobile phone services. In urban segment an abnormal trend has been seen where hundred percent respondents in the age group of 15-20 years agree that advertisements in media affects the customer’s buying behavior.

Author mentioned that more than three-fifth respondents like to go through deeply into the advertisements while reading newspapers, magazines. One significant analysis has emerged that advertisements in electronic media plays a guiding role for the rural and urban respondents. Appearance of celebrities in advertisements contributes to affect the minds of the customers in making choice. Rural respondents are comparatively more responsive in this behalf.

Dinesh Kamath, (2011)^{*102} Author for the study titled “A critical evaluation of customer satisfaction of cellular phone services in Pune” has collected data from 597 respondents from Pune City who are using Mobile telephones. He has mentioned the four parameters namely Network Coverage, Call Economy, Value Added Services and Instinct on which customer satisfaction depends.

Author concludes that local voice calls being most important service used by the user followed by SMS. In recommending the present service provider to other Idea Cellular Company’s customers are more enthusiastic, followed by ‘Airtel’. Author further reveals that ‘Airtel’ is the most aspired service provider in the event of choosing a second service provider. Author further says that majority of customers do not surf internet through Cellular phones. This is reflection of the higher cost.

2.20 References:

1	Philip Kotler P., (2004) , Principles of Marketing, , Pearson Education Pte Ltd, Indian Branch, 5 th Indian Print, Delhi, Page No. 444
2	C. Bhattacharjee , (2006) Service Marketing : Concepts, planning & implementation, Excel Book, First edition, New Delhi, Page No. 5
3	C. Bhattacharjee, (2006) , Service Marketing : Concepts, planning & implementation, Excel Book, First edition, New Delhi, Page No. 5
4	K. Rama Mohana Rao, 2005 , Services Marketing, Pearson Education Pte. Ltd, First Edition, Delhi, Page No. 8-12
5	Valarie A. Zeithaml and Mary Jo Bitner, 2004 , Services Marketing, Integrating Customer Focus Across the Firm, Tata McGraw-Hill Edition, New Delhi, 5 th Edition, Page No 60
6	Philip Kotler .,2004 , 5 th Indian Print, Principles of Marketing, Pearson Education Pte Ltd, Indian Branch, Delhi, Pg no 62
7	K. Rama Mohana Rao, 2005 , Services Marketing, Pearson Education Pte. Ltd, First Edition, Delhi, Page No. 77 to 84
8	Valarie A. Zeithaml and Mary Jo Bitner, 2004 , Services Marketing, Integrating Customer Focus Across the Firm, Tata McGraw-Hill Edition, 5 th Edition, Page No 83
9	Valarie A. Zeithaml and Mary Jo Bitner, 2004 , Services Marketing, Integrating Customer Focus Across the Firm, Tata McGraw-Hill Edition, 5 th Edition, Page No 6-7
10	Cacioppo, Kevin. (2000) , “Measuring and Managing Customer Satisfaction.” Quality Digest , [online], available on : http://www.qualitydigest.com/sept00/html/satisfaction.html ,[accessed on 12 march 2012]
11	Nigel Hill & Jim Alexander, 2006 , Handbook of customer satisfaction and Loyalty measurement, Gower Publishing limited, England, Page No 2
12	Dr. K. Karunakaran, 2008 , Marketing Management, Himalaya Publishing House, Mumbai, Page No 228
13	Valarie A. Zeithaml and Mary Jo Bitner, 2004 , Services Marketing, Integrating Customer Focus Across the Firm, Tata McGraw-Hill Edn., Fifth Edition, Page No 86

14	Valarie A. Zeithaml and Mary Jo Bitner, 2004 , Services Marketing, Integrating Customer Focus Across the Firm, Tata McGraw-Hill Edition, Fifth Ed. Page No 86
15	Philip Kotler P., 2004 , Principles of Marketing, Delhi, Pearson Education Pvt. Ltd, Indian Branch, 5 th Indian Print, Page No. 62-65
16	Valarie A. Zeithaml and Mary Jo Bitner, 2004 , Services Marketing, Integrating Customer Focus Across the Firm, Tata McGraw-Hill Edition, 5 th Ed. , New Delhi, Page No. 87-112
17	Philip Kotler P.,2004 , Principles of Marketing, Pearson Education Pte Ltd, Indian Branch, 5 th Indian Print, Delhi, Page No. 208
18	C. Bhattacharjee, (2005) , Service Sector Management An Indian Perspective, Jaico Publishing House, Fifth Impression ,2005, Pp. 23- 28
19	K. Rama Mohana Rao, 2005 , Services Marketing, Pearson Education Pte. Ltd., First Edition, Delhi, Page No. 63
20	C. Bhattacharjee , (2005) , Service Sector Management An Indian Perspective, Jaico Publishing House, Fifth Impression,2005,Pp 184-186
21	Philip Kotler, 2004 , Marketing Management, Prentice Hill, Fifth Indian Reprint, New Delhi, Page No. 73- 75
22	Philip Kotler, 2004 ,Marketing Management, Prentice Hill, Fifth Indian Reprint, New Delhi, Page No. 85-87
23	S.M. Jha, 2008 , Services Marketing, Himalaya Publishing House, Reprint 2008, Mumbai , Page No 83 to 85
24	Parasuraman & Valarie A. Zeithaml and L. L. Berry, 1985 , “A Conceptual Model of Service Quality & its Implications for Future Research “Journal of Marketing (Fall 1985), Page No. 41-50
25	Shri. Manasa Bhattacharya (1998) , Committee on India: Vision 2020, [online], available on : http://planningcommission.gov.in/reports/genrep/bkpap2020/1_bg2020.pdf , [accessed on 13 December 2013]
26	British Chambers of Commerce, (2003) , BCG Broadband Survey, [online] available: www.britishchambers.org [Accessed on 24 Jun,2011]
27	TRAI, (Dec-2010) , Recommendation Paper on National Broadband Plan, [online], available on: http://www.trai.gov.in/WriteReadData/Recommendation/Documents/Rcommendation81210.pdf [Accessed on 15 May,2011]

28	Govida Raj A, 2009 , Broadband Services comparison in India, [online] available on : < http://www.iitcoe.in/index.php?option=com_docman&task=doc > [Accessed on 25 December 2010]
29	Jupiter Research, (2007) , Customer`s Experience in Telecom, [online], available on <: http://www.rightnow.com/pdf/Jupiter-Telecom.pdf?Cex=796 >, [Accessed on 12/11/2011]
30	Dr. Sing Gagan, (2011) , Disinvestment & Telecom Sector of India, Indian Journal of Commerce & Management Studies, Vol.-II, Issue 2, March-2011, Page No. 65-76
31	Sheetal Singla (2011) , Mobile use pattern among Indian Consumer, Asian Journal of Management Research, Volume I , No 2, 2011, Page No. 594-599, [online], available on : http://www.ipublishing.co.in/ajmrvol1no2.html [Accessed on 31/12/2012]
32	William C. Johnson, Anuchit Sirikit, (2002) "Service quality in the Thai telecommunication in industry: a tool for achieving a sustainable competitive advantage", Management Decision, Vol.40 Iss:7, Pp 693 – 701
33	DR. G. Rama Krishna, M. Giridhar Kumar and DR. M. Madhu Lincoln (2011) , Growth of Telecom Sector in India, International Journal of Marketing and Management Research, Volume II, Issue 7
34	Shri Jayanta Banergi and Indraneel Bose (2011) , Higher Education Through Mobile Learning, Indian Journal of Commerce & Management Studies, Volume II, Issue I, July 2011
35	Mr. Sherah Kurnia , Heejin Lee and song Yang (2007) , Understanding Consumers? Expectations of Mobile Data Services in Australia, International Conference on the Management of Mobile Business (ICMB 2007) Page No.14,
36	Shri. G. Raghuram and Rekha Jain (2009) , Role of Universal Service Obligation Fund in Rural Telecom Services Lessons from the Indian Experience, Working Paper No 2009-06-03, IIM , Ahmedabad , [online] available on : www.iimahd.ernet.in/publications/data/2009-06-03Jain.pdf , [Accessed on 12/12/2011]
37	Sulekha Munshi (2011) , Expectations And Perceptions Of Mobile Phone Users , International Journal of Asian Social Science, 1(1), pp.10-16,

38	Indian Brand Equity foundation (2007) , Indian telecom Sector, [online], available on : < http://www.ibef.org > , [accessed on 24 December 2012]
39	Sahil Shah (2011) , Is Mobile Internet is really growing in India, [online] available on : http://www.imediaconnection.in/article/321/Digital/Mobile/is-mobile-internet-really-growing-in-india-survey.html , [Accessed on 22/08/2012]
40	Pravin Prashant, (2006) , Mobile Users' Satisfaction Survey (2006), VOICE&DATA [online], available on : < http://voicendata.ciol.com/content/top_stories/107010606.asp >, [Accessed on 25/09/2011]
41	Dr. Nagasimha Balakrishna Kanagal (2009) , Mobile Virtual Network Operator Model in India, [online], available on ; < http://tejas-iimb.org/articles/25.php >,[Accessed on 21/12/2011.]
42	Dr. Vivian Witkind Davis, Dr. Larry Blank, and others, (1996) National Regulatory Research Institute , The Ohio State University, Columbus, [online], available on: < http://tp.osu.edu/index.shtml >, [Accessed on 11/12/2011]
43	Ofir Turel, Alexander Serenko (2006) , Satisfaction with mobile services in Canada: An empirical investigation , [online] available on : < www.sciencedirect.com >, [Accessed on 11/09/2011]
44	Mohammed Upal (2008) Telecommunication Service Gap: Call Center Service Quality Perception and Satisfaction , Communications of the IBIMA , Volume 3, 2008, Page No 18-29
45	Sabbir Rahman, Ahasanul Haque, Mohd Ismail Sayyed Ahmad (2011) , Choice Criteria for Mobile Telecom Operator: Empirical Investigation among Malaysian Customers, Page No.18-24 , Communications of the IBIMA, Volume 3, 2008
46	Jean Lam, <u>Susy S. Chan</u>, <u>Xiaowen Fang</u>, <u>Jacek Brzezinski</u>, (2004) , Proposed Research Model for Customization and Satisfaction with Mobile Commerce, [online], available on : < facweb.cs.depaul.edu/research/techreports/tr04-009.doc >, [Accessed on 25/09/2011]

47	Abraham Karimpanal (2003) , The Mobile Customer Retaining customer loyalty in mobile telephony , [online], available on : < http://economictimes.indiatimes.com/the-mobile-customer-retaining-customer-loyalty-in-mobile-telephony/articleshow/40164559.cms > , [Accessed on 25/09/2011]
48	R. Harish and Raman Kumar Sharma (2010) , Use of 3G and 4G in Mobile Marketing, Marketing Mastermind, May 2010, Page No. 27-31
49	Amjad Iqbal, Mubashar Hassan Zia and others (2011) , Antecedents and Outcomes of Customer Satisfaction in using Prepaid Cellular Service in Pakistan ,[online], available on : http://www.wbiconpro.com/Marketing/503-Iqbal,A%20&%20Others.pdf , [Accessed on 22/12/2012]
50	Seema Gupta (2009) , Telecom Industry Pricing : Who is Eating into whose share, [online], available on : http://tejas.iimb.ac.in/articles/62.php [Accessed on 29 Dec 2012]
51	Sanjit Kumar Roy (2006) , Mobile Marketing An Overview, Marketing Mastermind Magazine, [online], available on http://www.iupindia.in/506/MM_Mobile_Marketing_50.html Page No 51-58[accessed on 1/1/2011]
52	Makam S. Balaji (2009) , Customer Satisfaction with Indian Mobile Services, The IUP Journal of Management Research, Vol. VIII, Pp 52 - 62
53	Zainurin Bin Dahari, Muhammad Sabbir Rahman and S.M. Ferdous Azam (2011) , Customer Satisfaction With Mobile Phone Operators: An Exploratory study In Kuala Lumpur, Malaysia, Indian Journal of Marketing, Issue May 2011, Page No 39-46
54	S. K. Chadha and Deepa Kapoor (2009) , Effect of Switching Cost, service Quality and Customer Satisfaction on Customer Loyalty of Cellular Service Providers in Indian Market, The ICFCI University Journal of Marketing Management, Vol VIII, Page 24-29
55	S. S. Agarwal (2009) , Brand Ambassadors And Their Impact On Consumer Behaviour: A case Study Of Mobile Companies In India , Indian Journal of Marketing, December 2009 issue, Page No 3-8
56	Dr. V. Mallikarjuna and Dr. G. Krishna Mohan (2010) , Customer Switching Behaviour – An Evaluation Of Factors Affecting Mobile Users by Indian Journal of Marketing , Issue March 2010, Page No. 42-49

57	Ashish Das and Sukesh Kumar, (2011) , Understanding Users of Mobile services in Rural area: A case of Bishalkhinda Village in Odisha, The IUP Journal of Marketing Management, Issue February 2011, Page No 54 to 63
58	Subhrajyoti Bora (2011) , Mobile Infrastructure Sharing – An Indian Scenario, Indian Journal of Management , May 2011 issue, Page No 3-16
59	Malhotra Gunjan, Mukherjee Amitava, Nandi Abhishek and Sinharay Soumyadeep (2011) , Consumer Behaviour towards Mobile Phone Service Provider- An Empirical Research on Mobile Number Portability in India , Advances in Management , Issue-June 2011 , Page No. 44-47
60	Hiren J. Patel, Jigar Makwana, Shailesh Desai (2011) , An Empirical study on Factors Considered by Potential Users of 3G Mobile Services, Marketing Mastermind, Vol. XI, Page No. 42-55.
61	M.Muthuswami, Dr. Thangavel and Dr. Y.L.chaudhari (2007) ,Consumer Preference on Mobile Connections and buyer behavior Towards Relaince Mobile in Chennai City , Journal of Contemporary Research in Management, July-December-2007,Page No.89-101
62	Shirshendu Ganguly (2008) , Drivers of Customer Satisfaction in the Indian Cellular Services Market, Icfaiian Journal of Management Research, Volume VII, Page No 51-69
63	Chaitanys Vyas (2010) , Marketing Communications Through SMS and Phone Calls Preferences and Perceptions of Young consumers ,Marketing Mastermind February 2010 issue, Page No 39-42
64	Pravin Patil (2011) , 3G Wonderland: The world is Not Enough , Marketing Mastermind Volume 7 , July 2011,Page No 51-55
65	Piotr Rzepakowski (2008) , Supporting telecommunication product sales by conjoint analysis, Journal of Telecommunication and Information Technology, Issue No. 3, [online] , available on : http://dlibra.itl.waw.pl/dlibra-webapp/Content/197/JTIT-2008_3_28.pdf [accessed on 12 Jan 2012]
66	Raiyani Jagadish R. and Joshi Nilesh K., 2011 , Service Sector in India : Performance, Problems and Prospects, Advances In Management , May 2011 issue.,

67	S. G. Sureshraj and Dr. M. Selvachandra (2009) , Factor Analysis Of Rural Consumers' Preference Attributes In The Purchase Of Cell Phone: An Empirical Analysis, Indian Journal of Management, Issue January 2011, Page No. 50-54.
68	Rakesh Kumar Sharma & R.K. Yadav (2007) , Reforms in Indian Telecom Sector, [online], available on : http://www.indianmba.com/FacultyColumn/FC701/fc701.html [Accessed on 22/11/2012]
69	Muhammad Mohsin Butt & Ernest Cyril de Run (2009) , Modeling customer satisfaction in cellular phone services , Journal Kemanusiaan bil, Issue -2009, [online], available on : < http://www.fppsm.utm.my/download/doc_view/24-modeling-customer-satisfaction-in-cellular-phone-services.htm > [Accessed on 01/09/2011]
70	Vishwanath Kendurkar (2003) , Strategic Positioning of Tarang (BSNL WLL Service), Post Graduate Management Project submitted to Management Development Institute , Gurgaon, Page No 4 -5
71	Shanthi Venkatesh , (2008) , Analysis of gaps in telecommunication services – a study with respect to service gaps in fixed-line segment , Innovative Marketing , Volume 4, Issue 1, 2008 , Page No. 64-72
72	Vivek Khattar , IMRB International (2006) QOS and Customer Satisfaction: A Study, [online], available on : < http://www.pipelinepub.com/0706/pdf/khattar_HP.pdf >, [Accessed on 11/08/2011]
73	Dr Sandhya Joshi, Parveen Khurana, Shashi Khurana, (2010) , Service Quality in Telecom Sector – A study of Telecom Service Providers of Chandigarh , Panchkula and Moholi, International Journal of Mgmt Marketing research, Vol.1, Issue 1 (December, 2010) , Page No. 90 -98
74	TRAI, (2010) , Monitoring level of congestion at the point of Interconnection, [online], available on : < traai.gov.in/WriteReadData/PIRReport/.../POIREPORT12MAY.pdf > [Accessed on 21/09/2011]
75	Aminu Ahmad, Tafawa Balewa , (2008) Marketing Mix Drivers of Clients Satisfaction in Technology-enabled Service: Study of Nigerian GSM Subscribers, Communications of the IBIMA Volume 1, 2008

76	IAMAI & e-Technology Group @ IMRB, (2008) , Mobile VAS in India, [online] , available on : http://www.wpp.com/wpp/marketing/digital/mobile-vas-in-india.htm , [Accessed on 16 Jul-2011]
77	Yi Hao, Xiaoqin Yuan and Weiqing Zhang (2009) , How to promote Loyalty Of Chinese Mobile operator , [online], available on : < www.bth.se/fou/cuppsats.nsf/0/3dae4fb1399cd1e8c125765f0044a7c5 > [Accessed on 18/09/2011]
78	Debrun Chakraborty (2013) Customer Satisfaction and Expectation Towards Aircel: A Research conducted in West Midnapore , Abinav , International Monthly Refereed Journal of Research In Management & Technology , Abhinav Volume II, Jan-13 ,Page No 114-127
79	Anita Ramadass, Dr. C. Swarnalatha , (2012) Identification Of Service Gaps In Bsnl, Madurai -A Step Towards Improving Service Quality. International Journal of Scientific Research , Volume: 1/4, Sep 2012, Page No.102 -105
80	G. N. Satish Kumar, 2011 , Factors Influence Mobile Users In Selecting Cellular Service Providers in India : An Empirical Study Based On Structured Equation Model, International Journal of Research in Commerce and Management , Volume No2, 2011, Issue 6 (June)
81	Singh, Sanjeet, Sharma, Gagan Deep and Singh, Gurbhej, (2011) Customer Perception and Expectation of Mobile Number Portability (April 27, 2011).[online], Available on : < SSRN: http://ssrn.com/abstract=1852019 >[Accessed on 12 March 2013]
82	M. Usharani and M Kavitha, 2012 , Growth Analysis of Reliance Telecom Ltd, International Journal of Marketing and Technology, Jan-2012, Volume 2, Issue I, Page No 153-166
83	Shahzad Khan1, Saima Afsheen , 2012 Determinants of Customer Satisfaction in Telecom Industry A Study of Telecom industry Peshawar KPK Pakistan ,Journal of Basic and Applied Scientific Research, [online] available on : http://www.textroad.com/pdf/JBASR , [Accessed on 10 April 2013]

84	Suthar B.K., Dr. Sharma J.K., Dr. Anant Gwal , 2012 , A Study on Consumer Behavior After Mobile Number Portability with Reference to Gujrath Telecom Circle, Bauddhik , Vol.3/2, , May-Aug-2012, [online] available on : < http://www.chimc.in/volume3no2/research%20paper-1.pdf > [Accessed on 10 April, 2013]
85	K Kumaresh , Dr.C.Sekar 2012 , Mobile Number Portability In Coimbatore : an Empirical Analysis of Consumer Switching Behavior, International Journal of Research in IT & Management , Vol.2/1, (Feb-2012), [online], available on : < http://www.euroasiapub.org /IJRIM/feb2012 /405.pdf >, [Accessed on 06 May 2013]
86	Anita Seth, K Momaya, and H M Gupta (2008) Managing the Customer Perceived Service Quality for Cellular Mobile Telephony: An Empirical Investigation, Vikalpa, Vol.33 /1, Jan-Mar 2008 Page No 19-34 , [online] available on : http://www.vikalpa.com/pdf/articles/2008/V33102_ [Accessed on 12 April 2011]
87	Vaibhav Misra And Dr. R.K Shukla , (2011) , The study of Relationship Between Reasons of Churn outs in Telecom Sector in Rural Markets of Lucknow District, Indian Journal of Research, (2011), Pp 35-40, [online], available on:< http://ssrn.com/abstract=2189572 >, [Accessed on 12/04/2012]
88	Jessy John , 2010 , An analysis on the customer loyalty in telecom sector: Special reference to Bharath Sanchar Nigam limited, India , African Journal of Marketing Management Vol. 3(1) , January 2011, Page 2-5
89	Vani Haridasan & Shathi Venkatesh (2011) , CRM Implementation In Indian Telecom Industry – Evaluating The Effectiveness Of Mobile Service Providers Using Data Envelopment Analysis , International Journal of Business Research and Management, Vol.2/3, Page No 110-127, [online] , available on : < http://cscjournals.org/csc/manuscript/Journals /IJBRM > [Accessed on 24 Dec 2012]
90	Dr. Amulya. M and Prof. D. Anand , (2012) , Demographic Trends in Indian Telecom sector – A study from the perspective of Customers of Select Telecom service providers in Mysore City , Paripex - Indian Journal Of Research , Volume 1/12, Dec-2012, Page No 141-151 , [online], available on :< http://theglobaljournals.com/paripex/file.php?val=NjY4 >, [Accessed on 31 Jan 2013]

91	Ashutosh Nigam , Rajiv Kaushik (2011) , Attribute Based Perceptual Mapping of Prepaid Mobile Cellular Operators: An Empirical Investigation Among Management Graduates in Central Haryana , International Journal of Computational Engineering & Management, Vol.11, Jan-2011, Page No 71-81 , [online] , available on : http://www.ijcem.org/papers12011 [Accessed on 21 Nov-2012]
92	R. C. Upadhyaya & Vashundhra Sharma , (2012) , A Comparative Study Of Telecommunication Service Providers BSNL & Airtel Operating In Gwalior Division India , International Journal of Business Management & Research (IJBMR) ,Vol.2 Issue 4 Dec-2012 , Pp 13-20 , [online], available on:< www.tjprc.org/download.php > , [Accessed 12 /01/2013]
93	Mr. Sourabh, P Chowdhuri, Dr. Shilpa and K. Bendale (2013) , When Mumbai Shifts Loyalties (A Scenario Of Mumbai Telecom Market) , Spectrum: A Journal of Multidisciplinary Research Vol.2 Issue 2, February 2013, Pp 36-45 , [online] , available on : http://www.pinnaclejournals.com /setup/socialscience/paper48.pdf , [Accessed on 6 May 2013]
94	Rajkumar Paulrajan & Harish Rajkumar, 2011 , Service Quality & Customers Preference of Cellular Mobile Service Providers , Journal of Technology Management & Innovation , Volume 6/1 Page No. 38-45 , [online], available on : < http://www.scielo.cl/pdf/jotmi/v6n1/art04.pdf > [Accessed on 12 January, 2013]
95	M.Sathish , K.Santhosh Kumar K.J.Naveen, V.Jeevanantham , 2011 , A Study on Consumer Switching Behaviour in Cellular Service Provider: A Study with reference to Chennai , Far East Journal of Psychology and Business Vol. 2 No 2, February 2011, [online], available on : < http://www.fareastjournals.com/files/V2N2P5.pdf > , [Accessed on 12 Dec 2012]
96	Yogesh K. Dwivedi & others, 2008 , Understanding Factors Affecting Consumer Adoption of Broadband in India: A Pilot Study, [online], available on: http://csi-sigegov.org/3/8302_3.pdf , [Accessed on 22/05/2013]
97	Naman Shah (2008) , To critically analyze the customer preference and satisfaction measurement, [online],available on : < www.slideshare.net/ guest377d84/ telecom-sector-thesis > [Accessed on 25 July 2011]

98	Mrs. Aurna Deoskar, (2009) A Study Of Mobile Services From Customer's Perspective , Doctoral Thesis Submitted to University of Pune, [online] , available on : http://shodhganga.inflibnet.ac.in/handle/10603/1997 [Accessed 28 Feb 2012]
99	Merlin Thanga Joy A (2009), Cell Phone Services In Kanyakumari District , Doctoral Thesis submitted to Manonmaniam Sundaranar University, [online], available on : http://hdl.handle.net/10603/682 [Accessed on 23 Dec 2011]
100	Nasit, Alpesh A. (2011) , An empirical study on Marketing strategy of telecom sector in Gujarat State. Ph.D. thesis, Saurashtra University [online], available on :< http://etheses.saurashtrauniversity.edu/764/ > , [Accessed on 22 October 2012]
101	Sharma, Kapil (2011) , Advertisement sensitivity in the promotion of cellular services: a comparative study of rural and urban areas in Punjab , [online], available on : http://shodhganga.inflibnet.ac.in/handle/10603/2886 , [Accessed on 21 Feb, 2013]
102	Dinesh Kamath, 2011 , A critical evaluation of customer satisfaction of cellular phone services in Pune , Submitted for PhD degree to the Symbiosis International University, Pune, [online], available on : http://shodhganga.inflibnet.ac.in/handle/10603/8516 [Accessed on 10 Jan-2013]

CHAPTER III
TELECOM SECTOR
REVIEW

CHAPTER III
TELECOM SECTOR REVIEW
CONTENTS

Chapter No	Description	Page No
3	Telecom Sector Review	78-111
3.1	Services Provided by Telecom Service Operator	80
3.1.1	Landline Phone Services	80
3.1.2	Fixed Line Prepaid Services	81
3.1.3	Conferencing Services	81
3.1.4	Web Hoisting Services	82
3.1.5	I-Net Services	82
3.1.6	Fleet Management Solution	83
3.1.7	INMARSAT Services	83
3.1.8	Very Small Aperture Terminal (VSAT)	83
3.1.9	Centrex	83
3.1.10	EPABX	84
3.1.11	Managed Network Services	84
3.1.12	Ethernet Leased Lines Services	84
3.1.13	Leased Lines Services	84
3.1.14	Integrated Service Digital Network (ISDN)	85
3.1.15	IP Backbone using MPLS Technology	85
3.1.16	Broadband Services	86
3.1.17	Mobile Services	86
3.1.18	Wireless Application Protocol (WAP)	87
3.1.19	GPRS and MMS Services	87
3.1.20	Fixed Cellular Terminal	88
3.1.21	3G Systems	88
3.1.22	Value Added Services (VAS)	88
3.2	Profile of Telecom Service Operator Companies	89
3.3	Current Status of the Telecom Sector	96
3.4	References	107

Chapter No III

Telecom Sector Review

3. Introduction: - The telecom industry can be divided into two major segments namely wire-line segment and wireless segments. This chapter takes the reviews of different services which are provided under these two segments. This chapter also describes the profile of different telecom service operators and telecom sector.

3.1:- Different Services provided by Telecom Service Operators: - This section takes the review of the different services provided by Telecom Service Providers.

3.1.1 Landline Phone (BSNL, 2011)*¹: Landline phone service which is also called as fixed wire-line telephone service is provided through electronic telephone exchanges. Presently this service is not only used to make and receive voice calls but also offers many phone plus services. These phone plus services have converted the basic telephone into an advance tool which can be used for a variety of business applications. Some of the phone plus services are listed below.

- **Abbreviated Dialing:** If the customer needs to call few numbers frequently he can program these number as codes like 1 or 2. Subscriber then can dial only code instead of 10 digit numbers. This is very useful in case of STD/ISD call.
- **Call Waiting:** With this facility customer gets a short duration tone when his line is busy and third party wants to call him. The customer can speak to any one caller and can keep the other one waiting.
- **Hot Line:** Customer may want to be connected directly to a pre-determined number as soon as he lifts the hand set even without dialing. The number of customer's choice can be programmed by the exchange staff at his request. After doing so if he lifts the telephone and do not dial within five seconds he will be automatically connected to the programmed number. This is hot line facility.
- **Reminder Call Service:** The electronic exchange gives a reminder call at predetermined time.

- **Number / Call Hunting Service:** Suppose customer is having two numbers. If caller dialed first number and if this number is busy then automatically exchange diverts the call to second number if second number is free at that moment.
- **Calling Line Identification Presentation (CLIP):** This facility allows the customer to view the calling party number before attending the call.
- **Group Billing Scheme:** If company is having more than five connections working at different locations then company can register itself to get the consolidated bill and make a payment by single cheque.
- **Electronic Locking for STD / ISD:** The electronic code is available to lock and unlock the STD / ISD facility to avoid misuse.
- **Call Transfer (Call Forward):** With this facility one can forward the received call to another telephone number. This facility is very useful for a person who is having travelling job.

3.1.2. Fixed Line Pre-Paid Services (BSNL,2011)^{*2}: This service enables a subscriber to make calls from a prepaid account linked to his telephone number. Every time he need not dial the authentication code. FLPP offers following features:

- No need of telephone bill as it is prepaid. STD/ISD Facility can be availed by the customer.
- Easy de-linking from telephone line when prepaid is not required on any number and free from authentication code like prepaid calling card.
- Balance enquiry is online real time and recharge is very easy.

3.1.3 Conferencing: The conferencing is one of the easy ways to communicate with a group of people at the same time. Following are main types of conferencing.

A. Audio Conferencing: Audio Conferencing service allows multiple participants to converse with each other regardless of their location through the fixed line telephone or cellular phone. The authorized participants have just to dial in a particular telephone and password to enter into an audio conference. (BSNL, 2011)^{*3}

B. Video Conferencing: Video conference is the conference between different participants at different locations by using computer networks to transmit audio and

video data. Video call in 3G Network is same as point to point video conference. In multiparty video conference each participant has a camera, microphone, computer and communication system. Multipoint videoconferencing allows three or more participants to sit in a virtual conference room and communicate with each other. **(Webopedia, 2012)**^{*4}

C. Web Conferencing: Web conferencing refers to a service that allows conferencing events to be shared with remote locations. These are sometimes referred to as online workshops. In general the service is made possible by Internet technologies. The service allows real-time point-to-point as well as point to multipoint communications from one sender to many receivers. It offers information of text-based messages, voice and video chat to be shared simultaneously, across geographically dispersed locations. **(Wikipedia, 2011)**^{*5}

3.1.4 Web Hoisting Services (BSNL, 2011)^{*6}: Currently companies are developing the website giving full details of their product, services offered and about the company itself. This website needs to be published or uploaded on the server so that company product and services are reachable to the customers. The investment needed to publish this website is on higher side and requires the high end servers.

The Web Hoisting service providers do have the powerful web servers. These servers are shared by different companies. The administrative control of the website remains with the customer, though the website is in the operator's server.

3.1.5 I-Net Services (BSNL, 2011)^{*7}: This is packet switched Public Data Network. It is cost effective and provides high speed. Networking of data terminals and computers in different offices both within the country and outside is possible through I-Net. Following is the list of the applications which can run with I-Net.

- Electronic Mail related activities
- Data communication in corporate houses.
- Retrieval of the information & Database Services.
- Banking applications like Credit Card authentications.
- Useful for Travel industries for applications like Travel Reservations.
- Internet connectivity

X.25 connectivity (Cisco, 2011)^{*8}:- X-25 connectivity is protocol standard for WAN communications that defines how connections between user devices and network devices are established and maintained.

3.1.6 Fleet Management Solution (BSNL, 2011)^{*9}:- Presently it is possible to track the different vehicles like truck, trailers and containers with hazardous explosive or chemicals. The vehicle tracking system mounted on vehicles sends the periodic messages from vehicle to control rooms. This information is forwarded to server which is available on internet. User can access information by authenticating himself with password. The user can also access information through SMS, Fax as well as via E-mail. Features of the services are as follows.

- 24 X 7 tracking and the system does not require manual intervention.
- It is a real time system and reduces in-transit inventory.
- Information via Internet with security.

3.1.7. INMARSAT (Department of Telecom, 2013)^{*10} (International Maritime Satellite Organization): INMARSAT provides phone, fax and data communication with the help of satellites. Subscriber dialed INMARSAT services from Shore to Ship, Ship to Shore and Ship to Ship in Indian region is operational in the BSNL.

3.1.8. Very Small Aperture Terminal (BSNL, 2011)^{*11}:- VSAT is a Terminal aligned towards a designated Satellite for up-linking and down-linking of communication signals. Anywhere connectivity is made possible even at those locations, which can not be connected through conventional media like copper cable, optical fiber and any other wireless links. VSAT is a versatile solution, not only as a reliable primary link for non feasible areas, but also as a very successful alternate technology as backup link. High speed data transfer up to 2Mbps and voice communication service covering the entire country is possible with VSAT.

3.1.9. Centrex (BSNL, 2012)^{*12}:- Centrex is a system which integrates telephone connections located at different places into single group and do not require any additional equipment at subscriber premises. The Centrex is customizable and do have very good voice clarity. It permits flexible design and private dialing plan. In this systems quick implementation of new features are possible.

3.1.10. EPABX: - (Electronic Private Automatic Branch Exchange) Telecom service operator permits telephone subscribers to use their own PABX and EPABX connected to the service operator's network under certain commercial conditions.

3.1.11. Managed Network Services (BSNL, 2012)^{*13}:- Now a days business houses need not worry about the installing and maintaining robust IP Backbone. In Managed Network Services Telecom service operators provide hardware, connectivity packages and managed services. The Managed network services save the capital expenditure. As these networks are maintained by Service providers there is no risk of technical obsolescence.

It is scalable according to the changing needs of the customers. The troubleshooting is provided with the helpdesk numbers. Managed Network Services provides Enterprise Broadband, Internet and MPLS VPN connectivity as completely managed offering. Customers can enter in service level agreements with the service providers. It is just like the turn key project.

3.1.12. Ethernet Leased Lines (Reliance, 2012)^{*14}:- Ethernet Leased Line services can be used to connect different computer networks between two or more business houses. Ethernet leased line provides scalability that is one can add the bandwidth without any additional wiring or physical work. The bandwidth is scalable from 64 Kbps to 1 Gb on same interface. The Ethernet leased line can be provided with point to point and point to multipoint links. The Ethernet provides following benefits.

1. Addition of bandwidth is possible without additional deployment.
2. Saves the operational and capital expenses.
3. It is just plug & play network with high speed.
4. It has got a capacity to work without any packet drop.
5. Prioritization of voice, video and data is possible.
6. The network can be designed to provide high security.

3.1.13. Leased Lines (About.com, 2011)^{*15}: -“A leased line connects two locations for private voice or data telecommunication service. A leased line is actually a reserved circuit between two points. Service Providers maintain a single open circuit at all times, as opposed to traditional telephone services that reuse the same lines for many different conversations through a process called switching.”

The leased line provides the guarantee of the bandwidth. With leased line customers can connect their branch offices. These lines are available from 64Kb to one Gb bandwidth. These lines can be provided within cities and between different cities. The low down time is the most important aspect of the leased line; hence it can be used for the critical applications.

3.1.14. ISDN (Integrated Service Digital Network):- ISDN is a “Network technology that supports digital transfer of simultaneous voice and data traffic”. (Todd Lammle, 2007) ^{*16}

An ISDN user can set up two simultaneous independent Telecom calls on the existing pair of telephone wires. The two simultaneous calls can be of any type - speech, data, image or video. Using an ISDN line the data transfer rate is a 64 Kbps and it can go up to 128 Kbps. (Calcutta Telephone, 2011) ^{*17}

Services offered and Types of Accesses of ISDN connections (BSNL, 2012) ^{*18}

- A. Telephone with calling number identification facility & Fax
- B. Data speed upto 64 Kbps & Video Conferencing at 128 Kbps.
- C. Calling Line Identification Presentation (CLIP), call Hold and call waiting are also the feature of ISDN.

Types of Accesses of ISDN connections

- A. Basic Rate Access (BRA): 2B+D: - This provides 2 Channels of 64 Kbps for Speech and Data and one Channel of 16 Kbps for Signaling.
- B. Primary Rate Access (PRA): 30 B+D: - This provides 30 Channels of 64 Kbps for speech and data and a one Channel of 64 Kbps for signaling.

3.1.15. IP Backbone using MPLS Technology: - “The Virtual Private Network is a method of encrypting point to point logical connections across a public network, such as Internet.” This allows secure connection across a public network. The basic idea of Virtual Private Network (VPN) is quite simple.

A Company may have many offices at different locations. Each of these locations has its own local network. Internetworking these separate networks over a shared network creates a VPN. (Tomm Lammhe, 2007) ^{*19}

MPLS is a packet-forwarding technology which uses labels to make data forwarding decisions. MPLS provides applications like VPN, Quality of Service and any transport over MPLS.

Additionally, it decreases the forwarding overhead on the core routers. MPLS technologies are applicable to any network layer protocol. (Cisco, 2012) *20

Advantage of MPLS over other Technology (BSNL, 2012) *21:

- Provides a diversified range of services to meet the requirements of the entire spectrum of customers from small and medium to large business enterprises and financial institutions. Make the service very simple for customers to use even if they lack experience in IP routing.
- Make the service very scalable and flexible to facilitate large-scale deployment. Provides a reliable service.
- Capable of meeting a wide range of customer requirements, including security, quality of Service and any-to-any connectivity.
- Capable of offering fully managed services to customers.

3.1.16. Broadband:- As per Broadband Policy 2004 broadband connectivity is defined as “An always-on data connection that is able to support interactive services including Internet access and has the capability of the minimum download speed of 256 kbps to an individual subscriber” (Broadband Policy, 2004) *22

The National Telecom Policy-2012 has revised the existing broadband download speed of 256 Kbps to 512 Kbps and subsequently to 2 Mbps by 2015 and higher speeds of at least 100 Mbps thereafter. (National Telecom Policy-2012) *23

The services supported broadband service (BSNL, 2011) *24:

1. Broadband access for domestic and business use.
2. Internet Protocol Television, Games, video and music on demand.
3. Voice and Video over Broadband.
4. IP Telephony is also possible with the use of broadband services.
5. Distance learning also made easy with the help of broadband services.

3.1.17. Mobile: - A mobile phone is a “device that can make & receive telephone calls over a radio link while moving around a wide geographic area. It does so by connecting to a cellular network provided by a mobile network operator, allowing access to the public telephone network”. (Wikipedia, 2012) *25 In addition to voice services mobile phones are providing different value added services like data, text messages, music and video on demand, gaming, Call Conference & call waiting etc.

Presently following features are available on Mobile Network (BSNL, 2012)*²⁶

- A. **Voice Mail Service (VMS):-** When the customer is busy, out of service area, or he has switched off telephone purposely the voice mail service is the solution for this. The caller can record what he wants to convey to called party and called party can listen at his own convenience.
- B. **SMS: -** This facility enables the mobile customer to forward Text message to the other mobile customer. The feature is Very useful as well as available at low cost. If called number is switched off the mobile exchange system periodically checks the status of the called party and immediately delivers message whenever the called party switches on his mobile.
- C. **International Roaming: -** The subscriber stays connected to the parent network while he is roaming nationally and internationally. This is very useful facility for international tourist and subscribers working in multinationals those need to go on foreign tours frequently.
- D. **UMS (Unified Messaging Service):** Unified messaging services are integration of different messaging and communication technology. System can be categorized as per the below mentioned functionality :
 - 1. **Voice Mail Service (VMS):** Using this feature the voice message can be send and received.
 - 2. **FAX Message :** One can receive the fax messages on mobile
 - 3. **E-Mail:** subscriber can receive the E-Mail.
 - 4. **E-Mail to Speech (ETS):** This feature will enable the subscriber to listen the Email on the mobile phone

3.1.18. Wireless Application Protocol: - Wireless Application Protocol is a “secure specification that allows users to access information instantly via handheld wireless devices such as mobile phones, pagers”. WAP has provided interactive services like Email by mobile phone, tracking of stock market, sports, music downloads and news headlines. (Webopedia, 2011)*²⁷

3.1.19. GPRS and MMS (BSNL, 2011)*²⁸

GPRS (General Packet Radio Service):- GPRS offers high speed data services in GSM network. Users will be able to browse Internet using handsets supporting Internet browsing. Also browsing of Internet from Laptops and Desktop computers

is possible by connecting the computer with the GPRS enabled mobile handset through a data cable or Infrared connectivity.

MMS (Multimedia Messaging Service): MMS delivers a total communication experience, allowing personalised multimedia content such as images, audio, text, video and combinations of these. The subscriber can easily create the MMS with the images already stored in the phone or camera.

3.1.20. Fixed Cellular Terminal: - A Fixed cellular Terminal is a box, which contains a number of SIM cards, depending on the requirements. A fixed cellular terminal would most suit to the companies that make a lot of calls from fixed line office phones to their own fleet of mobile phones or any company with a significant monthly expenditure on landline to mobile calls. **(Discountcomms, 2011)**^{*29}

3.1.21. 3G Systems: - 3G is an ITU specification for the “third generation of mobile communications technology. 3G promises increased bandwidth, up to 384 Kbps when a device is stationary or moving at pedestrian speed, 128 Kbps in a car, and 2 Mbps in fixed applications. 3G is the third generation of wireless technologies.” **(Webopedia, 2012)**^{*30}

3G provides the following features

- High Data speed and Video Calling
- IPTV support through Internet
- Enhanced video streaming

3G supports the following class of traffic

- Conversational class: - This includes voice, video.
- Streaming class: - This includes multimedia, video on demand, webcast.
- Interactive class: - Web browsing, network gaming, database access.
- Background class: - email, SMS, data downloading from Internet.

3.1.22. Value Added Services: - **(Internet and Mobile Association of India, 2008)**^{*31} “Value Added Services are enhanced services which add value to the basic tele-services and bearers services for which separate licence are issued”. The Government of India issues licenses for the following Value Added Services: -

- ✓ Voice mail service & Videotext service

- ✓ Global Mobile Personal communication via satellite
- ✓ Internet & Audio text
- ✓ Unified messaging service

MVAS categories: - Mobile VAS can be divided into three broad categories, named as Entertainment VAS, Information VAS and M-Commerce VAS.

Entertainment VAS: - The Entertainment VAS provides a way to spend the time. The Jokes, ringtones, games, dating are some of the options that come under Entertainment VAS categories.

Information VAS: - This service provides useful information to customers. The breaking news, TV guide, movie tickets, bank account information and stock exchange update are the few categories that come under the information VAS.

M-Commerce VAS (Transactional services):- M-commerce relates to transaction of money using mobile phone. These can broadly be classified into two categories namely Mobile banking and Mobile payments. Mobile banking is a term used for performing balance checks, account transactions, payments, credit applications and other banking transactions through a mobile phone.

Mobile payments on the other hand may be defined as the use of mobile devices to pay for goods or services either at the point of purchase or remotely.

3.2 Profile of Different Telecom Service Operator Companies

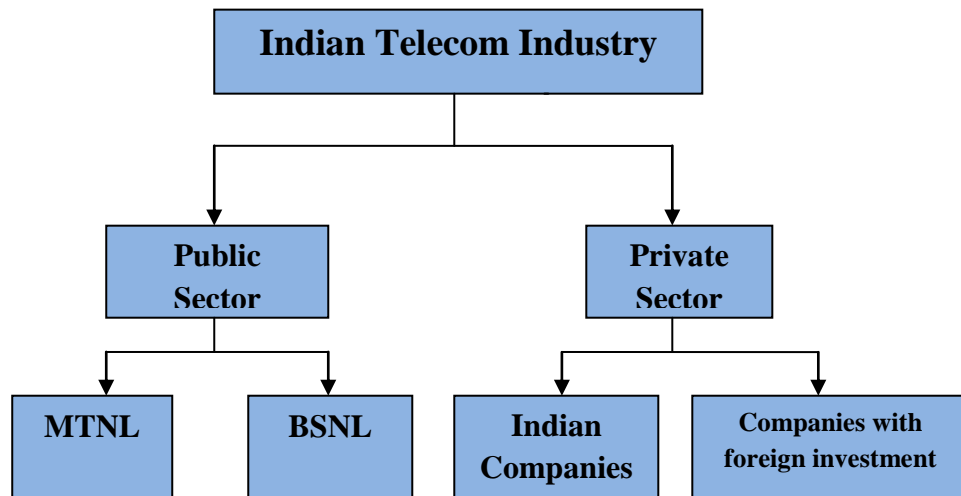
Indian telecom industry has seen a high pace of growth after changes in Telecom Policies. Indian Telecom Industry is equipped with the different communications systems that link all parts of the country by telephone and Internet. India has large mobile phone user base with over 867.80 millions users as of 31/03/2013. (TRAI, Press Release, No. 38/2013) ^{*32}

Structure of Telecom Sector: - The Indian telecom industry includes private-sector as well as Public Sector Companies. Most of these private companies are formed after implementation of New telecom Polices. These companies have obtained Fixed and wireless communication licences and expanded their customer base. Fig No 3.1 shows the structure of Indian Telecom Industry.

Public Sector: There are two state run companies BSNL and MTNL which provide telecom services in the country. MTNL operates in Delhi and Mumbai and BSNL provides services to the rest of the country. These PSU have provided tough competition to private sector companies and also has a very good progress with the

bundle of different services and technologies. These companies have major share in broadband customer base.

Fig No.3.1 Structure of Indian Telecom Industry



(Source: - Own Research of Researcher)

Private Sector: - Private operators also have remarkable role in the growth of telecom industry especially in wireless sector. After the implementation of NTP-1999 private sector demonstrated the excellent progress in customer base. The private sector companies have tried to provide the fixed and wireless network but their growth is prominent in wireless services.

Some of the Private companies are present all over India and other provides the services to specific circles in the country. The Private operators are holding 87.76 % market share and 12.24 % Market share is held by the PSUs as on 31 March 2013. (TRAI, Press Release No. 38/2013)*³³

Following section take the brief review of the different Telecom service providers which are operating in Pune city.

3.2.1 Bharat Sanchar Nigam Limited:-

Introduction (BSNL, 2011) *³⁴ Bharat Sanchar Nigam Ltd. formed on 1st October 2000 by converting Department of Telecom Services into Public Sector Unit. BSNL provide all types of Telecom Services like Data, Wire-line / Wireless telecom Services, MPLS and VPN services. The network of BSNL is spread all over country in rural as well as urban area. BSNL provides service on pan India basis except Mumbai and Delhi where the services are provided by MTNL. The company has

vast experience in planning, installation, integration, maintenance of networks. The vision, Mission and objectives of the companies are as follows.

Vision:

1. Be the leading telecom service provider in India with global presence.
2. Create a customer focused organization with excellence in sales, marketing and customer care,
3. Leverage technology to provide affordable and innovative telecom services across different customer segments.

Mission:

1. Providing a work environment with strong focus on performance.
2. Establishing efficient business processes enabled by Information Technology.

Main Objectives:

1. To be the Leading Telecom Services provider by achieving higher rate of growth so as to become a profitable enterprise.
2. To provide quality and reliable fixed telecom service to customer and thereby increase customer’s confidence.
3. To provide customer friendly mobile telephone service of high quality and play a leading role as GSM operator in its area of operation.

Director Board of BSNL (BSNL, 2011)^{*35}- The Director Board comprise of twelve Directors. Six directors (including the CMD) are full time Directors. Two part time Directors are nominated by the Government. The board also comprises four Non-official Part Time Directors. Thus, the Board has the optimum mix of fifty percent full-time and fifty percent part-time Directors.

Staff Strength

As on 31 December 2012 BSNL staff strength was 2,56,088. The staff is categorized as Executives and Non Executives. **(DOT, Annual Report, 2013)^{*36}**

Table No. 3.1 Staff Strength of BSNL

Sr. No.	Staff	Strength
1	Executives	50,598
2	Non-Executives	2,05,490
	Total	2,56,088

(Source: Annual Report, DOT, 2013, available at www.dot.gov.in)^{*36}

Financial Status of BSNL: - BSNL's profit started declining continuously since 2004-05 and reported loss first time in the year 2009-10. BSNL had announced a loss of Rs. 1,823 crore in the year 2009-10. During 2010-11, BSNL losses rose to Rs 6,384 crore mainly due to heavy outgo on salaries and expenses borne by the BSNL for procuring 3G and BWA spectrum. BSNL's losses widened to about Rs 8,850.70 crore during 2011-12 mainly due to regulatory expenses and non-receipt of funds for its rural landlines operations. (**Business Standard, 2012**)^{*37}

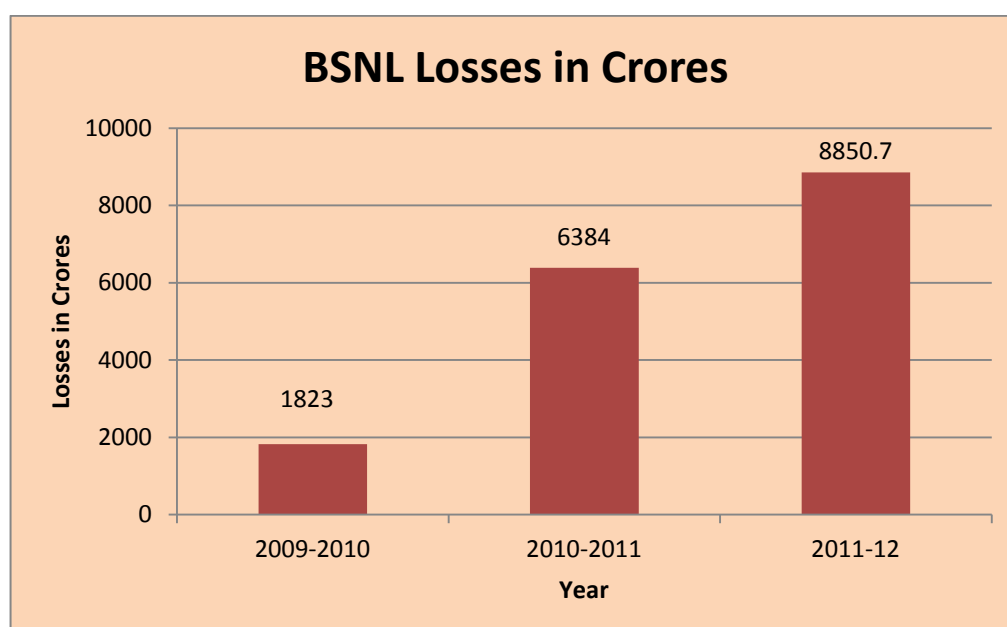
BSNL losses, as per estimates, are expected to be about Rs 8,198 crore in the year 2012-13. (**Times of India, 2013**)^{*38}

Table No. 3.2: Losses of BSNL

Sr. No.	Financial Year	Losses...Crore
1	2009-2010	Rs. 1,823
2	2010-2011	Rs. 6,384
3	2011-2012	Rs. 8,850.7
4	2012-2013	Rs 8,198 (Estimated)

[Source: (**Business Standard, 2012**)^{*37} & (**Times of India, 2013**)^{*38}]

Fig. No. 3.2 Losses of BSNL



(Source: [**Business Standard, 2012**)^{*37} & (**Times of India, 2013**)^{*38}]

3.2.2. IDEA Cellular Limited (Idea cellular, 2013)^{*39}:- Idea Cellular is an Aditya Birla Group Company. It is an integrated GSM operator offering 2G and 3G services with pan India presence. Idea has its own National Long Distance and International Long Distance operations network. It has also got a license as an Internet Service Provider. Idea Cellular is listed company on the National Stock Exchange and the Bombay Stock Exchange in India.

The Mission of the company is “We will delight our customers while meeting their individual communication needs anytime anywhere. We survive because of our customers”.

Revenue earning of the company is more than \$4 billion. The subscriber base of the company is more than 121 million in FY 2013. Idea’s robust pan-India coverage is built on a network of over 100,000 cell sites (Towers), spread across over 55,000 towns in India. Using the latest in technology, Idea Cellular provides service delivery through the extensive network of customer touch points, comprising of nearly 4,500 exclusive Idea outlets and over 7,000 call centre seats

Idea offers a range of high-speed mobile broadband devices including android based 3G smart-phones, dongles etc. Idea’s wide portfolio of 3G smart-phones offer the latest 3G applications and high-end data services such as Idea TV, games, social networking and many others. In voice services segment Idea provides the Fixed Cellular Terminals, GSM PRI Gateway and Call Conference Service. In GPRS Application segment Idea provides Internet on Mobile and USB card. In business application it provides vehicle tracking solution and in customized solution. It also provides SMS / GPRS based business solutions.

3.2.3 Tata Teleservices Limited (Tata Teleservices, 2013)^{*40}:- Investment in communications is among one of the Tata Group’s larger investments. The Group’s objective is to provide end-to-end telecommunications solutions for business and residential customers across the nation. The Group’s communications activities are currently spread primarily over companies namely Tata Teleservices Limited, Tata Teleservices (Maharashtra) Limited and Tata Communications (erstwhile VSNL). These companies provide following telecom services.

1. **Data Services:** - Leased Lines, Managed Data Networks, IP/MPLS VPN, Dial-up Internet, Wi-Fi and Broadband.

2. **Telephony Services:-** Fixed and Mobile telecom services
3. **Value-added Services:-** Mobile and Broadband Content/Applications, Calling Cards, Net Telephony and Managed Services
4. **Infrastructure Services:-** Submarine Cable Bandwidth, Terrestrial Fiber Network and Satellite Earth Stations and VSAT Connectivity

TTL Profile: - Incorporated in 1996, Tata Teleservices Limited was the pioneer of the CDMA (Code Division Multiple Access) technology platform in India, embarking on a growth path after the acquisition of Hughes Telecom. Over the last few years, the company has launched different telecom services. Company has launched CDMA mobile operations in January 2005 under the brand name Tata Indicom. The company launched Broadband Services under the brand name Tata Photon in the year 2008 and 2G GSM services under the brand name Tata DOCOMO in the year 2009.

Tata DOCOMO received a pan-India license to operate GSM telecom services and rolled out GSM services in all the 18 telecom Circles. The company has integrated all brands into single flagship brand called Tata DOCOMO. Tata DOCOMO marks a significant milestone when per-second tariff option was introduced. Tata Teleservices Limited also launched 3G services in India

Tata Teleservices is also in the fixed wireless telephony market. Tata Teleservices presently offers different telecom services like Mobile Services, Wireless Desktop Phones, Public Booth Telephony and Wire-line Services.

3.2.4 Aircel:- Aircel commenced operations in 1999 in Tamil Nadu. In the year 2003, it has launched telecom services commercially in Chennai. Aircel began its outward expansion in the year 2005. Aircel is GSM mobile service provider with a subscriber base of 65.1 million. Aircel is a pan India operator with a presence across 23 circles. The company offers voice & data services ranging from 2G/3G services, Broadband Wireless, Value-Added-Services (**Aircel, 2013**) ^{*41}

3.2.5 Reliance Communications Limited: - Reliance Communications is the flagship company of the Reliance Group. Company business encompasses a complete range of telecom services covering mobile and fixed line telephony. It includes broadband, national and international long distance services and data services along with an exhaustive range of value-added services and applications.

Reliance Mobile services cover over 24,000 towns, 6 lakh villages. Reliance provides the business solutions for the small, medium and large business houses. Reliance offers the comprehensive portfolio of voice, video and data network services on an integrated and highly scalable platform.

In India, Reliance provides long distance business services including voice, bandwidth and infrastructure services, national and international private leased circuits, broadband internet access, audio and video conferencing, MPLS-VPN, remote access VPN, Centrex, toll-free voice services for offices, voice VPN for corporate and managed internet data centre services. **(Reliance, 2013)**^{*42}

3.2.6 Vodafone: - Vodafone India is a member of the Vodafone Group and commenced operations in 1994 when its predecessor Hutchison Telecom acquired the cellular license for Mumbai. The company now has operations across the country with over 150 million customers. Serving the needs of an enterprise, Vodafone Business Solutions offers business houses a total solution for voice, data telecommunications.

Vodafone offer a wide array of high-performance data, IP and network transport Services for National and International telecommunications carriers. Vodafone offer has installed 100,000 km. of highly reliable and redundant optical fiber network across the country. Vodafone also provide the 3G services. **(Vodafone, 2013)**^{*43}

3.2.7 Bharti Airtel Limited : Bharti Airtel Limited is a global telecom company with operations in 20 countries across Asia and Africa. The Company Headquarter is at New Delhi. Company provides GSM mobile services in the 22 telecom circles in India. The company registered itself as Public Limited Company on July 07, 1995.

In India, the company's product offerings include 2G, 3G and 4G wireless services, mobile commerce, fixed line services, high speed broadband, IPTV, DTH, enterprise services including national & international long distance services. Airtel has also launched 4G services which deliver data speed upto 100 Mbps in ideal condition. The Enterprise business provides end-to-end telecom solutions to the corporate customers. Airtel also provides national and international long distance services to other Telecom Service Providers through its optic fiber network.

Airtel also provides the different services under mobile data like BlackBerry, a web-enabled mobile email solution, USB modem that helps in getting instant access to Internet. Airtel also provides GPRS Based Solutions like Track Mate, automatic meter reading solutions. Airtel also provides SMS Based Solutions like interactive SMS, bulk SMS, inbound call center solutions. (Airtel, 2013)^{*44}

3.2.8 Uninor:- Uninor is an Indian mobile network operator based at Gurgaon, India. The company is a joint venture between Telenor Group (A telecommunications company headquartered in Oslo, Norway) and Unitech Group (An Indian real estate Company). Uninor offers mobile voice and data services based on the GSM technology. As of December 2012, Uninor has 31.8 million customers and a total workforce of 16,500 people. Uninor has launched services with 100% outsourced tower infrastructure. Uninor is better known with its “24 X 7” Badalta Discount Plan which is somewhat different. (Uninor, 2013)^{*45}

3.3 Current Status of the Telecom Sector:-

The Indian Telecom Sector provides the different telecom services to the users, but these services can be broadly classified as Mobile, Landline and wire-line Broadband. The review of these services is taken in the flowing section. The TRAI monitors the status of the telecom sector in India and publishes the different press releases on telecom subscription data. The data in respect of different services is compiled with the help these press releases.

3.3.1 Status of Cellular Mobile Service Sector: The Country is divided into 23 service areas consisting of 19 Telecom Circles and 4 Metro Service Areas for providing Cellular Mobile Telephone Service (CMTS). As per National Telecom Policy, the first phase of liberalization in mobile telephone services started in November 1994 with issue of 8 licenses for CMTS in the 4 metro cities of Delhi, Mumbai, Calcutta and Chennai.

Subsequently, 34 licenses for 18 Territorial Telecom Circles were also issued to 14 private companies from 1995 to 1998. During this period a maximum of two licenses were granted for CMTS in each service area and these licensees were called first and second cellular licensees. These licensees were to pay fixed amount of

license fees annually based on the agreed amount during the bidding process. Subsequently, they were permitted to migrate to New Telecom Policy (NTP) 1999 regime wherein they are required to pay License fee based on revenue share, which is effective from 1st August, 1999.

State owned Public Sector Undertakings MTNL and BSNL were issued licenses for provision of CMTS as third operator in various parts of the country. Further, 17 fresh licenses have been issued to private companies as fourth cellular operator in October, 2001, one each in 4 Metro cities and 13 Telecom Circles.

As per conditions of the License Agreement, cellular operators are free to provide, within their area of operation, all types of mobile services including voice and non-voice messages, data services and Public Call Offices (PCOs) utilizing any type of network equipment, including circuit or package switches that meet the relevant International Telecommunication Union standards. **(DOT, 2013)** ^{*46}

Table No. 3.3 Metros and States under different circle

Sr. No.	Metro	Circle A	Circle B	Circle C
1	Delhi	Maharashtra	Kerala	Bihar
2	Mumbai	Gujarat	Punjab	Orissa
3	Chennai	Karnataka	Haryana	Assam
4	Kolkata	Tamil Nadu	West Bengal	J & K
5		Andhra Pradesh	Uttar Pradesh East	North Eastern States
6			Uttar Pradesh West	Himachal Pradesh
7			Madhya Pradesh	
8			Rajasthan	

(Source: COAI, 2012) ^{*47}

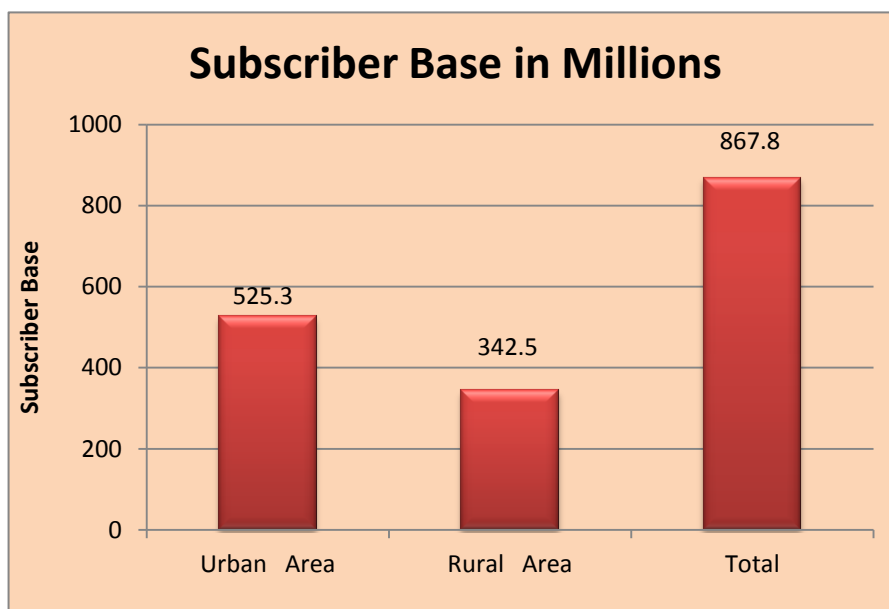
3.3.1.1 Wireless Subscriber Base and Tele-density:-TRAI has released the Press Release No. 38/2013 on 29th May 2013 containing the information about the subscriber base and Tele-density in Urban and Rural area. The subscriber base as on 31 March 2013 in Urban Area is 525.30 Millions and in rural area is 342.50 millions. The total wireless subscriber base is millions 867.8 Millions. The Overall Tele-density is 70.85. Urban Tele-density is 140.67 and Rural Tele-density is 40.23 **(TRAI, Press Release No. 38/2013,)** ^{*48}

Table 3.4 Wireless Subscriber Base and Tele-density as on 31/03/2013

Sr. No.	Category	Subscriber Base	Tele-density
1	Urban Area	525.30 millions	140.67
2	Rural Area	342.50 millions	40.23

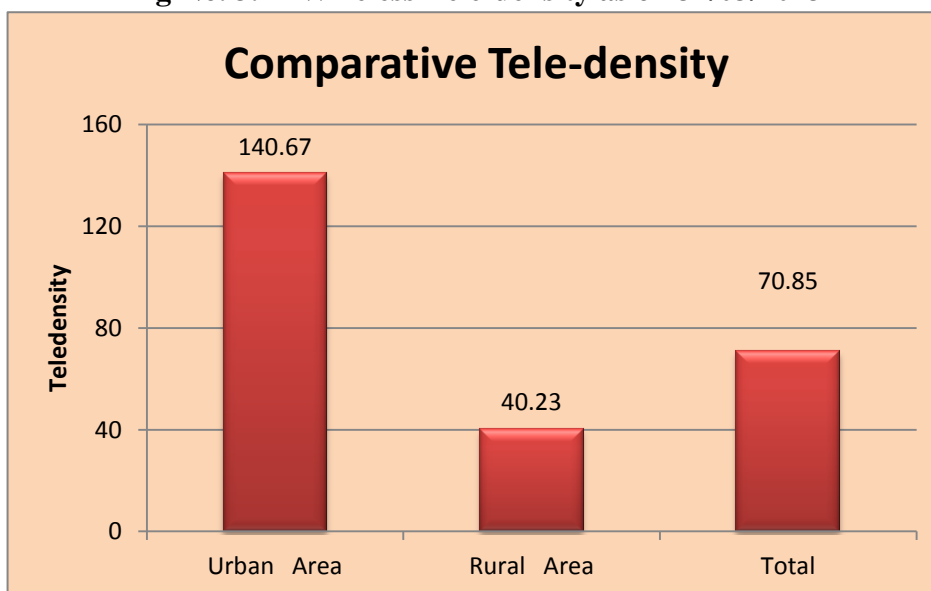
(Source: Press Release No. 38/2013 available at www.trai.gov.in)*48

Fig. No. 3.3 Wireless Subscriber base in millions as on 31/03/2013



(Source: TRAI, Press Release No. 38/2013 available at www.trai.gov.in)*48

Fig No. 3.4 Wireless Tele-density as on 31/03/2013



(Source: TRAI, Press Release No. 38/2013 available at www.trai.gov.in)*48

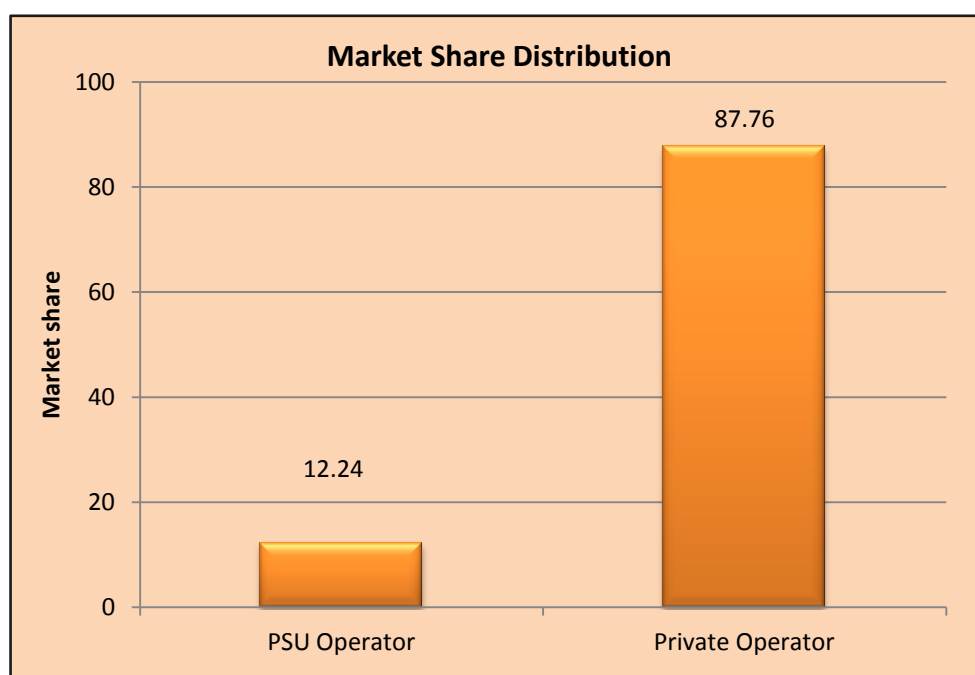
3.3.1.2 Distribution of Public and Private Operator Market Share (TRAI, Press Release No. 38/2013)^{*48}:-: In wireless telecom market the Private operators are holding 87.76 % market share and Public sectors are holding 12.24 % Market share as on 31 March 2013.

Table No .3.5 Distribution of Subscriber Base between PSU & Private Operator

Sr. No.	Operator	Subscriber Base	Market Share
1	PSU Operator	106205976	12.24 %
2	Private Operator	761597607	87.76 %
	Total	867803583	100.00 %

(Source: TRAI, Press Release No. 38/2013 available at www.trai.gov.in)^{*48}

Fig. No. 3.5 Distribution of Market Share between PSU & Private Operator



(Source: TRAI, Press Release No. 38/2013 available at www.trai.gov.in)^{*48}

3.3.1.3 The Distribution of Market Share between different service Operators:

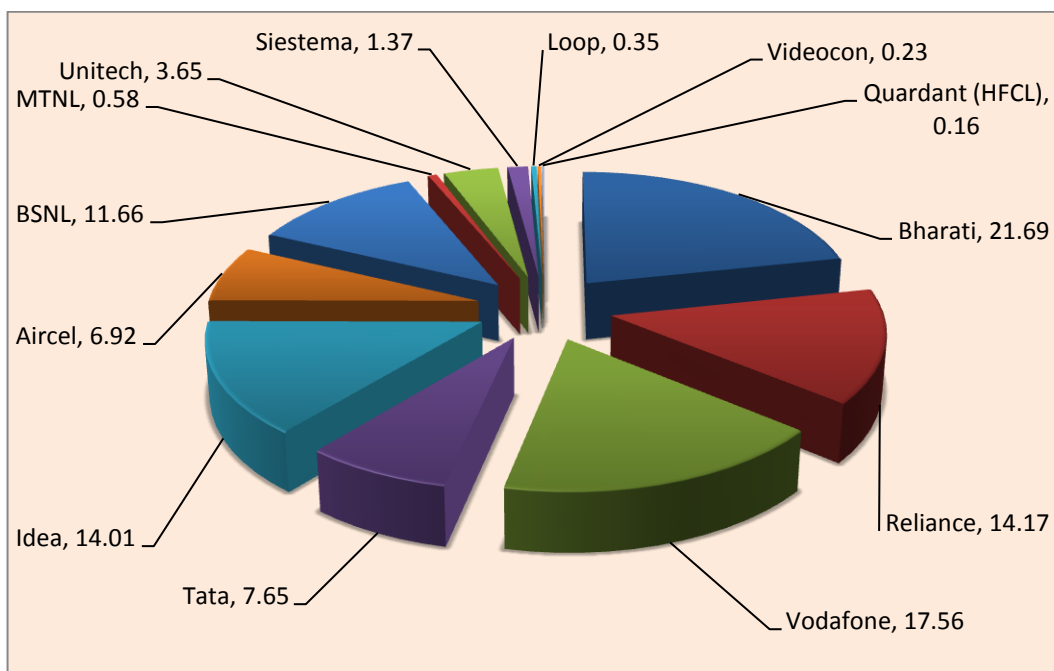
As on 31st March, 2013 The Distribution of Market Share of different service Operators are shown in Table No 3.6 The Bharati is holding the top position with 21.69 % market Share followed by the Vodafone with 17.56 % market Share. The Idea is holding 14.01 % Market Share. The Government operators BSNL and MTNL are holding 11.66 % and 0.58 % Market share respectively. Aircel is holding 6.92 % market Share. (TRAI, Press Release No. 38/2013)^{*48}

Table No. 3.6 Service Provider wise Wireless Market Share as on 31/03/2013.

Sr. No.	Operator	Subscriber Base	Market Share in %
1	Bharati	188196071	21.69
2	Reliance	122972717	14.17
3	Vodafone	152353654	17.56
4	Tata	66416138	7.65
5	Idea	121607390	14.01
6	Aircel	60071967	6.92
7	BSNL	101206625	11.66
8	MTNL	4999351	0.58
9	Unitech	31683600	3.65
10	Siestema	11912010	1.37
11	Loop	3008352	0.35
12	Videocon	2009474	0.23
13	Quadrant (HFCL)	1366234	0.16
	Total	867803583	100.00 %

(Source: TRAI, Press Release No. 38/2013 available at www.traigov.in)^{*48}

Fig. No. 3.6 Service Provider wise Wireless Market Share as on 31/03/2013.



(Source: TRAI, Press Release No. 38/2013 available at www.traigov.in)^{*48}

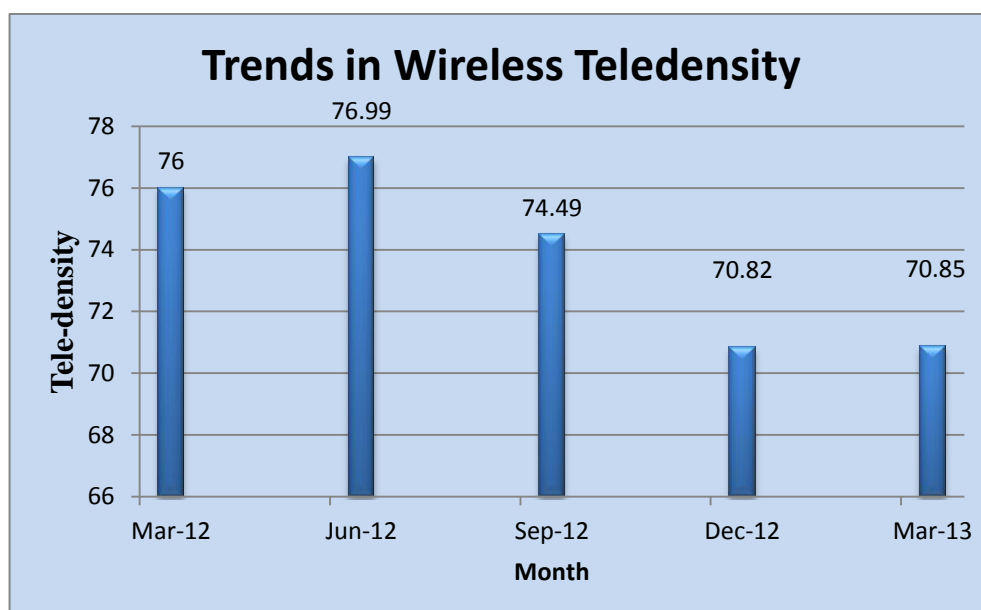
3.3.1.4 Growth of the wireless Sector: - The growth of the wireless sector made available communication on demand to all the citizens of nation which was difficult prior to the year 1994. The urban tele-density is high as compared to rural area. There is lot of scope for the development of telecom in rural area. Heavy investment needed to cater rural telephony needs. The Telecom operators are spending lot on MNP compliance, Stringent EMF requirement, Subscriber verification, Lawful interception and spectrum Charges. This expenditure is bringing very much economical pressure on telecom service operators. Table no 3.7 shows the current trends in Wireless Teledensity. Surprisingly decrease in the overall Teledensity (Urban + Rural) is seen in last few quarters.

Table No. 3.7 Trends in the Wireless Tele-density

Sr. No.	Month	Wireless Tele-density
1	Mar-12	76
2	Jun-12	76.99
3	Sep-12	74.49
4	Dec-12	70.82
5	Mar-13	70.85

(Source: Compiled with the different Press Release Published by TRAI) *49

Fig. No. 3.7 Trends in the Wireless Tele-density



(Source: Compiled with the different Press Release Published by TRAI) *49

3.3.2 Status of Wire-line Segment: - Earlier Department of Telecom was providing fixed line telephone services all over the country. After liberalization, Department of Telecom service is converted into the BSNL. MTNL was already formed in 1986. These two PSU are holding major share in the Wire-line Telecom Segment. These PSUs were providing the fixed line services over the copper wire. Afterwards Government allowed the private player in the sector and monopoly of these PSUs was over. Tata, Airtel, Reliance and other players started their services and Wire-line segment also become a multiplayer market.

3.3.2.1 Wire-line Subscriber Base as on 31/03/2013 (TRAI, Press Release No. 38/2013)^{*50}: - Wire-line subscriber base was 30.21 Million at the end of March 2013. The share of urban subscribers was 77.78% where as share of rural subscribers 22.22%. The overall wire-line Tele-density was 2.47 in March 2013, with urban and rural Tele-density being 6.29 and 0.79 respectively.

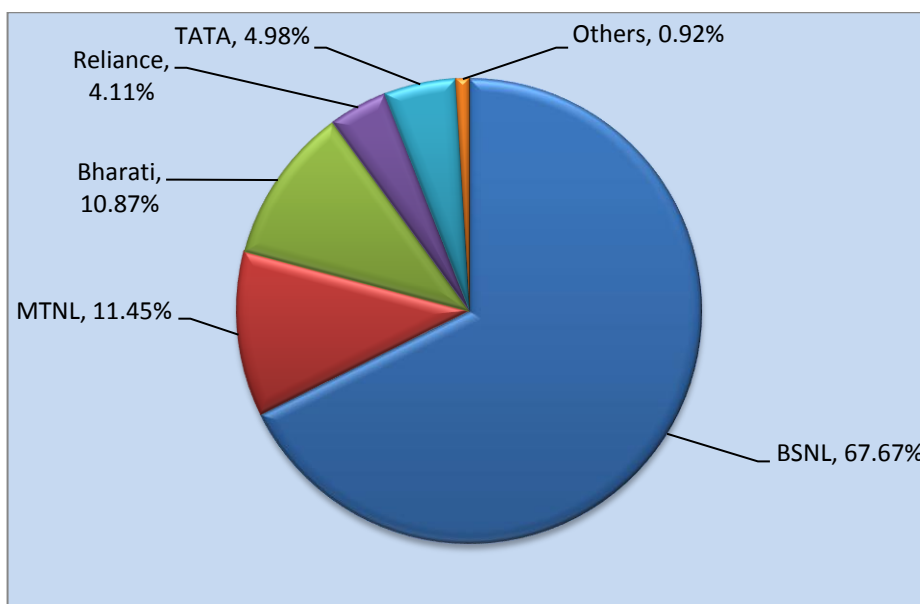
BSNL and MTNL, the two PSU operators, hold 67.67 % and 11.45 % market share respectively. Among the private operators Bharati leads with the 10.87 % market share. Reliance and Tata are holding 4.11 % and 4.98 % market share respectively. Table No 3.8 shows operator wise distribution of Market share.

Table No. 3.8 Service Operator wise Wire-line Market Share as on 31/03/2013

Sr. No.	Service Operator	Subscriber Base	Market Share
1	BSNL	20446062	67.67%
2	MTNL	3460049	11.45%
3	Bharati	3283070	10.87%
4	Reliance	1242626	4.11%
5	TATA	1505999	4.98%
6	Others	275936	0.92%
7	Total	30213742	100.00%

(Source: TRAI, Press Release No. 38/2013 available at www.trai.gov.in)^{*50}

Fig No. 3.8 Service Operator wise Wire-line Market Share as on 31/03/2013



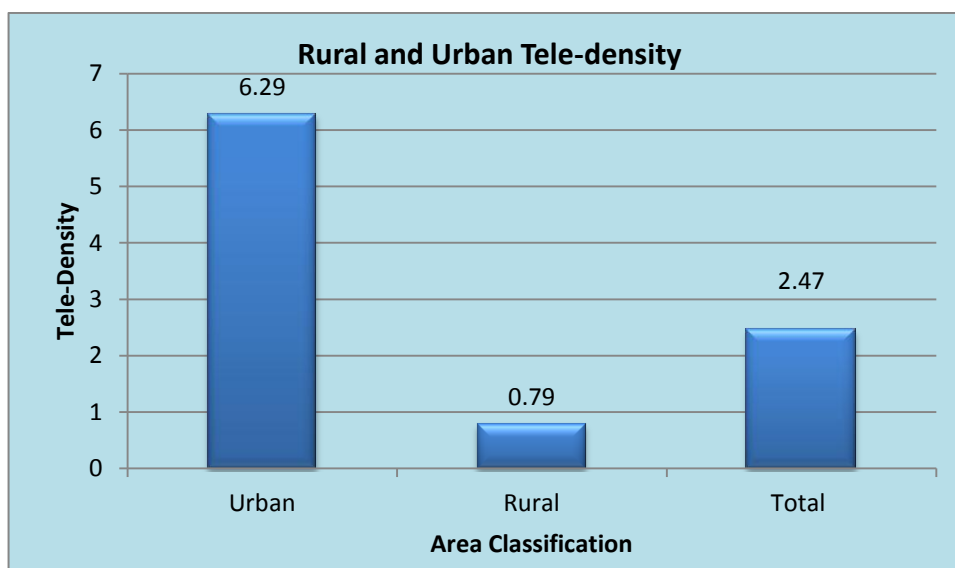
(Source: Press Release No. 38/2013 available at www.trai.gov.in)^{*50}

Table No 3.9 Showing the Subscriber base of Wire-line as on 31/03/2013

Sr. No.	Category	Tele-density	Subscriber Base in Million
1	Urban	6.29	23.5
2	Rural	0.79	6.71
	Overall	2.47	30.21

(Source: TRAI, Press Release No. 38/2013 available at www.trai.gov.in)^{*50}

Fig No 3.9 Rural and Urban Wire-line Tele-density as on 31/03/2013



(Source: TRAI, Press Release No. 38/2013 available at www.trai.gov.in)^{*50}

3.3.2.2 Future of Fix Line Sector: - Due to stiff competition from cellular market industry fix line industry is facing significant drop in customer base. Landline industry needs to be more efficient and reliable to stay in the competitive market. The industry is affected by the developmental activities on roads leading to cable faults and heavy downtime.

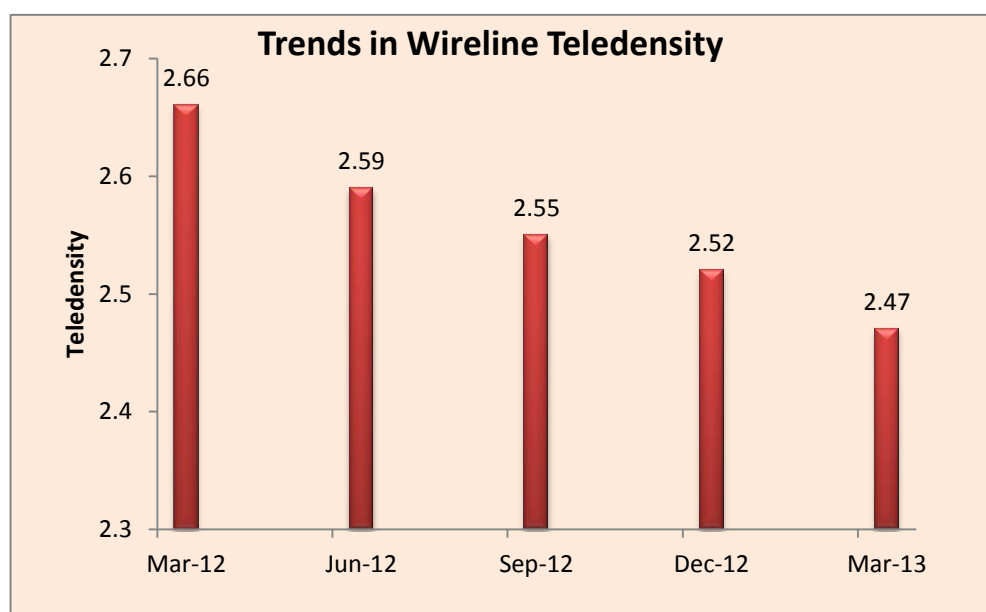
The different TRAI Press releases also registered the decline in Landline Customer base. Presently the service providers are offering the broadband services on Landline Copper network. This has helped to arrest the decline of customer base to some extent. Table no 3.10 shows the declining status of Landline Sector.

Table No. 3.10 Trends in Tele-density for wire-line subscribers

Sr. No.	Month	Wire-line Tele-density Overall
1	Mar-12	2.66
2	Jun-12	2.59
3	Sep-12	2.55
4	Dec-12	2.52
5	Mar-13	2.47

(Source: Compiled with the different Press Release Published by TRAI) ^{*51}

Fig. No. 3.10 Trends in Tele-density for wire-line subscribers



(Source: Compiled with the different Press Release Published by TRAI) ^{*51}

3.3.3 Broadband Sector: - In November 1998, the Government recognized the need for encouraging spread of Internet in the country and opened the sector for private Operators. Due to this good growth of Broadband sector has happened. (TRAI, Consultation Paper, 19/2012) *52

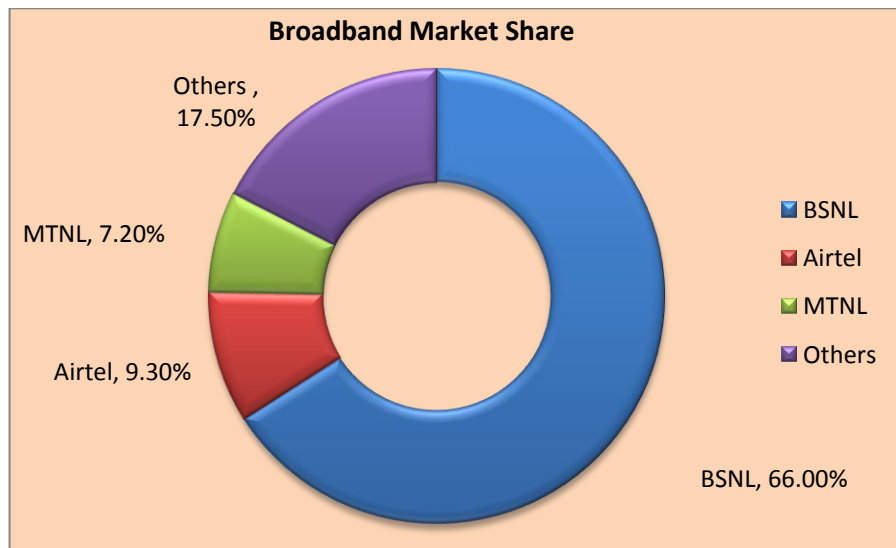
3.3.3.1 Status of Broadband in India:- Total Broadband subscriber base has increased to 15.05 million at the end of March 2013. As on 31st March 2013, there are 161 Internet Service Providers (ISP) which are providing broadband services in the country. Top five ISPs in terms of market share (based on subscriber base) are: BSNL (9.93 million), Bharti Airtel (1.40 million), MTNL (1.08 million), Hathway (0.37 million) and You Broadband (0.31 million) (TRAI, Press Release No. 38/2013)*53

Table No. 3.11 Operator Wise Broadband Market share

Sr. No.	Name of Internet Service Provider (ISP)	Subscriber base in millions	Market share
1	BSNL	9.93	66.0 %
2	Airtel	1.4	9.3 %
3	MTNL	1.08	7.2 %
4	Others (Hathway , You etc)	2.64	17.5 %
	Total	15.05	100 .0 %

(Source: Press Release No. 38/2013 available at www.trai.gov.in) *53

Fig. No .3.11 Operator Wise Broadband Market share



(Source: TRAI, Press Release No. 38/2013 available at www.trai.gov.in) *53

3.3.3.2 Technology options for Broadband Services (Broadband Policy-2004)^{*54}:- The broadband speed is very much dependent on the technology used to provide the Broadband connections. There are various access technologies which are listed below which contribute to growth of Broadband & can mutually coexist. The DSL is the leading technology in the broadband network

- 1. Optical Fibre Technologies:-** The basic quality of optic fibre is unlimited bandwidth. It is needed to replace the copper cables in the city area by OFC cables. The big commercial complexes will be highly benefitted with the help of the Optic fibre cable network.
- 2. Digital Subscriber Lines (DSL) on copper loop:** - The BSNL and MTNL have already laid copper cables for providing voice telecom services. Those companies are aggressively using their copper cable network for providing broadband connectivity. Thus DSL has become important technology in expansion of broadband network.
- 3. Cable TV Network:** - The cable TV networking companies had laid the cable for providing Television connectivity. The same cable is being used by these companies to extend the broadband connectivity.
- 4. Satellite Media:** - Very Small Aperture Terminals (VSAT) and Direct-to-Home (DTH) services can be used to provide the broadband connections in the remote areas where it is impossible to lay the cables of copper and optic fibre cables.
- 5. Wireless Media:** - It is possible to provide the broadband connectivity on 3G network installed by Mobile operators since 2009. Downloading speed of upto 2Mbps is possible in these networks. The technology is changing very fast and we can expect higher speed in near future.

3.3.3.3. Future Plans of Government of India for Broadband Sector (TRAI, Recommendations on National Broadband Plan, 2010)^{*55}:-

Government felt the need to create a suitable institutional framework at national and state levels with clearly outlined authority and responsibilities of laying optic fiber cable network throughout the country. Hence, TRAI has recommended in National Broadband Plan to form two agencies at National and state level named as NOFA and SOFA.

National Optic Fiber Agency (NOFA): It is proposed to form a 100%, Central Government owned, holding company called National Optical Fiber Agency which would discharge the following functions:

- Carry out top level planning of the shared fiber network in the country and oversee the work of creation of shared fiber infrastructure.
- Centrally organize procurement of equipment, fiber and other material in order to get volume benefits.
- Plan, install, operate and maintain shared fiber network in the 63 important cities of the country.
- Means to allow any service provider to use the network for giving broadband connections using any technology in the last mile.
- Arrange & manage funds from the Government programs.

State Optical Fiber Agency (SOFA):- Debt raised by NOFA will be further given to state level agencies called as State Optical Fiber Agency (SOFA). NOFA would be the holding company of all the SOFAs. All the SOFAs, under the overall guidance of NOFA have to carry out the works related to creation of shared infrastructure in their states.

3.4 References:-

1	BSNL, 2011, Phone Plus facility, [online], available on : < http://www.bsnl.co.in:9080/opencms/bsnl/BSNL/services/landline/plus.html >, [Accessed 16 July 2011]
2	BSNL, 2011, Fixed Line Pre-Paid Telephone , New Delhi, [online], available on : < http://www.bsnl.co.in/opencms/bsnl/BSNL/services/landline/flpp_bfone.html > , [Accessed 22 August , 2011]
3	BSNL,2011, Audio Conferencing, [online], available on : http://bsnl.co.in/opencms/bsnl/BSNL/services/landline/audiocnf.html , [Accessed 22 August , 2011]
4	Webopedia, 2012, IT Business Edge, 2012, What is Video Conferencing [online], available on : http://www.webopedia.com/TERM/V/video-conferencing.html , [Accessed on 2 January 2012]

5	Wikipedia Free Encyclopedia, 2011, Video Conferencing, [online], available on : http://en.wikipedia.org/wiki/Web_conferencing , [Accessed on 23/09/2011]
6	BSNL ,2011, Web Hosting Services, [online], available on : http://bsnl.co.in/opencms/bsnl/BSNL/services/enterprises/web_hosting.html [Accessed on 12 December 2011]
7	BSNL, 2011, I-Net, [online], available on: http://www.bsnl.co.in:9080/opencms/bsnl/BSNL/services/enterprises [Accessed on 5 Sept 2011]
8	Cisco, 2011, X.25 , [online], available on : http://docwiki.cisco.com/wiki/X.25 , [Accessed on 11 Jun 2011]
9	BSNL, 2011, Fleet Management Service, [online], available on : http://www.bsnl.co.in:9080/opencms/bsnl/BSNL/services/enterprises/fleet_management.html , [Accessed on 26 Jul 2011]
10	Department of Telecom, 2013, Inmarsat, [online], available on : http://www.dot.gov.in/carrier-services/inmarsat , [Accessed on 19 Feb , 2013]
11	BSNL, 2011, VSAT ,[online], available on : http://bsnl.co.in/opencms/bsnl/BSNL/services/enterprises/vsat.html , [Accessed on 09 Oct 2011]
12	BSNL, 2012, Centrex, [online], available on : http://bsnl.co.in/opencms/bsnl/BSNL/services/landline/centrex.html , [Accessed on 09 /03 /2012]
13	BSNL, 2012, BSNL Managed Network Services, [online], available on : http://bsnl.co.in/opencms/bsnl/BSNL/services [Accessed on 12/01/2012]
14	Reliance, 2012, Ethernet Connectivity Services, [online], available on : http://www.rcom.co.in/Rcom/business/ [Accessed on 12/05/2012]
15	About.com (2011), Wireless and Networking, Leased line, [online], available on : http://compnetworking.about.com/od/networkcables/g/bldef_leasedlin.htm , [Accessed on 7 August,2011]
16	Todd Lammle, 2007, Cisco Study Guide, BPB Publication, Second Edition, New Delhi, Page No 505 to 506.
17	Calcutta Telephone, 2011, ISDN Circuits, [online], available on : http://www.calcuttatelephones.com/mln1.shtml , [accessed on 30 July,2011]
18	BSNL, 2012, PRI/BRI ISDN, [online], available on: http://www.bsnl.co.in/opencms/bsnl/services/broadband [Accessed on 29 July, 2012]

19	Tomm Lammhe, 2007, Network Devices, 5 th Edition, BPB Publications, Delhi, Page No 659 to 661
20	Cisco, 2012, MPLS FAQ for Beginner, [online], available on : http://www.cisco.com/en/US/tech/tk436/tk428/technologies_q_and_a_item09186a00800949e5.shtml#intro , Document ID: 4649 [Accessed on 11 /7/ 2012]
21	BSNL, 2012, BSNL's IP Backbone using MPLS Technology, [online], available on : http://www.bsnl.co.in/opencms/bsnl/BSNL/services/enterprises/mplsvpn.html [Accessed on 18 June 2012]
22	Broadband Policy 2004, Department of Telecom, [pdf], Clause No 1.0 [online], available on: http://www.dot.Gov.in/ntp/ntpindex.htm , [Accessed on 21 Nov 2011] ,
23	National Telecom Policy-2012, Department of Telecom, Government of India, [pdf], [online], available on : < http://www.dot.gov.in /ntp/NTP- 06.06.201 >, Clause No 1.5, Page 8-20 [Accessed on 02 /12/2012]
24	BSNL, 2011, Broadband Services, [online], available on : http://www.bsnl.co.in:9080/opencms/bsnl/BSNL/services/broadband [Accessed on 22 Sept 2011]
25	Wikipedia, 2012, Mobile Phone, [online], available on: http://en.wikipedia.org/wiki/Mobile_phone , [Accessed on 22 December 2012]
26	BSNL, 2012, BSNL Mobile, [online], available on: http://www.bsnl.co.in:9080/opencms/bsnl/BSNL/services/mobile , [Accessed on 14 /9/2012]
27	Webopedia, 2011, What is WAP, [online], available on: http://www.webopedia.com/TERM/W/WAP.html , [Accessed on 24/12/2011]
28	BSNL, 2011, Punjab telecom circle, Mobile services [online], available on : www.punjab.bsnl.co.in/gprs_mms.html , [Accessed on 23/09/2011]
29	Discountcomms, 2011, Fixed Cellular Terminal, [online], available on : http://www.discountcomms.co.uk/gsm-fct-gateways/directory/What_is_GSM_gateways.htm , [Accessed on 1 st October ,2011]
30	Webopedia, 2012, 3G, [online], available on: http://www.webopedia.Com /TERM/3/3G.html , [Accessed on 8 December 2012]

31	Internet and Mobile Association of India, 2008, Mobile VAS in India, [online], available on : http://www.wpp.com/NR/rdonlyres/7B6D761F-4DE6-4FEE-B0B7-B9862EAE0B0B/0/mobile_vas_report_aug08.pdf , Page No 18-19 , [Accessed on 7 December,2011]
32	TRAI, 2013, Press Release No. 38/2013 , Page No 1-17 [online], available on : http://www.trai.gov.in/Content/PressReleases.aspx [Accessed on 23 Jun 2013]
33	TRAI, 2013, Press Release No. 38/2013, Page No 1-17, [online], available on: http://www.trai.gov.in/Content/PressReleases.aspx [Accessed on 30 Jun 2013]
34	BSNL, 2011, About BSNL, [online], available on : < http://www.bsnl.co.in/opencms/bsnl/BSNL/about_us/company > [Accessed on 24/11/2011]
35	BSNL, 2011, Board of Directors, [online], available on : http://www.bsnl.co.in/opencms/bsnl/BSNL/about_us [Accessed on 15 Feb- 2011]
36	Department of Telecommunication, 2013, Annual Report12-13, [online], available on : < http://www.dot.gov.in/ > , [Accessed on 09/04/2013]
37	Business Standard, BSNL Losses, ,Accessed [online], available on : http://www.business-standard.com/india/news/bsnls-losses-widen-to-rs-8851-cr-in-fy12/185087/&tp=on , [Accessed on Dec 02,2012]
38	Times of India , 10 May 2013, [online], available on : http://articles.timesofindia.indiatimes.com/2013-05-10/telecom/39167686_1_bsnl-and-mtnl-mtnl-employees-bsnl-losses , [Accessed on 13 May 2013]
39	Idea Cellular, 2013. About Us, [online], available on : http://www.ideacellular.com/wps/wcm/connect/aboutus [Accessed on 23 July 2013]
40	Tata Teleservices, 2013, Tata Group in telecommunications, [online], available on : http://www.tatateleservices.com/t-aboutus [Accessed on 11 May 2013]
41	Aircel, 2013, About us , [online], available on : http://www.aircel.com/AircelWar/appmanager/aircel/maharashtra [Accessed on 10 May 2013]
42	Reliance, 2013, Reliance Business Services, Group, [online], available on : http://www.rcom.co.in , [Accessed on 10 May 2013]
43	Vodafone, (2013), Business, [online], available on : http://www.vodafone.in , [Accessed on 20 August 2013]

44	Airtel, 2013, About Bharati Airtel, [online], available on : http://www.airtel.in [Accessed on 10 May ,2013]
45	Uninor, 2013, About Us, [online], available on : < http://www.uninor.in/about-uninor/about-us/Pages/about-us.aspx [Accessed on 10 May 2013]
46	Department of Telecom, 2013, Introduction to Unified Access Services /Cellular Mobile Services, [online], available on :< http://www.dot.gov.in/access-services/introduction-unified-access > [Accessed on 11 Jan 2013]
47	COAI, 2012, List of Unified Access Licensees, [online], available on : http://www.coai.com/List%20of%20unifiedaccess%20licensees , [Accessed on 12/01/2012]
48	TRAI, 2013, Press Release No. 38/2013 [online], available on : http://www.trai.gov.in/Content/PressReleases.aspx Page No 1-17 [Accessed on 30 Jun 2013]
49	TRAI, 2013, Press Releases No. 86/2012,171/2012,199/2012, 08/2013, 38/2013, [online], available on : http://www.trai.gov.in/Content/PressReleases.aspx , [Accessed on 30 Jun 2013]
50	TRAI, 2013, Press Release No. 38/2013, [online], available on : http://www.trai.gov.in/Content/PressReleases.aspx , Page No 1-17, [Accessed on 30 Jun 2013]
51	TRAI, 2013, Press Releases No. 86/2012, 171/2012, 199/2012, 08/2013, 38/2013 [online], available on : http://www.trai.gov.in/Content/PressReleases.aspx , [Accessed on 30 Jun 2013]
52	TRAI , 2012, Consultation Paper No.: 19/2012, [online], available on: http://www.trai.gov.in , [Accessed on 12 May 2013,]
53	TRAI, 2013, Press Release No. 38/2013, Pp1-17, [online], available on: http://www.trai.gov.in/Content/PressReleases.aspx , [Accessed on 30 May 2013]
54	Broadband Policy -2004 ,TRAI, [online], available on : http://www.trai.gov.in/Content/broadband_policy.aspx , [Accessed on 10 May 2012]
55	TRAI (2010), Recommendations on National Broadband Plan, Page No 109-111, [online], available on : www.trai.gov.in , [Accessed on 12 April 2012]

CHAPTER IV

RESEARCH

METHODOLOGY

Chapter No IV
Research Methodology
CONTENTS

Chapter No	Description	Page No
4	Research Methodology	112-158
4.1	Introduction	114
4.2	Broad groupings of Objectives of Research	114
4.3	Time Horizon	115
4.4	Research Approach	115
4.5	Types of Research	115
4.6	Objectives of the Study	116
4.7	Hypothesis of the Research	118
4.8	Primary Data Sources	120
4.9	Design of Questionnaire	124
4.10	Data Collection	140
4.11	Variables of Study	140
4.12	Secondary Data	141
4.13	Steps taken to ensure Reliable Data Collection	143
4.14	Sampling Design	143
4.15	Period of Data Collection	147
4.16	Response Rate and screening of Responses	147
4.17	Reliability Analysis	147
4.18	Statistics of the Research	148
4.19	Organization of Thesis	154
4.20	References	155

Chapter No IV

Research Methodology

4.1 Introduction: -

Research is the systematic process of collecting and analyzing information to increase our understanding of the subject under study. Research methodology is a way of solving the research problem systematically. As per Kotler “When we talk of research methodology we not only talk of research methods but also consider the logic behind the methods we use in the context of our research study. We should explain why we are using a particular method or technique and why we are not using others so that research results are capable of being evaluated either by the researcher himself or by others.” (Kotler, Cited in C. R. Kothari, 2004)*¹ in research methodology researcher has to answer following questions.

1. How the research problem has been defined?
2. What are objectives of the study?
3. How hypothesis are formulated?
4. How the primary data is collected?
5. Which instrument is used to collect primary data?
6. Which particular statistical techniques are adopted to analyse the primary data and why this particular technique is adopted?

4.2 Broad Groupings of the Objectives of Research (C. R. Kothari, 2004) *²

Objectives of the research are grouped as follows

- a) **Exploratory or Formulative research studies:** – To gain familiarity with a phenomenon or to achieve new insights into it.
- b) **Descriptive research studies:** – It is a study that seeks to portray an accurate profile of persons, events or situations.
- c) **Diagnostic research studies** – To determine the frequency with which something occurs or with which it is associated with something else.
- d) **Hypothesis testing research studies:** - To test a hypothesis of a casual relationship between variables.

The study undertaken by the researcher was a combination of the different purposes mentioned above. The customer satisfaction and service

quality factors are described in this study. The study also examines the relationship of different Factors with overall customer satisfaction. Study also sought to explore the relative importance of different service quality factors. The different hypotheses are tested in this study.

4.3 Time Horizon

According to time horizon, research can be one time research or longitudinal research. In one time research, the research is carried out in specific period of time and sample of a population is taken and studied at a particular time. On the other hand research is longitudinal research if a particular phenomenon is studied at different periods of time. (C. R. Kothari, 2004) *³

The study undertaken by the researcher is a one time research as researcher has approached sample elements only once.

4.4 Research Approach

The research may be approached from deductive or inductive perspectives Deduction help us to move from theory to hypothesis testing. Deductive reasoning works from the more general to the more specific. One can start with the theory then on the basis of theory one can propose some hypothesis. In this data is collected and hypothesis is tested. This is done for confirmation of the theory.

Inductive reasoning works the other way, moving from observations to theories. In inductive reasoning, we begin with specific observations, then collect data and then we develop theory. (Jai Narain Sharma, 2007) *⁴

In the study undertaken by the researcher, researcher has studied the customer satisfaction, formulated hypothesis and then collected data. Afterwards the researcher has tested hypothesis. Hence one can call this research work as deductive approach.

4.5 Types of Research (C. R. Kothari, 2004)*⁵:-

- A. Descriptive Research and Analytical Research:** – Descriptive Research includes survey & fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. Here researcher has no control over variables. The researcher only

reports what has happened in past & what is happening at present. In **Analytical Research** on the other hand the researcher has to use facts or information already available and analyze these to make a critical evaluation of the problem.

- B. Applied Research and Fundamental Research:** – Applied research aims at finding a solution for an immediate problem faced by the society or an industrial organization, whereas fundamental research is mainly concerned with the generalization and with the formulation of theory. The central aim of applied research is to discover a solution for some pressing problem whereas basic research is directed towards finding information that has a broad base of application.
- C. Quantitative Research and Qualitative:** The Quantitative research is based on the measurement of some quantity or amount. It is applicable to phenomenon that can be expressed in terms of quantity. Qualitative Research is concerned with the quality of phenomenon.
- D. Conceptual Research and Empirical Research:** Conceptual research is related to some idea or theory or concept. Empirical Research is based on experience or observation. It is data base research. Here the researcher has full control over variables under study.
- E. Other Research Categories** – Simulative Research, Laboratory Research, Historical research, One Time Research, Longitudinal Research are other categories of the research.

The researcher has used the qualitative research approach with hypothesis testing. The hypotheses were tested to find the relationship between various factors and overall customer satisfaction.

4.6 Objectives of the Research: The Objectives of study were as follows.

- A. To study and assess the level of satisfaction of Corporate Customers:** - Customer satisfaction is the key performance indicator. Telecom customer satisfaction is influenced by a complex interplay of different factors leading to the customer satisfaction. It is very much important to study the level of Satisfaction as customer satisfaction leads to customer retention.
- B. To find out the different factors leading to customer satisfaction and also to judge the scale of importance of those factors:** - “A factor is an

underlying dimension that account for several observed variables. There can be one or more factors depending upon the nature of the study and number of variables involved in it.” (C.R. Kothari, 2004)^{*6}. Every Telecom Service has got different types of attributes. These attributes are grouped together to form single factor. It was also decided to find out which is most important factor that drives the customer satisfaction.

- C. To study the correlation between the overall customer satisfaction and the individual factors influencing the customer satisfaction:** - This correlation study is important because those factors which are strongly correlated with overall satisfaction can be improved on priority to achieve improvement in overall satisfaction.
- D. To find out whether the level of satisfaction changes according to the amount of the billing:** - The amount of the billing depends on the needs of the industry. The efforts have been made to find out if there is any difference in the level of satisfaction across the groups of customers having high or low monthly billing. The voice and data services are having different sets of attributes and drivers which lead to customer satisfaction. The efforts have been made to find out whether there is difference in the level of satisfaction with respect to voice and data services also.
- E. To study the various causes leading to the interruption of the services:** - Understanding importance of corporate customers, Telecom Service Providers might be trying their level best to provide uninterrupted service to the Corporate Customers. But there are some factors, which are beyond the control of the Telecom Service Providers like continuity in Electricity supply, maintenance of Outdoor Network etc.

For example Telecom operators had laid Optic fiber cable for establishing the network. This network may be disturbed by road digging work done by the various agencies like Municipal Corporation, MSEDCL Company, Highway authorities, Gas supplying agencies etc. This is beyond the control of Telecom Service Operators. Hence it is decided to study the various causes of interruption.

- F. To find most preferred media of advertisement:** - There are different Medias of the advertisement. Efforts have been made to find out which media of advertisement is most preferred by the Corporate Customers.

- G. To study the trends in the communication needs of the Corporate Customer:** - The telecom needs of the corporate customers are changing and becoming more and more high technology oriented. Attempt has been made to find out the current trend in the telecom needs.
- H. To give suggestions to the Telecom Service Operators to improve the quality of the service:** - The primary data is collected with the help of questionnaire and opinions of the customers are sought. Depending on this results of the study suggestions will be given to the service providers to improve the quality of service.
- I. To find originating point of congestion of Voice Traffic at peak hour:** - It is learned that there is congestion in voice traffic at peak hours of the day. It was decided to find out the originating point of congestion of Voice Traffic at peak hours.

4.7 Hypothesis of the Research:-

Hypothesis is main research instrument. The hypothesis should be designed properly. The main task of hypothesis is to establish co-relationship between the various factors those influence the phenomenon. Hypothesis is the focal point of the research. There are different definitions of hypothesis proposed by different scholars. Some of those are listed below

“A hypothesis is a proposed explanation made on the basis of limited evidence, as a starting point for further investigation”. (**Oxford Dictionary, 1997**)*⁷

"A hypothesis is a tentative generalization, the validity of which remains to be tested. In its most elementary stage, the hypothesis may be a mere bunch, imaginative data which becomes the basis for action or investigation. (**George A. Lundberg, cited in Jai Narain Sharma, 2007**)*⁸

Hypothesis may be defined as a proportion or set of proportion set forth as an explanation for the occurrence of some specified group of phenomenon either asserted merely as a provisional conjuncture to guide some investigation or accepted as highly probable in the light of established fact. (**C.R. Kothari, 2004**)*⁹

Main Hypothesis of Study: - Hypothesis keeps the researcher on right track. Hypothesis arises as a result of available data, advice from experts and guides,

literature survey of related study. After extensive literature survey and advice from guide researcher has designed the hypothesis as follows, those were tested in the later part of study.

Hypothesis I: Network Quality followed by Uninterrupted Services are the most important drivers leading to the Customer satisfaction.

Hypothesis II: - The inter-operator congestion (at Point of Inter connection) is higher than intra-operator congestion.

Hypothesis III: Satisfaction in Cost of Service for Voice is more than Cost of Service for Data.

Hypothesis IV: Satisfaction in Provision of Services is better in voice services than data services.

Hypothesis V: The level of Customer Satisfaction on different Factors varies according to the amount of billing.

Sub hypothesis for Hypothesis V: Researcher had prepared list of the 12 Numbers of factors on which level of customer satisfaction depends. These are mainly Provision of services, Billing convenience, Cost of services, Customer care access, Customer care, Tangible (Physical Evidence of Services), Responsiveness, Redressal of Customer Grievances, Network Quality for Mobile, Network Quality Broadband, Network Quality Landline and Uninterrupted Services. **To test hypothesis V the following is the list of the 12 sub hypothesis (One for every factor) which were tested in later part of the study by grouping the customers on the basis of their Monthly Expenditure (Monthly Billing) on Telecom Needs.** The customers those are spending more than Rs. 10,000/- per month on telecom needs are considered **High billing customers** and those are spending less than Rs. 10,000/- per month are considered as **Low Billing Customers**.

1. **Hypothesis Va:** The level of satisfaction on the factor **Provision of Services** is different for low billing customers and high billing customers.
2. **Hypothesis Vb:** The level of satisfaction on the factor **Billing Convenience** is different for low billing customers and high billing customers.

3. **Hypothesis Vc:** The level of satisfaction on the factor **Cost of Services** (Both Voice and Data) is different for low billing customers and high billing customers.
4. **Hypothesis Vd:** The level of satisfaction on the factor **Customer Care Access** is different for low billing customers and high billing customers.
5. **Hypothesis Ve:** The level of satisfaction on the factor **Customer Care** is different for low billing customers and high billing customers.
6. **Hypothesis Vf:** The level of satisfaction on the factor **Tangible (Physical Evidence of Services)** is different for low billing customers and high billing customers.
7. **Hypothesis Vg:** The level of satisfaction on the factor **Responsiveness** of Telecom Service Operators is different for low billing customers and high billing customers.
8. **Hypothesis Vh:** The level of satisfaction on the factor **Redressal of Customer Grievances** is different for low billing customers and high billing customers.
9. **Hypothesis Vi:** The level of satisfaction on the factor **Network Quality for Mobile** is different for low billing customers and high billing customers.
10. **Hypothesis Vj:** The level of satisfaction on the factor **Network Quality Broadband** is different for low billing customers and high billing customers.
11. **Hypothesis Vk:** The level of satisfaction on the factor **Network Quality Landline** is different for low billing customers and high billing customers.
12. **Hypothesis Vl:** The level of satisfaction on the factor **Uninterrupted Services** is different for low billing customers and high billing customers.

4.8 Primary Data sources: - “Data implies a set of numerical figures usually obtained by measurement or counting.” (Dr. Paradeshi P. C., 2004)^{*10} The Data is a factual information used as a basis for reasoning, discussion, or calculation. The collection of data to prove hypothesis is important stage of research in any science. The sources of information are generally classified as primary and secondary.

Primary Data: - Primary data are information collected or generated by researchers for the purpose of project in hand. The primary data are those which are collected fresh and for the first time and thus happen to be original in character. Experiments and surveys are the main sources of primary data. (Dr. Paradeshi P. C., 2004).^{*11}

Advantages of primary Data

- * **Reliability of Data:** - There is more scope for the reliability of the data as investigator collects data for himself. He can take all precautions to ensure the reliability of the data.
- * **Logical Starting Point:** Primary data are the logical starting point for research in several disciplines.
- * **First hand information:** Primary data are the first hand information of the situation.
- * **Opinion and Attitude:** Primary data are only source for knowing opinions, attitudes, expectations, and personal qualities.

Disadvantages of Primary Data:

- * **Scope for the bias of the researcher:** There is more scope for the bias of researcher. The Researcher should be unbiased for good results.
- * **Expensive and Time consuming:** Collection of Primary data is expensive in terms of time and money. To accumulate the required data, lot of time is consumed sometimes cost involved is also unmanageable.
- * **Sample selection:** If the conclusion of the study is to be meaningful the researcher must select the representative sample. The selection of representative samples is difficult.
- * **Other Limitations:** Primary data is affected by the non co-operation of respondents, low reliability of conclusion.

4.8.1 Methods of Primary Data Collection: There are different methods to collect data. The main methods are Observation, Questionnaire and Interview.

4.8.1.1 Observation Method: - Observation becomes a scientific tool and method of data collection for the researcher when it is systematically planned and recorded. The observation can be Participant observation & Non-Participant observation. If the observer observes by making himself a member of group then observation is called participant observation. In case of non-participant observation the researcher

remains a passive observer and do not get involved in the observed activity. (C. R. Kothari, 2004) *12

Data can be gathered through observation by watching the behavior of phenomenon carefully. The meaningful information is being drawn after hearing to the person. "Observation is susceptible to the **Hawthorne effect** that is, when individual or group becomes aware that they are being observed, they may change their behavior. Depending upon the situation this change could be positive or negative i.e. it may increase or decrease. The use of such observation in such a situation may introduce distortion." (Ranjeet Kumar, 2011) *13

Indirect observation may decrease the Hawthorne effect. The observation can be expensive and time consuming and it does not throw light on why people behave as they do.

Observation done by Researcher while research:-

- a. **Visit of fault Location:** Researcher has visited the actual fault location and observed the happenings over there. The fault was at Khadaki Pune. Researcher observed the procedure of the restoration of Fault. It was found that the company was trying its level best to restore the fault within the stipulated time. The cable was cut due to the road digging work. Around 1000 Telephone lines were out of service because of this cable fault.
- b. **Customer premises visit:** Customer premises were visited for handing over of questionnaire. Researcher got the chance to observe the working of person who is looking after the telecom needs of the company.
- c. **Visit of Telephone Exchanges:** - In visit to the Telephone Exchange it is observed that there is a provision of two diesel generators to fight with MSEDCL Electricity Power shutdown.
- d. **Visit of Customer Service Center:** The customer service centers of the Telecom service providers were visited. The researcher observed the working of the center and the staff behavior at customer service center.

Through the observation the researcher has observed that the customer expectation differs from customer to customer. The researcher has also observed that the customers are more interested in better network quality.

4.8.1.2 Interview Method: - Interviewing is one of the major methods of data collection. It is two-way systematic conversation between a researcher and respondent for specific study in hand. Interviewing is the only suitable method for gathering information from illiterate or less educated respondents. People are usually more willing to talk than to write. (C. R. Kothari, 2004) *14

Advantages of Interview

1. More information and that too in greater depth can be obtained. Personal information can be easily obtained by this method.
2. There is greater flexibility as the opportunity to restructure questions is always there, especially in case of unstructured interviews.
3. Samples can be controlled easily as the non response is generally low.
4. The language of the interview can be adapted to the ability or educational level of the person interviewed and misinterpretation of the concerning questions can be avoided.

Disadvantages of Interview

1. Expensive when large and widely spread geographical sample are to be taken. There is Headache of supervision and control of interviewers.
2. Certain types of respondents such as highly placed managers, important officers may not have time to spare for interview.
3. Respondent may give imaginary information to make the interview interesting.

The researcher has collected the primary data for the study by interacting with several customers. This has collected the customer views with reference to their expectation in respect of quality. For compiling the list of the attributes interviews of some of customers were conducted.

4.8.1.3 Questionnaire: - A Questionnaire is a set of questions arranged logically, divided into sections and groups, drawn with the object of collecting information. It secures standardized results that can be tabulated and treated statistically. If the researcher is to collect the data about the attitude, opinions, preferences feelings the questionnaire is the best tool. (Sharma K. R., 2002) *15

Classification of Questionnaire (C. R. Kothari, 2004) *16:- The questionnaires can be classified as Unstructured and Structured Questionnaires.

Unstructured Questionnaire: In an unstructured questionnaire, the interviewer is provided with a general guide on the type of information to be obtained, but exact question formation is largely his own responsibility. The replies are to be taken in respondent's own words to the extent possible. In some cases tape recorder can be used to achieve this goal. The interviewer can construct new questions which have not been scripted.

The advantages of an unstructured approach is respondent can answer in their own words. The disadvantages of an unstructured approach are respondents require more time to answer. This reduces the number of questions that can be asked in a given time. The cost will be fairly expensive. The respondent may give unhelpful information which may defeat the purpose.

Structured Questionnaire: - Structured Questionnaire are those questionnaires in which there are definite, concrete and predetermined questions. The questions are presented in the same order and in same words to all respondents. Respondent have limited alternatives to answer. The comments in respondents own words are kept to minimum. This type of questionnaire is prepared in advance and not on the spot during questioning period.

Advantages of a structured questionnaire: The structured questionnaires are easy to administer and inexpensive to analyze. Questionnaires are relatively quick and easy to create code and interpret. The provision of alternate replies helps respondent to understand questions. A questionnaire is easy to standardize.

Disadvantages of a structured questionnaire: In case of Postal questionnaires it will be difficult for researcher to understand what respondent feels and response rate is low. When researcher is not with the respondent it is difficult to know whether respondent has understood question or not.

A structured Questionnaire was used to collect the data in this study, which served as a primary data to answer the research objectives and to prove the hypothesis.

4.9 Design of the Questionnaire: -

The aim of the questionnaire design is to make the questionnaire as easy and enjoyable as possible. A well designed questionnaire makes the researcher's job easy and also improves the quality of data obtained. (Arvind Kumar, 2002) ^{*17}

4.9.1 Type of Questions (Philip Kotler, 2004)^{*18}:- The questions can be closed end and open end questions. Open end questions allow respondent to answer in their own words. Closed end questions specify all the possible answers and provide answer that is easier to interpret and tabulate. Following are the some types of Closed End Questions.

1. **Dichotomous questions:** A question with two possible answers. One major drawback of a dichotomous question is that it cannot analyze any of the answers between yes and no.
2. **Multiple Choices:** A question with three or more answers. It is easy to process the data generated with these types of questions
3. **Likert Scale:** A statement with which the respondent show the amount of agreement or disagreement. Likert questions can also help to assess how your customers feel towards a certain issue, product or service.
4. **Semantic Differential:** A scale connecting two bipolar words. The respondent selects the point that represents his opinion.
5. **Importance scale:** A scale that rates the importance of some attribute. These questions can help to grasp what are the things that hold importance to respondents.
6. **Rating Scale:** A scale that rates some attribute from poor to excellent.

In this Research, researcher has used closed end questions of the different types like Importance questions, Likert Scale questions, dichotomous questions and multiple choice questions as this made data processing very easy.

4.9.2 Points considered for good questionnaire: - Following points were kept in mind while designing of questionnaire.

- A. The questions are kept as **simple** as possible. The questionnaire does not include any **ambiguous questions. Redundant question** and inclusion of **two items in one question** is strictly avoided.
- B. A question is not added in questionnaire unless the data generated through it is useful for satisfying objectives & testing of hypothesis.
- C. **Opening Question:** - The questions placed in the beginning of the questionnaire should be easiest to answer. Placing a question early in the questionnaire that can affect answer to later questions should be prevented wherever possible. (Arvind Kumar, 2002)^{*19}.

If respondent find the first question difficult to understand, or beyond their knowledge and experience, respondent will loose their interest. On the other hand, they find the opening question easy and pleasant to answer, they are encouraged to continue. **In the light of this Researcher has kept Opening question very simple.**

- D. Question sequence:** A proper sequence of questions reduces considerably chances of the individual questions being misunderstood. (C. R. Kothari, 2004)^{*20} Question flow is kept in such a way that one question leads easily and naturally to the next question. Questions on one subject, or one particular aspect of a subject, are grouped together.
- E. Question variety:** Different type of questions arranged in the questionnaire to avoid respondents getting bored and restless.

4.9.3 Physical layout of the questionnaire: - The physical layout of a questionnaire also will influence whether the questionnaire is interesting and easy to administer. For self administered questionnaire the quality of the paper, clarity of fonts and appearance of questionnaire are important variables. The job of researcher is considerably eased if the questionnaire is not crowded. It is needed to provide precise instruction to fill up questionnaire. (David Aakar et al, 2008)^{*21}

Physical Layout influences quality of data to be obtained. In developing the questionnaire researcher had paid particular attention to the presentation and layout of the Questionnaire. Explanations are provided wherever necessary. Ample writing space is provided to record answers. The layout is kept simple and short to avoid confusion.

4.9.4 Finalization of Section I to V of questionnaire: - To understand what the Corporate Customer expects, a discussion was carried out with 25 corporate customers. After introduction, the purpose of the meeting was explained. The points discussed and raised were noted. The discussion was also carried out with senior persons working in the Telecom field and project guide. These discussions, objectives and hypothesis of present study formed the basis for preparing the list of questions. After thinking in all directions initially list of 51 questions was prepared. These questions were divided into five groups. Those five groups are Introductory

Information, Network Performance related information, billing related information, Customer Care related information, Miscellaneous Information.

This questionnaire was shown to Research Guide. He asked to exclude some questions from questionnaire, which he found irrelevant. As per his instruction some of the questions were excluded from questionnaire. Respected Guide has also asked to add some questions in the Questionnaire. Those questions were included in the questionnaire.

4.9.5 Finalization of List of Attributes (Section VII Part A of Questionnaire):

Two dimensions of service quality in relation to quality perception by customer are Technical Quality and Functional Quality. Technical quality is the quality of what consumer actually receives as a result of his interaction with the service firm and the way service processes are handled in a service encounter is called functional quality. (Gronroos cited in K. Rama Mohana Rao, 2005) *22

Parasuraman et al proposed that service quality is a function of the differences between expectation and performance along the quality dimensions. They developed a service quality model based on gap analysis. The focus group interviews taken by Parsuraman and others revealed that regardless of the type of service, consumer used basically similar criteria in evaluating service quality.

These criteria seem to fall into 10 key categories which are labeled service quality determinants. These are Reliability, Responsiveness, competence, Access, Courtesy, Communication Credibility, Security, Understanding, and Tangibles. (Parasuraman et al, 1985) *23

Above mentioned research was again refined by **Parasuraman et al** in 1988. In their study they reduced original ten dimensions of service quality to five dimensions namely **reliability, responsiveness, tangibles, assurance** (communication, competence, credibility, courtesy, and security were clubbed together) and **empathy**. (Parasuraman et al, 1988) *24

In this study of Satisfaction of Corporate Customers, researcher has used a modified version of the SERVQUAL instrument provided by Parasuraman et al. In this study some of the factors (Parsuraman labeled those as Service Quality Determinants) from Parasuraman et al SERVQUAL model were renamed and some were newly generated as an outcome of interviews and discussions with 25 numbers of Corporate Customers. Researcher has prepared list of the 12 Numbers of factors which represents the number of attributes.

Table No 4.1 shows the list of Factors and Number of Attributes representing each factor. For these factors separate opinion about the voice and data services were sought.

Table No 4.1: Showing the List of Factors for which separate opinion about the voice and data services were sought.

Sr. No.	Dimensions of Service Quality (Factors)	Services	
		Voice	Data
1	Provision of Service	6	6
2	Cost of Service	7	6
3	Network Quality (Landline)	5	0
4	Network Quality (Broadband)	0	5
5	Network Quality (Mobile)	7	5

(Source: Own Work of the Researcher)

Table No 4.2 shows the list of Factors and Number of Attributes representing each factor. For these factor combine opinion about the voice and data services was sought.

Table No 4.2: Showing the List of Factors for which combine opinion about the voice and data services were sought.

Sr. No.	Dimensions of Service Quality (Factors)	Services (Combine for Voice and data)
1	Billing convenience	9
2	Customer Care Access	7
3	Customer Care	9
4	Tangibles (Physical Evidence of Services)	5
5	Responsiveness	5
6	Redressal of Customer Grievances	5
7	Uninterrupted Service	9

(Source: Own work of the Researcher)

These factors represents number of attributes (Parasuraman and others called those as Statements) which will be used to measure customer satisfaction. Before finalizing the list of attributes care has been taken that list meets the expectations of most of the customers. Although, the list can never be exhaustive as each customer has got his own opinion, the list has been made nearly exhaustive, with a limited number of attributes for all practical purposes by understanding requirements of the customers. The also list need to be numerically manageable to get proper response.

The discussion with 25 customers formed the basis for finalizing the list of attributes for questionnaire. The researcher has used the statements of Parasuraman and others (**Parasuraman et al, 1985**)^{*23} and reviewed those in order to fit the telecommunication environment. Some of the statements are added to cater all the expectations of Customers in Indian telecom environment.

4.9.6 Scale of Measurement of satisfaction on every attribute of the factor:

The Likert Scale: Named after Dr. Rensis Likert, a sociologist at the University of Michigan, who developed the technique. The Likert Scale is a response scale primarily used in questionnaires. Likert scales require a respondent to indicate a degree of agreement or disagreement with a variety of statement related to the attitudes or objects. Likert scales usually consists of two parts the item part and emulative part. The item part is essentially statement about certain product or services. The emulative part is a list of responses ranking from strongly agree to strongly disagree (**Richa Arora, Nitin Mahankale, 2013**)^{*25}.

Likert Scale advantages: - Likert scale is simple to construct. The scale is highly reliable and easy to understand. Likert scale takes much less time to construct. (**C. R. Kothari, 2004**)^{*26}

The Scale used by the researcher is Likert Five-point scale for measuring the satisfaction in respect of the various Attribute. Researcher has used a Five-point scale ranging from ‘very dissatisfied’ on one end to ‘very satisfied’ on the other with ‘Neutral’ in the middle.

4.9.7 Explanation and list of attributes under each factor

A. Provision of Services:

In telecom, provisioning of services is the process of preparing of Telecom equipment to provide the desired services to the end users. The time taken for provision of different Value added services as well as new connection of mobile, landline and data circuit are considered under the provisioning of services Factor. Considering all these points following is the list of the attributes in respect of factor called as Provision of Service. Opinions of the customers were sought for both Voice and data services. Table No 4.3 shows the attributes of the Factor Provision of Services.

Table No 4.3 Attribute of the Factor Provision of Service

Factor	Provision of Service
PS1	Time taken to install and activate a New Landline (Voice / Data Broadband) Connection after you apply for it
PS2	Time taken to reactivate the Landline (Voice / Data) connection if it is disconnected due to non payment
PS3	Time taken to activate or deactivate VAS (Value Added Services) after you requested for it (In Wire-line Services)
PS4	Time taken to activate a New Mobile Connection after you apply for it (Voice/ Data)
PS5	Time taken to reactivate the Mobile connection if it is disconnected due to non payment (Voice/ Data)
PS6	Time taken to activate or deactivate VAS (Value Added Services) after you requested for it (In Wireless Services)

(Source: Own Research of Researcher)

B. Billing convenience:

In billing convenience researcher has considered different attributes in respect of billing services. The customer expects that he should receive the bill in time and the customer need not have to take pain for receiving bill. Customer wants Bills should be transparent without any hidden charges. Customer expects that the bills which are received should be clear and easy to understand. The bills should accurate.

The tariff plans once subscribed should be flexible. It should be hassle free to switch from one plan to other. In case of recharge vouchers customers expects that vouchers should be available in all denominations.

Every mode of payment (cheque, cash, online etc) should be available. In case of billing complaints customer expects the process of resolution of billing complaints should be simple and time taken for attending the billing complaints should be least. Considering all these points Table No 4.4 shows the list of the attributes in respect of factor called as Billing convenience.

Table No 4.4 Attribute of the Factor Billing Convenience

Factor	Billing Convenience
BC1	Timely delivery of the bills
BC2	Transparency in the billing
BC3	Clarity of the bills in terms of understandability
BC4	Flexibility of Billing plans
BC5	Accuracy in the billing
BC6	Process of resolution of billing complaints
BC7	Time taken to attend billing complaints
BC8	Availability of the Recharge voucher of all Denominations
BC9	Ease of mode of payment

(Source: Own Research of Researcher)

C. Cost of the Service: Cost-of-service is a price for a service based on the costs incurred in providing that service. In case of telecom services customer has to pay the cost at the time of registration that is cost of installation or cost of modems etc. Afterwards he has to also pay monthly recurring charges (Rentals) or charges depending on usage. The usage in respect of voice calls is calculated on the pulse rate basis and charges in case of data services are calculated on basis of data uploading and downloading quantity. Considering all these points following is the list of the attributes in respect of factor called as Cost of service.

Table No 4.5 Attribute of the Factor Cost of Service

Factor	Cost of Service
CS1	Price to be paid for registration and security deposit
CS2	Monthly Rental Charges
CS3	Charges for Value Added Services
CS4	Pulse Rate Local (Fixed wire line)
CS5	Pulse Rate for ISD (Fixed wire-line)
CS6	Pulse Rate Local (Mobile)
CS7	Pulse Rate for ISD (Mobile)
CS8	Charges / Rental for of Data Circuit Services
CS9	Charges for Data downloading / Uploading in Wire-line
CS10	Charges for Data downloading / Uploading in Wireless

(Source: Own Research of Researcher)

D. Customer Care Access:

The customer may encounter different problems while using services. To solve his queries he has to approach customer care center or he has to contact call center. The customer expects that the service center should be easily accessible and it should have convenient business hours. At Customer care center customer may face the language barrier or may see that service center is overcrowded. This means customers are finding the accessing customer center itself difficult. In case of call center customer has to wait for his call getting answered. He has to hold the call for longer duration. Considering all these points following is the list of the attributes in respect of factor called as **Customer Care Access**.

Table No 4.6 Attribute of the Factor Customer Care Access.

Factor	Customer Care Access
CA1	Ease of access to customer service center
CA2	Convenient business hours of service centers
CA3	The comfort at the waiting areas of service centers
CA4	Communications in the language of your choice at call center / Customer care service centers
CA5	Time taken to answer your call by Call Center Executive / or time taken to attend you at customer care center
CA6	The variety of methods to access the service centers (e.g., Phone, In-person, E-mail,)
CA7	The amount of bureaucratic requirements for new connections

(Source: Own Research of Researcher)

E. Customer care:

Once customer gets the access to customer care executives customer expects that they should get the individual attention and customer care executive who is attending them should have sufficient knowledge to solve their problem. They expect that executive should be polite and should provide accurate information. The requests should be effectively processed by the executives. In the days of Internet revolution customer expects that Telecom Service Operator's website should be of good quality and comprehensive. Considering all these points following is the list of the attributes in respect of factor called as **Customer Care**.

Table No 4.7 Showing Attribute of the Factor Customer Care

Factor	Customer Care
CC1	Individual attention paid by Customer care Executive for being a Corporate Customers
CC2	Ability of the customer care executive to understand the problem
CC3	Accuracy of Information available with the Executives
CC4	Quality of Website
CC5	Comprehensiveness of information content provided by Service provider's on his website
CC6	Customer's feeling of safety while dealing online
CC7	Adequacy of information available with customer care executive
CC8	Politeness of Customer care Executive
CC9	Effect on the frequency of commercial call after registering the number for DNC

(Source: Own Research of Researcher)

F. Responsiveness: Researcher has referred Responsiveness to the specific ability of a Service operator to complete assigned tasks within a given time. Customer expects that the service should be right at first time. Customer expects that Provision of services should be done within given time and promises should be kept. The service operator should give prompt response to the customer requirement means operator should provide custom built solutions. Customer also wants the updates about the request of the service or maintenance call. Considering all these points following is the list of the attributes in respect of this factor.

Table No 4.8 Showing Attribute of the Factor Responsiveness

Factor	Responsiveness
RP1	Company will perform right service at first time
RP2	Company tells customers when exactly desired services will be provisioned
RP3	Company Keeps promise about the provision of services in respect of time
RP4	Information provided regarding progress about Customer's request
RP5	Response to requirement (Whether customized solutions are provided?)

(Source: Own Research of Researcher)

G. Redressal of Customer Grievances (Nodal Officer Level): In case the consumer is not satisfied with the Call Centre or in case the Call Centre does not attend to the complaint within given time, customer may approach the Nodal Officer for redressal of his grievance. Customer expects that he should be treated politely by nodal officer. Customer usually has more expectations from nodal officer in respect of knowledge, prompt action and adequacy of information. Depending on this following is the list of attribute in said factor.

Table No 4.9 Attribute of the Factor Redressal of Grievances

Factor	Redressal of Customer Grievances (Nodal Officer Level)
CR1	Ease to contact the nodal officer
CR2	Adequacy of information available with the nodal officer
CR3	Ability of nodal officer to understand the problem
CR4	Politeness of the Nodal officer
CR5	Time taken by Nodal Officer for Redressal of complaint

(Source: Own Research of Researcher)

H. Network quality Landline: The customer expects that there should be good voice quality and modern VAS services should be available on Landline Network. Customer also expects that the network should be congestion free with no call drops. Depending on this following is the list of attributes under this factor.

Table No 4.10 Attribute of the Factor Network Quality Landline

Factor	Network Quality Landline
NQL1	Voice Quality
NQL2	Availability and Quality of VAS
NQL3	Call Drop Rate
NQL4	Network congestions Intra Operator at busy hour
NQL5	Network congestion Inter operator at busy hour

(Source: Own Research of Researcher)

I. Network Quality Mobile: To provide the good network quality means providing a good voice as well as data service quality. Customer wants that there should not be call drop and network should be congestion free even at busy hour. On special occasions customer wants congestion free network to greet their dear ones. Presently mobile network is widely used to get the internet connectivity and

customer wants the consistent speed and no data call drops. Customer expects that modern Value added services should be available with the service providers and those should work properly. Depending on these expectation following is the list of attribute in respect of the factor Network Quality Mobile.

Table No 4.11 Attribute of the Factor Network Quality Mobile

Factor	Network Quality Mobile
NQM1	Voice quality
NQM2	One Way Speech occurrence
NQM3	Call Drop Rate Voice
NQM4	Availability and Quality of VAS
NQM5	Network congestions Intra Operator at busy hour (For Voice)
NQM6	Network congestion Inter operator at busy hour (For Voice)
NQM7	Network congestion on special occasion (For Voice)
NQM8	Speed of Downloading (In Wireless data Services)
NQM9	Speed of Uploading (In Wireless data Services)
NQM10	Consistency of Speed (In Wireless data Services)
NQM11	Data Call Drop Rate (In Wireless data Services)

(Source: Own Research of Researcher)

J. Network quality Wire-line Broadband: In case of the wire-line broadband service customers want the high and consistent downloading and uploading speed. The customers expect that there should not be any undesired disconnection. The modern Value Added Services should be available. Depending on this following is the list of attributes under the Network quality Broadband.

Table No 4.12 Attribute of the Factor Network Quality Broadband

Factor	Network Quality Broadband
NQB1	Availability and quality of VAS
NQB2	Data Call Drop Rate (In Wire line Data Service)
NQB3	Speed of downloading (In wire line Data Service)
NQB4	Speed of Uploading (In wire line Data Service)
NQB5	Consistency of Speed (In wire line Data Service)

(Source: Own Research of Researcher)

K. Uninterrupted Service:

The customer wants uninterrupted services. The interruption may be due to fault conditions or due to non availability of the network coverage. If the part of the city does not have good mobile network coverage then the service of Mobile Voice as well as data gets interrupted while customer is on move.

The customers are also sensitive about the number of fault incidences and time taken to restore the faults. The customer wants the mobile network should be available in rural area, urban area as well as on state and National highways. Customer want to stay connected round the clock on mobile as well as landline network for voice and data connectivity. Depending on this following is the list of the attributes in respect of the factor Uninterrupted service.

Table No 4.13 Attribute of the Factor Uninterrupted Service

Factor	Uninterrupted Service
US1	Mobile Network Coverage City Area
US2	Mobile Network Coverage Rural area
US3	In building Network Coverage
US4	Mobile Network Coverage On Road
US5	Number of Fault Incidences (In case of Mobile Network)
US6	Number of Fault Incidences (In case of Landline Network)
US7	Time taken to restore faults
US8	Time taken to restore faults (Landline)
US9	Working of the Customer Premises Equipment

(Source: Own Research of Researcher)

L Tangibles (Physical Evidence of Services):

Whenever the customers visits to the customer care center he expects that ambience of the service center should be pleasant. Modern equipments should be available in customer care center and Service center Employees should appear neat and clean. Appearance of maintenance person visiting to the customer premises should be neat and clean. Visual appeal of the Material associated with the services (For example pamphlets) should be excellent.

Table No 4.14 Attribute of the Factor Tangible

Factor	Tangible (Physical Evidence of Service)
TG1	Visual appeal of the advertisement Material (Pamphlets etc.)
TG2	Employees appear neat and clean at Service Center
TG3	Ambience of Service Center
TG4	Modern equipments available at service center
TG5	Appearance of maintenance person visiting to your premises

(Source: Own Research of Researcher)

4.9.8 Section No VI Part B: - Importance of the Different Factors

There are different factors of service quality. Some of the factors may be very important and others may not. The different customers attach different importance to different factors. Respondents were asked to rate importance of these Service Quality Factors on scale of 1 to 5, with 1 being Not at all important and 5 being Very Important. This data will help the service providers to know which factor most important for customers, so that service provider can address the issues related to this factor on priority basis.

Three Factors namely Network Quality for Mobile, Network Quality Broadband, Network Quality Landline are combined in one single factor namely Network Quality for the purpose of rating importance.

Table No 4.15 Table for seeking opinion on Importance of the Factors

Sr. No.	Factor of Service Quality	Circle Only one Option				
1	Provision of Service	1	2	3	4	5
2	Billing convenience	1	2	3	4	5
3	Cost of Service	1	2	3	4	5
4	Customer Care Access	1	2	3	4	5
5	Customer Care	1	2	3	4	5
6	Tangibles (Physical Evidence of Services)	1	2	3	4	5
7	Responsiveness	1	2	3	4	5
8	Complaint Redressal	1	2	3	4	5
9	Network Quality	1	2	3	4	5
10	Uninterrupted Service	1	2	3	4	5

(Source: Own Research of Researcher)

4.9.10 Pilot Testing of questionnaire:

The objective of Pilot testing of questionnaire was to verify the clarity of the questions. It is also helpful in knowing the estimated time required to fill up the questionnaire.

As a part of the pilot testing the questionnaire was given to twenty customers to fill up. Discussion was carried out with them. This was questionnaire Pilot Test aimed to capture potential wording ambiguities and other difficulties encountered by the respondents in completing the questionnaire. They suggested some changes. This experience was helpful and proved that minor modifications are still needed.

The questionnaire was reviewed by the two Professors, the one who is holding Ph.D. degree in Statistics and other who was holding Ph.D. degree in Management. The purpose is to ensure that the questionnaire possessed face validity. Feedback from these two eminent professors noted.

Feedback received from the professors and customers was shared with the Respected Guide. The necessary changes were incorporated in questionnaire in consultation with guide. Language of some of the questions was made more simple and clear. The structure of the final questionnaire approved by Respected Research Guide was as follows.

4.9.11 The Final Structure of the Questionnaire:

- 1. Covering Letter:** The questionnaire was accompanied by a covering letter (Refer Annexure-II). In covering letter the purpose of the data collection was explained. This was done to motivate the respondent to provide information without any doubts in mind. The covering letter was also accompanied with the Letter issued by Tilak Maharashtra University regarding permission to collect primary data.
- 2. Section I: Section I Part A** takes the general information about the Corporate Customer like Name and Address of Corporate Customer, monthly expenditure on telecom needs, different services availed by Customer, Current service provider for different services. The **Part B of Section I** seeks the information about Gender, educational qualification and age of the respondent who is filling questionnaire on behalf of Corporate Customers.

3. **Section II:** Section II deals with the information about the Network Performance parameters like Fault incidence per year, In general fault repair duration. The information about the type of the problems normally faced by the customer in case of Landline, mobile and broadband network was also sought in this section. It also queries about the customer satisfaction on network performance.
4. **Section III:** Section III deals with the billing related information. This section covers the transparency in the billing, need of detailed bill, mistakes in the billing, alert in between the billing cycles, readiness about the payment of premium charges. It also queries the customer satisfaction on billing services.
5. **Section IV:** Section IV takes information about the help desk and customer care services. This section takes information about the time taken to provide the new connection of Mobile, Landline and Broadband services. It also enquires about the channel opted by the customer to register complaint.

It was also asked that whether customer wants alternative means of communication in case of prolonged failures of services. It also finds the awareness about the contact details of Nodal Authority, Appellate authority and Do not Call Registry. It also finds the customer satisfaction on After Sales services.

6. **Section V:** Section V takes general information like media of advertisement preferences, need of direct communications, Publicity, Overall satisfaction on services. It also find out to what extent the customer expectations are met. It also queries about the reasons behind interruption of services.
7. **Section VI: In Section VI Part A** respondents were asked to rate the satisfaction on different service quality attributes on Likert scale from 1 to 5. There are 85 Attributes to rate. Researcher has divided these attributes in 12 Factors.

In **Part B of Section VI**, customers were asked to rate importance of Service Quality Factors on a five-point Likert Scale: where 1 -“Not at all important”, 2-”Not Important”, 3-“Neither important or nor unimportant”, 4-“Important”, and 5-“Very Important”.

4.10 Data Collection

4.10.1 Access Strategy: The questionnaire was accompanied with the covering letter (See Appendix II) addressed to the respondent in which the purpose of data collection was clearly explained. This has made the informant free and open. The respondent was also assured the **confidentiality and anonymity** of their responses.

4.10.2 Selection of the person to fill the questionnaire: To have the accuracy in data collection questionnaire is needed to be filled up by the senior person who has been employed by Corporate Customer to take care of the communication needs of the organization. These senior level persons are very busy, but these persons have complete idea of the communication network of the organization. They are having rich experience in handling Telecom Network. Hence these persons are selected to fill up the questionnaire. If this person is not available, person who is next junior to him was approached.

4.10.3 Personal handing over of the Questionnaire: It was decided to handover the questionnaire personally. In most of the cases the Researcher was with the respondent when he was filling the questionnaire. This was done to settle the doubt of the respondent across the table. The personal visit benefited researcher in following way

1. Personal visit avoided delay in the receipt of filled questionnaire.
2. Chances of misinterpretation of questions were nil.
3. Researcher got the chance to observe the working of person who is looking after the telecom needs of the organization.

4.11 Variables of the Study: -

A concept which can take on different quantitative values is called variable. The concepts like height, weight are examples of variables. Variable is some concept that can be measured. Variables need to be understood clearly in order to measure any concept. (C.R. Kothari, 2004)^{*27} This research study covers different types of variables related to service quality parameters.

4.11.1 Dependent and Independent Variables: “If one variable depends upon other variable or it is consequence of other variable it is termed as the dependent

variable and variable that is antecedent to the dependent variable is termed as independent variable” (C.R. Kothari, 2004)^{*27}

In this study Customer Satisfaction is the dependent variable. The dependent variable can be measured with the help of independent variable. The independent variables in this study are Provision of Services, Cost of Service, Customer care Access, Customer carte, Tangible (Physical Evidence of Service) , Network Quality, Uninterrupted Service, Billing convenience, Responsiveness, Redressal of Customer Grievances, Customer Redressal.

4.11.2 Extraneous Variables: - “The independent variables that are not related to the purpose of the study, but may affect the dependent variable are termed as extraneous variable” (C.R. Kothari, 2004)^{*27}. Such variables may not cause any change directly to the dependent variable but if measured can give some effect on the dependent variable. **Extraneous variable considered during the research study is Monthly Expenditure done by Corporate Customers on Telecom needs.**

4.12 Secondary Data: -

The secondary data are data that were collected for another purpose and already exist somewhere. (Philp Kotlar, 2004)^{*28}. The sources of secondary data are publications of State and Central Government, local bodies, foreign Governments, International organization, banking and financial institutes. It also includes professional journals, reports of commissions of enquiry, books, magazines, and Newspaper. The unpublished sources like diaries, letters, unpublished biographies etc also come under secondary data sources.

Advantages and Disadvantages of Secondary Data (Dr. Parseshi P.C, 2004)^{*29}

Main Advantages of Secondary data

1. **Quickness:** Time needed to collect data is less. It is quickly available.
2. **Economy:** Expenditure on printing data collection forms, hire field workers, sending them to places is saved if we use secondary data.

Main Disadvantages of Secondary data:

1. Researcher may not know the purpose of the earlier data collection. Hence data may be unsuitable for study.
2. Secondary data may not be precise.

3. There is practical difficulty getting data.
4. Data may not be easily accessible.
5. Limited Utility: - If the conclusion drawn is not based on information collected, the utility of secondary data is limited

The researcher has used secondary data depending on need and relevance by understanding the above mentioned advantages and disadvantages of secondary data. Following sources of Secondary data are used by researcher.

4.12.1 Secondary Data Source: Secondary source of data used by researcher includes: Relevant News in Newspapers, Various Journal articles, books, different research work done previously in the field of telecom, relevant magazine etc. Researcher also used other different types of reports available on different websites. The secondary sources used by researcher can be grouped as follows.

- A. Internet:** Different websites were used to collect secondary data. These mainly include official websites of Public Sector Units like BSNL, MTNL and ITI. The websites of Government department TDSAT, DOT, TRAI, UGC were also used to get secondary data.
- B. Newspaper and Journals:** Number of articles from Newspaper like Marathi Daily Sakal, Times of India, Indian Express and Economic Times were studied to get secondary data.
- C. Journals:** - The number of issues of the journals like Journal of Technology Management & Innovation, A Journal of Multidisciplinary Research, International Journal of Business Management & Research, Journal of Basic and Applied Scientific Research, International Journal of Research in Commerce and Management, International Journal of Scientific Research, Indian Journal of Management, Indian Journal of Marketing were used to get the secondary data.
- D. Publications:** Various Press Releases and Survey reports published by TRAI were referred for Telecom Subscription data.
- E. Gazettes of the Government of India:** - The Gazettes of Government of India were also referred for telecom sector related information.
- F. Customer service Centers:** Some data were collected from Customer service centre of different Telecom Services providers.

4.13 Steps taken to ensure Valid and Reliable Data Collection: -

Following steps were taken to ensure valid and reliable data collection and analysis

1. The right target population was identified i.e. Corporate Customers of Telecom Service Operators in Pune city.
2. The representativeness of the sample was ensured. The corporate customers from different fields (like Public and Private Limited companies, Educational Institutes, Public Sector Unit, and Government Organizations) were included to make sample more representative.
3. The secondary data sources were also reliable since researcher used data from press releases of Government Organizations.
4. Structured questionnaire was used to remove errors resulting from unstructured answers.
5. While administering the data collection instrument, the respondents were assured of anonymity and confidentiality so that they could express their real feelings. This has removed participant biases.
6. Incompletely filled Responses were discarded.
7. To avoid errors researcher has entered data with much care and used SPSS and Microsoft Excel.
8. To ensure validity and reliability of data, the researcher must have adequate knowledge on the context (Industry) being studied. The researcher has been very active subscriber and has been using most of the telecom services for at least 15 years.

4.14 Sampling Design:

The Sampling design is a definite plan for obtaining sample from the sampling frame. It refers to the technique or the procedure the researcher would adopt in selecting some sampling units from which inference about the population can be drawn. Sampling design is determined before any data is collected. (C.R. Kothari, 2004)^{*30}

4.14.1 Sample Size: The sample size refers to the number of items to be selected from the universe to constitute a sample. The size of the sample should be neither excessively large nor too small. It should be optimum. It is also dependent on three criteria called as level of precision, the level of confidence or risk, and the degree of variability in the attributes being measured. These three factors are discussed below.

4.14.1.1 The Level of Precision: The level of precision, sometimes called sampling error. Sampling Error gives us some idea of the precision. A low sampling error means that we have relatively less variability in sampling distribution. If the sample size is greater error will be smaller. This range is often expressed in percentage. **(Dr. J. K. Sachdeva, 2008)*³¹** For Example if a data shows that that 60% of telecom customers in the sample are not happy with the voice quality with a precision rate of $\pm 5\%$, then researcher can conclude that between 55% and 65% of Telecom Customers in the population are not happy with the voice quality.

4.14.1.2 The Confidence Level: - The confidence level or reliability is the expected percentage of times that the actual value will fall within the stated precession limits. For 95% confidence level, 95 out of 100 samples will have the true population value within the range of precision. But there is always chance that sample does not represent true population. If the confidence level is 95 % then significance level will be 5 %. This risk is reduced for 99% confidence levels. **(C.R. Kothari, 2004)*³²**

4.14.1.3 Degree of Variability: - If the population is heterogeneous, sample size required is high for given level of precision. The homogenous population requires smaller sample size. As a proportion of 0.5 represents the maximum variability in a population, so it is used in determining the sample size

4.14.2 Strategies for Sample Size Determination: - There are several approaches for determining the sample size. These include using a census for small populations, imitating a sample size of similar studies, using published tables, and applying formulas to calculate a sample size.

Formula for Calculating a Sample for Proportions (Cochran, 1963:75 Cited by Glenn D Israel, PEOD6)*³³: - For populations that are large, Cochran developed the following Equation to yield a representative sample for proportions.

$$N = \frac{Z^2 PQ}{e^2}$$

Here

N: - Sample Size to be Estimated.

Z: - The 'z' value represents the Z score from the standard normal distribution for the confidence Level desired by the researcher. A 95% confidence

level would indicate a Z score of 1.96. (From a standard normal distribution for a two – sided probability value of 0.95)

P: - is taken as 0.5 as it indicates the maximum variability in a population

Q: - It is the frequency of non-occurrence of the same event. Therefore the quantity of ‘q’ would be 1-0.5=0.5.

e:- This is acceptable error = 0.05.

After substituting values in the formula we get

$$N = \frac{Z^2 pq}{e^2}$$

$$= \frac{(1.96)^2 \cdot (0.5) \cdot (0.5)}{(0.05)^2}$$

$$= \frac{0.9604}{0.0025}$$

$$N = 384.16$$

In a paper ‘Determining Sample Size for Research Activities’, (**Robert V. Krejcie & Daryle W. Morgan 1970**) ^{*34} the authors removed the confusion of many researcher. In this paper the authors recommended that optimal number of respondents for a population of 51 lakhs is 384 for 95% level of confidence.

4.14.3 Sample Size in the Present Research: -

The different service operators were approached for obtaining the list of the corporate customers. The operators provided the list only after lot of pursuance. The operators were ready to provide the list after assuring them that the use of the list will be done for educational purpose only. The researcher merged the lists received from different Telecom Service Operators and prepared a single list with total **3792** corporate customers. The researcher has gone for sample size **385** Corporate Customers **which is more than 10 % of the Total Population of Corporate Customers.**

Researcher has also given the well thought to the two research papers (**Cochran, 1963:75 Cited by Glenn D Israel, PEOD6** ^{*33} and **Robert V. Krejcie & Daryle W. Morgan** ^{*34} **1970**) which also advocates the sample size as 385.

4.14.4 Sampling Universe and Unit: - “The Aggregate of elementary units to which the conclusions of study apply is called as population or universe and the units that form the basis of the sampling process are called as sampling units”. (U.K. Shrivastava and others, 2005) *35

The Universe for this study is All Corporate Customers of Telecom Service Operators in the Pune city. The individual Corporate Customers who is responding the questionnaire is considered as sampling unit for the study.

4.14.5 Sampling Technique: - If the population from which a sample is to be drawn does not constitute a homogenous group, stratified sampling technique is generally applied in order to obtain representative sample. Under stratified sampling the population is divided into several sub-populations that are individually more homogenous than the total population. The sub populations are called as strata.

Following procedure is observed for stratification: - The researcher has gone through the list of Corporate Customers. It was noticed that most of the operators had classified customers mainly into four categories those are listed in Table 4.16

Table No: 4.16 Classification of Sample as per Core Business area

Sr. No.	Category (Core Business Area of Corporate Customer)	Population	Sample Size	Percentage
1	Banks, Insurance, Financial Services companies	341	35	10.26 %
2	IT , ITES , Data processing centers	531	54	10.17 %
3	State and Central Government organization, Local Bodies, Public Sector Units, Educational Institutes, colleges & Universities	455	46	10.11 %
4	Private Limited, Public Limited companies and others (Excluding Categories mentioned in Sr. No. 1, 2, and 3 of this table)	2465	250	10.14 %
Total			385	10.15 %

(Source: - List of Corporate Customers provided by Operators)

To make the sample representative of each categories researcher has selected 10 % customers from each category of Customers. Care has been taken to make the sample representative by including customers from different industries. This **proportionate stratified sampling** has resulted in more reliable information.

Then the elements of each stratum are selected for inclusion in the sample on the ease of access and on the basis of their preparedness to respond without using any bias. This sampling technique is called **convenience sampling**. Thus researcher has used the mixed sampling technique for gathering the desired sample. This can be called as **stratified convenience sampling**.

4.15 Period of Data Collection:

Primary data was gathered by filling the questionnaire during the period of **Mar 2011 to Mar 2013**

4.16 Response Rate and screening of Responses:

Response Rate:–“Response rate is number of people returning completed questionnaire.” (Philip Kotler et al, 2010).^{*36} Total 512 Corporate Customers were contacted. Out of the 512 Corporate Customers 468 customers have accepted questionnaire. Out of 468 questionnaires those were administered only 414 were received back.

Screening of Responses: - Researcher has received back total **414** responses. In received responses there were some responses in which some of the questions were left unanswered by respondent. However those responses were excluded from data analysis. After screening process **29** responses found unusable and rest **385** constituting the response rate **82.26 %** were considered valid for data analysis and hypothesis testing.

The high response rate is a result of the personal visit in most of the cases for handing over the questionnaire and in some cases continuous follows up.

4.17 Reliability Analysis:

Reliability analysis is used to study the properties of measurement scales and the items that make them up. Intra-class correlation coefficients can be used to compute inter rater reliability estimates. The reliability statistics has been used for testing reliability of the questionnaires in pilot study. The following section presents the result test for a 385 respondents.

***** Method 1 (space saver) will be used for this analysis *****

Table No 4.17 Reliability Analyses

RELIABILITY ANALYSIS - SCALE (ALPHA)

No of Cases = 385.0

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
Value	25.2039	21.5506	28.8571	7.3065	1.3390	26.6924

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
Value	6.3026	5.9978	6.6075	0.6097	1.1017	.1859

Intra-class Correlation Coefficients

Two-Way Mixed Effects Model (Consistency Definition)

95% Confidence Interval

Measure	ICC Value	Lower Bound	Upper Bound	F-Value	Sig.
Single Rater	0.7967	0.7571	0.8305	8.8399	0.00
Average of Raters *	0.8869	0.8618	0.9074	8.8399	0.00

Degrees of freedom for F-tests are 384 and 384. Test Value = 0.

* Assumes absence of People * Rater interaction.

Reliability Coefficients 2 items

Alpha = 0.8869 Standardized item alpha = 0.8875

Results of the reliability tests resulted in an **overall Cronbach Alpha value of 0.8869 with standardized item alpha of 0.8875**, which is theoretically large enough. **Hence one can say that questionnaire and data collected through it is statistically reliable.**

4.18 Statistics of the Research:

The Primary data collected with the help questionnaire. This data has been coded so that it can be entered in the computer for further analysis. Coding is the process of assigning number or other symbols to answer so that responses can be grouped into

a limited number of categories or classes. In the questionnaire used for the research contains the close end questions so that numeric values can be assigned easily to the responses.

The attributes related to satisfaction of customers regarding various factors such as billing convenience, Network Quality etc were coded using Likert scale having five points starting from very satisfied to the very dissatisfied. Five points were allotted to the very satisfied level and one point was allotted to very dissatisfied level. The details of coding of attributes are tabulated in Table No 4.18 This coded data has been entered in MS Excel sheets. The composite scores are calculated for the individual sub categories of different factors.

Table No: 4.18 Answer of Respondent and Assigned codes

Sr. No.	Answer of Respondent	Assigned Codes
1	Very Dissatisfied	1
2	Dissatisfied	2
3	Neutral	3
4	Satisfied	4
5	Very Satisfied	5

(Source: Own work of the Researcher)

4.18.1 Calculation of Maximum Score allotted to Each Factor: - Researcher has calculated the Maximum score allotted to the Factor as described in Table No. 4.19. This table describes the maximum score calculation for the factor Billing Convenience. On the same lines the maximum score is calculated for all the Factor and tabulated in the Table No 4.20 and 4.21

Table No: 4.19 Calculation of Maximum Score allotted to the Factor

1	Factor	Billing Convenience
2	Number of Attributes for the factor	9
3	Max score per Attribute	5
4	Sample Size	385
5	Maximum Score = Number of Attribute X Maximum Score Per Attribute X Sample Size	= 385 X 9X 5 = 17325

(Source: - Own work of Researcher)

Table No. 4.20 Maximum Score allotted to the factor where separate opinion about the Voice and data services were sought

Sr. No.	Dimensions of Service Quality (Factors)	Sample Size	Voice Service		Data Service	
			Number of Attributes	Max Score Allotted	Number of Attributes	Max Score Allotted
1	Provision of Service	385	6	11550	6	11550
2	Cost of Service	385	7	13475	6	11550
3	Network Quality (Landline)	385	5	9625	0	0
4	Network Quality (Broadband)	385	0	0	5	9625
5	Network Quality (Mobile)	385	7	13475	5	9625

(Source: - Own work of Researcher)

Table No. 4.21 Maximum Score allotted to the factor where combine opinions about the Voice and data services were sought

Sr. No.	Dimensions of Service Quality (Factors)	Sample Size	Combine Voice and Data	
			Number of Attributes	Max Score Allotted
1	Billing convenience	385	9	17325
2	Customer Care Access	385	7	13475
3	Customer Care	385	9	17325
4	Tangibles (Physical Evidence of Services)	385	5	9625
5	Responsiveness	385	5	9625
6	Redressal of Customer Grievances	385	5	9625
7	Uninterrupted Service	385	9	17325

(Source: - Own work of Researcher)

4.18.2 Use of Computer in Research: - For this study Researcher has used a Computer with software **SPSS version 11.5 for MS Windows** and **Microsoft Office Excel 2007**.

- A. SPSS :-** SPSS is used for the Chi-square analysis, Correlation test (spearman rank), Reliability analysis–Cronbach’s alpha, t-test, Analysis of Variance, (ANOVA)
- B. Microsoft Excel:** - Microsoft Excel was used for the data management. Microsoft Excel is also used to draw several bar graphs & frequency distribution charts and Calculation of Mean, Variance, and Standard Deviation.

4.18.3 Tools Used for Data Analysis: - The collected primary data neatly tabulated under following two categories

1. Customers whose Monthly Telecom Billing is Less than Rs. 10000/-.
2. Customers whose Monthly Telecom Billing is More than Rs. 10000/- .

Attempt has been made to find out if there is any difference (statistically significant difference) in the satisfaction levels of customers belonging to above mentioned two different billing groups. To assess the statistical significance of difference in satisfaction levels of customers the researcher has used independent sample t-test, after confirming underlying normality assumption as necessary. P-value is obtained using independent sample t test. P-value < 0.05 is considered to be statistically significant.

To study the correlation between the overall satisfaction and the individual factors researcher has used The Spearman rank correlation method or (Spearman’s Method). This analysis aims at finding the extent of linear relationship between overall satisfaction and several individual factors.

The average importance score of different factors leading to customer satisfaction has been compared statistically using the F-Test. P-value is obtained using Analysis of variance (ANOVA) technique. P-value<0.05 is considered to be statistically significant.

To find out the distribution of problems faced by the customers and distribution of communication needs researcher has used the Chi-Square Test. The Reliability statistics have been used for reliability test of questionnaires. Cronbach Alpha is used to test it.

4.18.4 Description of the Statistical Tools used in Research: -

4.18.4.1 The arithmetic mean is (A.M.) or mean is a sum of observations divided by number of observations. The formula for the mean is as follows.

$$\text{Arithmetic Mean} = \frac{\text{Sum of the Observations}}{\text{Number of Observations}}$$

The mean is easy to calculate and simple to follow. It is based on all observations and is capable of further mathematical treatments. It is unduly affected by extreme observations and can not be calculated for frequency distribution with open end classes. (Dr. Mrs. V. R. Prayag and P. G. Dixit, 2005) ^{*37}

4.18.4.2 Variance: - Variance is an important statistical measure and described as the mean of the squares of deviation taken from mean of the given series of data. It is frequently used measure of variation. The variance represents how widely individuals in a group vary. If individual items vary greatly from the group mean, the variance is high and vice versa. Square root of variance is known as Standard Deviation. (C.R. Kothari, 2004) ^{*38}

4.18.4.3 t-Test: - Researcher draws two groups of samples randomly and assigns specific experimental treatment to each group. After being exposed to this treatment, the two groups are compared with respect to certain characteristic in order to find the effect of the treatment. A difference might be observed after such treatments. The index used to find the significance of the difference between the means of two samples is called as the t-test for independent samples. These samples are called as independent samples because they are drawn independently from population without any pairing or other relationship between the groups. (Arvind kumar, 2002) ^{*39}

4.18.4.4 F-Value Test: - F-Test is based on F-distribution and used to compare the variance of the two independent samples. This test is also used in the context of analysis of variance (ANOVA) for judging the significance of more than two sample means at one and the same time. It is also used for judging the significance of multiple correlation coefficients. Test statistic, F, is calculated and compared with its probable value for accepting and rejecting hypothesis. (C.R. Kothari, 2004) ^{*40}

4.18.4.5 P values: - What is the smallest value of significance level at which null hypothesis get rejected? The answer is p value (probability value) associated with

observed data. Once P value is calculated one can make use of it to come to a conclusion by comparing the P value with significance level. If the P value $\leq \alpha$ (Significance Level) then reject H_0 otherwise accept H_0 . (Nabendu Pal, Sahadeb Sarkar, 2005) ^{*41}

Thus P value is the estimated probability of rejecting the null hypothesis (H_0) of a research study question. The null hypothesis is usually a hypothesis of "no difference". The alternative hypothesis (H_1) is the opposite of the null hypothesis. The term significance level (alpha) is used to refer to a pre-chosen probability.

In this research study researcher has obtained P-value by using independent sample t test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.

4.18.4.6 Chi Square Test (C.R. Kothari, 2004) ^{*42}:- The chi square is an important non parametric test and no rigid assumptions are necessary in respect of type of population. One will require only the degrees of freedom and sample size for using this test. It is symbolically written as χ^2 . The Chi-Square statistic is computed by summing up the squared deviations [Observed value (O) minus Expected value (E)] divided by the Expected value of each cell.

4.18.4.7 Spearman`s Rank Correlation: (C.R. Kothari, 2004) ^{*43} :- When the information is sufficient to rank the data as first, second, third and so fourth, then one can use rank correlation method and work out the coefficient of rank correlation. In fact, the rank correlation coefficient is the measure of correlation that exists between the two sets of rank. In other words it is a measure of association that is based on the ranks of observations and not on numerical values of data

4.18.4.8 Cronbach Alpha: Cronbach Alpha is an indicator of consistency or homogeneity of a scale. Cronbach alpha tells the extent to which all of the items on the test are behaving similarly.

A low alpha suggests that there are errors in the selection of items. A Cronbach alpha of 0.7 to 0.8 is acceptable. Cronbach alpha more than 0.8 to 0.9 is good and Cronbach alpha more than 0.9 is excellent.

4.19 Organization of Thesis

Chapter 1: Introduction: - Chapter one is an introductory chapter that covers the background of the study, Problem statement, Importance of the study, scope of the study and definitions of the important terms used in the study. This chapter also covers Major Landmarks in the developments of Telecom in sector before and after liberalization. It takes the review of NTP-1994 as well as NTP-1999. It also covers Broadband Policy 2004 and NTP-2012. The Functions of TRAI and other regulators are also covered in this chapter.

Chapter 2: Literature Survey: - This chapter develops the idea about different theoretical concepts used in the study. This chapter also covers the study of different research papers and study of Doctoral Thesis in the field of Telecom.

Chapter 3: Telecom Sector Review: - This chapter discusses about the different telecom services like Landline, Broadband, Mobile, RABMS, Web Hoisting, Centrex, Managed Network Services, Ethernet Leased Line, Leased line, ISDN and MPLS Broadband Services. This chapter takes review of the Telecom Sector in India. The profile different telecom service operators like BSNL, Idea, Airtel, Aircel, Tata Indicom, Reliance, Vodafone and Uninor are discussed in brief. This chapter also discusses the present status Cellular Mobile sector, Landline (Wireline) sector and Broadband sector in India.

Chapter 4: Research Methodology: - This chapter covers the complete research methodology used in the study. The research process beginning with the gathering data, data analysis and hypothesis testing is explained in this chapter. Designing of questionnaire, Pilot testing of questionnaire, Access Strategies are explained in detail in this chapter. This chapter describes the different factor of customer satisfaction which mainly includes Network Quality, Customer care, Cost of Services, Provision of Services etc. The chapter also discusses different attributes under different factors. The Sampling Plan, Sample size calculation, and sampling technique are discussed in detail in this chapter. The Statistical methods used for analysis of the Data are also explained in this chapter.

Chapter 5: Data Analysis: - This chapter focuses on the Data Analysis. The data is gathered with the help of the Questionnaire is analyzed in this chapter. The data

editing, coding, validating and representing it graphically is done in this chapter. The different hypotheses are tested in this chapter.

Chapter 6: Conclusion: - This chapter presents findings, conclusion, suggestions & limitation of the study. This chapter provides a summary of all the findings and results. Relevant suggestions are conveyed in this chapter which will be useful for the regulator as well as Telecom Service Operator. The chapter also provides the guideline for further research.

Appendices: - Different annexure like Questionnaire, Abbreviations, Acronyms, List of different TRAI Releases and Explanation of different terms used in this study are included in Appendices.

4.20 Reference

1	C. R. Kothari, 2004, Research Methodology: Methods & Techniques, New Age International Publishers, Second Revised edition, New Delhi, Page No. 8
2	C. R. Kothari, 2004, Research Methodology : Methods & Techniques, New Age International Publishers, Second Revised edition, New Delhi, Page No. 2
3	C. R. Kothari, 2004, Research Methodology: Methods & Techniques, New Age International Publishers, Second Revised edition, New Delhi, Page No. 4
4	Jai Narain Sharma, 2007, Research Methodology The Discipline and its dimensions, Deep and Deep Publications Pvt. Ltd, New Delhi, Pp 41-42
5	C. R. Kothari, 2004, Research Methodology: Methods & Techniques, New Age International Publishers, Second Revised edition, New Delhi, Page No. 2-4
6	C. R. Kothari, 2004, Research Methodology : Methods & Techniques, New Age International Publishers, Second Revised edition, New Delhi, Page No. 323
7	Oxford Dictionary, 1997, Seventh Edition, Oxford University Press, New Delhi, Page No 310

8	Jai Narain Sharma, 2007, Research Methodology The Discipline and its dimensions, Deep and Deep Publications, New Delhi, Page No 41-42
9	C. R. Kothari, 2004, Research Methodology: Methods & Techniques, New Age International Publishers, Revised 2 nd edition, New Delhi, Page No. 184
10	Dr. Paradeshi P.C., 2004, Research Methodology and Project Work in Cost Accounting, Nirali Prakashan, Pune, Page no 5.1
11	Dr. Paradeshi P.C., 2004, Research Methodology and Project Work in Cost Accounting, Nirali Prakashan, Pune, Page no 5.2 to 5.3
12	C. R. Kothari, 2004, Research Methodology: Methods & Techniques, New Age International Ltd. Publishers, Second Revised edition, New Delhi, Page No. 95 -100.
13	Ranjit Kumar, 2011, Research Methodology: A Step By Step Guide For Beginners, Sage Publications, 3rd edition, New Delhi, Page No. 141.
14	C. R. Kothari, 2004, Research Methodology : Methods & Techniques, New Age International Ltd. Publishers, Second Revised edition, New Delhi, Page No. 97-99
15	Sharma K. R., 2002, Research Methodology, National Publishing House, New Delhi, Page No 45
16	C. R. Kothari, 2004, Research Methodology : Methods & Techniques, New Age International Ltd. Publishers, Second Revised edition, New Delhi, Page No. 101-102
17	Arvind Kumar, 2002, Research Methodology in social science, Sarup and Sons, New Delhi, first Edition, Page No 56-57
18	Philip Kotlar, 2004, Marketing Management, Pearson Education Pte Ltd, Delhi -92, Fifth Indian Reprint, Page No 133-135
19	Arvind Kumar, 2002, Research Methodology in social science, Sarup and Sons, New Delhi, first Edition, Page No 85
20	C. R. Kothari, 2004, Research Methodology : Methods & Techniques, New Age International Ltd. Publishers, Second Revised edition, New Delhi, Page No. 102

21	David A. Aaker, V. Kumar, George S. Day, 2008, Marketing Research, 9 th Ed, Wiley India Pvt. Ltd, New Delhi, Page No 330, [online], available on < http://books.google.co.in/books > [Accessed on 10/05/ 2013]
22	K Rama Mohana Rao, 2005, Services Marketing, Pearson Education, First Indian Print, Delhi, Page No 149
23	Parasuraman et al, 1985, "A Conceptual Model of Service Quality and Its Implications for Future Research," Journal of Marketing, Fall 1985, pp. 41-50. [online], Available at < http://areas.kenan-flagler.unc.edu/marketing > , [Accessed on 12 January 2012]
24	Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1988), "SERVQUAL: a multiple item scale for measuring consumer perception of service quality", Journal of Retailing, Vol. 64 No. 1, pp. 12-37.
25	Richa Arora, and Nitin Mahankale, 2013, Marketing research, PHI learning private Ltd, New Delhi, [online], Available on < http://books.google.co.in/books?id=YYksErDN97gC > No 104, [Accessed on 7 May 2013]
26	C. R. Kothari, 2004, Research Methodology: Methods & Techniques, New Age International Publishers, Revised 2 nd Edn. New Delhi, Pg 84-87
27	C. R. Kothari, 2004, Research Methodology : Methods & Techniques, New Age International Publishers, Revised Second edition, New Delhi, Page No. 33-34
28	Philp Kotlar, 2004, Marketing Management, Pearson Education Pte Ltd, Delhi -92, Fifth Indian Reprint, Page No 131
29	Dr. Paradeshi P.C., 2004, Research Methodology and Project Work in Cost Accounting, Pune, Nirali Prakashan, Page no 5.11
30	C. R. Kothari, 2004, Research Methodology : Methods & Techniques, New Age International Publishers, Revised 2nd edition, New Delhi, Pg 153
31	Dr. J.K. Sachdeva, 2008, Business Research Methodology, Himalaya Publishing Limited, First Edition, 2008, New Delhi, Page No : 142-143
32	C. R. Kothari, 2004, Research Methodology: Methods & Techniques, New Age International Publishers, Revised 2nd edition, New Delhi, Pg 155

33	Glenn D Israel, PEOD6, Institute of Food and Agricultural Sciences, University of Florida. Original publication date Nov-1992. Reviewed April 2009, [online], Available on: http://www.gobookee.net/search.php?q= Determining+Sample+Size1 , [Accessed on 12/01/2012]
34	Robert V. Krejcie & Daryle W. Morgan, 1970, Determining Sample Size for Research Activities, [online], Available on: http://home.kku.ac.th/sompong/guest_speaker/KrejcieandMorgan_article.pdf [Accessed on 10 July 2011]
35	Uma K. Srivastava, G.V. Shenoy, Subhash C. Sharma , 2005, Quantitative Techniques For Managerial Decisions , New Age International Publishers, New Delhi, Page No 192
36	Philip Kotler et al, 2010, Principles of Marketing: A South Asian Perspective, 13/E, 2010, By, Dorling Kinderslay –licensees Pearson Education in south Asia, Page No 96
37	Dr. Mrs. V.R. Prayag and P.G. Dixit, 2005, Statistics , Nirali Orakashan, fourth Edition , Page No 5.2 to 5.11
38	C. R. Kothari, 2004 : Research Methodology : Methods & Techniques, New Age International Publishers, Revised 2nd edition, New Delhi, Pg 256
39	Arvind Kumar, 2002, Research Methodology in Social Science, Sarup and Sons Publishers, New Delhi, Page No.134
40	C. R. Kothari, 2004, : Research Methodology : Methods & Techniques, New Age International Publishers, Revised 2nd edition, New Delhi, Pg 196
41	Nabendu Pal & Sahadeb Sarkar, 2005, Statistics Concepts and Applications, Prentice Hall of India Pvt. Ltd, New Delhi , Page No 154
42	C. R. Kothari, 2004, Research Methodology : Methods & Techniques, New Age International Publishers, Revised 2nd edition, New Delhi, Page No. 236-242
43	C. R. Kothari, 2004: Research Methodology : Methods & Techniques, New Age International Publishers , Revised 2nd edition, New Delhi, Page No. 302-3034

CHAPTER V

DATA

ANALYSIS

CHAPTER NO V

DATA ANALYSIS

CONTENTS

Chapter No	Description	Page No
5	Data Analysis	159-242
5.1	Analysis of Questionnaire's Section-I Part A	161
5.2	Analysis of Section- I Part B of Questionnaire	168
5.3	Analysis of Section-II of Questionnaire (Network Performance)	170
5.4	Analysis of Section- III of Questionnaire (Billing Information)	177
5.5	Analysis of Section-IV of Questionnaire (Provision of Services and Customer Care Information)	185
5.6	Analysis of Section V of Questionnaire (Miscellaneous Information)	193
5.7	Analysis of Section VI of Questionnaire (Attribute Table and Importance Score of Factors)	198
5.8	Testing of Hypothesis	204
5.9	Relating Objectives with Primary Data	238
5.10	References	242

CHAPTER V

DATA ANALYSIS

Introduction: - The data gathered with the help of questionnaire was coded and processed using statistical tools and techniques. In this chapter researcher has presented the data in the eight-fold manner. The first six sub-sections of this chapter analyses the responses of the questionnaire. Section seven is pertaining to the testing of hypothesis & Section eight relates the primary data with the objectives of the study.

5.1 Analysis of Questionnaire's Section-I Part A:- Section I Part A takes the general information about the Name and Address of Corporate Customer, their monthly expenditure on telecom needs, different telecom Services availed by Customers, their present service provider for different services and their period of Association with the present service provider.

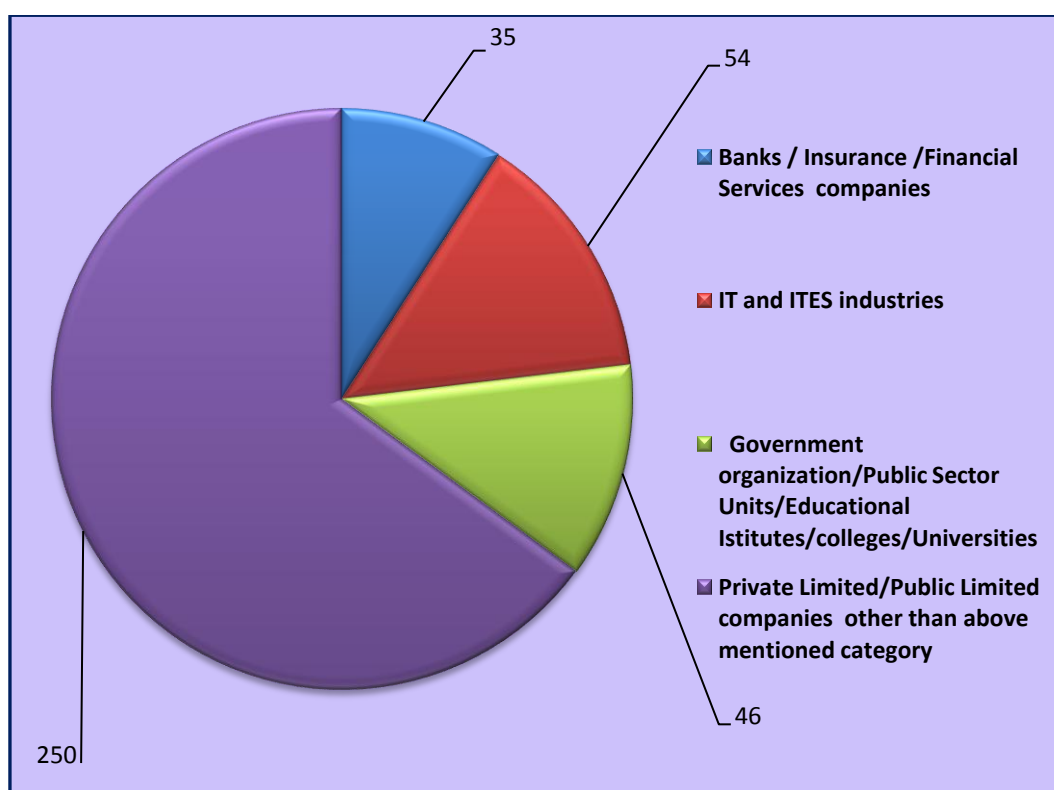
5.1.1 Broad classification of Customer as per Sector (main business area):- Out of 385 customers 35 Customers were from Banking, insurance and financial services company, 54 customers were from IT, ITES and Data processing centers, 46 Customers were from Government organization, Public Sector Units, Educational Institutes, University and colleges and 250 customers were Private and Public Limited companies.

Table No: 5.1 Sector-wise Classifications of Sample

Sr. No.	Sector (Main Business Area)	Count	Percentage
1	Banks / Insurance /Financial Services	35	9 %
2	IT , ITES , Data processing centers	54	14 %
3	State and Central Government organization, Local Bodies, Public Sector Units, Educational Institutes, Colleges & Universities.	46	12 %
4	Private Limited, Public Limited companies and others (Excluding Categories mentioned in Sr. No. 1, 2 and 3 of this table)	250	65 %
	Total	385	100 %

(Source: Primary Data collected by researcher)

Fig. No 5.1 Sector wise classifications of the Samples



(Source: Primary Data Collected by the Researcher)

5.1.2 Classification of Customers on the basis of Monthly Expenditure on Telecom Needs (Monthly Billing)

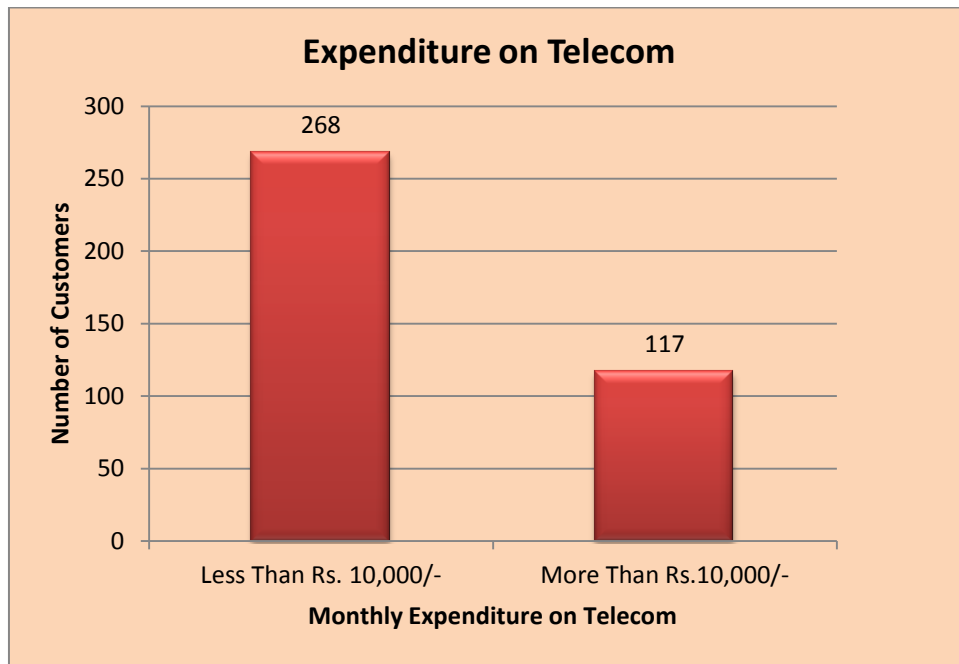
Out of 385 customers, 268 customers responded that their Monthly expenditure on communication is less than Rs. 10,000/- and 117 customers responded that their monthly expenditure on telecom is more than Rs. 10,000/-. This indicates that survey includes 69.6 % customers who spend less than Rs. 10,000/- on their telecom needs and 30.4 % customers who spend more than Rs. 10,000/- on their telecom needs.

Table No 5.2 Classification of Customers on the basis of Monthly Expenditure on Telecom Needs (Monthly Billing)

Sr. No.	Monthly Expenditure on Telecom Needs	Number of Customers	Percentage
1	Less Than Rs. 10,000/-	268	69.6 %
2	More Than Rs.10,000/-	117	30.4 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig No. 5.2 Classification of Customers on the basis of Monthly Expenditure on Telecom Needs (Monthly Billing)



(Source: Primary Data Collected by the Researcher)

5.1.3 The distribution of Services used by Customers: - The different customers use different Telecom services in wire-line and wireless segment. Telecom Service operators provides basic technology services like Landline services as well as they provide advance technology services like 3G, Lease lines etc. The Table No 5.3 shows the list of the services and the percentage of the customers those are using these services.

Survey reveals that fixed wire Telephone, Mobile and Broadband are most popular services which are used by 100 % customers. The centrex is the least popular service among the customers as only 9.67 % customers use it. 3G services are used by 47.27 % and 29.09 % customer are using ISDN services. Leased lines services are also used by 41.29 % customers. I-Net services are used by 10.38 % customers.

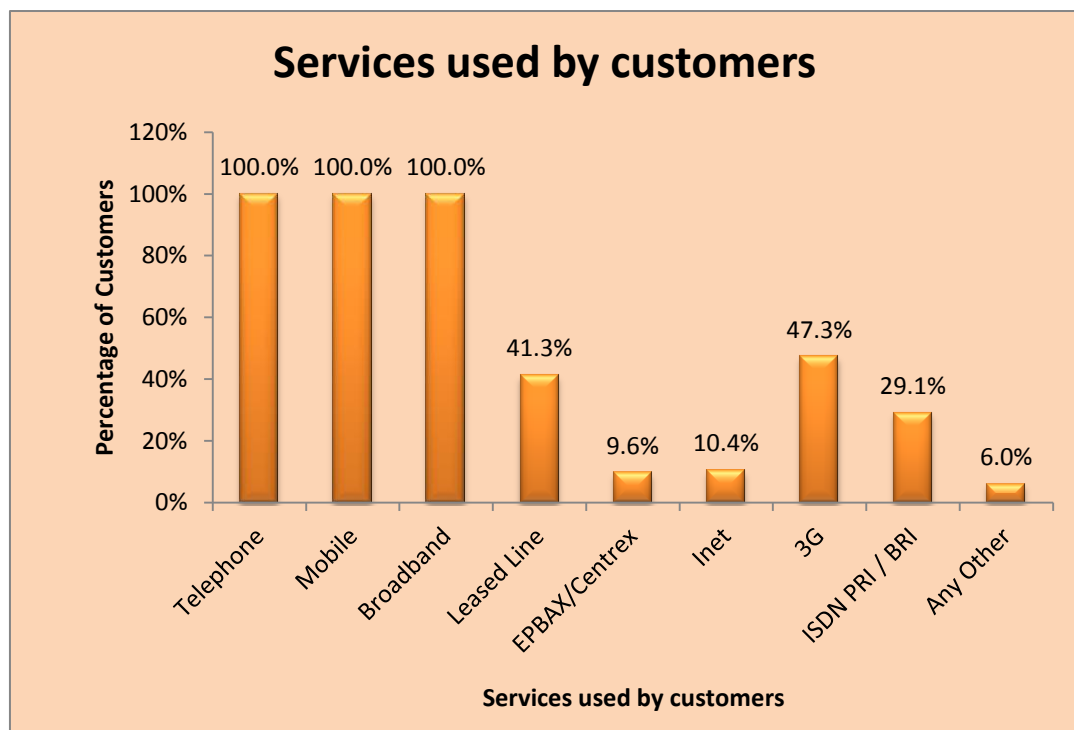
From the Table 5.3 one can conclude that the needs of corporate customers are becoming more and more high technology oriented, as most of the customers are using Mobile, Broadband, ISDN, 3G and Leased line services which are high technology services. To find the trends in the services used by the customers was one of the objectives of the research.

Table 5.3 Distribution of Services Used By Corporate Customers

Sr. No.	Name of the Service	No. of Customers using services	Technology (Basic/High)	Percentage of Customers
1	Telephone(Landline)	385	Basic	100 %
2	Mobile	385	High	100 %
3	Broadband	385	High	100 %
4	Leased Line	159	High	41.3 %
5	EPBAX/Centrex	37	High	9.6 %
6	I-net	40	High	10.4 %
7	3G	182	High	47.3 %
8	ISDN PRI / BRI	112	High	29.1 %
9	Any Other	23	High	6.0 %

(Source: Primary Data Collected by the researcher)

Fig. No 5.3. Distribution of Services used by Corporate Customers



(Source: Primary Data Collected by the Researcher)

5.1.4:- Classification of Customers according to their Cellular Service Provider

Out of the sample size of 385 Customers, 56 customers are using the mobile services of Bharati, 51 customers are using services provided by Reliance. The Idea Cellular tops the list with 87 customers and Vodafone is second in the list with 74

customers. Tata is mobile service provider for 38 customers and Unitech is mobile service provider for 31 customers. The BSNL is providing mobile services to 37 customers.

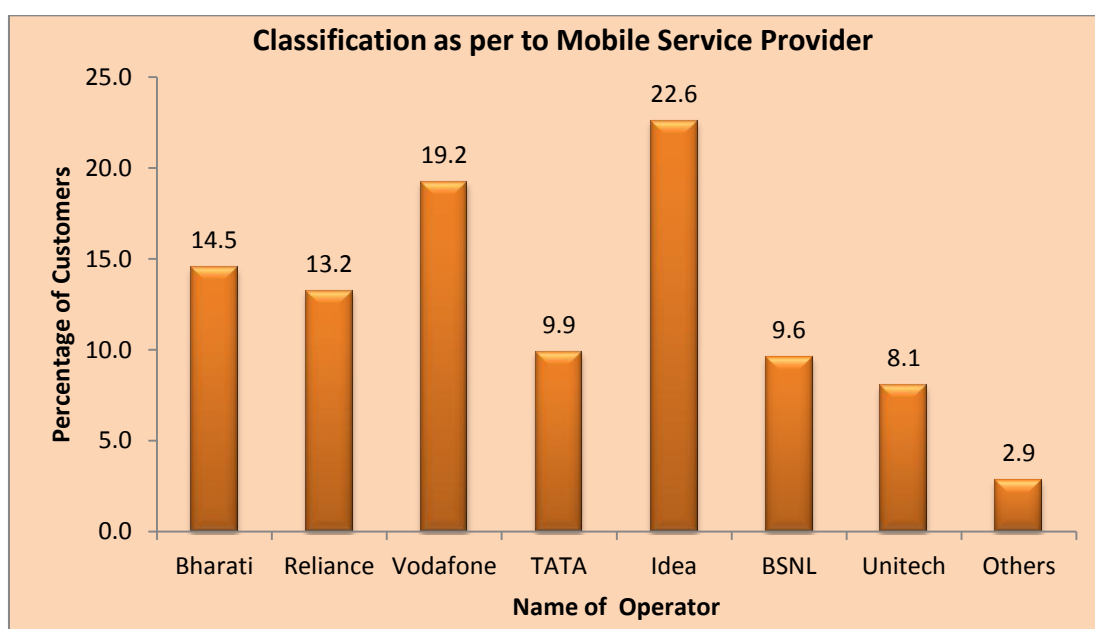
The samples represent all the Mobile Service Operators working in the city. This Classification of customer also matches approximately with the Operator wise subscriber base statistics published by the TRAI Press Release No. 179/2012. (TRAI, Press Release 179, 2012) *¹. This is one of the proofs of reliability of data.

Table No 5.4 Distribution of Sample according to Mobile Service Provider

Sr. No.	Service Provider	Number of Customers	Percentage
1	Bharati	56	14.5 %
2	Reliance	51	13.2 %
3	Vodafone	74	19.2 %
4	TATA	38	9.9 %
5	Idea	87	22.6 %
6	BSNL	37	9.6 %
7	Unitech	31	8.1 %
8	Others	11	2.9 %
	Total	385	100 %

(Source: Primary data collected by the researcher)

Fig. No: 5.4 Mobile Service Operator wise Distribution of the Customers



(Source: Primary data collected by the researcher)

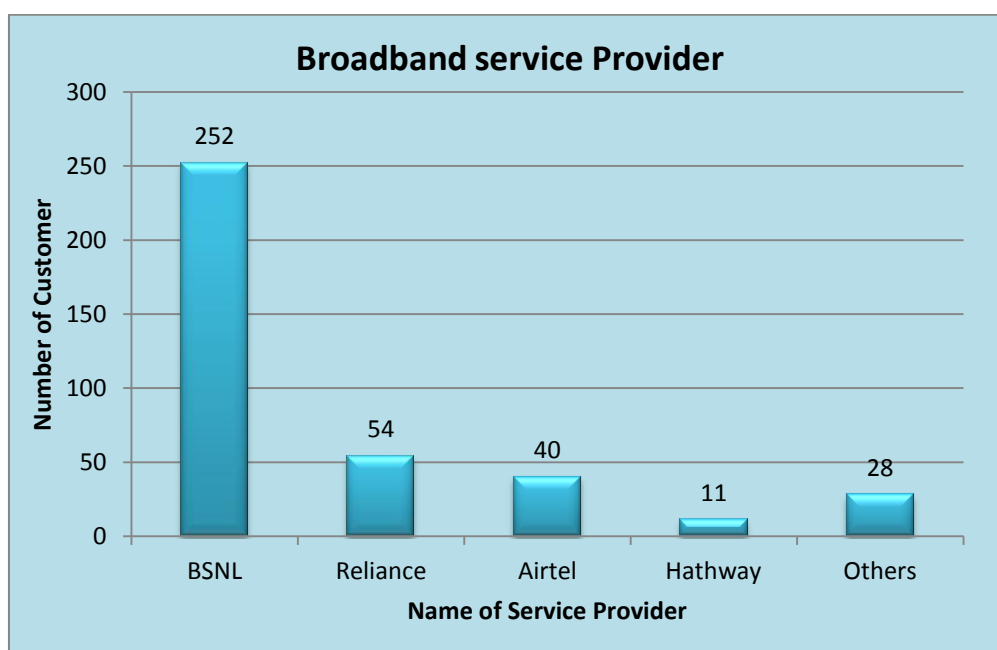
5.1.5 Classification of Customers according to their Present Broadband Service Provider:- Out of 385 customers 252 customers has opted BSNL as a broadband service Provider. It is seen that private operator's broadband services are also used by number of subscribers. Reliance and Airtel broadband services are used by 54 and 40 customers respectively. The Hathway is a broadband service operator for 11 users. It shows that sample represent the different broadband service providers. This percentage matches approximately with the Operator wise broadband subscriber base statistics published by the TRAI Press Release No. 179/2012. (TRAI, Press Release 179, 2012)*² This is another proof of reliability of data.

Table No 5.5 Classification according to Broadband Service Provider

Sr. No.	Service Operator	Number of Customer	Percentage
1	BSNL	252	65.45 %
2	Reliance	54	14.03 %
3	Airtel	40	10.39 %
4	Hathway	11	2.86 %
5	Others	28	7.27 %
		385	100.00 %

(Source: Primary data collected by the Researcher)

Fig. No 5.5 Classification according to Broadband Service operator



(Source: Primary data collected by the Researcher)

5.1.6:- Period of Association of Customer with the current Service Provider: -

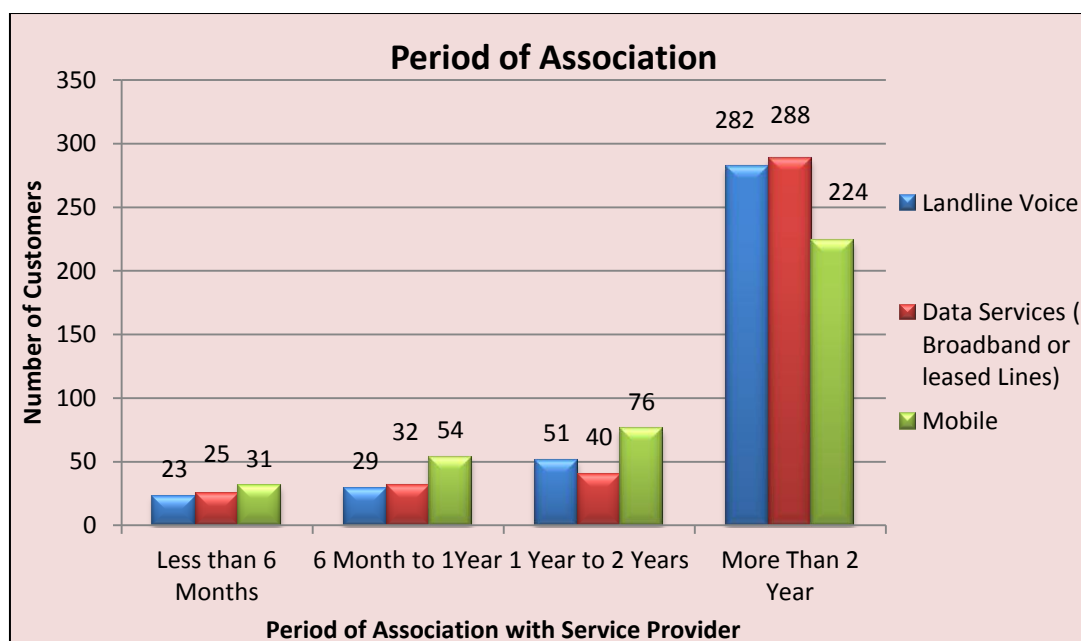
The Customers were asked about the period of association with the current service provider. In case of Mobile Network there are only 58.18 % customers who are with their current service provider for period of more than 2 years. In case of fixed line network this percentage is 73.25 % and in case of broadband it is 74.81 %. This variation is because of MNP (Mobile Number Portability). Data indicates that customers had changed their mobile service provider in last 2 years after launching of MNP in the Month of January 2011. MNP allows consumers and businesses to keep their existing telephone numbers when they switch operators.

Table No. 5.6 Period of Association with the different Service

Period of Association	Wire-line Voice		Broadband		Mobile	
	Count	%	Count	%	Count	%
Less than 6 Months	23	5.97 %	25	6.49 %	31	8.05 %
6 Month to 1Year	29	7.53 %	32	8.31 %	54	14.03 %
1 Year to 2 Years	51	13.25 %	40	10.39 %	76	19.74 %
More Than 2 Year	282	73.25 %	288	74.81 %	224	58.18 %
Total	385	100 %	385	100 %	385	100 %

(Source: Primary Data Collected By the Researcher)

Fig. No 5.6 Period of Association with Service Provider for different services



(Source: Primary Data Collected By the Researcher)

5.2 Analysis of Section I Part B of Questionnaire: - The Part B of Section I seeks the information about Gender, Educational Qualification and Age of the respondent who is filling questionnaire on behalf of Corporate Customers. This person is employed by the Corporate customer to look after the telecom needs of their organization.

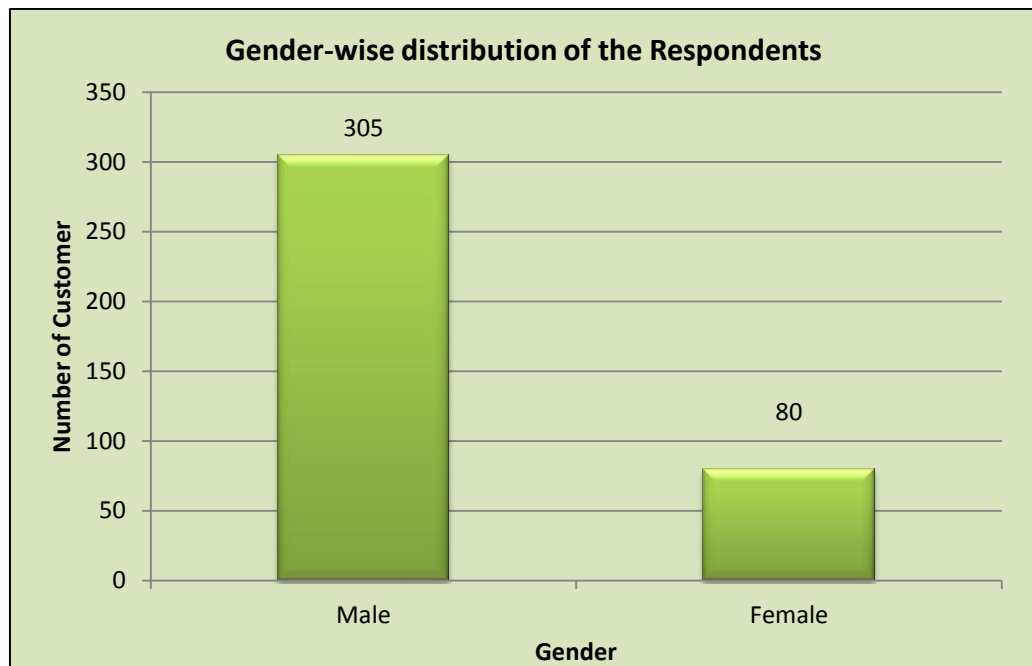
5.2.1 Classification of respondents according to Gender: - The Questionnaire is filled by the person who is employed by Corporate Customers to look after the telecom needs of their organization. The information was sought about the Gender of this person. The survey reveals that out of 385 respondents 305 (79.22 %) were male respondent & 80 (20.78 %) were female respondent. It shows that there is a domination of the male gender in Telecom Maintenance work.

Table No 5.7 Gender-wise Distribution of the Respondents

Sr. No.	Gender	Number of Respondent	Percentage
1	Male	305	79.22 %
2	Female	80	20.78%
	Total	385	100 %

(Source: Primary Data Collected by the Researcher)

Fig No 5.7: Gender-wise Distribution of Respondents



(Source: Primary Data Collected by the Researcher)

5.2.2 Classification of respondent's according to their Age

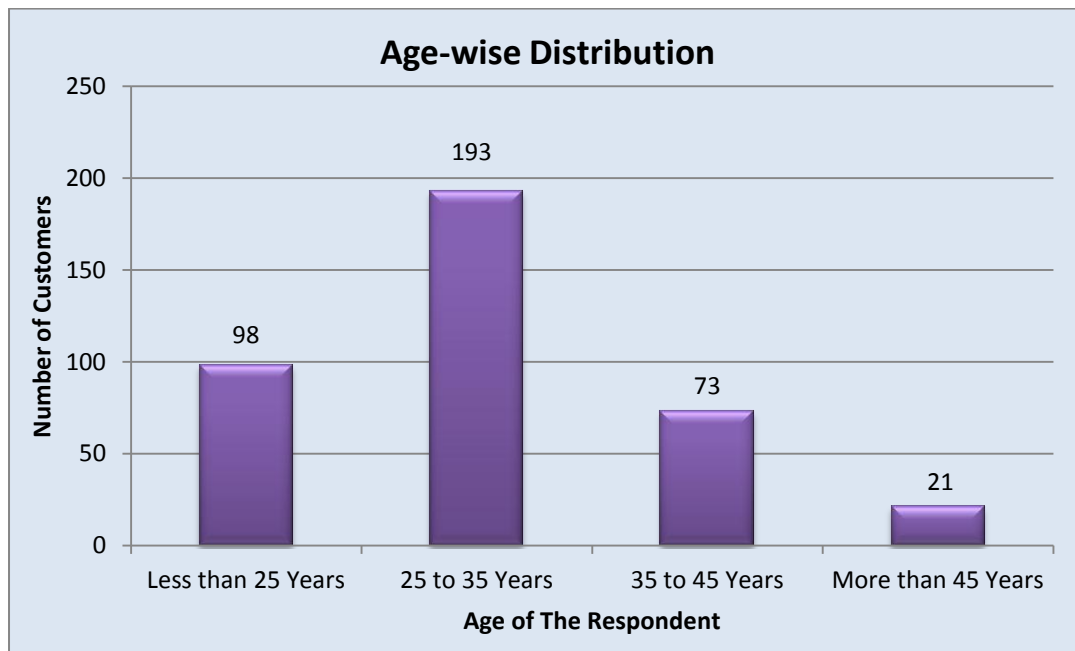
50.13% of the total respondents are from the age group of 25-35 years. 25.45 % respondents are less than 25 years in age. Only 5.45 % respondents are more than 45 years and 18.96 % respondent are from the age group of 35- 45 years. Survey reveals that the Corporate Customers allocate the responsibility of telecom maintenance to the young talent as telecom technology is high end technology.

Table No 5.8 Classification of Respondent according to Age

Sr. No.	Age Group	Number of Customers	Percentage
1	Less than 25 Years	98	25.45 %
2	25 to 35 Years	193	50.13 %
3	35 to 45 Years	73	18.96 %
4	More than 45 Years	21	5.46 %
		385	100 %

(Source: Primary Data Collected by the Researcher)

Fig. No. 5.8 Age wise distribution of the Respondents



(Source: Primary Data Collected by the Researcher)

5.2.3 Classification of respondents according to Educational Qualification

57.9 % respondents are Graduate and 8.6% Respondents are post graduate. The 33.5 % respondent have the other professional qualifications like Diploma in Engineering, Professional certification etc. The respondents are maintaining the

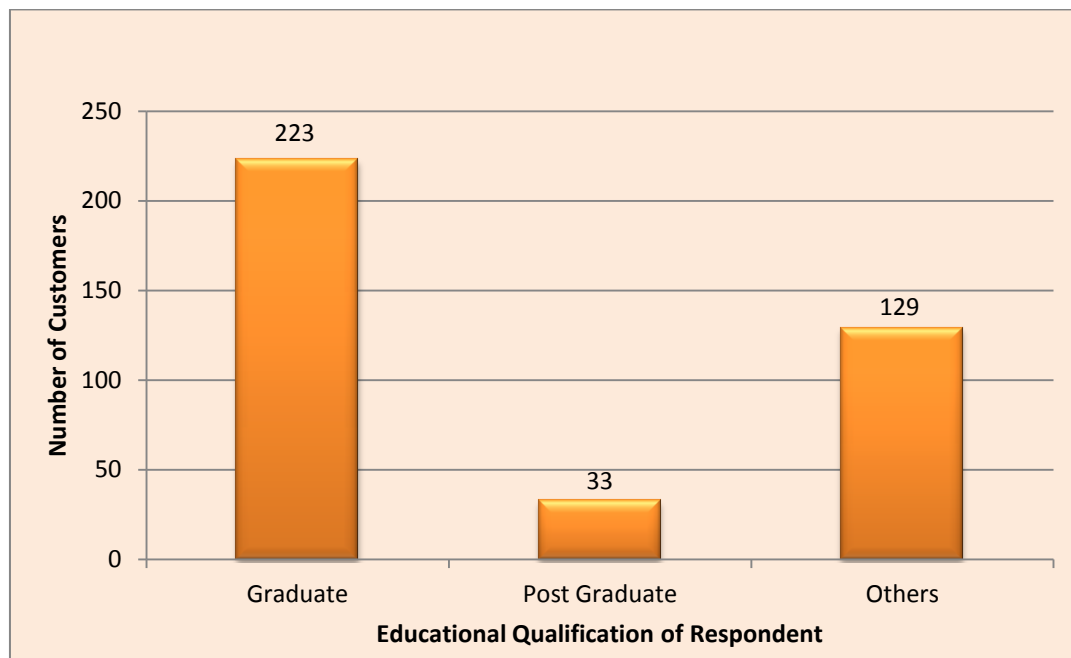
telecom network. The job profile demands the highly qualified person who has sound knowledge of the technology. The job also demands the licensing with different level of officers working with Telecom Service Operator. Hence data shows that companies had given the maintenance of communication into qualified hands.

Table No 5.9 Classification of Respondent as per Educational Qualification

Sr. No.	Educational Qualification of Respondent	Number of customers	Percentage
1	Graduate	223	57.9 %
2	Post Graduate	33	8.6 %
3	Others	129	33.5 %
	Total	385	100.0%

(Source: Primary Data Collected by the Researcher)

Fig. No 5.9 Classification of Respondent as per Educational Qualification



(Source: Primary Data Collected by the Researcher)

5.3 Analysis of the Section II (Network Performance) of Questionnaire:-

Section II deals with the information about the Network Performance parameters like Fault incidence per year, In general fault repair duration. The information about the type of the problems normally faced by the customer in case of Landline, mobile and broadband network also sought in this section. It also quaries about the customer satisfaction on network performance.

5.3.1 Number of Fault incidences per year faced by Corporate Customers

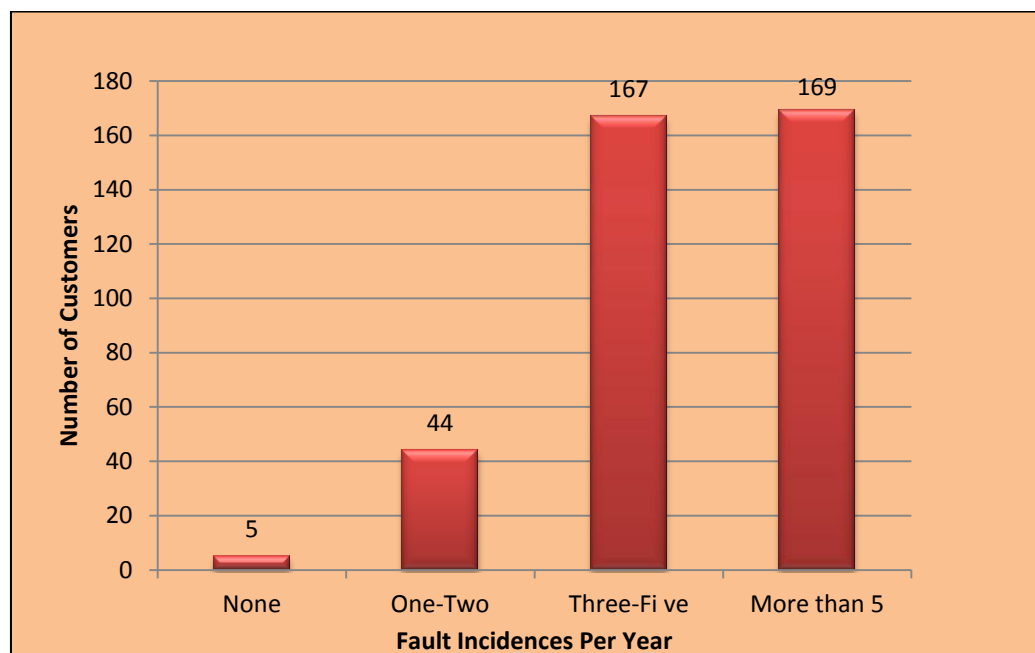
Even though the telecom service operators are trying their level best to provide uninterrupted service, there are different instances when the fault condition occurs. The customers were asked about the average number of fault incidences they are facing per year when there is complete failure of the communication. It is found that 43.9 % customers have faced more than 5 fault incidences per year. 43.4 % customer reported that there are 3-5 fault incidences per year. It is quite high figure in the age of high technology. The 11.4 % customers have faced one to two faults per year. The 1.3 % customers have faced nil fault incidences per year.

Table No 5.10 Yearly Fault incidences faced by Customers

Sr. No.	Number of Fault Incidences Per Year	Number of Customers	Percentage
1	Nil	5	1.3 %
2	One-Two	44	11.4 %
3	3-5	167	43.4 %
4	More than 5	169	43.9 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig. No: - 5.10 Distribution of Fault incidences per year faced by Customers



(Source: Primary Data Collected by the Researcher)

5.3.2 In General Fault Repair duration

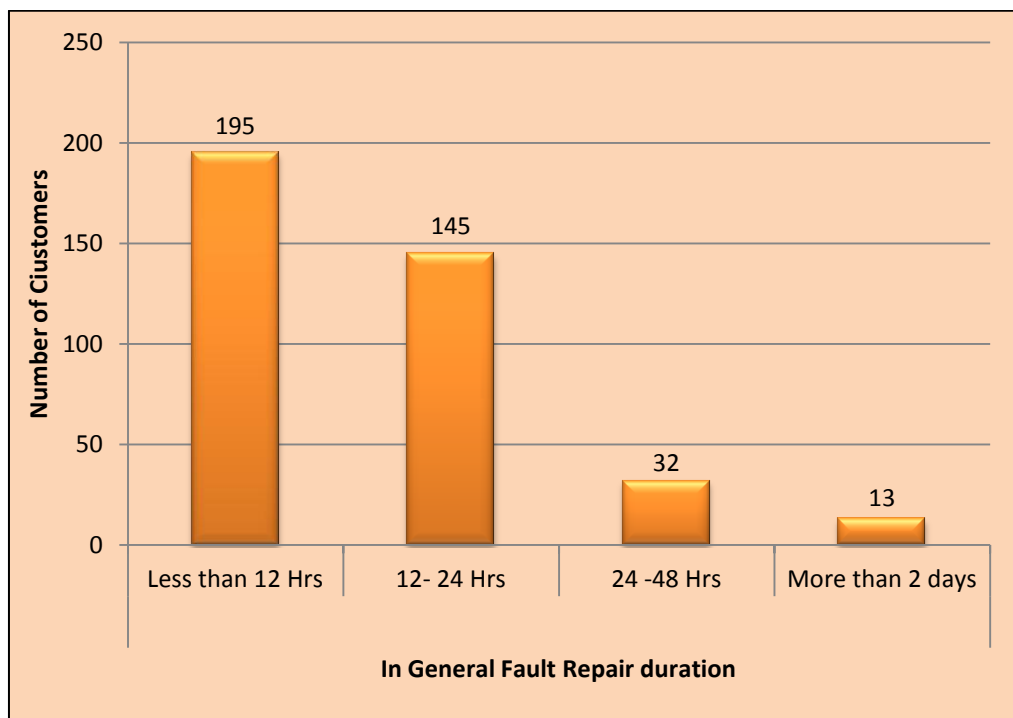
Whenever fault condition occurs, customer wants immediate attention and wants that fault should be repaired at the earliest. In general fault repair duration is the time taken by the Telecom Service Provider to set the fault right. In a survey 50.6 % customer said that the faults are attended within 12 Hrs. 37.7 % customers reported that faults are attended in between 12-24 Hrs. 11.7 % customers said that faults Service providers takes 24 Hours to set the fault right. The customer wanted to stay connected round the clock and such longer duration is always unacceptable by them.

Table No 5.11 In General Fault Repair duration

Sr. No.	In General Fault Repair Duration	Number of Customers	Percentage
1	Less 12 Hrs	195	50.6 %
2	Between 12Hrs-24 Hrs	145	37.7 %
3	Between 24 Hrs-48Hrs	32	8.3 %
4	More than 2 Days	13	3.4 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig. No. 5.11 In General Fault Repair duration



(Source: Primary Data Collected by the Researcher)

5.3.3:- Distribution of Network problem (Type of Fault) for Landline Phone:-

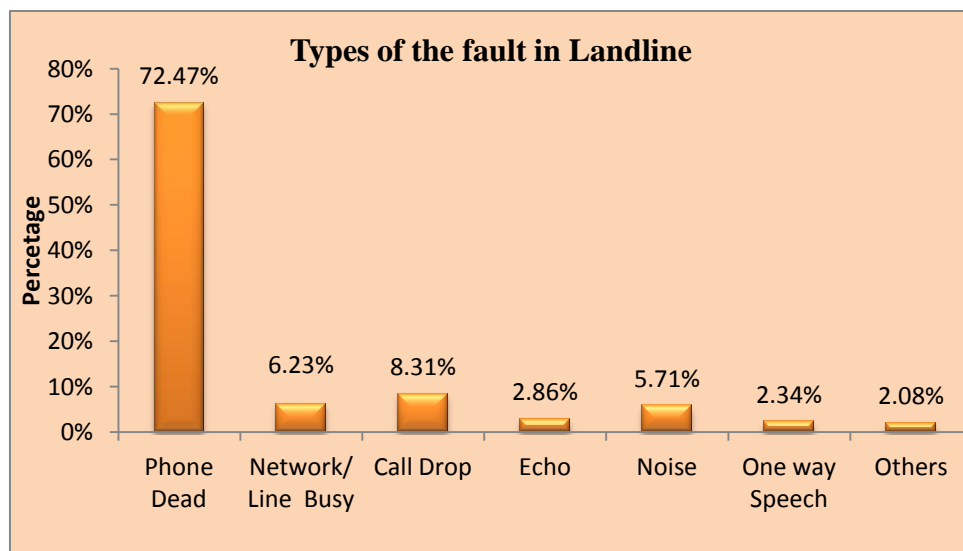
Customers were asked a simple question that whenever fault condition occurs in Landline network what is nature of the fault they face frequently. The 279 customers out of 385 reported that the Phone dead (Phone dead means there is no dial tone) is the type of fault they are facing frequently. If there is congestion in the network customer will get the Line busy. There are 24 customers who face Network / line busy issue. Call drop means the premature disconnection of the call. This problem is faced by 32 customers. The echo means customers listens their own voice when they are calling the other party, this problem is reported by 11 customers. The noisy lines and one way speech are faced by the 22 and 9 customers respectively.

Table No 5.12 Distribution of type of Fault in case of Landline

Sr. No.	Type of Fault	Number of Customers	Percentage
1	Phone Dead	279	72.47 %
2	Network/ Line Busy	24	6.23%
3	Call Drop	32	8.31 %
4	Echo	11	2.86 %
5	Noise	22	5.71 %
6	One way Speech	9	2.34 %
7	Others	8	2.08 %
	Total	385	100.00 %

(Source: Primary Data Collected by the Researcher)

Fig No. 5.12 Distribution of type of Fault in case of Landline phone



(Source: Primary Data Collected and processed by the Researcher)

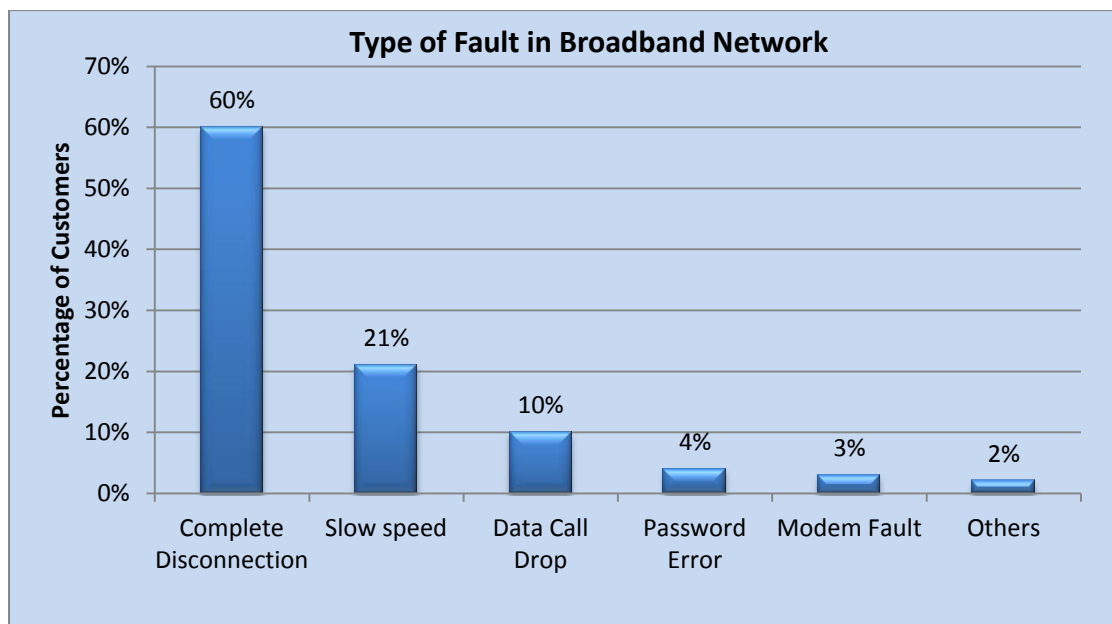
5.3.4:- Distribution of Network problem for Broadband users:-Customers were asked about what type of problem they face frequently when fault condition occurs in broadband network. It is found that 60% of customers are facing the complete disconnection problem. The slow speed is another fault area faced by the 21 % of the customers. Intermittently data call drops are faced by 10 % of customers and modem faults are faced by 3 % customers. 4% customers are facing Password issues. 2 % face other problems (Other problem includes problems like not able to access particular website or not able to operate in particular transmission protocols etc.)

Table No 5.13 Distribution of Network problems in Broadband Services

Sr. No.	Type of Fault	Number of Customers	Percentage
1	Complete Disconnection	231	60%
2	Slow speed	81	21%
3	Data Call Drop	39	10%
4	Password Error	15	4%
5	Modem Fault	11	3%
6	Others	8	2%
	Total	385	100 %

(Source: Primary Data Collected by the Researcher)

Fig No 5.13 Distribution of Network Problems in case of Broadband Services



(Source: Primary Data Collected by the Researcher)

5.3.5 Distribution of Network problems in Mobile Networks

It was asked to the customer while using the mobile services what type of problem do you face frequently. **Each customer was asked to select the two options because the number type of problem is higher in case of Mobile Network.** The survey revealed that 26.9 % customers are facing call drop problem. The survey further reveals that 22.7 % customers are facing poor coverage problem. This shows that there are some areas in the city where there is poor network coverage.

The Network busy problems are faced by 17 % customers. Data service problem are faced by 14.7 % customer. The poor voice quality problems like noise, echo and one way speech are faced by 2.73%, 3.8 % and 3.8 % customer respectively. VAS troubles are faced by 5.6 % customers.

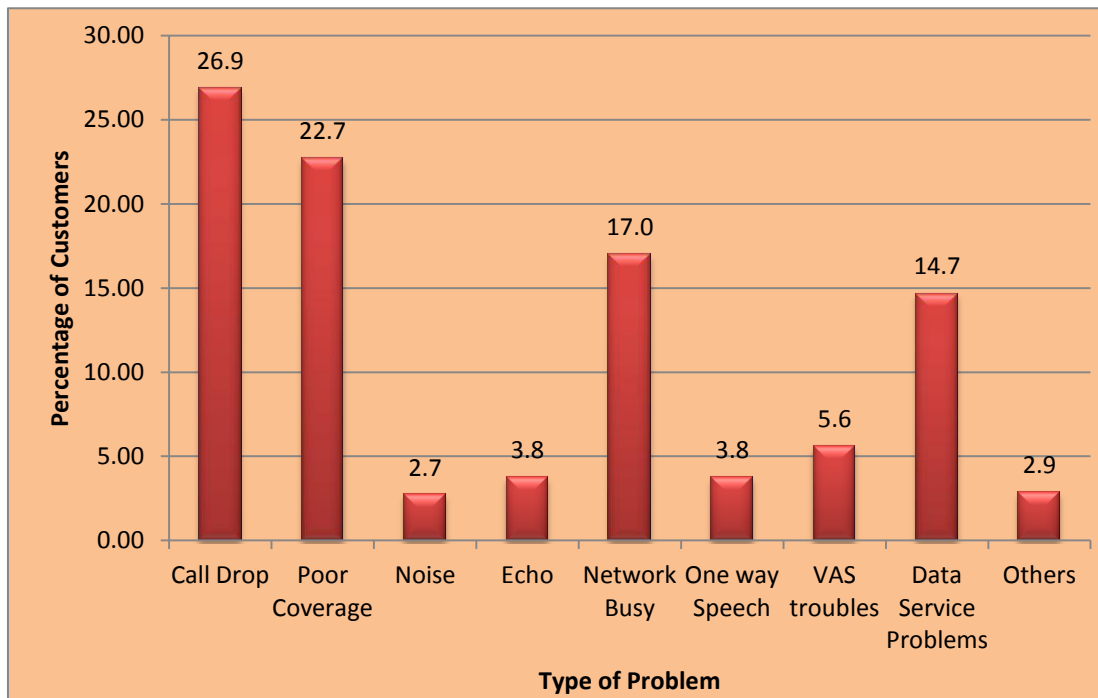
Comment: - There is variety of problems in the mobile network and survey shows that there is lot of room for improvement in case of Mobile Network.

Table No 5.14 Distribution Network Problem in case of Mobile Networks

Sr. No.	Type of Fault	Number of Customers	Percentage
1	Call Drop	207	26.9%
2	Poor Coverage	175	22.7 %
3	Noise	21	2.7 %
4	Echo	29	3.8 %
5	Network Busy	131	17 %
6	One way Speech	29	3.8 %
7	VAS troubles	43	5.6 %
8	Data Service Problems	113	14.7 %
9	Others	22	2.9 %
	Total	770	100 %

(Source: Primary Data Collected by the Researcher)

Fig. No 5.14 Network Problems (Type of Fault) in Mobile Service



(Source: Primary Data Collected by the Researcher)

5.3.6 Satisfaction about Network Performance for different services: - Customers were asked to rate their satisfaction in respect of Network performance on a five point scale starting from very satisfied to very dissatisfied.

In case of Landline voice there are 27.8 % customers who are very satisfied and 46.8 % customers are satisfied. By adding these two percentages one can say that 74.6 % customers are satisfied about the Network quality of Landline . There are 14.5 % customers who are neutral. 9.4 % customers are dissatisfied and 1.6 % customers are very dissatisfied.

In case of Wire-line Broadband there are 29.6 % customers who are very satisfied and 51.4% customers are satisfied. By adding these two percentages one can say that 81.0 % customers are satisfied about the Network quality of wire-line Broadband. There are 9.1 % customers who are neutral. 7.5% customers are dissatisfied and 2.3 % customers are very dissatisfied.

In case of Mobile there are 15.3 % customers who are very satisfied and 42.6 % customers are satisfied. By adding these two percentages one can say that 57.9 % customers are satisfied about the Network quality of Mobile. There are 22.6 % customers who are neutral. 14.5 % customers are dissatisfied and 4.9 % customers are very dissatisfied.

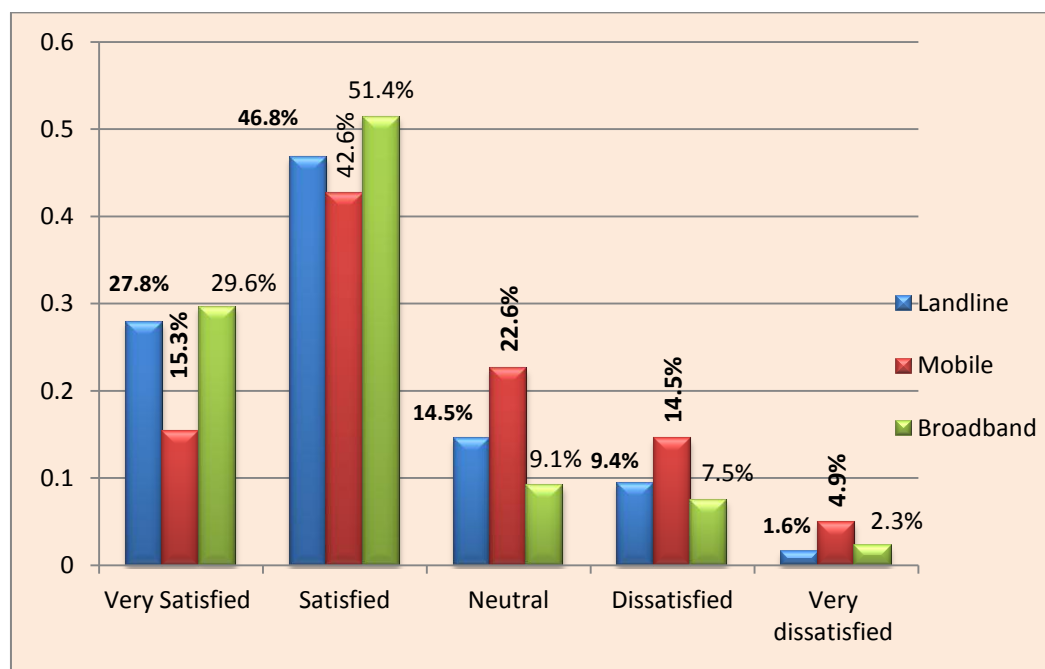
Comment: - By comparing score of three services it can be said that Mobile Network quality is poor than wire-line Network Quality.

Table No. 5.15 Satisfaction on Network Performance for different services

Level of Satisfaction	Landline Voice		Mobile		Wire-line Broadband	
	Count	%	Count	%	Count	%
Very Satisfied	107	27.8 %	59	15.3%	114	29.6%
Satisfied	180	46.8 %	164	42.6%	198	51.4%
Neutral	56	14.5%	87	22.6%	35	9.1%
Dissatisfied	36	9.4 %	56	14.5%	29	7.5%
Very dissatisfied	6	1.6 %	19	4.9%	9	2.3%
Total	385	100 %	385	100 %	385	100 %

(Source: Primary Data Collected by Researcher)

Fig. No 5.15 Satisfaction about Network Performance for different services



(Source: Primary Data Collected by Researcher)

5.4 Analysis of Section No III of Questionnaire (Billing Information) : -

Section III deals with the billing related parameters like Availability and need of detailed bills, mistakes in the billing, alert in between the billing cycles, Customers readiness to pay premium charges, transparency in billing and Satisfaction on billing services..

5.4.1 Expectation about detailed bill: - A Detailed bill is the bill containing information about system usage such as the points of origin of the call, the points of destination of the call, the duration of each call, the amount billed for each call, the total usage time in the billing period, the total free time remaining in the billing period. Telecom Service Operator shall be able to generate the billing information, in adequate details, to prove the genuineness of the bill. (TRAI, 301-37/2004-Eco)*³.

The question was asked to customers do you feel that every bill raised by service provider should be detailed bill. There are 94 % respondents who said yes to this question.

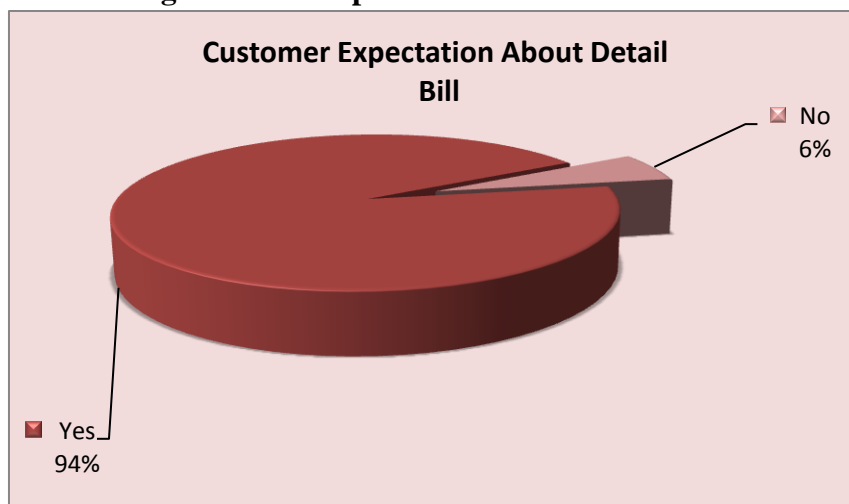
Comment: - As corporate customer is a major revenue source it is very much needed to build a confidence between the Service Operator and customer. Providing detailed bill without demand will reflect the transparency. Hence it is good to provide the detailed bill without demand.

Table No 5.16 Expectation about the detailed bill

Sr. No.	Response	Number of Customers	Percentage
1	Yes	362	94 %
2	No	23	6 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig. No 5.16: Expectation about detailed Bill.



(Source: Primary Data Collected by the Researcher)

5.4.2 Mistakes in the billing

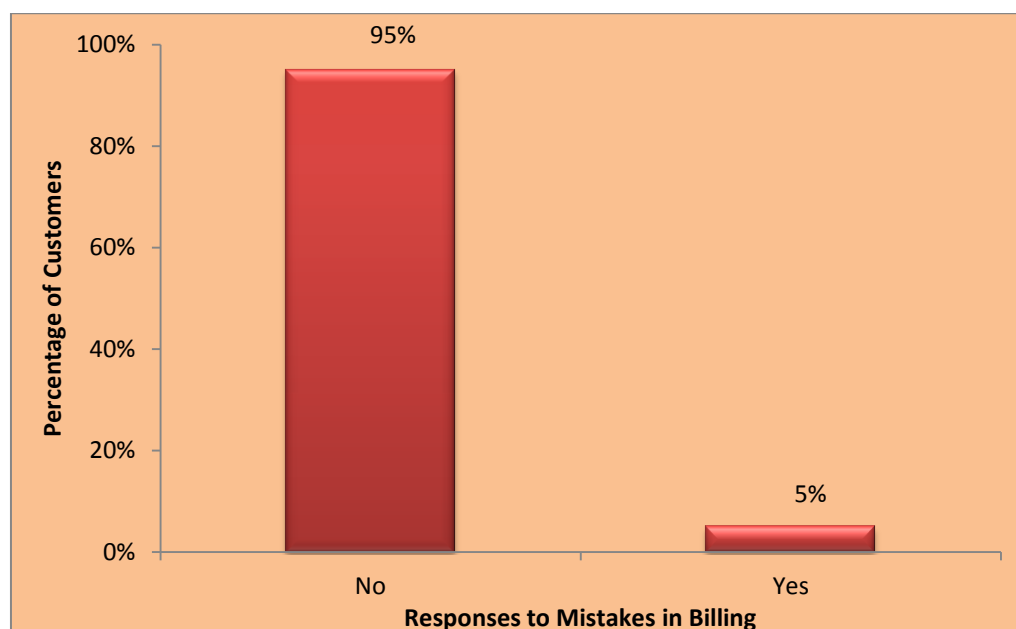
Billing mistakes lead customer to pay for the services those are not used by him or not asked by him. Billing mistakes can be duplicate bills, simple miscalculation, Extra surcharges, unreimbursed credits, incorrect rates. When the customers were asked a simple question that whether they find mistakes in the bills? 95 % customer reported that they do not find any mistakes in the bills.

Table No 5.17 Mistakes in the billings

Sr. No.	Response on Mistake in the Billing	Number of Customers	Percentage
1	No	366	95 %
2	Yes	19	5 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig. No. 5.17 Responses for Mistakes in the Billing



(Source: Primary Data Collected by the Researcher)

5.4.3 Requirement of Alert for Billing

The persons looking after the needs of the customer normally do not have time to review the bill as they are busy in keeping the telecom equipment functioning. If the managers get alert when their expenditure is exceeding the budgeted expenditure then it will be very advantageous for their organization. The telecom service operator

can warn the customers as they approaches different threshold levels of the billing. Customer was asked the simple question whether they want alert in between the billing cycles at different threshold levels of billing. The 296 out 385 (77 %) customers said yes for the suggestion.

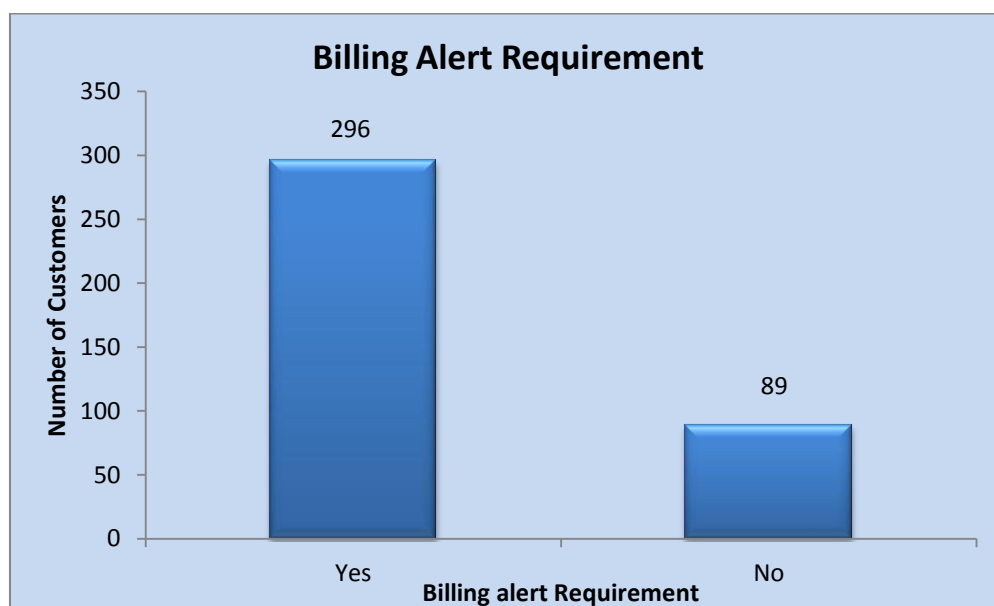
Comment: - Alert in between billing cycle is very useful for corporate customers to control their expenditure on telecom needs as well as it will be useful for operator to build up the trust.

Table No 5.18 Requirement of alert about billing amount

Sr. No.	Response	Number of Customers	Percentage
1	Yes	296	76.88 %
2	Yes	89	23.12%
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig. No: 5.18 Customers opinion about the Requirement billing alert



(Source: Primary Data Collected by the Researcher)

5.4.4 Awareness of Availability of Detailed bill for Prepaid Customers:- TRAI, the regulator, made it obligatory for every service provider to provide past usage

details in respect of pre-paid mobile connections, within a period of 30 days of receipt of such request. (TRAI, Consumer Handbook, 2004).^{*4} The customers were asked whether you are aware of availability of detailed bill for Prepaid Customers. 84.4 % of customer said yes in answer.

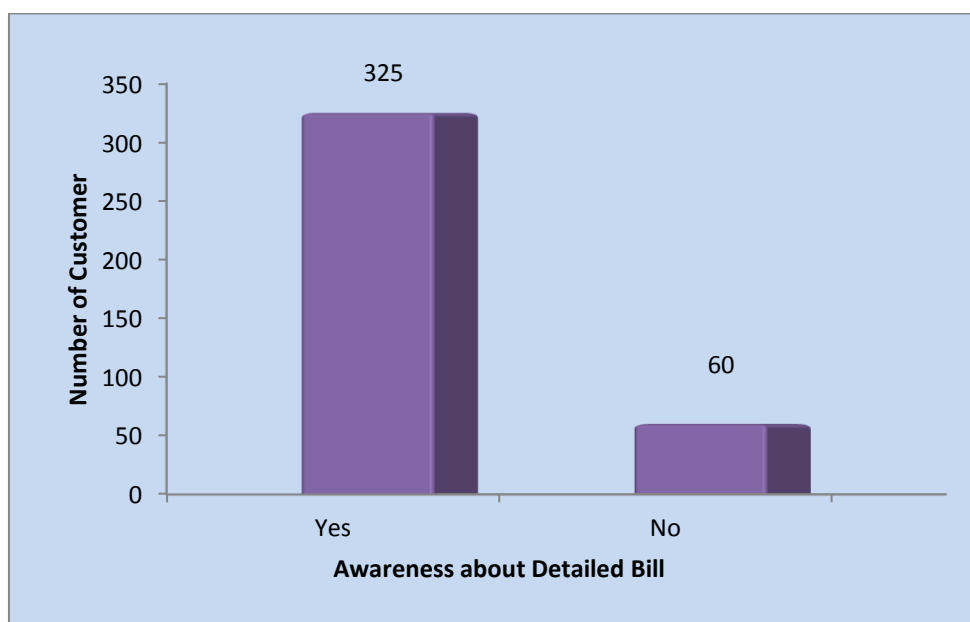
Comment: -This shows there is well awareness among the customers about the actions taken by the Indian Government Regulator TRAI.

Table No 5.19 Awareness on Availability of Detailed Bill in Prepaid Services.

Sr. No.	Response	Number of Customers	Percentage
1	Yes	325	84.4 %
2	Yes	60	15.6 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig No.5.19 Awareness about Availability of Detailed bill for Prepaid



(Source: Primary Data Collected by the Researcher)

5.4.5 Readiness to Pay Premium charges for Treating as a priority Customer: -

The corporate customers want their communication should be without any interruption. Considering the volume of the customer served by the Telecom Service providers, there are chances that customer may not be attended on priority basis due to lack of manpower or equipment. The customers were asked a simple question “Are you ready to pay premium charges to treat yourself as customer of prime importance

so that your complaints are attended on priority basis?” 92.47 % customers are not ready to pay any premium charges to treat themselves as priority customers.

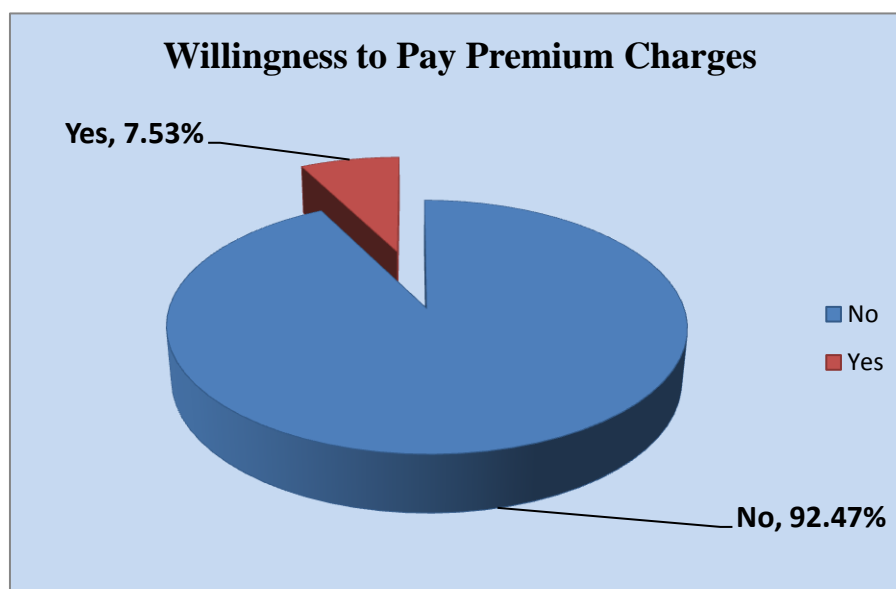
Comment: - The reason behind this may be multiplayer scenario in the Telecom market. If customer is not happy with the services provided they will switch to another telecom operator for better telecom services instead of paying premium charges.

Table No 5.20 Willingness to pay premium charges

Sr. No.	Willingness	Number of Customers	Percentage
1	No	356	92.47 %
2	Yes	29	7.53 %
	Total	385	100.00 %

(Source: Primary Data Collected by the Researcher)

Fig No 5.20 Willingness to pay premium charges



(Source: Primary Data Collected by the Researcher)

5.4.6 Transparency in the Billing: - To ensure transparency in telecom billing as per TRAI the following information should be included in the telephone bills issued (TRAI, 2007) *5

- The name of the applicable tariff plan; applicable credit limit.
- Methodology applied for the calculation of the amount mentioned in the telephone bills, details of the pulse rates and charges, STD, ISD and SMS charges and monthly fixed charges.

- The amount of security deposit to be shown separately in the first bill and whenever adjusted, subsequently.
- Details of late payment charges.
- Mode and procedure for making payment of telephone bills.
- Details of setup of public grievance mechanism.
- Information system for change of billing address;
- The acknowledgement of the last payment made & Information Box.

The customers were asked whether bills they receive from operator are transparent or not. Survey revealed that 374 customers (97.14 %) out of 385 customers said that bills issued by service provider are transparent. Only 11 customer raised doubt on the transparency of the bills issued by telecom service provider.

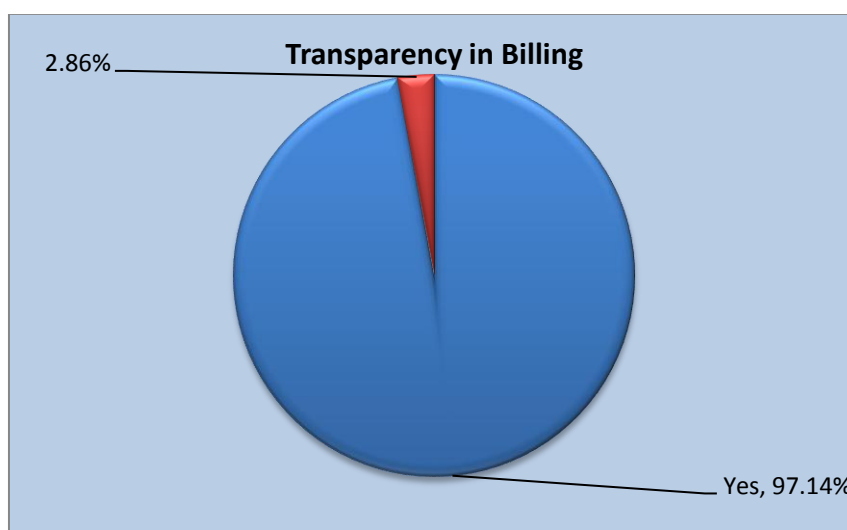
Comment: - It is good sign for telecom industry and it seems that Government Regulators are having better control on the service providers.

Table No 5.21 Opinion on the Transparency in Billing

Sr. No.	Transparency in billing	Number of Customers	Percentage of customers
1	Yes	374	97.14 %
2	No	11	2.86 %
	Total	385	100.00 %

(Source: Primary Data Collected by the Researcher)

Fig No 5.21 Transparency in Billing



(Source: Primary Data Collected by the Researcher)

5.4.7 Level of satisfaction about the billing services.

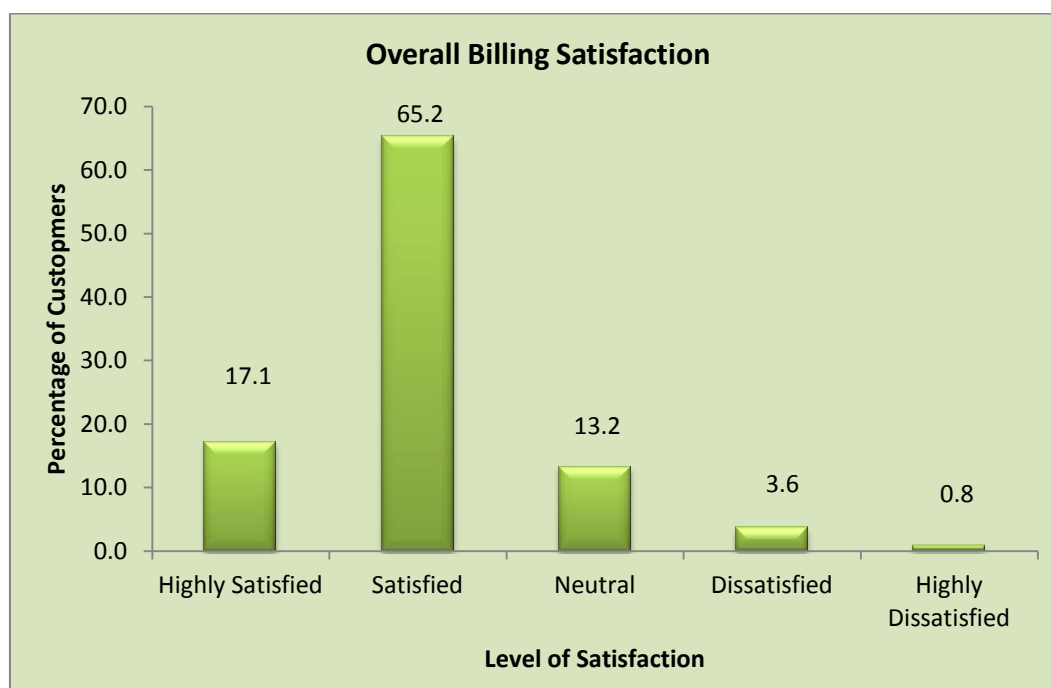
The customers were asked that, “What is level of your satisfaction in respect of the billing services provided by the Telecom Service Operators?” Survey revealed those 17.1% customers are Very satisfied about the billing services. Survey further reveals that 61.2 % customers felt that the billing service is satisfactory. Adding the percentage of these two level one can say that 78.3 % customer are satisfied about the billing services. 13.2 % customers are neutral followed by 3.6 % who are dissatisfied about the services. 0.8 % percent customers are Very dissatisfied.

Table No 5. 22 Satisfaction on the Billing service

Sr. No.	Level of Satisfaction	Number of Customers	Percentage
1	Very Satisfied	66	17.1%
2	Satisfied	251	65.2 %
3	Neutral	51	13.2 %
4	Dissatisfied	14	3.6 %
5	Very Dissatisfied	3	0.8 %
	Total	385	100.00%

(Source: Primary Data Collected by the Researcher)

Fig No 5.22: Satisfaction of Customers about the Billing Services



(Source: Primary Data Collected by the Researcher)

5.5 Analysis of Section No IV of Questionnaire (Provision of Services and Customer Care) : - Section IV takes information about the help desk and customer care services. This section enquire about the Time Taken by Telecom Service Operator to provide new connection, Do not Call Registry, time taken by the call center to solve the complaint, the channel opted by the customer to register complaint, need of deputation of special person for fault follow up. It also finds the customer satisfaction on After Sales Services.

5.5.1 Time Taken by Service operator to activate New connection: -

- A. Time Taken by Service Operator Activate New Landline Connection: -**
The customer was asked how much time was taken by the operator to activate the landline services once he has applied for the services. It is time taken for provision of landline services. 32.2 % customer said that they received connection after two days. 53.5 % customers said that they received connection within 24-48 Hours. Only 14.3 % customers said that they got the connection activated within 24 Hours.
- B. Time Taken by Service operator to activate New Mobile connection:-**
The customer was asked how much time it has taken to activate the New Mobile connection once he has applied for those services. It is time taken for provision of mobile services. 72.21 % customer said that they received connection within 24 hours. 22.9 % said that they received connection within 24-48 hours. Only 4.9 % said that they got the connection activated after two days.
- C. Time Taken by Service operator to activate New Broadband connection: -** The customer was asked how much time operator has taken to activate the Broadband services once the he has applied for those services. It is time taken for provision of Broadband services. 34.5 % said that they received connection after two days. 52.2 % said that they received connection within 24 Hrs to 48 Hrs. Only 13.3 % said that they got the connection activated within 24 Hours.

Comment: - The Table no 5.23 shows the comparative time of activation of different services like landline, mobile and broadband. Survey reveals that the activation time for the mobile services is less than the broadband and landline

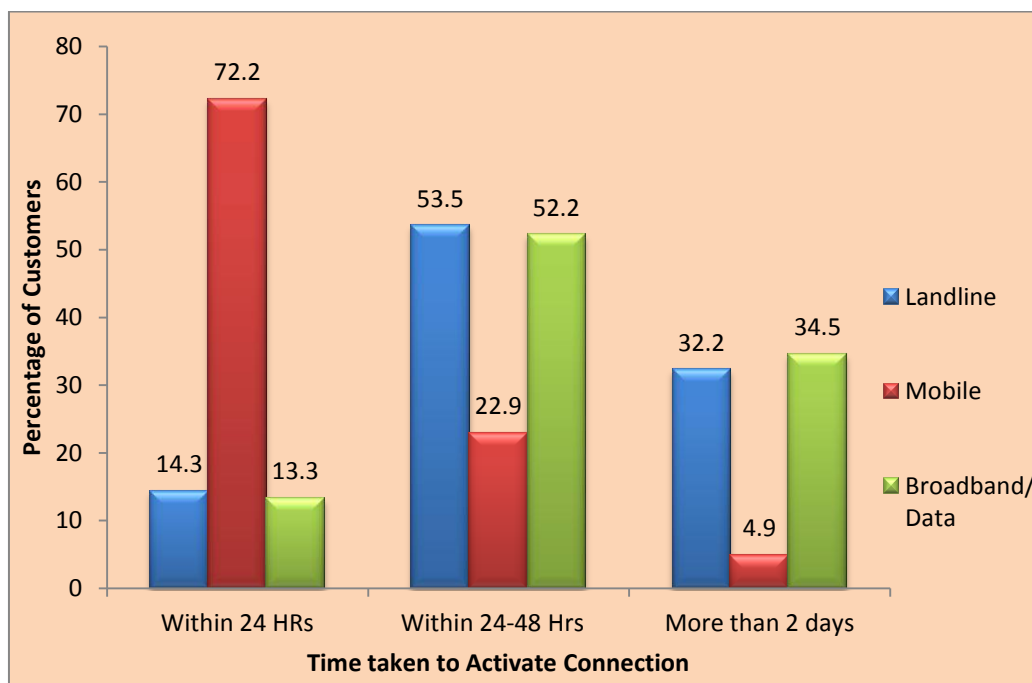
telecommunication services. This delay in activation of Landline and Broadband is because of the reason that the telecom service operator has to lay the physical wire from Exchange equipment to the customer premises for provisioning of Landline or broadband services which is time consuming work.

Table No 5.23 Comparative Activation time needed for provisioning of Services

Sr. No.	Services	Within 24 HRs		Within 24-48 Hrs		More than 2 days	
		Count	%	Count	%	Count	%
1	Landline	55	14.3 %	206	53.5 %	124	32.2 %
2	Mobile	278	72.2 %	88	22.9 %	19	4.9 %
3	Broadband/Data	51	13.3 %	201	52.2 %	133	34.5 %

(Source: Primary data Collected by the Researcher)

Fig No 5.23: Comparative time of Activation of Different Services



(Source: Primary data Collected by the Researcher)

5.5.2 Preferred Fault booking medium: - Customers were asked about the medium they preferred to launch the complaint in case of failure of services. Out of 385 customers 255 customers (66.23 %) said that they prefer the telephone to launch the

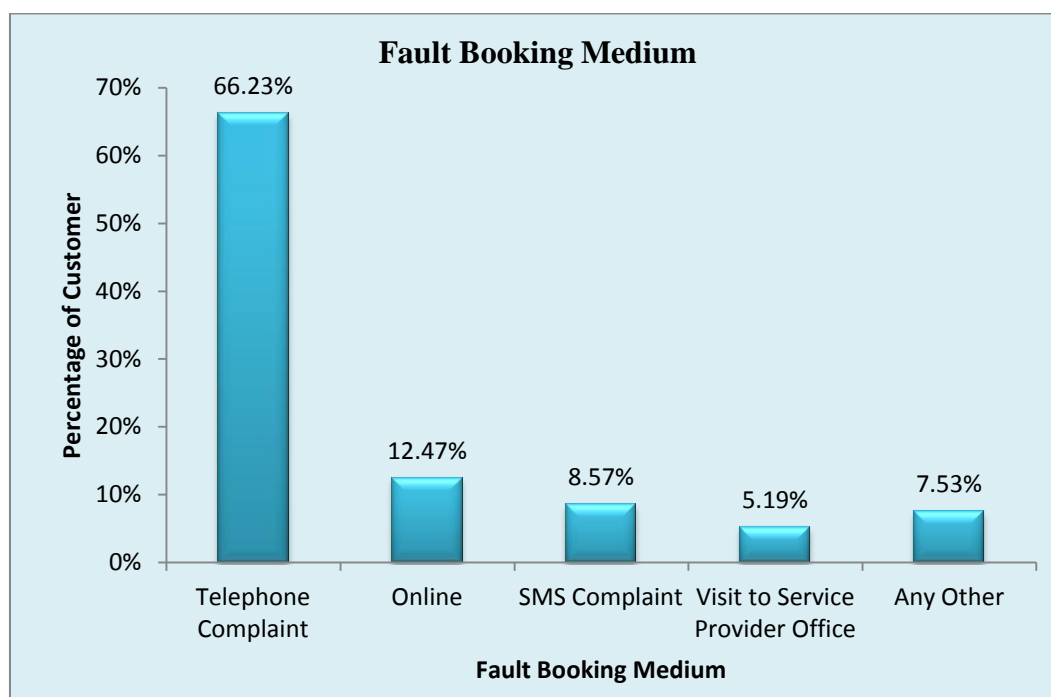
complaints. 12.47% customers prefer online and 8.57 % customers prefer SMS as a medium to launch complaint. 5.19 % customers visit the to the service center.

Table No 5.24: Preferred Fault booking medium

Sr. No.	Medium used by Customer to launch the Complaint	Number of Customers	Percentage
1	Telephone Complaint	255	66.23 %
2	Online	48	12.47 %
3	SMS Complaint	33	8.57 %
4	Visit to Service Center	20	5.19 %
5	Any Other	29	7.53 %
	Time	385	100 %

(Source: Primary data collected by the researcher)

Fig No: 5.24 Preferred Fault booking medium



(Source: Primary data collected by the researcher)

5.5.3 Awareness about the contact details of higher authorities:- In case the complaint has not been resolved by the call centre, customer can contact the next level officer called as Nodal Officer. In case the complaint has not been resolved by the Nodal Officer customer can contact the next level authority called as Appellate

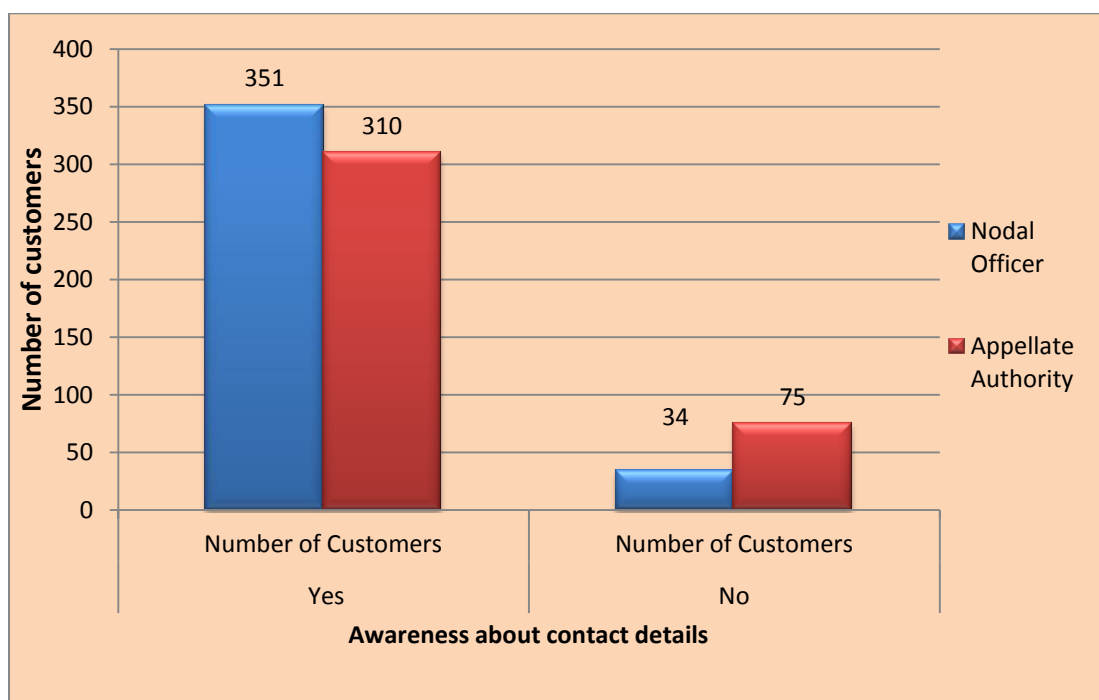
authority. Customers were asked that whether they aware of the contact details of these authorities. 91.17 % customers are aware of the contact details of Nodal officer and 80.52 % customers are aware of the contact details of Appellate Authority.

Table No 5.25 Awareness about the contact details of higher authorities

Sr. No.	Authorities	Yes		No	
		Number of Customers	Percentage	Number of Customers	Percentage
1	Nodal Officer	351	91.17 %	34	8.83 %
2	Appellate Authority	310	80.52 %	75	19.48 %

(Source: Primary Data Collected by the Researcher)

Fig No: 5.25 Awareness about the contact details of higher authorities



(Source: Primary Data Collected by the Researcher)

5.5.4 Expectation about the want single person for fault reporting: - Even though the concept of Call center is fine but the personalized feedback is not available on it most of the times. As Telecom Service operators are earning lot of revenue from corporate customer it is needed to treat them differently. Whenever the fault condition occurs they desire that there should be single person with whom they can contact and convey the failure. Then this person should update them about the progress of the settlement of the fault. The customer does not want to contact different engineers and

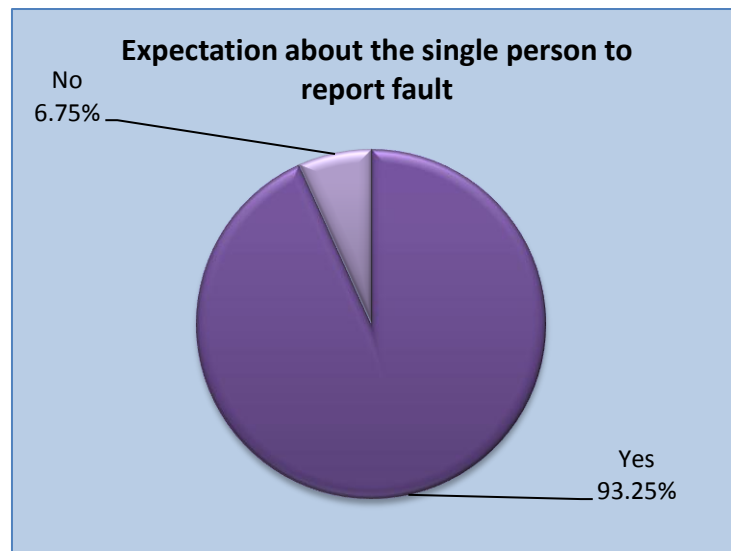
Manager placed at different hierarchy in the telecom service provider company. The **93.25 %** customers expect that there should be single person available for reporting of faults and same person will update them about the progress of fault settlement.

Table No 5.26 Expectation about want of the single person for fault reporting

Sr. No.	Expectation on Single Person fault reporting	Number of Customers	Percentage
1	Yes	359	93.25 %
2	No	26	6.75 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig No 5.26 Expectation about the want of single person for reporting of faults



(Source: Primary Data Collected by the Researcher)

5.5.6 Expectation about the conveying time for restoration of faults: -

In case of prolonged failures it is very much needed that the Telecom Service Operator should convey the approximate time to restore the faults. Too often in situations like this one, customers are told nothing. 90 % customers expect that they should get the information about the approximate time needed to restore the fault.

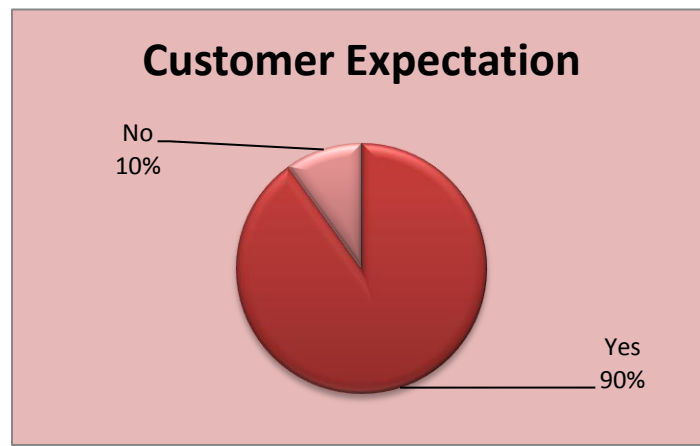
Comment: - In case of uncertain situation customer feels more need than usual to know the progress of restoration of fault. In such uncertain situations most customers would like to have a little information than none at all.

Table No 5.27 Expectation about the conveying time needed to restore faults

Sr. No.	Expectation	Number of Customers	Percentage
1	Yes	347	90 %
2	No	38	10 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig No: 5.27 Expectation about the conveying time for restoration of Fault



(Source: Primary Data Collected by the Researcher)

5.5.7 Expectation about the alternative means Communications: - At present customers want round the clock service. But there are some incidences when there is failure of services which is unavoidable and beyond the control of the telecom service operators. The 96.1 % customers expect that the Telecom Service Provider should provide the alternative means of communication in case of prolonged failures. Only 3.9 % have said no for alternative means of communication.

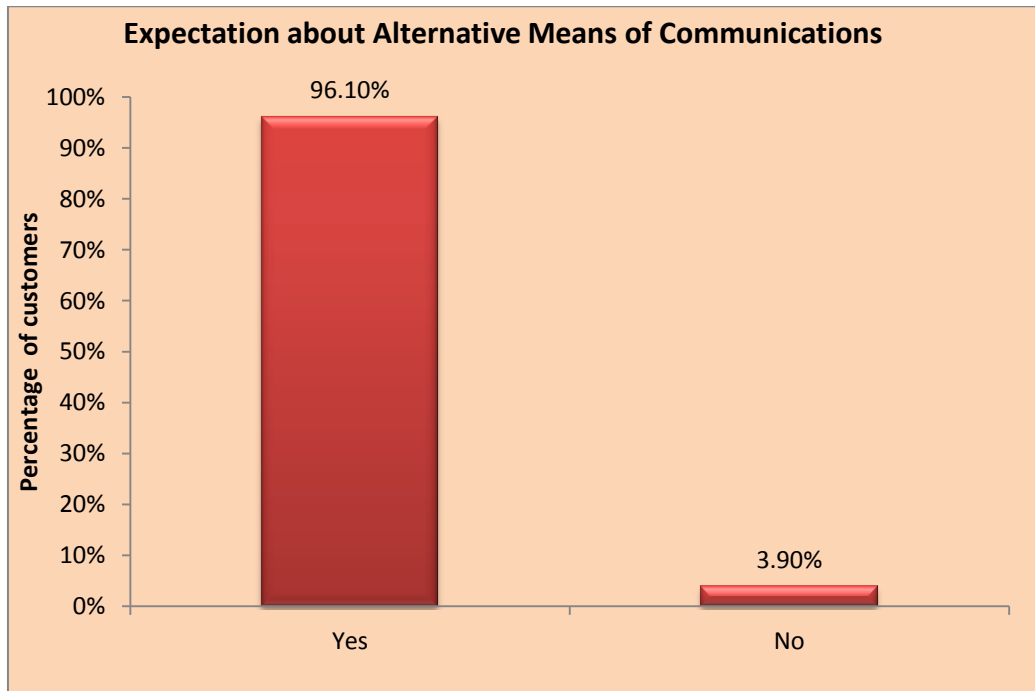
Comment: - Alternative means of communication can be Fixed Wireless Telephone for failure in Landline service. Wireless Data Cards can be provided in case Broadband services failures.

Table No 5.28 Expectation about the alternative means Communications

Sr. No.	Opinion	Number of Customers	Percentage
1	Yes	370	96.1 %
2	No	15	03.9 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig. No 5.28 : Expectation about the alternative means of communication



(Source: Primary Data Collected by the Researcher)

5.5.8 Registration to avoid unsolicited commercial Calls and Messages: -

Telemarketing has brought serious issues of invasion of privacy and has become a major irritant to customers. To holistically curb this growing menace and effectively regulate unsolicited commercial calls and messages, TRAI has notified the telecom Commercial Communication Customer Preference Regulations, 2010. Customers who do not want to receive commercial communications can register him in different categories. (nccptrai.gov.in, 2012)*6.

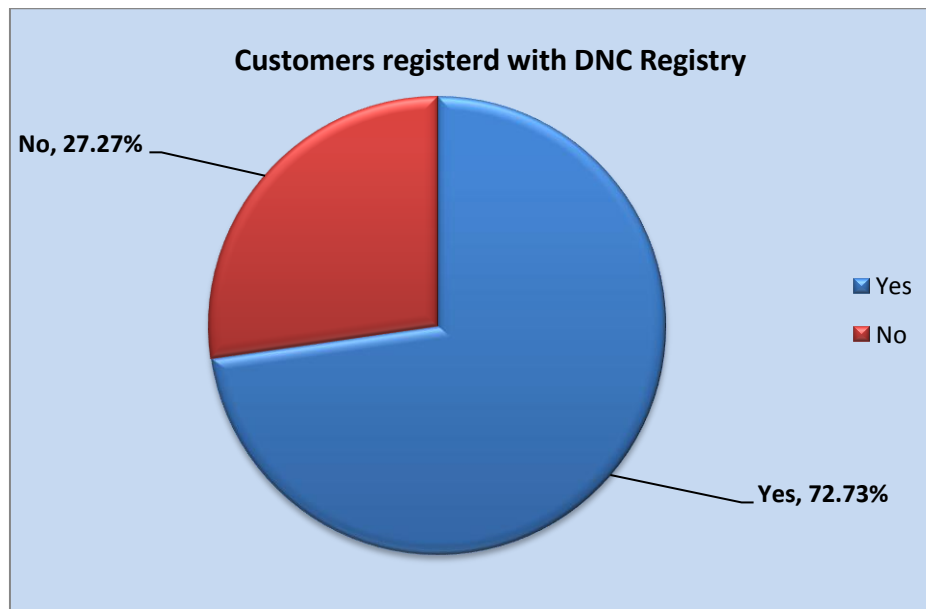
The question was asked to customer have you registered yourself to avoid unsolicited commercial Calls and messages. 72.73 % customer said that they have registered themselves with the do not call registry.

Table No 5.29 Registered customers with Do not call Registry

Sr. No.	Registration	Number of Customers	Percentage
1	Yes	280	72.73 %
2	No	105	27.27 %
	Total	385	100.00 %

(Source: Primary Data Collected by Researcher)

Fig No: 5.29 Registration to avoid unsolicited commercial Calls and messages



(Source: Primary Data Collected by Researcher)

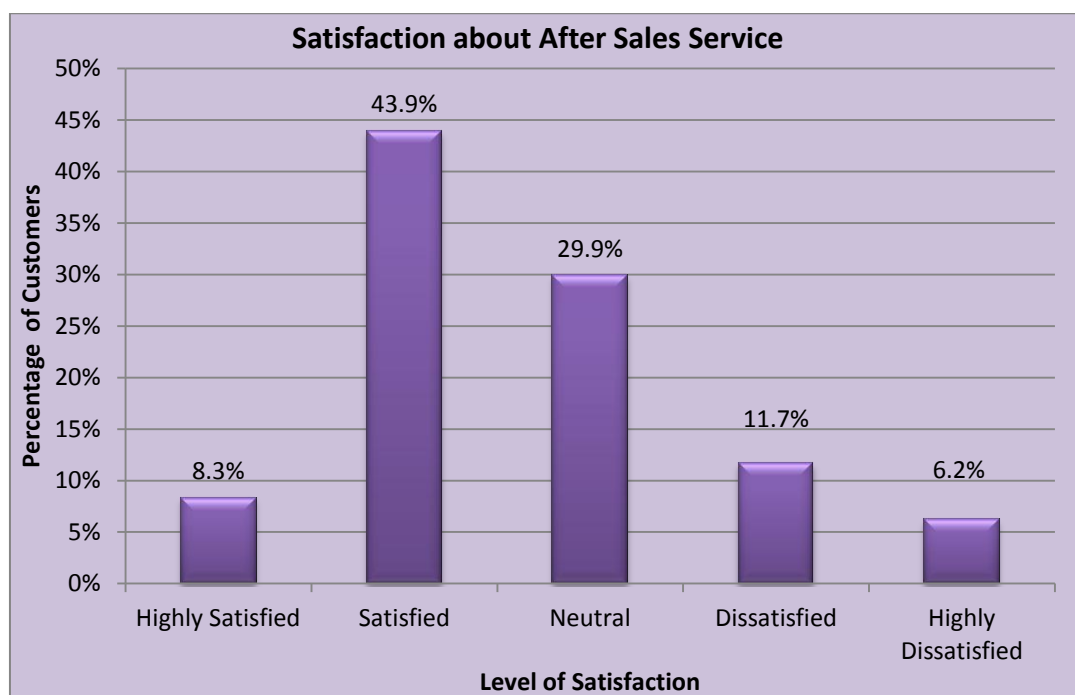
5.5.9 Satisfaction about the after sales service: - After sales service plays an important role in customer satisfaction and customer retention. It generates loyal customers. Customers start believing in the brand and get associated with the organization for a longer duration. Customers were asked the question whether they are satisfied with the after sales service provided by their Telecom Service Provider? The 8.3 % customers said that they are Very Satisfied with the after sales service, 43.9 % are Satisfied and 29.9 % customers were neutral on their opinion about the after sales services. 11.7 % customers are Dissatisfied and 6.2 % customers are Very dissatisfied about the after sales service.

Table No 5.30 Satisfaction about the after sales service

Sr. No.	Level of Satisfaction	Number of Customers	Percentage
1	Very Satisfied	32	8.3 %
2	Satisfied	169	43.9 %
3	Neutral	115	29.9 %
4	Dissatisfied	45	11.7 %
5	Very Dissatisfied	24	6.2 %
	Total	385	100.00 %

(Source: Primary Data Collected by the Researcher)

Fig No: 5.30 Customer in Satisfaction about After Sales service



(Source: Primary Data collected by Researcher)

5.6 Analysis of Section V of Questionnaire (Miscellaneous Information): -

This part of questionnaire takes general information like media preferences, Publicity need of direct communications, Overall satisfaction on services. It also finds out to what extent the customer expectations are met.

5.6.1 Publicity of the Products / services:

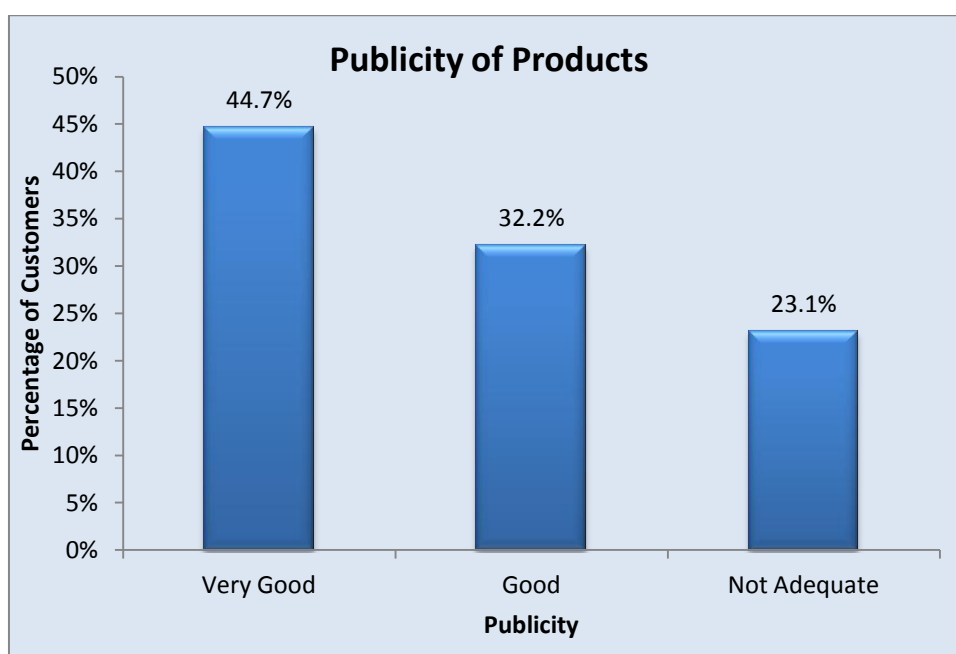
Customers were asked “How is the publicity of the products?” The 44.7 % customers feel that Publicity of the product is very good, 32.4 % customers feel that publicity is Good and 23.1 % customer feel that publicity is not adequate.

Table No 5.31 Publicity of the Products / Services

Sr. No.	Publicity	Number of Customers	Percentage
1	Very Good	172	44.7 %
2	Good	124	32.2 %
3	Not Adequate	89	23.1 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig No. 5.31 Publicity of the Products / Services



(Source: Primary data Collected by the Researcher)

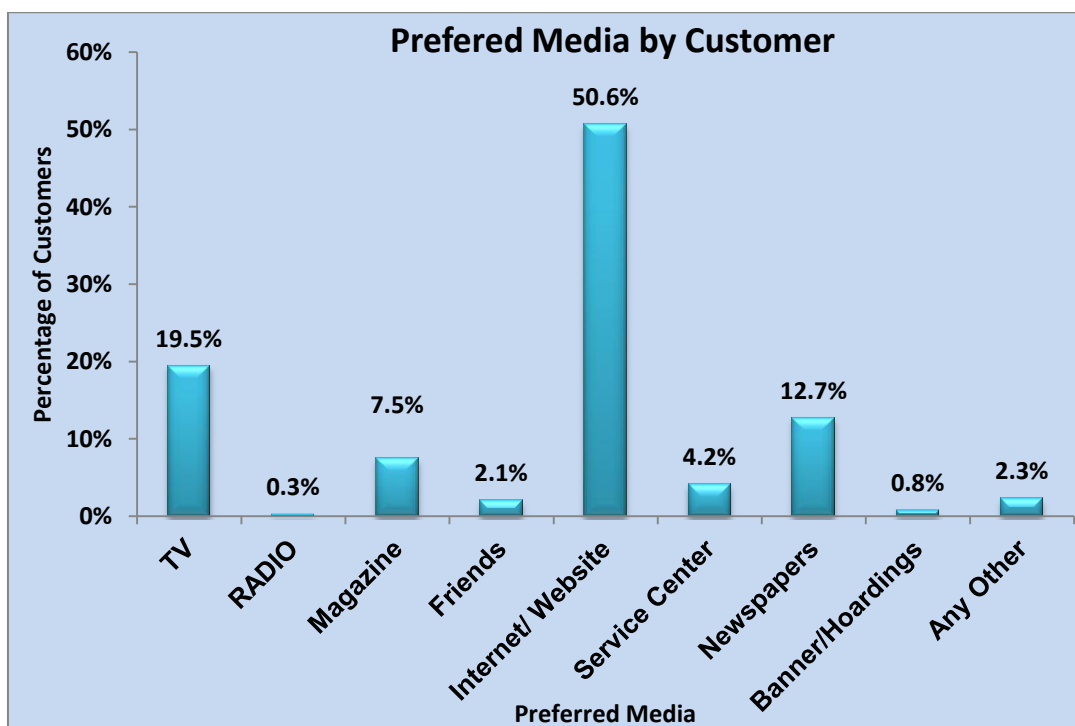
5.6.2 Preferred Medium of Advertising: - It is needed that the potential buyers to be aware and familiar with the different services and products. The corporate customers were asked which media you will prefer to get information about products & services. As per survey most preferred medium of advertising is Internet as **50.6 %** customers voted for it. The second preferred medium is Television followed by Magazine with **19.5 %** and **12.7%** respectively.

Table No 5.32 Preferred Medium of Advertising

Sr. No.	Media	No. of Respondents	% of Respondents
1	TV	75	19.5 %
2	RADIO	1	0.3 %
3	Magazine	29	7.5 %
4	Friends	8	2.1 %
5	Internet/ Website	195	50.6 %
6	Service Center	16	4.2 %
7	Newspapers	49	12.7 %
8	Banner/Hoardings	3	0.8 %
9	Any Other	9	2.3 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig No 5.32 Showing the preferred medium of Advertising as per Customers



(Source: Primary Data Collected by the Researcher)

5.6.3 Expectation about the direct communication

Many customers complain that their tariff plans suddenly get changed without getting proper intimation and ultimately they land up in trouble. In the survey it was asked to customer that “Do you expect the direct communication from your Telecom service operator regarding the New Rental schemes offered, new services offered, changes in rentals and Plans ? ”

Survey reveals that 83.12 % customer were eager to know directly from the Service Provider. This avoids delay in knowing better tariff plans, changes in tariff etc. It will also build the confidence between the customer and service provider.

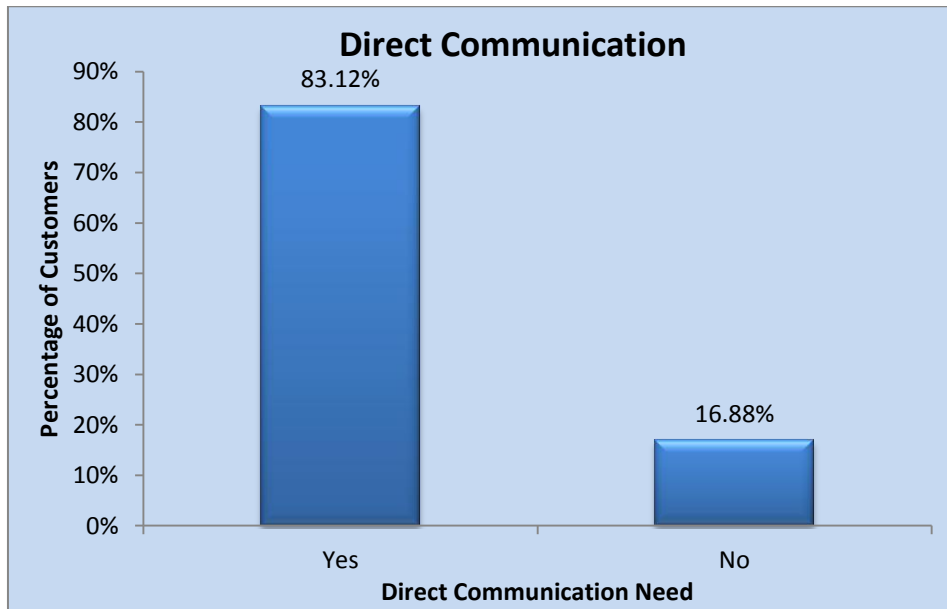
Comment:- Telecom Service operator can send New Rental schemes offered, new services offered, changes in rentals and Plans on E-Mail to Corporate Customers.

Table No 5.33 Expectation about the Direct Communication Need

Sr. No.	Response	Number of Customers	Percentage
1	Yes	320	83.12 %
2	No	65	16.88 %
	Total	385	100.00 %

(Source: Primary Data Collected by the Researcher)

Fig No: 5.33 Expectations about the Direct Communication Need



(Source: Primary Data Collected by the Researcher)

5.6.4 Overall satisfaction considering all areas:-

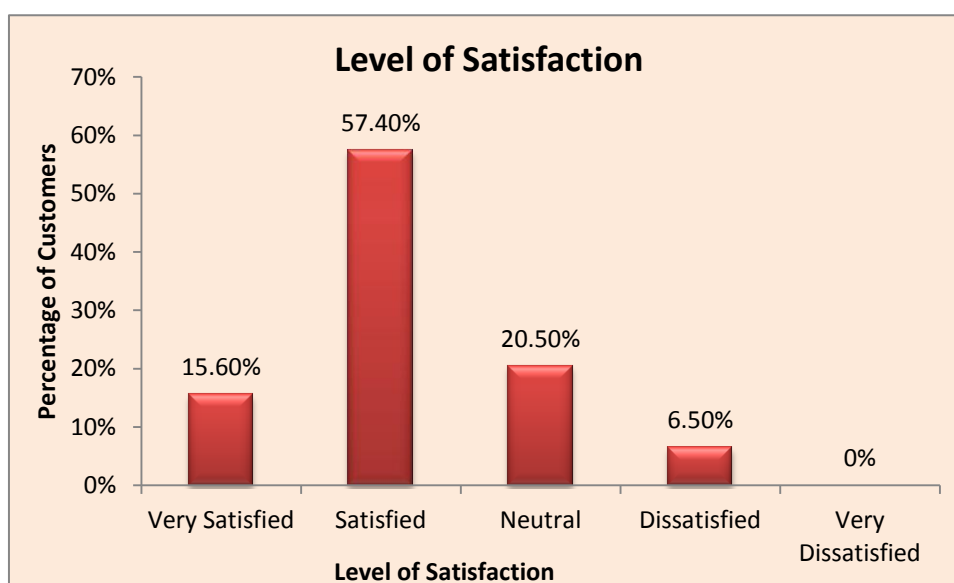
Customers were asked that considering all the areas (like billing, customer care, network quality, cost of service, after sales service) what your overall satisfaction is? Customers were asked to rate satisfaction from Very Satisfied to Very Dissatisfied. Out of 385 customers, 60 (15.6 %) customers are Very Satisfied, 221 (57.4 %) customers are satisfied about the services. By adding these two responses we get that 281 (73 %) customer are overall satisfied with the services. 79 (20.5 %) customers are having neutral opinion, 25 (6.5 %) customers said that they are dissatisfied about the services.

Table No 5.34 Overall Rating given by Customers

Sr. No.	Level of Satisfaction	Number of Customers	Percentage
1	Very Satisfied	60	15.6 %
2	Satisfied	221	57.4 %
3	Neutral	79	20.5 %
4	Dissatisfied	25	6.5 %
5	Very Dissatisfied	0	0 %
	Total	385	100.0 %

(Source: Primary Data Collected by the Researcher)

Fig no: 5.34 The Overall Rating of the services



(Source: Primary Data Collected by the Researcher)

5.6.5 Customer Expectation and actual service delivery: - Whenever subscriber subscribes the services he has got some expectation from services. The actual experience of the customer may be different from expectation when there is encounter with the service delivery. He finds a lot of difference between the expected service and actual service delivery.

The customer was asked a simple question that to what extent the services meet to your expectations? Out of 385 customers 44 (11.43 %) customer said that services are much better that expected, 193 (50.13 %) customer said that those are better than expected. 91 (23.64 %) customer find that services are as per expectations and 42 (10.91 %) find that services are worse than expectation. The survey further reveals that 15 (3.90 %) customers felt that services are much worse than expected.

Table No 5.35 Customer Expectation and actual service delivery

Sr. No.	Description	Number of customers	Percentage of Respondent
1	Much Better than Expected	44	11.43 %
2	Better than Expected	193	50.13 %
3	As per Expectation	91	23.64 %
4	Worse than Expected	42	10.91 %
5	Much worse than Expected	15	3.90 %
		385	100 %

(Source: Primary Data Collected by the Researcher)

Fig No: 5.35 Customer Expectation and actual service delivery



(Source: Primary Data Collected by Respondent)

5.7 Analysis of Section VI of Questionnaire (Attribute Table and Importance)

5.7.1 Analysis of Attributes:-The attributes related to satisfaction of customers regarding various factors were coded using Likert scale having 5 points starting from very satisfied to the very dissatisfied. Five points were allotted to the very satisfied level and 1 is allotted to very dissatisfied level. Provision of Services received 77.9 % score for voice communication and 66.7 % for data communication. Cost of service for voice communication has received score 82.4 % and cost of service for data has received score 71.8 %. Network Quality (Mobile) voice communication has received score 68.5% and Network Quality (Mobile) data communication has received 69.7%. Network Quality (Landline) voice communication has received score 80.5% and Network Quality data (Broadband) communication has received 79.4%.

Comment: - Satisfaction on the factor called Provision of service for voice communication is higher than data communication. It clearly indicates that operators should try to reduce delay in provision of services for data communication. Satisfaction on the factor Cost of service for voice is higher than Cost of Service for data. It clearly indicates that operators should try to reduce the cost of service for data. Satisfaction on the factor Network Quality Landline is higher than Network Quality Mobile. It indicates that the Telecom Service operators should improve a satisfaction Network Quality Mobile.

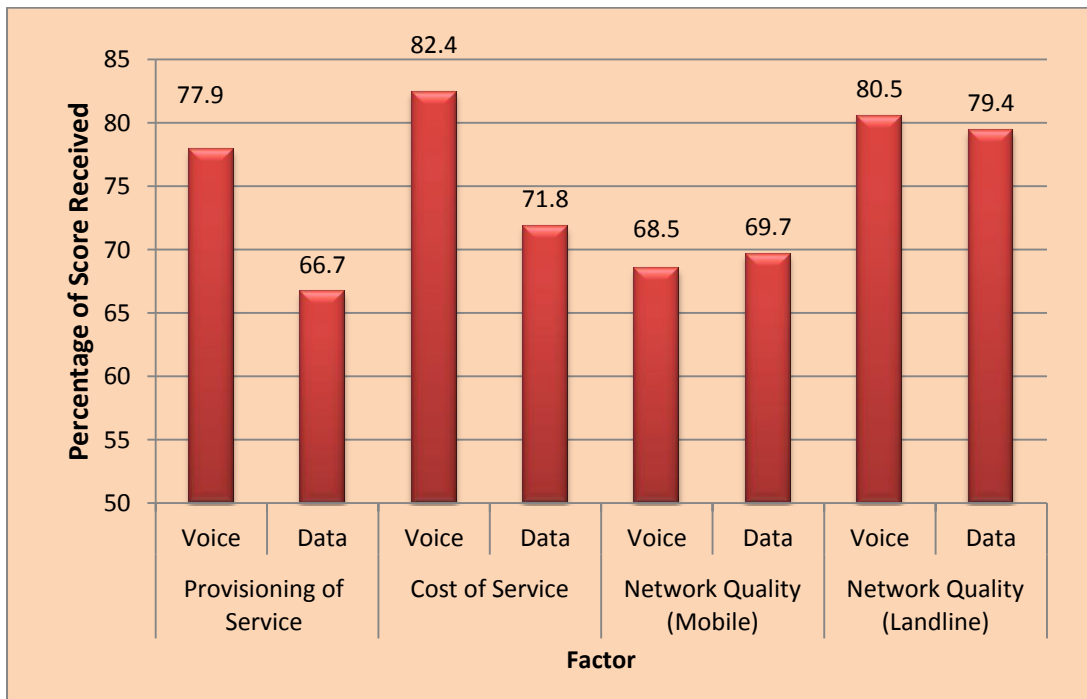
Table No: 5.36 Composite Scores received for different Factors (Where Separate opinion about Voice and Data is sought)

Factor	Communication	Score Received	Maximum Score**	Percentage
Provisioning of Service	Voice	8996	11550	77.9 %
	Data	7701	11550	66.7 %
Cost of Service	Voice	11110	13475	82.4 %
	Data	8297	11550	71.8 %
Network Quality (Mobile)	Voice	9233	13475	68.5 %
	Data	6704	9625	69.7 %
Network Quality (Landline)	Voice	7752	9625	80.5 %
	Data (Broadband)	7643	9625	79.4%

(Source: Primary Data Collected by the researcher)

** - For Calculation of Max Score please refer to Table No. 4.20 of Chapter 4

Fig. No: 5.36 Composite Scores received for different Factors



(Source: Primary Data Collected by the researcher)

The factor Billing Convenience has received 71.7% score and Customer Care Access has received 67.0 % score. The survey further reveals that Customer Care has received 68.6 % score. Tangible (Physical Evidence of Service) and responsiveness

have received score 86.5 % and 69.0 % score respectively. Redressal of Customer Grievances and Uninterrupted Service received score 77.2 % and 69.3 % respectively.

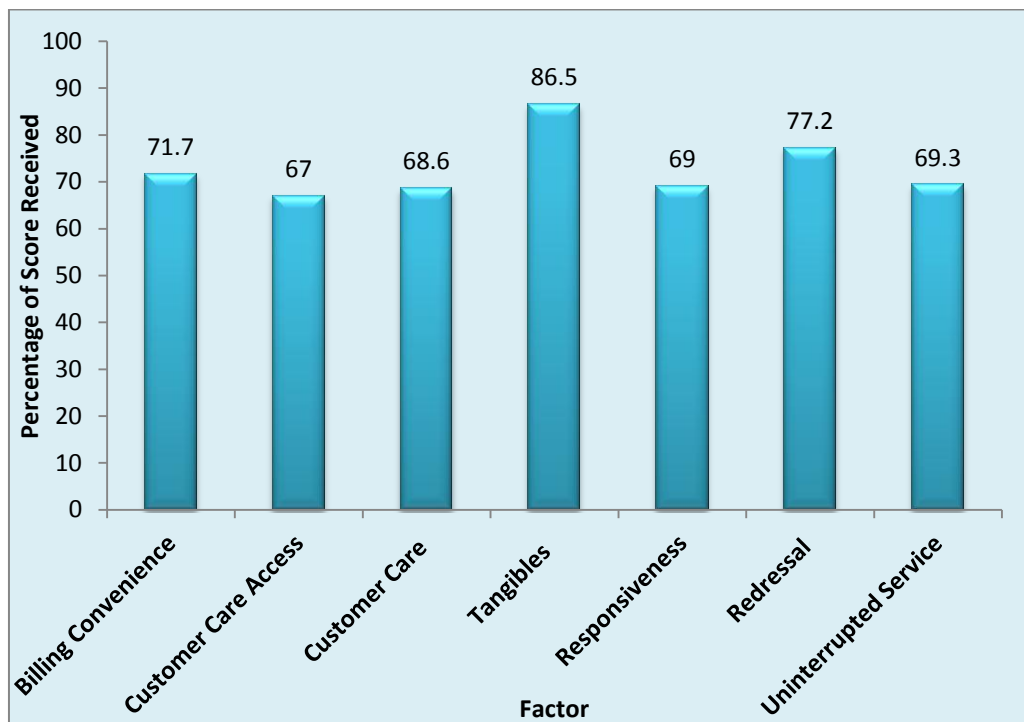
Table No: 5.37 Composite Scores received for different Factors (Where Combine opinion about Voice and Data is sought)

Sr. No.	Factor	Score Received	Max Score Allotted**	Percentage
1	Billing Convenience	12416	17325	71.7
2	Customer Care Access	9034	13475	67.0
3	Customer Care	11883	17325	68.6
4	Tangibles (Physical Evidence of Services)	8325	9625	86.5
5	Responsiveness	6637	9625	69.0
6	Redressal of Customer Grievances.	7428	9625	77.2
7	Uninterrupted Service	12013	17325	69.3

(Source: Primary Data Collected by the researcher)

(**- For Calculation of Max Score please refer to Table no. 4.21 of Chapter 4)

Fig No: 5.37 Composite Score received to different Factors



(Source: Primary Data Collected by the researcher)

Comment: - It is needed to improve on the factors like Customer Care Access, Customer Care, Responsiveness, and Uninterrupted Services. All these factors have received score less than 70 %. If operators put efforts on these factors then overall satisfaction will be improved. This will reduce the churning in between the operators.

5.7.2 Satisfaction about the coverage of Mobile Network: -

The customers were asked to rate the satisfaction on the coverage of Mobile Network in City area, Rural area and on Road in the attribute table under Uninterrupted Service Factor. These attribute are very much important from customer point of view hence these are separately analysed.

City Coverage: -

In a Survey, 25.7 % customers said that they are very satisfied about the city coverage, 52.2 % customers are satisfied about the city coverage. 17.9 % customers were neutral about their opinion on City coverage. 3.4 % Customers are dissatisfied about the City Coverage and 0.8 % customers are very dissatisfied about the City Coverage.

On Road Coverage: -

In a Survey, 22.6 % customers said that they are very satisfied about the On Road coverage, 50.7 % customers are satisfied about the On Road coverage. 20.8 % customers were neutral about their opinion on Road coverage. 4.9 % Customers are dissatisfied about the On Road Coverage and 1.0 % customers are very dissatisfied about the On Road Coverage.

Rural Coverage: -

In a Survey, 18.5 % customers said that they are very satisfied about the Rural coverage, 40.0 % customers are satisfied about the Rural coverage. 22.3 % customers were neutral about their opinion the Rural coverage. 14.5 % Customers are dissatisfied about the Rural Coverage and 4.7 % customers are very dissatisfied about the Rural Coverage.

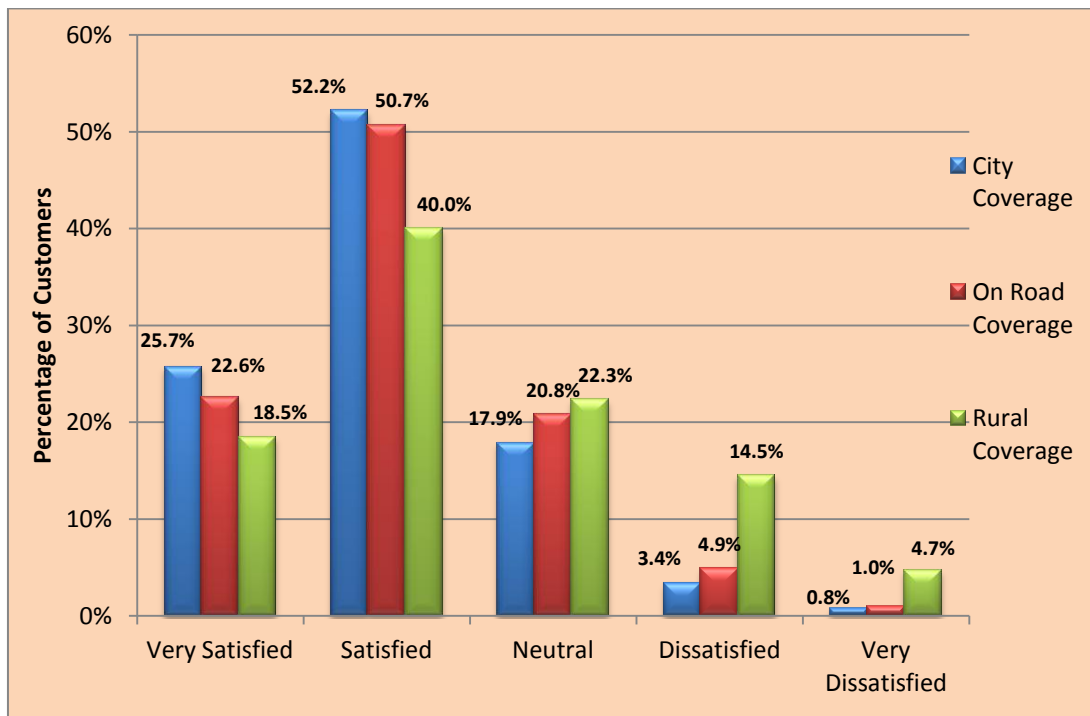
Comment: - There is scope of lot for the improvement in rural coverage in comparison with City Coverage and on road coverage.

Table no 5.38 Customer satisfactions on the coverage

Sr. No.	Level of Satisfaction	Number / Percentage	City Coverage	On Road Coverage	Rural Coverage
1	Very Satisfied	Count	99	87	71
		Percentage	25.7 %	22.6 %	18.5 %
2	Satisfied	Count	201	195	154
		Percentage	52.2 %	50.7 %	40.0 %
3	Neutral	Count	69	80	86
		Percentage	17.9 %	20.8 %	22.3 %
4	Dissatisfied	Count	13	19	56
		Percentage	3.4 %	4.9 %	14.5 %
5	Very Dissatisfied	Count	3	4	18
		Percentage	0.8 %	1.0 %	4.7 %

(Source: Primary Data Collected by the Researcher)

Fig No : 5.38 Coverage in Rural, City and on Road



(Source: Primary Data Collected by the Researcher)

5.7.3 Analysis of Part B of Section VI of Questionnaire: - Importance Score of the Factors: - Perceived values of Factors are different for different customers; hence, they attach different importance to these Factors. This serves the purpose of

determination of relative importance of different factors. Respondents were asked to rate these Service Quality Dimensions (Factor) on scale of 1 to 5, with 1 being Not at all Important and 5 being Very Important. As there are 385 customers so the total score allotted to each factor is 1925 (As 385 X 5= 1925).

For rating of Importance purpose the Network Quality Landline, Network Quality Broadband and Network Quality Mobile are clubbed together into a single Factor named Network Quality. Hence, for purpose of rating Importance of Factors there are only Ten Factors. The score received by each factor is displayed in Table No 5.39

Table No 5.39 Importance scores received to different factors.

Sr. No.	Factor	Score Received	Total Score	Percentage
1	Provisioning of Service	1336	1925	69.4 %
2	Billing Convenience	1282	1925	66.6 %
3	Cost of Service	1500	1925	77.9 %
4	Customer Care Access	1471	1925	76.4 %
5	Customer Care	1494	1925	77.6 %
6	Tangibles (Physical Evidence of Services)	462	1925	24 %
7	Responsiveness	1330	1925	69.1 %
8	Redressal of Customer Grievances	537	1925	27.9 %
9	Network Quality	1883	1925	97.8 %
10	Uninterrupted Service	1777	1925	92.3 %

(Source: Primary Data Collected by the Researcher)

Comment: - The Network quality is resulted as the most important factor with the 98 % score followed by the uninterrupted service with the score 92 %. As per customer's view these two factors are most important factor. If operator works hard on these two factors overall satisfaction will be improved. The Tangibles (Physical Evidence of Services) and Redressal of Customer Grievances got the lowest score. The customers felt these factors are not important at all.

5.8 Testing of Hypothesis: - Hypothesis testing is a systematic way to test claims or ideas about a group or population. In this study researcher has tested five hypotheses.

Hypothesis I: Network Quality followed by Uninterrupted Service are the most important drivers leading to Customer satisfaction.

Null Hypothesis (H0): - All the individual factors are equally important drivers leading to customer satisfaction.

Alternative Hypothesis (H1): - Network Quality followed by Uninterrupted Service are the most important drivers leading to Customer satisfaction (One tailed hypothesis).

Table No 5.40 The distribution of average importance score of all the individual factors studied.

Sr. No	Individual factor	Importance Score in % (Mean ± SD)
1	Provision of Service	69.4 ± 8.9
2	Billing convenience	66.6 ± 7.3
3	Cost of Service	77.9 ± 6.8
4	Customer Care Access	76.4 ± 5.1
5	Customer Care	77.6 ± 6.9
6	Tangibles (Physical Evidence of Services)	24.0 ± 5.0
7	Responsiveness	69.1 ± 7.4
8	Redressal of Customer Grievances	27.9 ± 6.3
9	Network Quality	97.8 ± 3.1
10	Uninterrupted Service	92.3 ± 5.9

(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of scores. Higher mean score indicate higher Importance and vice-versa. P-value is obtained using Analysis of variance (ANOVA) technique. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.

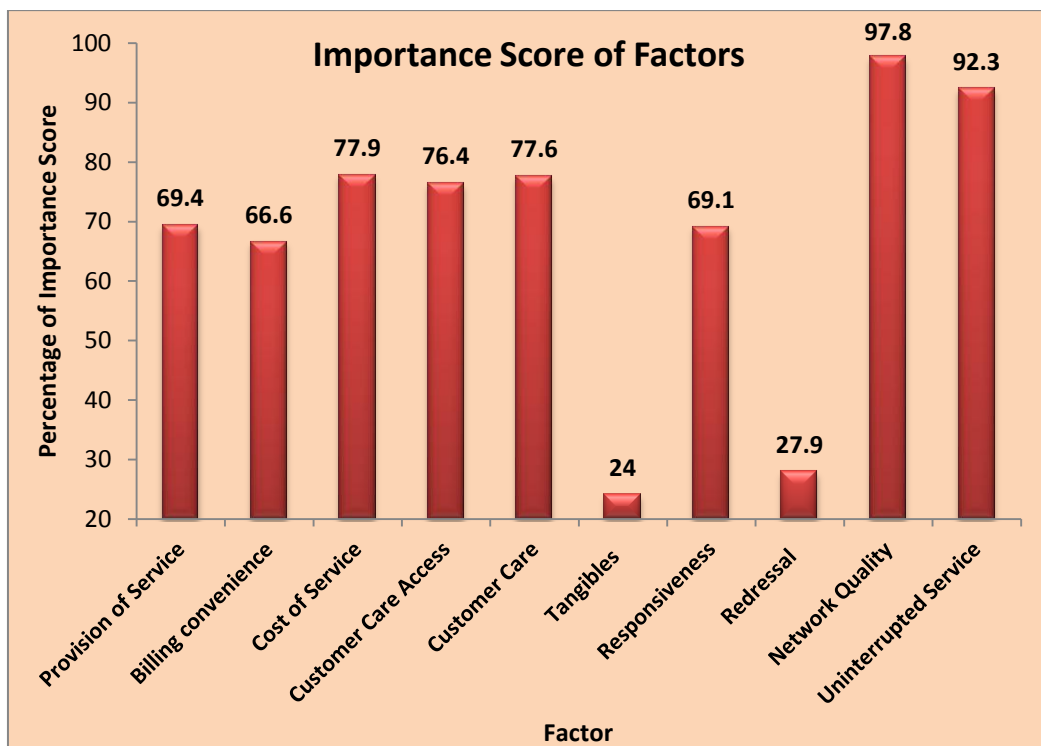
F-value (ANOVA Test) = 1357.17, P-value = 0.001 (Significant) (Accept H1).

The P-Value is less than 0.05 hence the alternative hypothesis accepted.

Comments:

- 1) The average importance score of network quality is significantly higher than all other individual drivers for customer satisfaction.
- 2) The average importance score of tangibles is significantly smaller than all other individual drivers for customer satisfaction.
- 3) Telecom Service Operators has to work hard to improve in the satisfaction on the factor Network Quality and Uninterrupted service to improve the overall customer satisfaction.

Figure 5.39 The distribution of average importance score of all the individual factors studied.



(Source: Based on Primary Data Collected and processed by the researcher)

Hypothesis II: -- The inter-operator congestion (at Point of Inter connection) is higher than intra-operator congestion.

Null Hypothesis (H0): -- The inter-operator congestion (at Point of Inter connection) is similar to intra-operator congestion.

Alternative Hypothesis (H1): -- The inter-operator congestion (at Point of Inter connection) is higher than intra-operator congestion (One tailed hypothesis).

(**Inter and Intra Operator Congestion :-** The Inter operator congestion means if BSNL customer calls Airtel customer and if he gets the network busy message then it is Inter operator congestion. The Intra-operator congestion means if BSNL customers calls another BSNL customer and if he gets the network busy message then it is Intra-operator congestion.)

Table 5.41 The comparison of average score of inter and intra-operator congestions for mobile and landline services.

Sr. No.	Description	Services	Services
1	Services	Mobile	Landline
2	Inter-operator Congestion (n=385)	3.29 ± 0.59	3.31 ± 0.57
3	Intra Operator Congestion (n=385)	4.08 ± 0.60	4.13 ± 0.59
4	T-value	-18.386	-19.506
5	P-value (One-tailed Significance)	0.001	0.001
6	Decision	Accept H1	Accept H1

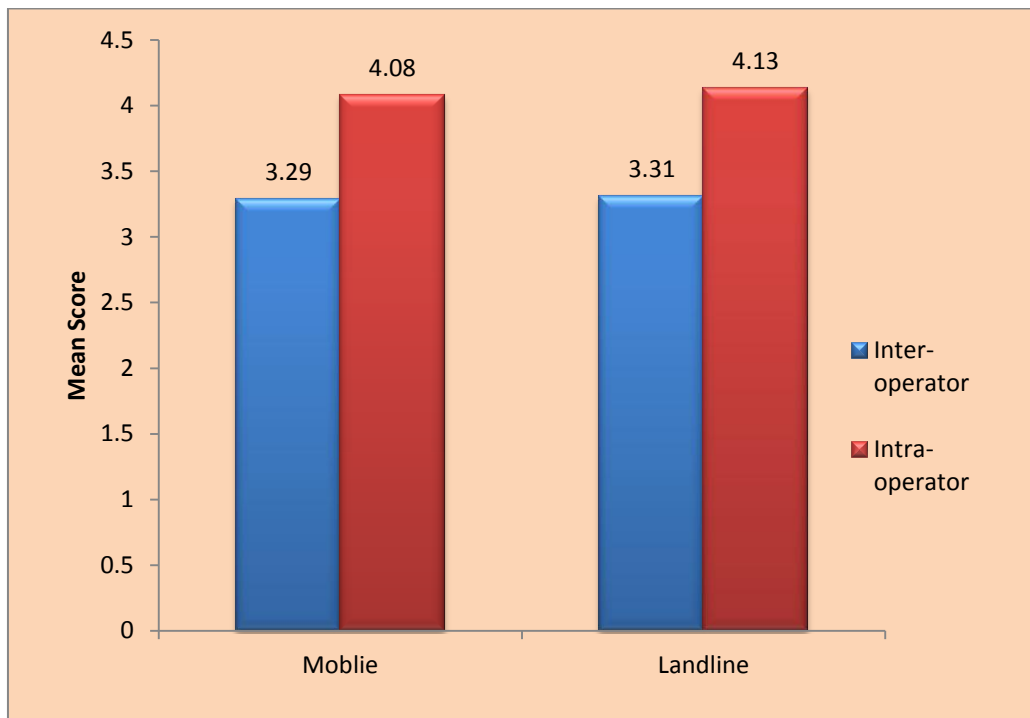
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample 't' test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comments

- 1) The average satisfaction score for intra-operator congestion is significantly higher than the inter-operator congestion for mobile services.
- 2) The average satisfaction score for intra-operator congestion is significantly higher than the inter-operator congestion for landline services.
- 3) The telecom Service Operators should try to reduce the Inter-operator Congestion to improve overall customer satisfaction. Periodic checks on Inter operator junction circuits are must.

Figure 5.40 The comparison of average score of inter and intra-operator congestions for mobile and landline services.



(Source: Based on Primary Data Collected and processed by the researcher)

Hypothesis III: Satisfaction in Cost of Service for Voice is more than Cost of Service for Data.

Null Hypothesis (H0): -- Satisfaction in Cost of Service for Voice is similar to the Cost of Service for Data.

Alternative Hypothesis (H1): -- Satisfaction in Cost of Service for Voice is more than Cost of Service for Data (One-tailed hypothesis).

(**Cost of Service:** - Cost-of-service is a price for a service based on the costs incurred in providing that service. In case of telecom services customer has to pay the cost at the time of registration that is cost of installation or cost of modems etc. Afterwards he has to also pay monthly recurring charges (Rentals) or charges depending on usage. The usage in respect of voice calls is calculated on the pulse rate basis and charges in case of data services are calculated on basis of data uploading and downloading quantity.)

Table 5.42 The comparison of average score of cost of services on voice and data services.

Sr. No.	Description	Values
1	Factor	Cost of Services Score Mean \pm SD
2	Voice Services (n=385)	4.12 \pm 0.35
3	Data Services (n=385)	3.59 \pm 0.43
4	T-value	18.825
5	P-value(One-tailed Significance)	0.001
6	Decision	Accept H1

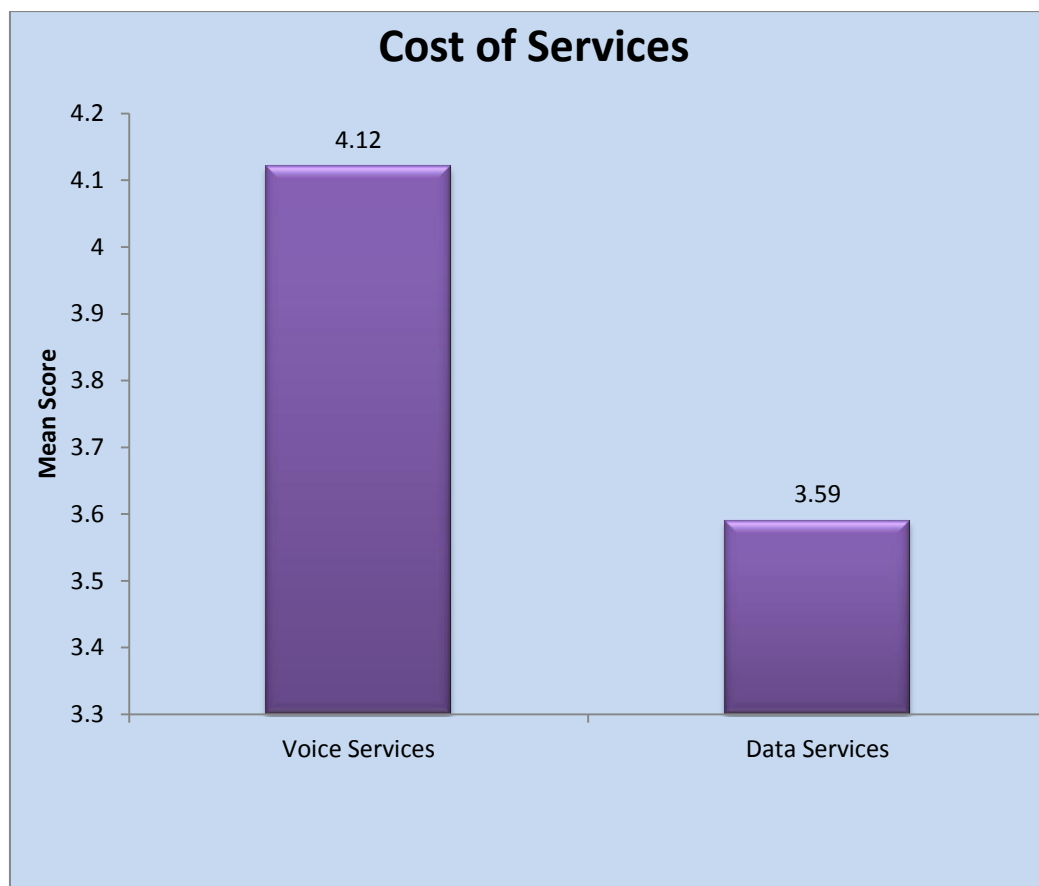
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean \pm Standard Deviation of scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample 't' test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comment: P-Value is less than 0.05 hence Alternative Hypothesis H1 is accepted.

- 1) The average satisfaction score for cost of service for voice is significantly higher than the cost of services score for data.
- 2) The Telecom Service Operator as well as Government Regulators should do the needful to reduce the cost of Service for data to improve overall customer satisfaction.

Figure 5.41 The comparison of average score of cost of services on voice and data services



(Source: Based on Primary Data Collected and processed by the researcher)

Hypothesis IV: Satisfaction in Provision of Services is better in voice services than data service.

Null Hypothesis (H0): -- Satisfaction in Provision of Services is similar in voice services and data services.

Alternative Hypothesis (H1): -- Satisfaction in Provision of Services is better in voice services than data services. (One-tailed hypothesis)

(Provision of Service: - In telecom, provisioning of services is the process of preparing of Telecom equipment to provide the desired services to the end users. The time taken for provision of new connection of mobile, landline and data circuit are considered under the provisioning of services Factor. Less the time taken by the operator to provide new service customer satisfaction will be on higher side)

Table 5.43 The comparison of average score for the factor provision of services on voice and data services

Sr. No.	Description	Value
1	Factor	Provision of Services Score Mean \pm SD
2	Voice Services (n=385)	3.89 \pm 0.89
3	Data Services (n=385)	3.33 \pm 0.72
4	T-value	9.619
5	P-value (One-tailed Significance)	0.001
6	Decision	Accept H1

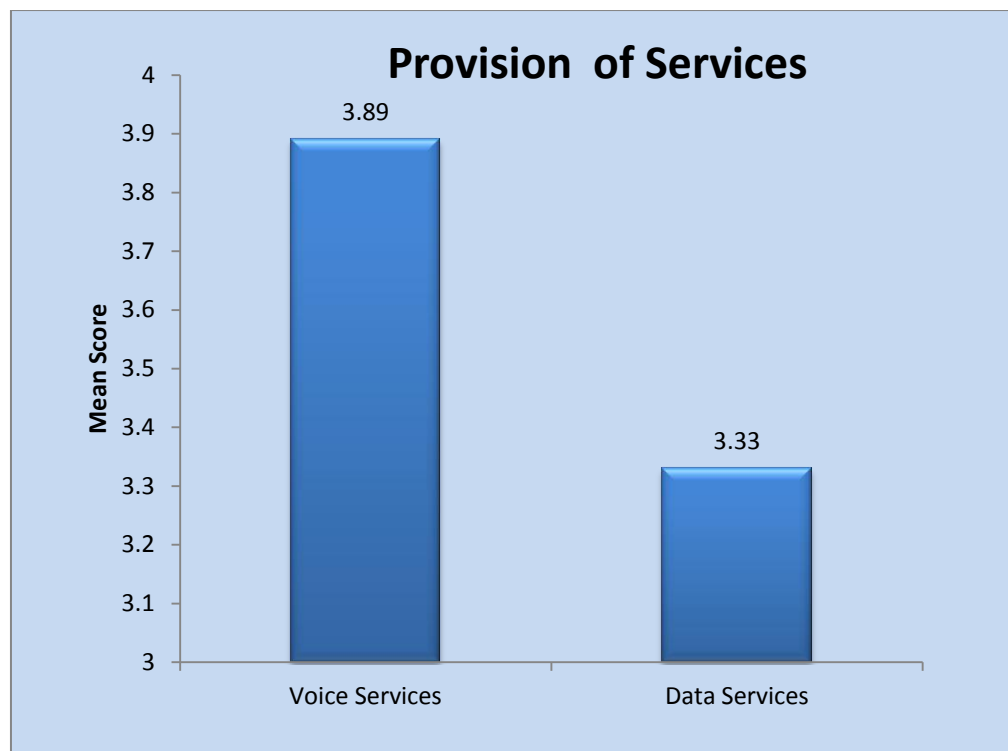
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean \pm Standard Deviation of scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample 't' test. P-value $<$ 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comment: P-Value is less than 0.05 hence Alternative Hypothesis is accepted. The average satisfaction score for provision of services for voice is significantly higher than the provision of services score for data.

Discussion: - The Telecom Service operators have to work hard to reduce the time required for provisioning of Data Services. In case of provisioning of Data services operators has to lay physical wire (Either Copper or Optic fiber) connectivity from customer premises to the Telephone Exchange. This takes a lot of time as laying of the cable is involved in this process. Also the telecom service operators have to take permission to dig up the road from Local Authorities this further add the delay.

Figure 5.42 The comparison of average score of provision of services on voice and data services.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Hypothesis 5

H5: The level of Customer Satisfaction on different Factors varies according to the amount of billing.

Test Procedure for Hypothesis No. 5: -

Researcher had prepared list of the 12 Numbers of factors on which level of customer satisfaction depends. These twelve factors are Provision of services, Billing convenience, Cost of services, Customer care access, Customer care, Tangible (Physical Evidence of Services), Responsiveness, Redressal of Customer Grievances, Network Quality for Mobile, Network Quality Broadband, Network Quality Landline and Uninterrupted Services.

To test hypothesis no. 5 the following is the list of the 12 sub hypothesis (One for every factor) which are tested by grouping the customers on the basis of their Monthly Expenditure (Monthly Billing) on Telecom Needs. The customers those are spending more than Rs. 10,000/- per month on telecom needs are considered **High Billing Customers** and those are spending less than Rs. 10,000/- per month are considered as **Low Billing Customers**.

Out of 385 Customers 268 customers responded that their Monthly expenditure on telecom needs is less than Rs.10, 000/- and 117 customers responded that their monthly expenditure on telecom needs is more than Rs.10,000/-.

Table No 5.44 Classification of Customers on the basis of Monthly Expenditure on Telecom Needs

Sr. No.	Expenditure	Group Name	Number of Customers
1	Less Than Rs. 10,000/-	Low Billing Customers	268
2	More Than Rs.10,000/-	High Billing Customers	117
	Total	Total	385

(Source: Primary Data Collected by the Researcher)

To assess the statistical significance of difference in the level of satisfaction the researcher has used independent sample t-test, after confirming underlying normality assumption as necessary. P-value is obtained using independent sample 't' test. P-value < 0.05 is considered to be statistically significant. This procedure has

been carried out for all the twelve Factors which lead to customer satisfaction. For this researcher has tested 12 Sub-hypothesis i.e. one for each factor.

Testing of Sub Hypothesis 5a (Provision of Services)

5.8.1.1 Hypothesis 5a: The level of customer satisfaction on the factor **Provision of Services** is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the factor **Provision of Services** is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on the factor **Provision of Services** is significantly different for low billing customers and high billing customers.

Table No: 5.45 -The comparison of average score of satisfaction on Provision of services across the groups of Low Billing and High Billing Customers

Description	Voice services	Data services	Overall (Voice & Data)
Low Billing Customers (Monthly Expenditure on Telecommunication needs Less than Rs. 10,000 (n=268))	3.90 ± 0.89	3.33 ± 0.73	3.62 ± 0.80
High Billing Customers (Monthly Expenditure on Telecommunication needs. More than Rs.10,000 (n=117))	3.88 ± 0.89	3.33 ± 0.70	3.61 ± 0.78
T-value	0.163	0.033	0.107
P-value	0.871	0.973	0.915
Decision	Accept H0	Accept H0	Accept H0

(Source: Based on Primary Data Collected and processed by the researcher)

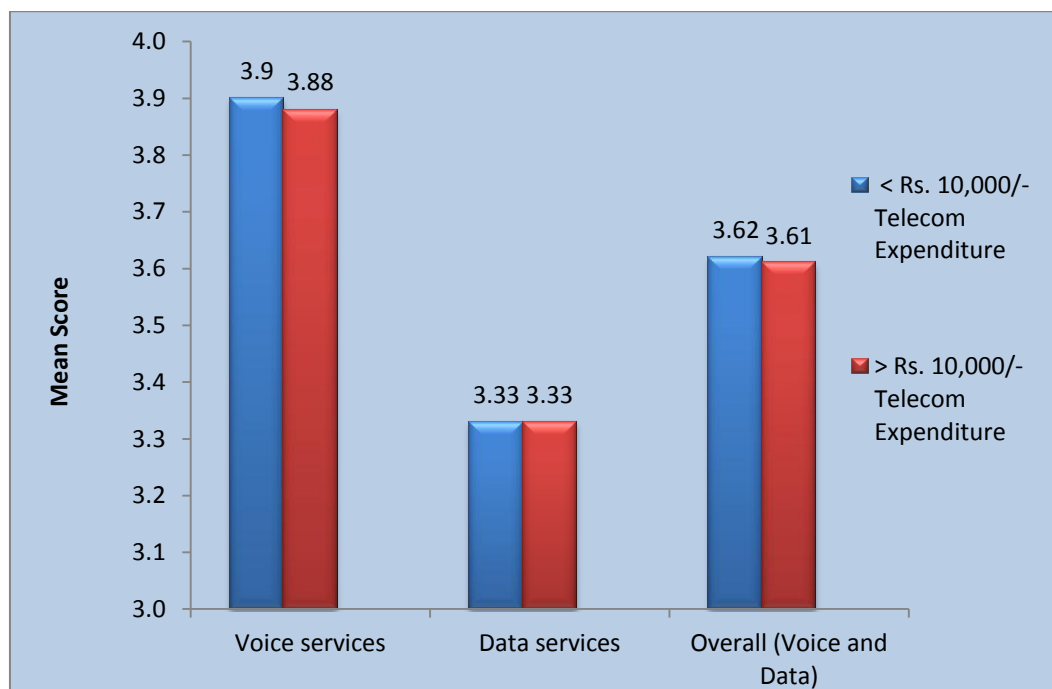
(Values in are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent

sample t test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted.)

Comments:

- 1) The average satisfaction score on provision of voice services did not differ significantly between the customers having Monthly telecom Expenditure less than Rs. 10,000/- and more than Rs. 10,000 /- .
- 2) The average satisfaction score on provision of data services did not differ significantly between the customers having Monthly telecom Expenditure less than Rs. 10,000/- and more than Rs. 10,000/- .
- 3) The average satisfaction score on overall (Data and Voice) Provision of Services did not differ significantly between the customers having Monthly telecom Expenditure less than Rs. 10,000/- and more than Rs. 10,000/- .
- 4) **Hence the level of Customer Satisfaction on the factor provision of services does not vary according to the amount of billing.**

Figure 5.43 The comparison of average score of overall satisfaction on Provision of services across the groups of different Telecom Expenditure.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5b (Billing Convenience)

Hypothesis 5b: The level of customer satisfaction on the factor **Billing Convenience** is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the factor **Billing Convenience** is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on the factor **Billing Convenience** is significantly different for low billing customers and high billing customers.

Table. No 5.46 The comparison of average score of satisfaction for the factor Billing convenience across the groups of Low Billing and High Billing Customers.

Sr. No.	Description	Values
1	Factor	Billing Convenience
2	Low Billing Customers Monthly Telecom Expenditure Less than Rs. 10,000 n=268)	3.59 ± 0.70
3	High Billing Customers Monthly Telecom Expenditure More than Rs. Rs.10,000 (n=117)	3.58 ± 0.71
4	T-value	0.073
5	P-value	0.942
6	Decision	Accept H0

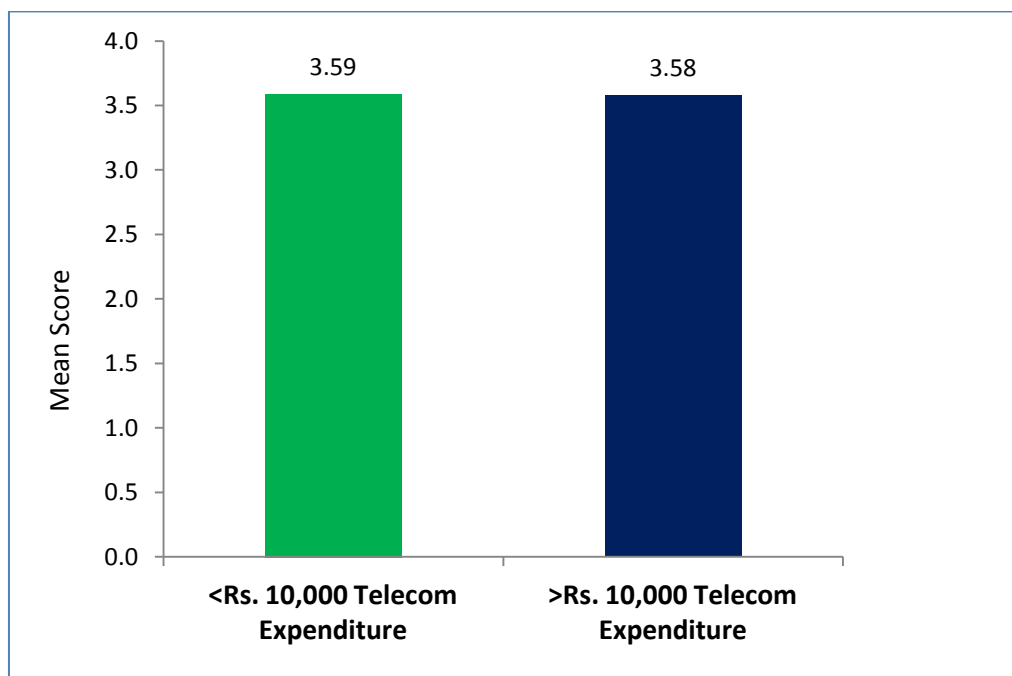
(Source: Based on Primary Data Collected and processed by the researcher)

(Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample t test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative hypothesis (H1); else Null hypothesis (Ho) is accepted)

Comment:

- 1) The average satisfaction score for billing convenience did not differ significantly between the customers having Telecom Expenditure more than Rs.10,000/- and Less than Rs.10,000/-.
- 2) Hence the level of Customer Satisfaction on the factor **Billing Convenience** does not vary according to the amount of billing.

Fig No 5.44 The comparison of average score of satisfaction for Billing convenience across the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5c (Cost of Service)

Hypothesis 5c: The level of customer satisfaction on the factor **Cost of services** (Voice, Data and Both) is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the factor **Cost of services** (Voice, Data and Both) is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on the factor **Cost of services** (Voice, Data and Both) is significantly different for low billing customers and high billing customers.

Table 5.47 The comparison of average score of the Factor Cost of services across groups of Low Billing Customers and High Billing Customers.

Sr. No.	Factor = Cost of services	Voice services	Data services	Overall (Voice & Data)
1	Low Billing Customer Telecom Expenditure Less than Rs. 10,000 (n=268)	4.13 ± 0.34	3.60 ± 0.43	3.86 ± 0.36
2	High Billing Customer Telecom Expenditure More than Rs. 10,000 (n=117)	4.11 ± 0.37	3.57 ± 0.43	3.84 ± 0.38
3	T-value	0.646	0.621	0.667
4	P-value	0.519	0.535	0.505
5	Decision	Accept H0	Accept H0	Accept H0

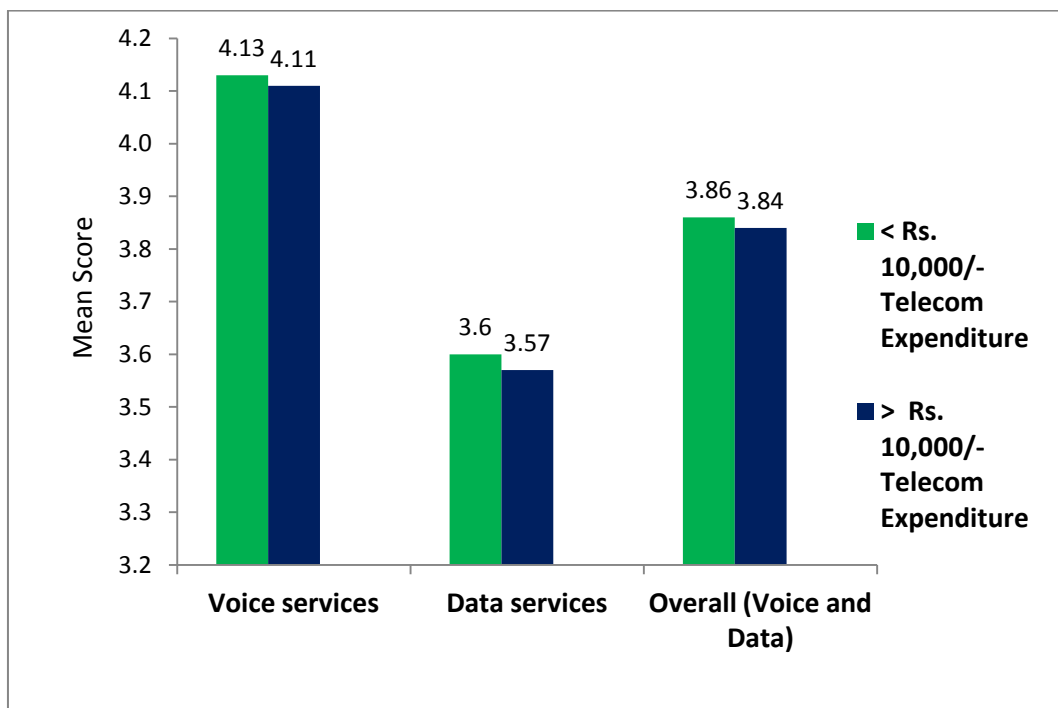
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample t test. P-value<0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comments:

- 1) The average satisfaction score for cost of services (voice services) did not differ significantly between low billing customers and high billing customers.
- 2) The average satisfaction score for cost of services (data services) did not differ significantly between low billing customers and high billing customers.
- 3) The average satisfaction score for cost of services (voice and data services) did not differ significantly between low billing customers and high billing customers.
- 4) Hence the level of Customer Satisfaction on the factor **cost of services (Voice and data)** does not vary according to the amount of billing.

Figure 5.45 The comparison of average score of Cost of services across the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5d (Customer care access)

Hypothesis 5d: The level of customer satisfaction on the factor **Customer care access** is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the factor **Customer care access** is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on the factor **Customer care Access** is significantly different for low billing customers and high billing customers.

Table 5.48 The comparison of average score of Customer care access across the groups of Low Billing Customers and High Billing Customers.

Sr. No.	Description	Values
1	Factor	Customer Care Access
2	Low Billing Customers Monthly Telecom Expenditure Less than Rs. 10,000 (n=268)	3.35 ± 0.76
3	High Billing Customers Monthly Telecom Expenditure More than Rs. 10,000 (n=117)	3.36 ± 0.77
4	T-value	-0.199
5	P-value	0.842
6	Decision	Accept H0

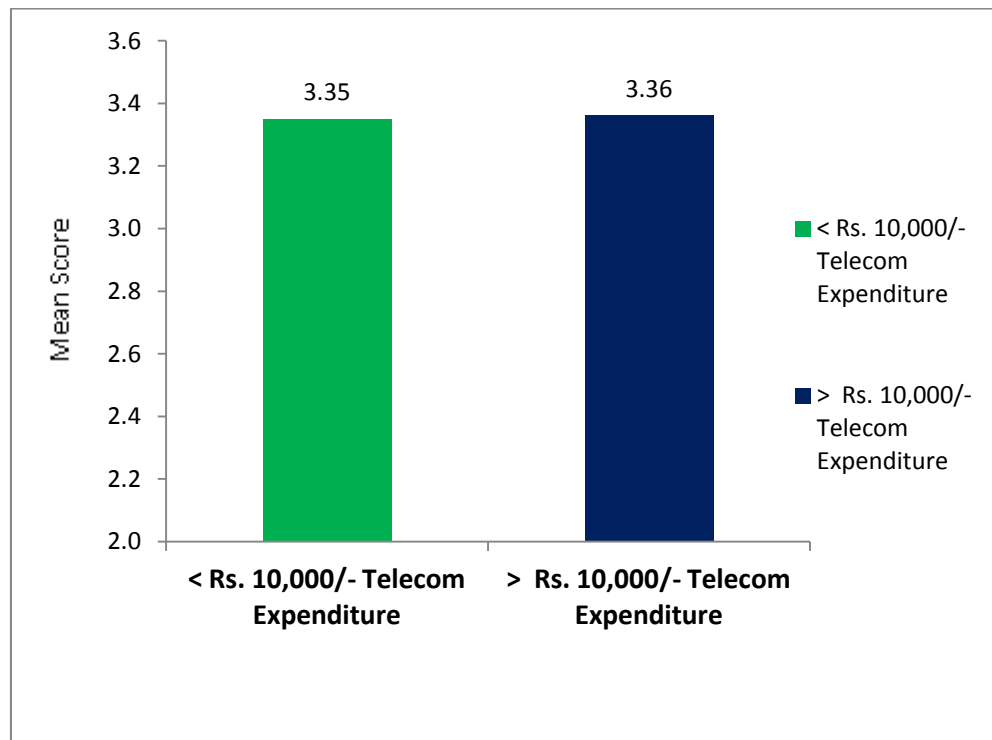
(Source: Based on Primary Data Collected and processed by the researcher)

(Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample t test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (Ho) is accepted.)

Comment:

- 1) The average level of satisfaction for the factor **customer care access** did not differ significantly for low billing customers and high billing customers.
- 2) Hence the level of Customer Satisfaction on the factor customer care access does not vary according to the amount of billing.

Figure 5. 46 The comparison of average score of Customer care access the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5e (Customer care)

Hypothesis 5e: The level of customer satisfaction on the factor **Customer care** facilities is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the factor **Customer care** facilities is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on **Customer care** facilities access is significantly different for low billing customers and high billing customers.

Table 5.49 The comparison of average score of Customer care facilities between the groups of Low Billing Customers and High Billing Customers.

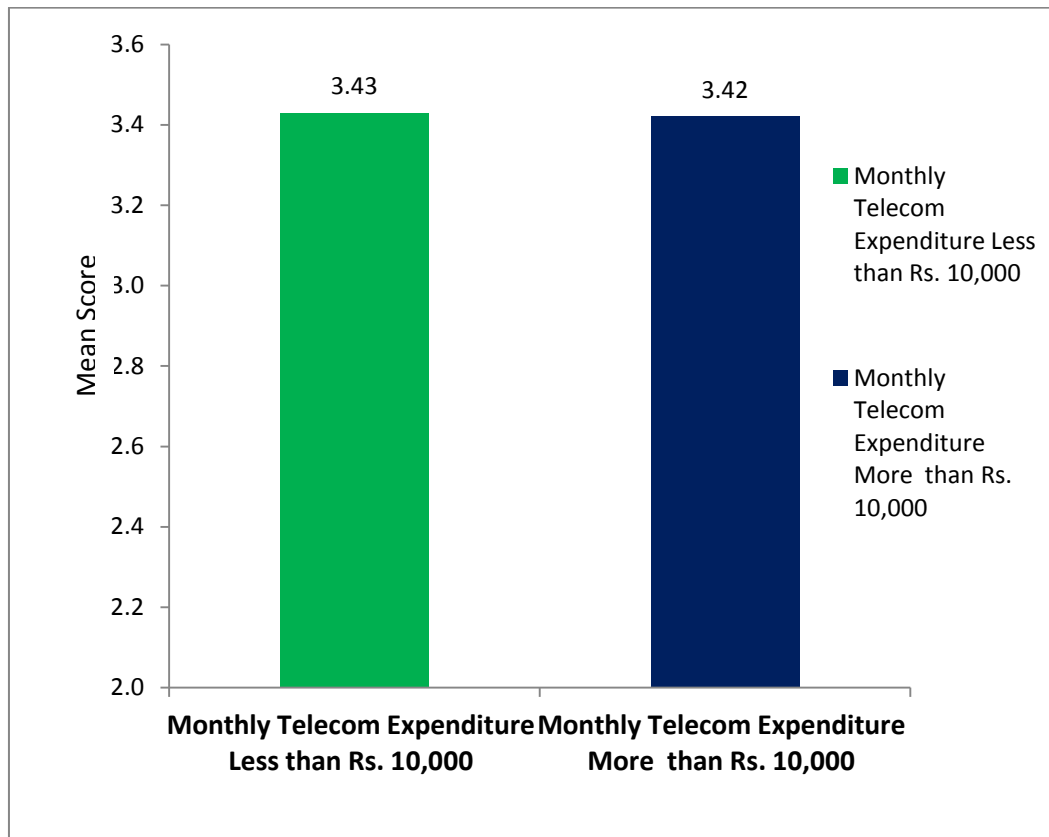
Sr. No.	Description	Values
1	Factor	Customer Care
2	Low Billing Customers Monthly Telecom Expenditure Less than Rs. 10,000 (n=268)	3.43 ± 0.67
3	High Billing Customers Monthly Telecom Expenditure More than Rs. 10,000 (n=117)	3.42 ± 0.67
4	T-value	0.206
5	P-value	0.837
6	Decision	Accept H0

(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample t test. P-value<0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comment: The average satisfaction score for customer care facilities did not differ significantly between the low billing customers and high billing customers. Hence level of customer satisfaction on the factor **Customer Care** does not vary according to amount of billing.

Figure 5.47 The comparison of average score of Customer care facilities across the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5f (Tangible- Physical Evidence of Services))

Hypothesis 5f: The level of customer satisfaction on the factor **Tangible (Physical Evidence of Services)** is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the factor **Tangible (Physical Evidence of Services)** is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on the factor **Tangible (Physical Evidence of Services)** is significantly different for low billing customers and high billing customers.

Table 5.50 The comparison of average score of **Tangible (Physical Evidence of Services)** aspects across the groups of **Low Billing** and **High Billing Customers**.

Sr. No.	Description	Values
1	Factor	Tangible
2	Low Billing Customers Telecom Expenditure Less than Rs. 10,000 (n=268)	4.33 ± 0.25
3	High Billing Customers Telecom Expenditure More than Rs. 10,000 (n=117)	4.30 ± 0.23
4	T-value	1.194
5	P-value	0.233
6	Decision	Accept H0

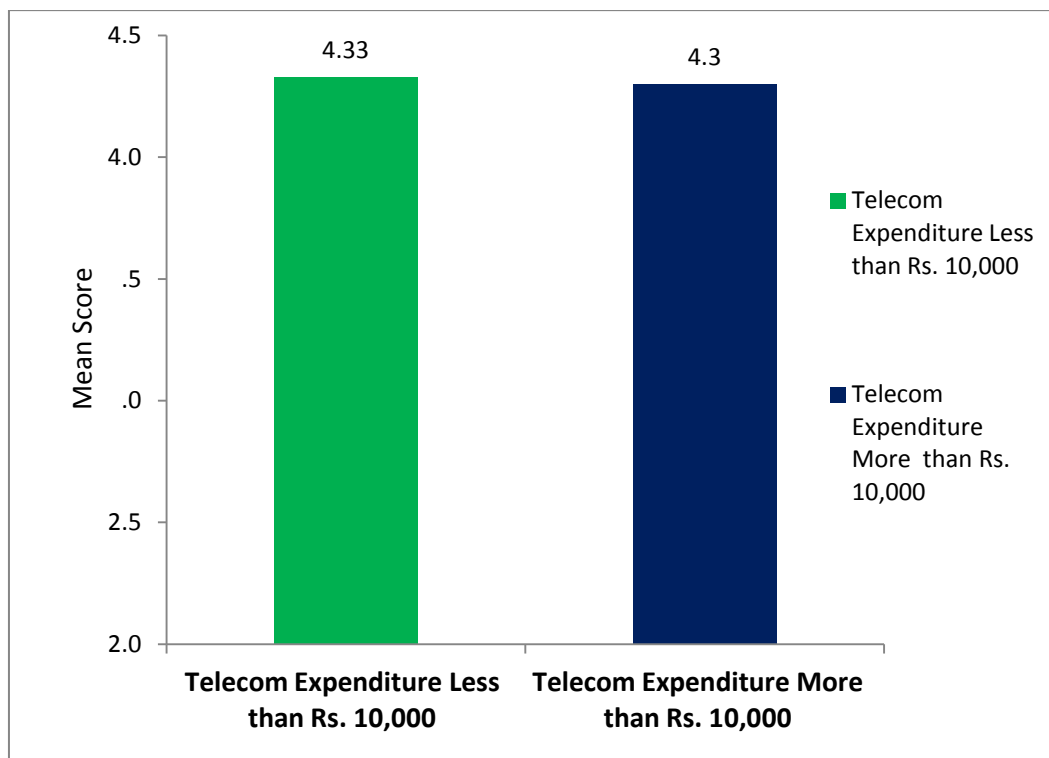
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent

sample 't' test. P-value<0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comment: The average satisfaction score for **Tangible (Physical Evidence of Services)** aspects did not differ significantly between the high billing and low billing customers. Hence customer satisfaction on **Tangible (Physical Evidence of Services)** aspects does not vary according to the amount of billing.

Figure 5.48 The comparison of average score of Tangible aspects the across groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5g (Responsiveness)

Hypothesis 5g: The level of customer satisfaction on the factor **Responsiveness** of Telecom Service Operators is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the factor **Responsiveness** of Telecom Service Operators is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on the factor **Responsiveness** of Telecom Service Operators is significantly different for low billing customers and high billing customers.

Table 5.51 The comparison of average score of the factor Responsiveness across groups of Low Billing Customers and High Billing Customers.

Sr. No.	Description	Value
1	Factor	Responsiveness
2	Low Billing Customer Monthly Telecom Expenditure Less than Rs. 10,000 (n=268)	3.46 ± 0.63
3	High Billing Customers Monthly Telecom Expenditure More than Rs. 10,000 (n=117)	3.42 ± 0.66
4	T-value	0.483
5	P-value	0.629
6	Decision	Accept H0

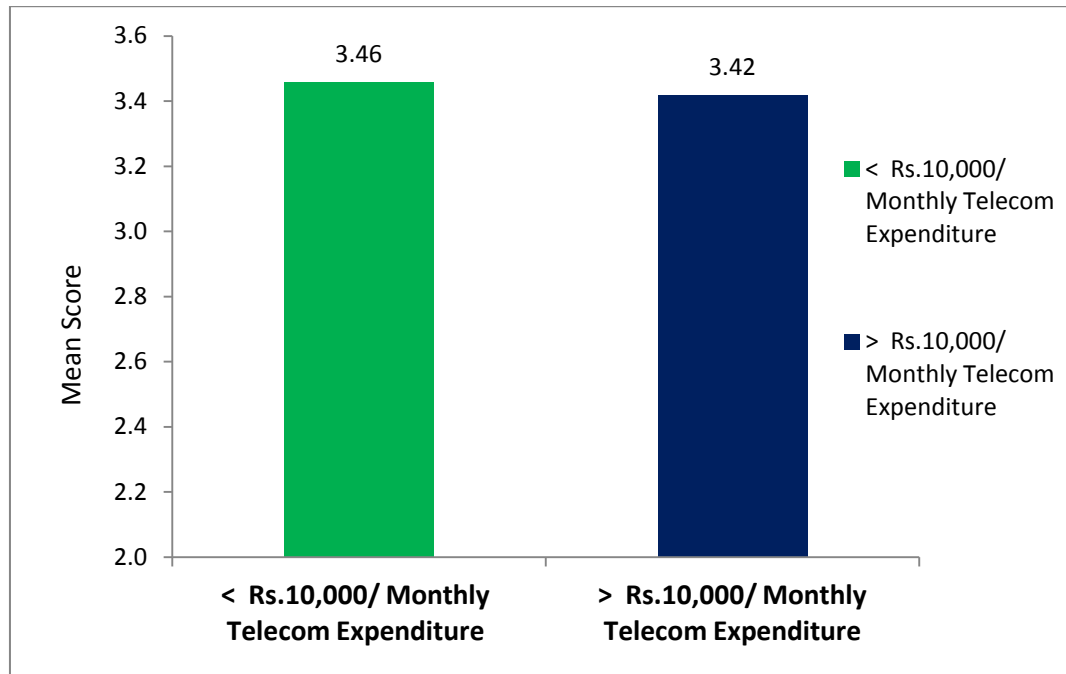
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample t test. P-value<0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comment: The average satisfaction score for **Responsiveness** did not differ significantly for low billing customers and high billing customers

Hence customer satisfaction on **Responsiveness** of Telecom service operator does not vary according to the amount of the billing.

Figure 5.49 The comparison of average score of Responsiveness across the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5h (Redressal of Customer Grievances)

Hypothesis 5h: The level of customer satisfaction on the factor **Redressal of Customer Grievances** by the Telecom Service providers is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the factor **Redressal of Customer Grievances** by the Telecom Service providers is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on the factor **Redressal of Customer Grievances** by the Telecom Service providers is significantly different for low billing customers and high billing customers.

Table 5.52 The comparison of average score of Redressal of Customer Grievances aspects across the groups of Low Billing Customers and High Billing Customers.

Sr. No.	Description	Values
1	Factor	Redressal of Customer Grievances
2	Low Billing Customers Telecom Expenditure Less than Rs. 10,000 (n=268)	3.86 ± 0.53
3	High Billing Customers Telecom Expenditure More than Rs. 10,000 (n=117)	3.85 ± 0.53
4	T-value	0.056
5	P-value	0.955
6	Decision	Accept H0

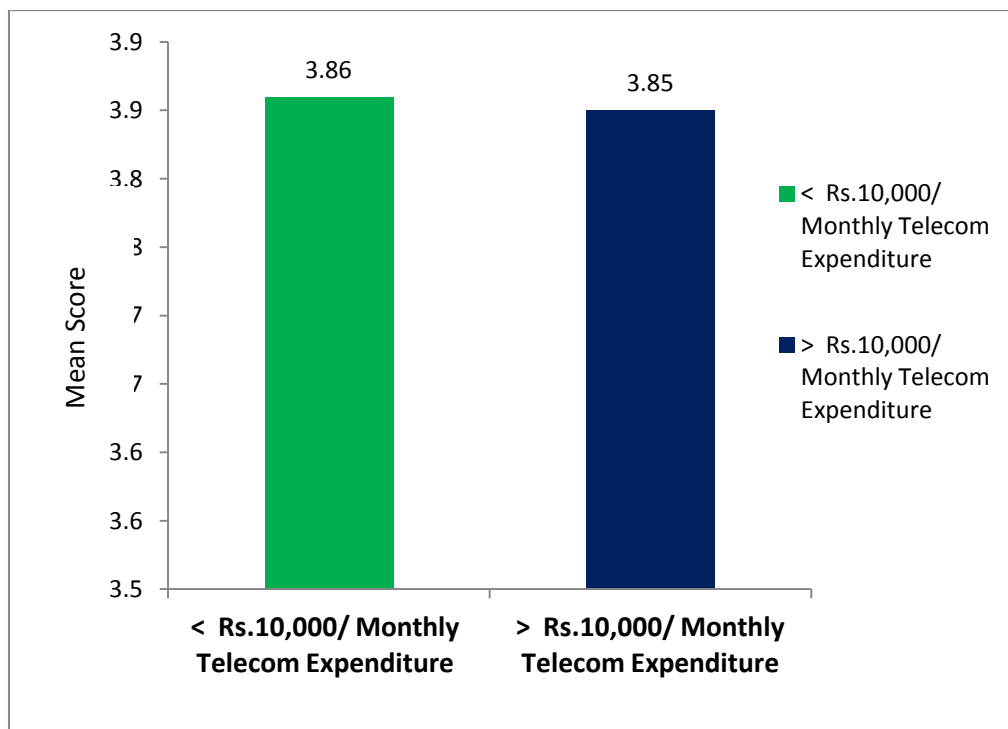
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample 't' test. P-value < 0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (H0) is accepted.

Comment:

The average satisfaction score for **Redressal of Customer Grievances** did not differ significantly **across the groups of Low Billing Customers and High Billing Customers**. Hence customer satisfaction on **Redressal of Customer Grievances** aspects does not vary according to the amount of the billing.

Figure 5.50 The comparison of average score of Redressal of Customer Grievances aspects across the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5i (Network Quality for Mobile Voice and Data services)

Hypothesis 5i: The level of customer satisfaction on the factor Network Quality (for Mobile voice and data services) is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level customer satisfaction on the factor Network Quality (for Mobile voice and data services) is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of customer satisfaction on the factor Network Quality for Mobile voice and data services is significantly different for low billing customers and high billing customers.

Table 5.53 The comparison of average satisfaction on Network quality (Mobile) across the groups the of Low Billing Customers and High Billing Customers.

Sr. No.	Factor	Network quality (Mobile)		
		Voice	Data	Overall (Voice & Data)
1	Services			
2	Low Billing Customers Telecom Expenditure Less than Rs. 10,000 (n=268)	3.44 ± 0.80	3.50 ± 0.77	3.47 ± 0.77
3	High Billing Customers Telecom Expenditure More than Rs. 10,000 (n=117)	3.40 ± 0.79	3.44 ± 0.73	3.42 ± 0.75
4	T-value	0.393	0.681	0.545
5	P-value	0.694	0.496	0.586
6	Decision	Accept H0	Accept H0	Accept H0

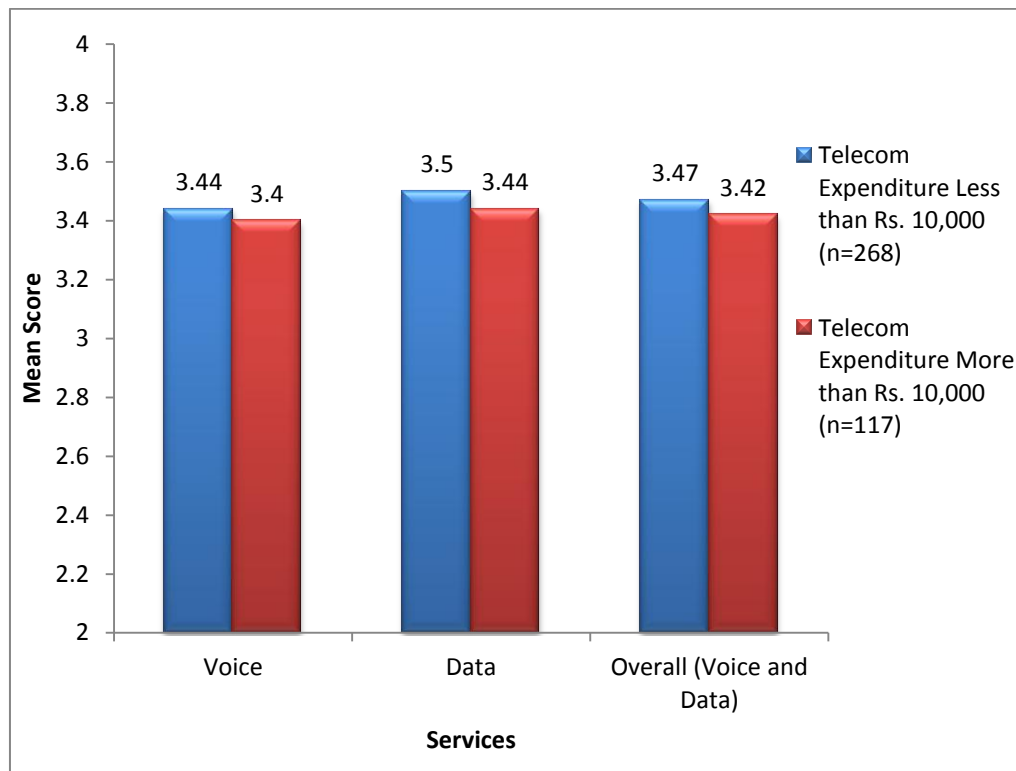
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent

sample t test. P-value<0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comments: The average customer satisfaction score for Network Quality mobile services (voice, data and overall services) did not differ significantly between the High Billing Customers and Low Billing customers. The Customer satisfaction on the aspect Network Quality mobile services (voice, data and overall services) does not vary according to the amount of the billing.

Fig No 5.51 The comparison of average satisfaction on Network quality Mobile (Voice, Data, and Overall) across the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5j (Network Quality Broadband Wire-line)

Hypothesis 5j: The Level of Customer satisfaction on the Factor **Network Quality Broadband** is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of Customer satisfaction on the factor **Network Quality Broadband** is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of Customer satisfaction on the factor **Network Quality Broadband** is significantly different for low billing customers and high billing customers.

Table 5.54 The comparison of average satisfaction on Network quality Broadband across the groups of Low Billing Customers and High Billing Customers.

Sr. No.	Description	Values
1	Network quality score	Broadband Data
2	Low Billing Customers Telecom Expenditure Less than Rs. 10,000 (n=268)	3.95 ± 0.77
3	High Billing Customers Telecom Expenditure More than Rs. 10,000 (n=117)	4.01 ± 0.81
4	T-value	-0.658
5	P-value	0.511
6	Decision	Accept H0

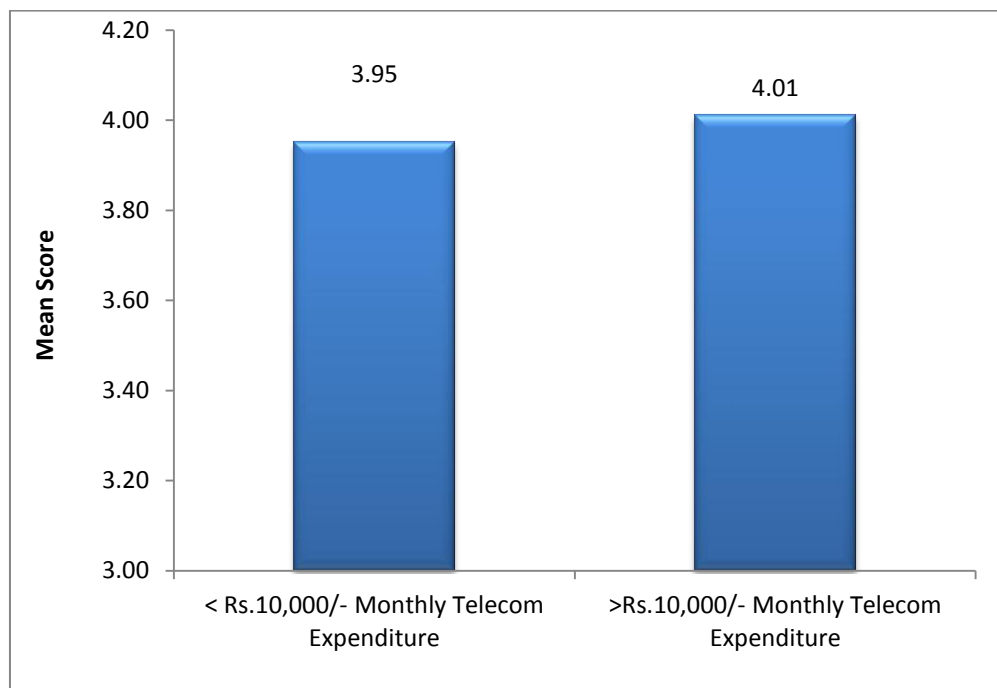
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample t test. P-value<0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comment

The average satisfaction score for **Network Quality Broadband** did not differ significantly between the Low Billing Customers and High Billing Customers. Hence, the level of Satisfaction on the factor **Network Quality Broadband** does not vary according to the amount of billing.

Table 5.52 The comparison of average satisfaction on Network quality Broadband across the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub hypothesis 5k (Network Quality Landline voice services)

Hypothesis 5k: The level of customer satisfaction on the factor **Network Quality Landline** voice services is different for low billing customers and high billing customers.

Null Hypothesis (H0): The level of customer satisfaction on the factor **Network Quality Landline** voice services is not significantly different for low billing customers and high billing customers.

Alternative Hypothesis (H1): The level of satisfaction on the factor **Network Quality Landline** voice services is significantly different for low billing customers and high billing customers.

Table 5.55 The comparison of average satisfaction on Network quality Landline (Voice services) across the groups of Low Billing Customers and High Billing Customers.

Sr. No.	Description	Values
1	Network quality score	Landline Voice
2	Low billing Customers Telecom Expenditure Less than Rs. 10,000 (n=268)	4.04 ± 0.72
3	High billing Customers Telecom Expenditure More than Rs. 10,000 (n=117)	4.01 ± 0.73
4	T-value	0.363
5	P-value	0.716
6	Decision	Accept H0

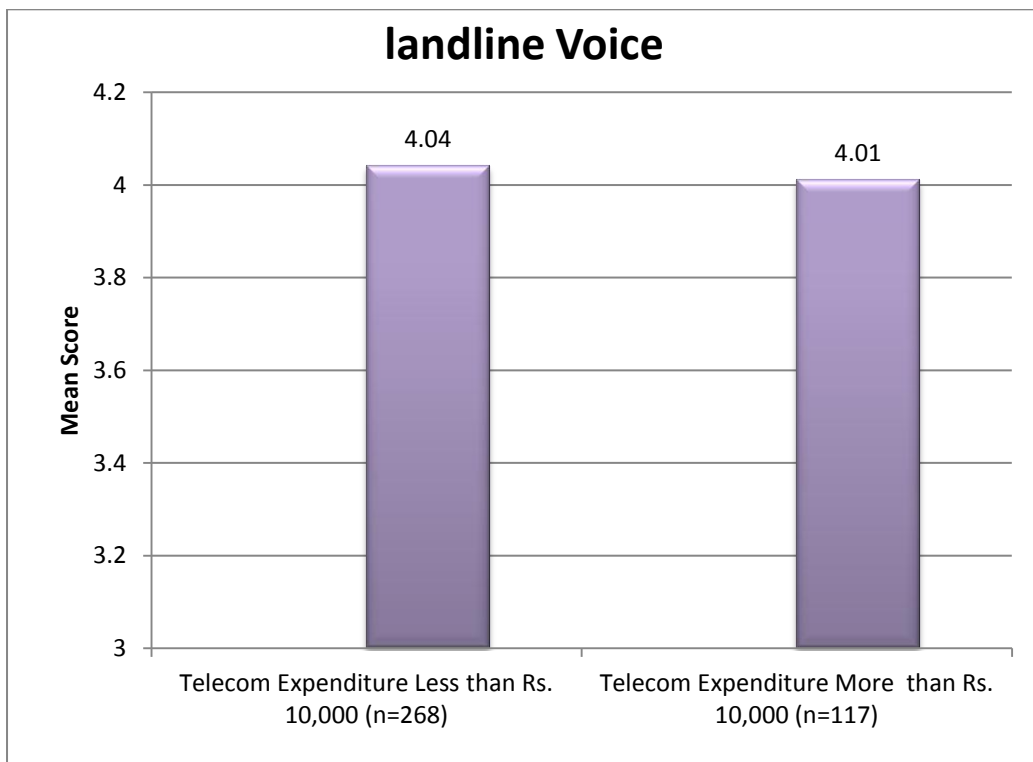
(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample 't' test. P-value<0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comment

The average satisfaction score for Network Quality landline (voice services) did not differ significantly between the low billing and high billing customers. Hence the Satisfaction on Network Quality Landline Voice does not vary according to the amount of billing.

Fig No. 5.53 The comparison of average satisfaction on Network quality Landline Voice services across the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

Testing of Sub Hypothesis 5L (Uninterrupted Services)

Sub Hypothesis 5L : The level of customer satisfaction on the factor **Uninterrupted Services** is different for low billing customers and high billing customers

Null Hypothesis (H0): The level of customer satisfaction on the factor **Uninterrupted Services** is not significantly different for low billing customers and high billing customers

Alternative Hypothesis (H1): The level of customer satisfaction on the factor **Uninterrupted Services** is significantly different for low billing customers and high billing customers

Table 5.56 The comparison of average satisfaction on Uninterrupted services across the groups of Low Billing Customers and High Billing Customers.

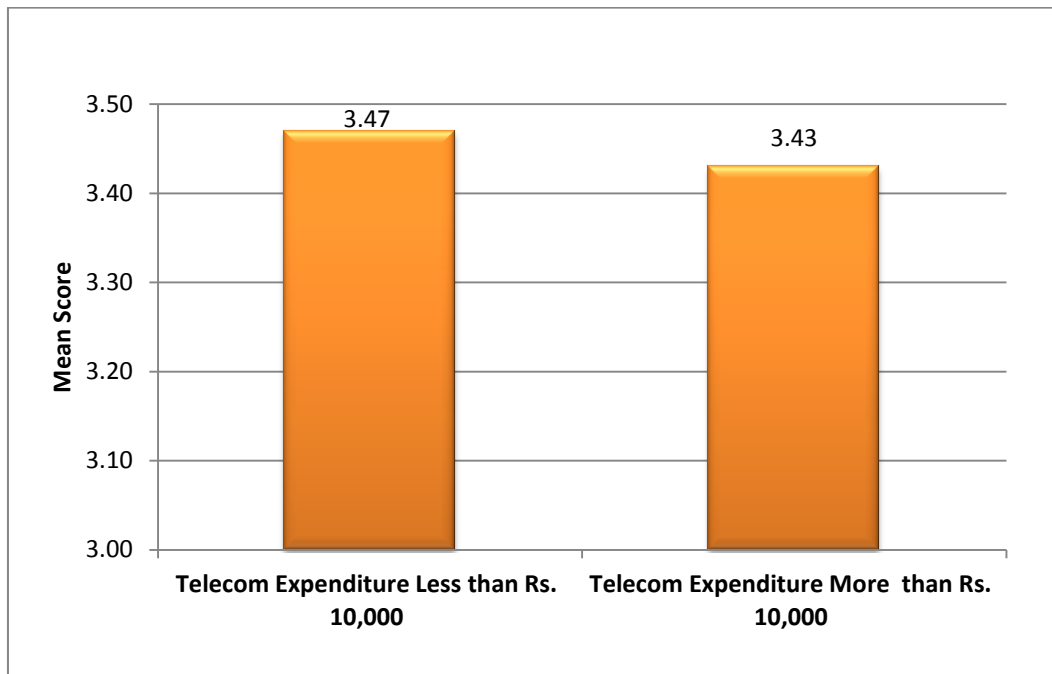
Sr. No.	Description	Values
1	Factor	Uninterrupted services
2	Low Billing Customers Telecom Expenditure Less than Rs. 10,000 (n=268)	3.47 ± 0.68
3	High Billing Customers Telecom Expenditure More than Rs. 10,000 (n=117)	3.43 ± 0.69
4	T-value	0.317
5	P-value	0.751
6	Decision	Accept H0

(Source: Based on Primary Data Collected and processed by the researcher)

Values are Mean ± Standard Deviation of satisfaction scores. Higher mean score indicate higher satisfaction and vice-versa. P-value is obtained using independent sample t test. P-value<0.05 is considered to be statistically significant and it leads to acceptance of Alternative Hypothesis (H1); else Null hypothesis (Ho) is accepted.

Comment: The average satisfaction score for **Uninterrupted Services** did not differ significantly between the Low billing Customers and High Billing Customers. Hence customer satisfaction on the factor the uninterrupted service does not varies with amount of the billing.

Figure 5.54 The comparison of average satisfaction on Uninterrupted services across the groups of Low Billing Customers and High Billing Customers.



(Source: Based on Primary Data Collected and processed by the researcher)

TESTING OF HYPOTHESIS H5

To test Hypothesis No. 5 the researcher has tested the 12 sub hypotheses (One for every factor) which are tested by grouping the customers on the basis of their Monthly Expenditure (Monthly Billing) on Telecom Needs. Thus researcher has analyzed the customer satisfaction on 12 different Factors and checked whether customer satisfaction varies according to the amount of billing. The Results of this testing are listed below.

- The level of customer satisfaction on the factor **Provision of Services** is not significantly different for low billing customers and high billing customers.
- The level of customer satisfaction on the factor **Billing Convenience** is not significantly different for low billing customers and high billing customers.

- The level of customer satisfaction on the factor **Cost of services** (Voice, Data and Both) is not significantly different for low billing customers and high billing customers.
- The level of customer satisfaction on the factor **Customer care access** is not significantly different for low billing customers and high billing customers.
- The level of customer satisfaction on the factor **Customer care** facilities is not significantly different for low billing customers and high billing customers.
- The level of customer satisfaction on the factor **Tangible (Physical Evidence of Services)** is not significantly different for low billing customers and high billing customers.
- The level of customer satisfaction on the factor **Responsiveness** of Telecom Service Operators is not significantly different for low billing customers and high billing customers.
- The level of customer satisfaction on the factor **Redressal of Customer Grievances** by the Telecom Service providers is not significantly different for low billing customers and high billing customers.
- The level customer satisfaction on the factor Network Quality (for Mobile voice and data services) is not significantly different for low billing customers and high billing customers.
- The level of Customer satisfaction on the factor **Network Quality Broadband** is not significantly different for low billing customers and high billing customers.
- The level of customer satisfaction on the factor Network **Quality Landline** voice services is not significantly different for low billing customers and high billing customers.
- The level of customer satisfaction on the factor **Uninterrupted Services** is not significantly different for low billing customers and high billing customers.

From the above mentioned 12 statements it is clear that The Level of Satisfaction on different factors influencing customer satisfaction is not significantly different for low billing customers and High Billing Customers. **Hence it is proved that the level of Customer Satisfaction on different Factors does vary according to the amount of billing.**

5.9 Relating Objectives with Primary Data: - Part A

5.9.1. Analysis Reason for Failure in services as reported by Service Providers

Whenever there are fault conditions, corporate customers report the faults to the Telecom Service Providers. Customers were asked that what answer they get from the service provider whenever they report the faults. Survey revealed that 76.88 % customer were told that reason behind the fault is the cable cut happened due to the excavation work done by the different authorities in the city for the development work. (These different authorities are Municipal Corporation, Electricity Board, Gas Authorities, Other Telecom Service Operators). This shows that there is there is lack of coordination between the telecom service operators and different Authorities.

The underground cable faults are also the one of the major reason of failure as reported by the 8.57 % customers. These cable faults normally occur in the rainy season. The rain water intrude in the cable generates the fault conditions. The power failure is also a major fault area as reported by 8.57 % customers. These faults are reported in case of data circuit failures. The branch offices in the villages are connected to the head or regional offices in Pune via data circuits. Whenever there is power shut down in rural area these offices in rural areas become out of reach .

The failure of the equipments and Store (Spares not available to replace faulty instruments or cables) unavailability does not have significant contribution to the fault conditions. The other includes the software troubles, incorrect billing updates, non payments etc. The Table no 5.57 shows the classification of the reasons behind faults.

Table No 5.57 Reason for Failure in services as reported by Service Providers

Sr. No.	Reason for failure	Count	Percentage
1	Cable cut due to different digging work	296	76.88 %
2	Underground Cable Fault	33	8.57 %
3	Equipment Failure	17	4.42 %
4	Power Failure	33	8.57 %
5	Spares not available to replace faulty equipments or cables	3	0.78 %
6	Any Other	3	0.78 %
	Total	385	100 %

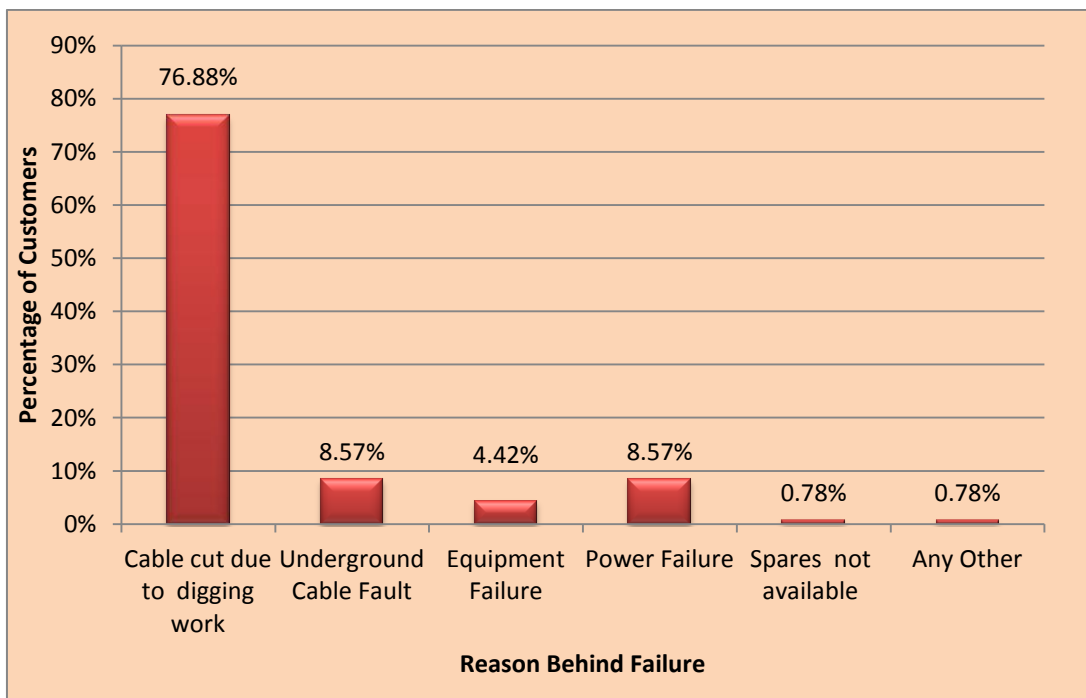
(Source: Primary Data Collected by the Researcher)

Chi-Square value= 1019.2, P-value= 0.001 (Significant).

Comments

- 1) The most common problem faced is ‘Cable cut due to digging work’ .
- 2) The least common problem faced is ‘Store not available to replace faulty equipment or cable’.
- 3) The Telecom Service operator should enhance coordination between the different authorities involved in digging work to avoid the problems happening due to road digging work.

Fig. No 5.55 Distribution of Reasons behind the Fault Condition Occurrence



(Source: Primary Data Collected by the Researcher)

5.9.2 Relating Objective with Primary Data –Part B

Objective: - To study the correlation between the overall satisfaction and the individual factors (Spearman’s Method).

In a questionnaire overall satisfaction about the services was also sought. There are twelve numbers of factors which contribute to overall customer satisfaction. Attempt has been made to find out whether these factors are related to the overall Satisfaction with the help of Spearman’s correlation. This study will be useful for the Telecom service provider to find out which factors are strongly correlated with the overall Satisfaction and which factors are weakly correlated with the overall satisfaction. The service operators can try to improve on those factors which are strongly correlated with the overall customer satisfaction to improve customer satisfaction.

Table No 5.58 Spearman’s correlation between the overall satisfaction and Individual factors.

	Individual Factors		Overall Satisfaction Score
Spearman's S rho	Billing Convenience Score	R	0.893(**)
		P-value	0.001
	Cost of services (Voice) Score	R	0.659(**)
		P-value	0.001
	Cost of services (Data) Score	R	0.701(**)
		P-value	0.001
	Cost of services (Overall Voice + Data) Score	R	0.717(**)
		P-value	0.001
	Customer Care Access Score	R	0.886(**)
		P-value	0.001
	Customer Care Score	R	0.826(**)
		P-value	0.001
	Tangible Aspects Score (Physical Evidence of Services)	R	0.050
		P-value	0.330
	Responsiveness Score	R	0.859(**)
		P-value	0.001

	Redressal of Customer Grievances Score	R	0.804(**)
		P-value	0.001
	Network Quality Mobile-Voice Score	R	0.891(**)
		P-value	0.001
	Network Quality Mobile-Data Score	R	0.891(**)
		P-value	0.001
	Network Quality Mobile (Overall Voice +Data) Score	R	0.892(**)
		P-value	0.001
	Network Quality Landline- Data (Broadband) Score	R	0.876(**)
		P-value	0.001
	Network Quality Landline-Voice Score	R	0.881(**)
		P-value	0.001
	Network Quality Landline – (Overall Voice + Data Score)	R	0.882(**)
		P-value	0.001
	Uninterrupted Services Score	R	0.896(**)
		P-value	0.001
	Billing Transparency Score	R	0.766(**)
		P-value	0.001
	Provision of Services (Voice) Score	R	0.780(**)
		P-value	0.001
	Provision of Services (Data) Score	R	0.885(**)
		P-value	0.001

(Source: Based on Primary Data Collected and processed by the researcher)

** Correlation is significant at the 0.01 level (2-tailed).

Comments:

- 1) The overall satisfaction score is significantly correlated with all the individual factors except tangible aspects score.
- 2) The overall satisfaction score is significantly and strongly correlated with Uninterrupted Services Score.
- 3) The overall satisfaction score is significantly and relatively weakly correlated with Cost of services (Voice) Score.

5.10 References:-

1	TRAI, 2012 , Press Release No. 179/2012, Page No 15 -16, [online], available on :< http://www.traigov.in/WriteReadData/WhatsNew/Documents/PR179-07sep12.pdf >, [Accessed on 21 Oct 2012]
2	TRAI, 2012 , Press Release No. 179/2012, Page No 12, [online], available on:< http://www.traigov.in/WriteReadData/WhatsNew/Documents/PR179-07sep12.pdf >, [Accessed on 21 Sept 2012]
3	TRAI, 2004 , Notification No. 301-37/2004-Eco, Page No 3, New Delhi [online], available on : < http://www.traigov.in/traigov.in/upload/TariffOrders/15tto7oct.pdf >, [Accessed on 12 Dec 2012]
4	TRAI, 2012 , Consumer's Handbook on Telecommunications, New Delhi, Page No 4, [online], available on : < http://www.traigov.in >, [Accessed on 18 May 2013]
5	TRAI, 2007 , New Delhi, Handbook for the consumer from Telecom Regulator, Page No 8, [online], available on : < http://www.traigov.in > [Accessed on 10 April, 2012]
6	nccptrai.gov.in , Telecom Commercial Communications Customer Preference Portal, Welcome Page, [online], available on: < http://www.nccptrai.gov.in/nccpreistry/Welcome.jsp > [Accessed on 12 January 2013]

CHAPTER VI

FINDINGS,

CONCLUSION AND

SUGGESTIONS

CHAPTER NO VI

FINDINGS, CONCLUSIONS AND SUGGESTIONS

CONTENTS

Chapter No	Description	Page No
6	Findings, Conclusions and Suggestions	243-269
6.1	Introduction	245
6.2	Finding and Conclusion of Section- I of the Questionnaire	245
6.3	Findings, Conclusion and Suggestions on Section- II of the Questionnaire	247
6.4	Findings, Conclusion and Suggestions on Section No. III of the Questionnaire	251
6.5	Findings, Conclusion and Suggestions On Section No. IV of the Questionnaire	253
6.6	Findings, Conclusion and Suggestions On Section No. V of the Questionnaire	256
6.7	Findings and Suggestions to Improve Satisfaction on Different Factors	258
6.8	Results of Hypothesis Testing and Related Suggestions	267
6.9	Directions for Future Studies	269
6.10	References	269

CHAPTER VI

FINDINGS, CONCLUSIONS AND SUGGESTIONS

6.1 Introduction:-

In this chapter the findings of fifth chapter are summarized and the concise results in the form of conclusions have been presented. Researcher has also given suggestions depending on the findings of the study. The reader of this thesis will get a clear view of the work done by the researcher by reading this chapter.

6.2 Finding and Conclusion of Section- I of the Questionnaire:

6.2.1 Findings of Part A of Section I of the Questionnaire:-

- A. Classification of Customers :-** Out of 385 customers 9 % Customers were from Banking, insurance and financial services company, 14 % customers were from IT, ITES and Data processing centers, 12 % Customers were from Government organization, Public Sector Units, Educational Institutes, University and colleges and 65 % customers were Private and Public Limited companies. **(Reference Table No 5.1)**

- B. Monthly Expenditure on Telecom Needs:** - Out of 385 customers, 268 (69.6%) customers responded that their Monthly expenditure on telecom needs is less than Rs. 10,000/- and 117 (30.4 %) customers responded that their monthly expenditure on telecom needs is more than Rs. 10,000/-. **(Reference Table No 5.2)**

- C. Distribution of Services used by Customers:** - 100 % customers use Mobile, Landline and Broadband services. The Leased Lines are used by 41.3 % customers and 29.1 % customers use ISDN services. The latest 3G Technology is used by 47.3 % customers and 10.4 % customers use I-Net. The Centrex is the least popular service as only 9.6 % customers are using it. **(Reference Table No 5.3)**

- D. Classification of Customers according to their Cellular Service Provider:-** 14.5% customers are using the mobile services of Bharati, 13.2% customers are using Reliance services. The Idea tops the list with

22.6 % customers and Vodafone is second in the list with 19.2 % share. Percentage of customers who are using Tata as mobile service provider is 9.9 % and 8.1 % customer are using services provided by Unitech. The Government operator BSNL is providing services to 9.6 % customers. **(Reference Table No 5.4)**

- E. Classification of Sample according to Broadband Service Providers:** Out of 385 customers 252 (65.45 %) customers has chosen BSNL as a Broadband service Provider. The private operators Reliance and Airtel are providing broadband service to 14.03 % and 10.39 % customers respectively. The Hathway is a broadband service provider for 2.86 % customers. The Other operators share is 7.27 % which includes operators like Tikona, Tata etc. **(Reference Table No 5.5)**
- F. Period of Association with the Service Operator:-** Percentage of customers those have not changed their telecom service Provider for a period of more than 2 years is 58.18 % for Mobile services, 73.25 % for landline services and 74.81 % for Broadband services. **(Reference Table No 5.6)**

6.2.2 Findings of Part B of Section I of Questionnaire: - The Part B of Section I seeks the information about Gender, educational qualification and age of the respondent who is filling questionnaire on behalf of Corporate Customers.

- A.** The questionnaire is filled up by the person who is employed by the Corporate Customers to take care of the telecom needs of their organization. The data in respect of the gender of these respondents was collected. The survey reveals that out of 385 respondents 305 (79.22 %) were male respondent & 80 (20.78 %) were female respondent. **(Reference Table No 5.7)**
- B.** Survey revealed that Percentage of Respondents in the age group of 25 to 35 year is 50.13 %. There are 25.45 % respondents having age below 25 years. There are 18.96 % respondents who are in the age group of 35 years to 45 years. Only 5.46 % respondents are more than of age 45 years. **(Reference Table No 5.8)**

- C. The survey also revealed that 57.9 % respondents are Graduate and 8.6 % are post graduate. There are 33.5 % respondent who are diploma engineers or professional qualification holders (Classified under Others Category).
(Reference Table No 5.9)

6.2.3. Conclusion for Section I of the Questionnaire:

Here researcher concludes that the samples are representative as there are customers from different business area like Government organization, Public and private limited companies, IT and ITES, Bank and Financial sector. Classification of customers according to the amount of monthly telecom billing shows that researcher has collected the voices of customers having high as well as low telecom expenses.

The distribution of services used by customers shows that during the study researcher has considered almost all the services of telecom. The Classification of customer according to their mobile and broadband service operator shows that the data is reliable as these classifications approximately matches with the telecom subscription data published by TRAI in Press Release 179/2012 **(TRAI, 2012)^{*1}**.

The period of association data shows that the most of the customers are using the services for more than one year. So their opinions about the services are rich with experience. Survey reveals that there is more churning in the Mobile sector due to implementation of Mobile Number Portability. The data shows that less churning has happened in the Landline and Broadband sector of the telecom.

The questionnaire of the customer is filled up by the person who is employed by the company to take care of the telecom needs of the company. This data shows that the field is dominated by the Male gender. It also reveals that young generation is involved in maintenance of telecom services as most of the respondents are in the age group below 35 years. The respondents are qualified and it shows that the telecom network of customer is in educated hands. The data about the respondent was collected to show that a respondent was qualified and mature person and hence data collected is more reliable.

6.3. Findings, conclusion and Suggestions on Section No II of Questionnaire: -

6.3.1 Findings of Section II of Questionnaire: - In this part of questionnaire, information related to the network performance has been gathered & analyzed. The Findings in respect of this section are discussed below.

- A. Number of Fault incidences per year:** - It was found that 43.9 % customer faced more than 5 fault incidences per year (When there is complete failure of the communication.) 43.4 % customer faced 3-5 fault incidences per year. 11.4 % customers faced one-two fault incidences per year. 1.3 % customer has faced nil fault incidences per year. **(Reference Table No 5.10)**
- B. In General Fault Repair Duration:** - 50.6 % of customer said that in general fault repair duration is less than 12 hours. 37.7 % customers said that fault repair duration is in between 12 Hrs to 24 hours. 8.3 % customers told that in general fault repair duration is in between 24 Hrs to 48 hours. 3.4 % customers reported that in general fault repair duration is more than 2 days. **(Reference Table No 5.11)**
- C. Reason for Failure in services:** - Customers were asked which a **most common** reason is given by the service provider when they report the failure of services. Survey revealed that 76.88 % customers were told that reason behind the failure of services is the cable cut due to the excavation work done by different agencies. 8.57 % customer said underground cable fault is the reason given by the service provider. According to 8.57 % customer reason is Power failure and 4.42 % customer was told equipment failure is the reason behind failure of services. **(Reference Table No 5.57)**
- D. Distribution of Network problem for fixed Line Landline Services:** - As per 72.47 % customers most common type of fault they are facing in case of landline network is phone dead (No dial Tone). The call drop, line busy and noisy lines are the other types of common fault which are faced by the 8.31 %, 6.23 % and 5.71 % customers respectively. Echo, one way speech is faced by 2.86 % and 2.34 % customers. **(Reference Table No 5.12)**
- E. Distribution of Network problem in case of Broadband services:** - In case of broadband services complete disconnection is the common type of fault faced by the 60 % of customers. The slow speed is another fault area faced by the 21 % of the customers. The data call drops intermittently is another fault area faced by 10 % of customers. 4% customers face password error, 3 % customer face modem fault. **(Reference Table No 5.13)**

- F. Distribution of Network problems in Mobile Networks:** - In case of Mobile services the survey revealed that 26.9 % customers are facing call drop as a major problem area. 22.7 % customers think that poor coverage is major problem. 17 % customers described Network busy as major problem. Data service troubles are with 14.7 % customers. The poor voice quality problems like noise & echo are faced by 2.7% and 3.8 % customers respectively. One Way speech is faced by 3.8 % customers. VAS troubles are faced by 5.6 % customers. **(Reference Table No 5.14)**
- G. Satisfaction on Network Performance of Landline Voice Services:** - In case of Landline network 27.8 % customer are very satisfied and 46.8 % customers are satisfied about the Network performance. Thus in all 74.6 % customer are satisfied with the network performance Landline services. 14.5 % customers are neutral about the Network Performance of Landline services. 9.4 % customers are dissatisfied and 1.6 % customers are very dissatisfied. **(Reference Table No 5.15)**
- H. Satisfaction on Network Performance of Mobile Services:** - In case of Mobile there are 15.3 % customers who are very satisfied and 42.6 % customers are satisfied. By adding these two percentages one can say that 57.9 % customers are satisfied about the Network quality of Mobile. There are 22.6 % customers who are neutral. 14.5 % customers are dissatisfied and 4.9 % customers are very dissatisfied. **(Reference Table No 5.15)**
- I. Satisfaction on Network Performance of Broadband Services:** - 29.6 % customers are very satisfied and 51.4% customers are satisfied. By adding these two percentages one can say that 81.0 % customers are satisfied about the Network quality of wire-line Broadband. There are 9.1 % customers who are neutral. 7.5% customers are dissatisfied and 2.3 % customers are very dissatisfied. **(Reference Table No 5.15)**

6.3.2 Conclusion on Section II of Questionnaire: The survey shows 87.3 % customers are facing three and more fault incidences per year. In the age of high technology this is very high figure and not acceptable by customers. According to 88.3 % customers faults are attended within 24 Hrs. The survey also reveals that 11.7 %

faults have taken more than 24 Hours to set right. Such longer fault duration is unacceptable by the customers. The main reason behind fault appears to be the cable fault occurring due to road digging work.

In case of landline network phone dead is the most common fault faced by 72.47% customers. The survey revealed that in case of Mobile network 27 % customers are facing call drop problem. The call drop happens due to the poor coverage as well as poor Radio Frequency design. The survey further reveals that 23 % customers are facing poor network coverage problem. This shows that there are some areas in the city where there is poor mobile network coverage.

In case of broadband services customers are facing the complete disconnection problem. The slow speed of the downloading is another fault area faced by the 21 % customers in case of Broadband network. The customer has feeling that the promised speed is not practically delivered by the operators.

As far as the satisfaction about the network performance is concerned it is found that customers are more satisfied about the network performance of broadband and landline network than mobile network.

6.3.3. Suggestions for Section II of the Questionnaire:

6.3.3.1. Fault Incidences: - In most of the cases cable faults are occurring due to road digging work done by different authorities. (The digging work is done by the Local authorities for activities like road concreting, drainage maintenance, road repairs, etc. The road digging work is also done by the different authorities like MSEDCL for laying their power cable, other telecom operators, Gas authorities for laying Gas pipe lines etc.) The frequent cable fault shows that there is lack of coordination between different authorities involved in road digging work and Telecom Operators. To avoid these cable faults following are the suggestions:-

- A.** Conduct frequent meetings with the officers of the different authorities involved in digging work to have better coordination. Handover the cable route index diagram to them. (Route index diagram shows the exact position of the underground cable and includes details about the depth at which cable is laid and distance of the cable from edge of the road)
- B.** Telecom service provider can depute the official at the site where the digging work is in progress so that official can guide about the exact location of underground cables.

- C. Telecom service operator can provide the alternate route of the Optic fiber cable so that there should not be complete failure even when cable is cut due to digging work.
- D. Have constant vigil on the circuits of corporate customers and attend the faults of the corporate customer on priority basis.

6.3.3.2. Data Network problems:

In case of broadband network customers are facing poor speed problem. Customers feel promised bandwidth is not delivered by the broadband service providers. In the advertisement operators mentions the maximum speed that customer will get but operators normally do not mention minimum speed that customer will get. This creates confusion. It is recommended to mention both minimum and maximum speed available in different plans subscribed by the customers. To provide higher and consistent speed it is recommended to install robust backhaul Network.

6.3.3.3 Mobile Network: Customers are complaining about the Poor coverage of the network. It proves that still there are some pockets in the city where the Network Coverage is very poor. The Network Coverage depends on the number of BTS stations (Popularly called as Towers) installed by the Mobile Service Operator. It is recommended to increase the number of BTS stations in the city to provide better coverage, with this poor voice quality problem can be solved up to certain extent.

Satisfaction in respect of Network performance is very poor in case of Mobile Network. Telecom service operators can to improve the customer satisfaction by addressing the poor coverage and call drop issues.

6.4 Findings, Conclusion and Suggestions on Section No III of Questionnaire (Billing related information):- Section III of questionnaire deals with the billing related parameter.

6.4.1 Findings of the Section No III of Questionnaire:

- A. 94 % customers wanted that every bill provided by the telecom service operator should be a detailed bill. **(Reference Table No 5.16)**
- B. The 95 % customer reported that they normally do not find any mistakes in the bills. **(Reference Table No 5.17)**

- C. 76.88 % customers reported that they should get alert from Telecom Service Provider as they approach different threshold levels of the billing. **(Reference Table No 5.18)**
- D. 84.4 % customers were aware about the fact that they can get detailed bill also in case of prepaid mobile connection. **(Reference Table No5.19)**
- E. 92.47% customers were not ready to pay any premium charges to treat themselves as priority customers. **(Reference Table No 5.20)**
- F. 374 customers (97.14 %) out of 385 customers said that bills issued by service provider are transparent. **(Reference Table No 5.21)**
- G. Survey revealed 17.1% customers are very satisfied and 65.2 % customers are satisfied with billing services. 13.2 % customers are neutral followed by 3.6 % who are dissatisfied with billing services. 0.8 % customers are very dissatisfied about billing services. **(Reference Table No 5.22)**

6.4.2 Conclusion of Section No III of Questionnaire: The customers wanted that every bill should be a detailed bill. Telecom Service provider can provide the bills on E-Mail. As the computerized systems are used by operators to generate the bills mistakes in the billing are less. To avoid the surprise about the extra usage customer wants the alert from the telecom service operators when their bills are exceeding certain threshold. The customers are well aware about the fact that they can get detailed bill as directed by TRAI in case of prepaid services also. This shows that there is awareness about the actions taken by the Regulator in customer's interest. Bills raised by the operators are transparent as per TRAI requirement.

The customers are not ready to pay any premium charges to treat themselves as priority customers. The reason behind this may be multiplayer scenario in the Telecom market. If customer is not happy with the services provided they will switch to another telecom operator for better telecom services instead of paying premium charges. It is found that 82.3 % customers are satisfied about the billing services and there is very less percentage of customer who are dissatisfied about the billing services.

6.4.3 Suggestions for Section No III of Questionnaire:

- A. **Detailed Bills:** -Detailed bills should be provided to corporate customers even if it has not been demanded. This will reflect the transparency.

- B. Accuracy in the Billing:** - There is small percentage of the customers who say that the bills are not accurate. Telecom service operator should try to provide accurate bills. The bills provided to the corporate customers should be verified twice before dispatch.
- C. Provide Alert:** - Alert about the billing amount should be provided in between the billing cycles as per the threshold set by the customer. This will help customer to control their expenditure on telecom.

6.5 Findings, Conclusion and Suggestions on Section No IV of Questionnaire (Customer Care and Provision of Services) Customer care department of the service operator should be strong enough as this is era of competition. This section enquires about the provisioning of services and Customer care services.

6.5.1 Findings of Section IV of Questionnaire:-

- A. Time Taken by Service Operator Activate New Landline Connection: -**
The customer was asked how much time was taken by the operator to activate the landline services once he has applied for it. It is time taken for provision of landline services. 32.2 % customer said that they received connection after two days. 53.5 % customers said that they received connection between 24-48 Hours. Only 14.3 % customers said that they got the connection activated within 24 Hours. **(Reference Table No 5.23)**
- B. Time Taken by Service operator to activate New Mobile connection:-**
72.2 % customer said that they received connection within 24 hours. 22.9 % said that they received connection within 24-48 hours. Only 4.9 % said that they got the connection activated after two days. **(Reference Table No 5.23)**
- C. Time Taken by Service operator to activate New Broadband connection:**
34.5 % said that they received connection after two days. 52.2 % said that they received connection within 24 Hrs to 48 Hrs. Only 13.3 % said that they got the connection activated within 24 Hours. **(Reference Table No 5.23)**
- D. Preferred Fault booking Medium:** - Out of 385 customers 255 (66.23%) customers said that they use the telephone as a medium to launch the complaints. 12.47 % customers preferred online (via Internet) and 8.57 % customers preferred SMS as a medium to launch complaint. Still there is

small percentage (5.19 %) of customers who visits to the services provider's office to launch the complaint. **(Reference Table No 5.24)**

- E.** If the complaint has not been resolved by the call centre, customer can contact to the Nodal Officer. In case the complaint has not been resolved by the Nodal Officer customer can contact the next level authority called as Appellate Authority. The 91.17 % customers are aware about the contact details of Nodal officer and 80.52 % customers are aware about the contact details of Appellate authority. **(Reference Table No 5.25)**
- F. Single Person for Fault Reporting:** - The 93.25 % customers expect that there should be single person available from Telecom Service operator side for reporting of faults and same person will update them about the progress of fault settlement. **(Reference Table No 5.26)**
- G.** 90 % customers expect that they should get the information about the time required to restore the fault. **(Reference Table No 5.27)**
- H.** 96.1 % Customers expects that the Service Provider should provide the alternative means of communication in case of prolonged failures. **(Reference Table No 5.28)**
- I.** 72.73 % customers have registered their numbers to Do Not Call (DNC) registry so that they should not receive unsolicited commercial calls / SMS. **(Reference Table No 5.29)**
- J.** The 8.3 % customers said that they are highly satisfied with the after sales service, 43.9 % are satisfied and 29.9 % customer was neutral about their opinion on the after sales services. 11.7 % customers are dissatisfied and 6.2% customers are highly dissatisfied about the after sales service. **(Reference Table No 5.30)**

6.5.2. Conclusion of Section IV of Questionnaire: -

The speed of provisioning of the mobile services is faster than the Landline and Broadband services. This delay is because of the reason that the telecom service operator has to lay the physical wire from Exchange equipment to the customer premises in case of provisioning broadband and landline services. Some delay is involved in these processes.

In case of fault situations customer does not want to contact different Engineers and Manager placed at different hierarchy in the telecom service

provider's organization. They want a single person to whom they will intimate fault incidences and they expect to receive further updates about the progress of settlement of fault from this person.

At present customers want round the clock services. But there are some incidences when there is failure of services which is unavoidable and beyond the control of the telecom service provider. Customers expect that the Telecom Service Provider should provide the alternative means of communication in case of prolonged failures. The customer also wanted that they should be intimated about the approximate time to restore the fault. Preferred medium of fault booking is Telephonic Complaint. Customers are well aware about the contact details of Nodal and Appellate authority. This data was collected to know whether the customers are aware about the different actions taken by TRAI in customer's interest.

The 8.3 % customers said that they are highly satisfied with the after sales service, 43.9 % are satisfied by adding these one can say that 52.2 % customer are satisfied about the after sales services. This shows that satisfaction in after sales service is poor than billing services and Network performance.

6.5.3 Suggestions on Section IV of Questionnaire:-

- A. To improve the speed provisioning of Services:** For providing Broadband and Landline voice services Telecom service operators has to lay the physical wire from Telephone Exchange to Customer premises. This is time consuming work. Hence it is suggested to install small capacity exchanges scattered all over cities instead of single large capacity exchange. This will avoid the length of the cable to be laid for provisioning of services. This will also improve the speed of provisioning of services.
- B. Road Digging Permissions:** - For laying the physical wires Telecom Service operators has to take the permission from Local authorities to dig the road. Some delay is involved in it. There should be separate agency available with the service provider for taking follow up with the local authorities for road digging permissions. This will reduce the delays in grant of permissions and in turn will improve speed of provisioning.
- C. Speed of provisioning Broadband Services:** - After laying of the cable up to subscriber premises Telecom Service Operators has to create the user

accessibility in their Network. This work is done at centralized data center location in the country. Some delay is involved in this process as data center has to work for entire country. It is needed to establish the regional data centers for creating user accessibility to reduce this delay.

- D. Depute special person:** In case of failures corporate customer books the fault at the call center. From call center complaint is transferred to the concerned area in-charge. Some delay is involved in this procedure. Instead of this telecom service provider can divide these customers in small group say 25 each according to geographical area and special person can be appointed to take care of the fault reported by these 25 Customers. The corporate customers can directly call this special person in case of fault incidences. This person can analyze the nature of the fault and there after he will coordinate with the corporate customer and concerned staff of Telecom service operator till the fault is set right.
- E. Unwanted Calls & Alternative means of communications:** - It is recommended to do the needful for avoiding the unwanted commercial calls to customers. Alternative means of communication should be provided to corporate customers in case of prolonged failures. This can be Fixed Wireless Telephone in case of failure in landline services and Wireless Data Cards in case of failure wire-line data link (Broadband).
- F. Lower customer satisfaction:** - Customer satisfaction on the after sales a service is very much on lower side. Above mentioned steps will improve the after sales service satisfaction.

6.6. Findings, conclusion and suggestions on Section No V of Questionnaire (Misc Information): - This section collects information like media preferences, need of direct communications, Publicity and overall satisfaction.

6.6.1. Findings of Section No V of Questionnaire:

- A.** The 44.7 % customers expressed that Publicity of the product is very good, 32.2 % customers feel that publicity is Good and 23.1 % customer feel that publicity is not adequate. **(Reference Table No 5.31)**
- B.** As per survey most preferred medium of advertising is Internet as 50.6 % preferred it. The second preferred media is Television followed by

Newspaper as 19.5 % & 12.7 % customers preferred these media. Banners and holding is the least preferred media. **(Reference Table No 5.32)**

- C.** It is found those 83.12 % customers are eager to know directly from the telecom service provider about the changes in tariff plans, new offers and discounts. **(Reference Table No 5.33)**
- D.** Customers were asked to rate satisfaction on five point scale from Very Satisfied to Very Dissatisfied considering all the areas (like billing, customer care, network quality, cost of service, after sales service). Out of 385 customers, 60 (15.6 %) customers are Very Satisfied, 221 (57.4 %) customers are satisfied about the services. By adding these two responses we get that 281(73 %) customer are overall satisfied with the services. 79 (20.5 %) customers are having neutral opinion, 25 (6.5 %) customers said that they are dissatisfied about the services. **(Reference Table No 5.34)**
- E.** The customer was asked a simple question that to what extent the services meet to your expectations? 11.43 % customer said that services are much better than expected, 50.13 % customer said that services are better than expected. In summary 61.56 % customer feel that the services are better than expected. 23.64 % customer find that services are as per expectations and 10.91 % find that those are worse than expectation. The survey further reveals that 3.9 % customers felt that services are much worse than expected. **(Reference Table No 5.35)**

6.6.2 Conclusion on Section No V of Questionnaire: Internet is most preferred medium by corporate customers and holding is least preferred medium of advertising. There is a still scope for improvement in respect of publicity of the products and service. The customer wants direct communication from the service provider in respect of the changes in tariff plans, new offers and discounts. The 73% customers are satisfied considering all areas like billing, Network, Customer care etc. 61.56 % customers feel that the services are better than expected.

6.6.3 Suggestion on Section No V of Questionnaire:-

- A.** The least satisfaction is observed in after sales services. The service providers should try to improve this area to improve overall customer satisfaction. Efforts should be taken to deliver the services which match with the customer expectations.

- B. Changes in the rental, New Plans of tariffs and discounts need to be directly intimated to the customer via Electronic Mail.
- C. As Internet is most preferred media of advertisement it is recommended that operators should spend more on Internet advertisements and keep their websites updated.

6.7 Findings and Suggestions to improve satisfaction on different factors. :-

6.7.1 Provision of Services: In telecommunication, provisioning is the process of preparing and equipping a network to allow it to provide services to its users.

6.7.1.1 Findings on the Factor Provision of Services:-

- A. Average score received for provision of the Voice services is 77.9 % and for data services is 66.7 %. **(Reference Table No 5.36)**
- B. It is found that the overall satisfaction score is significantly correlated with provisioning of Services. **(Reference Section 5.9.2 , Chapter 5)**
- C. The Level of satisfaction on the factor Provision of services (Both, Voice and Data) is not significantly different for Low billing customers and high billing customers. **(Reference Section 5.8 of Chapter 5)**
- D. Two least scoring attributes in this factor are ‘Time taken to install and activate a New Landline (Voice / Data Broadband) Connection after you apply for it’. Mean score received for this attributes are 3.25 for voice services and 2.64 for data services. **(Reference Appendix II)**
- E. Satisfaction in Provision of Services is better in voice services than data services. **(Reference Section 5.8 of Chapter 5)**

6.7.1.2 Suggestions on the Factor Provision of Services: - It is recommended by the researcher that the Telecom service operators should put in efforts to increase the speed of the provisioning of Voice and Data services. To improve the speed of Provisioning suggestions are already given in 6.5.3 of this chapter.

6.7.2 Billing Convenience: -

6.7.2.1 Findings on the factor Billing Convenience

- A. The level of customer satisfaction on the factor **Billing Convenience** is not significantly different for low billing customers and high billing customers. **(Reference Section 5.8 of Chapter 5)**

- B. Average Score received for this Billing Convenience is 71.7 %. (**Reference Table No 5.37**)
- C. It is found that the overall satisfaction score is significantly correlated with Billing Convenience. (**Reference Section 5.9.2 , Chapter 5**)
- D. Less scoring attributes in billing convenience factor are ‘Process of resolution of billing complaints’ & ‘Time taken to attend billing complaints’. Mean score received for Process of resolution of billing complaints is 2.21 and time taken for attending billing complaints has received mean score 2.03 (**Reference Appendix II**)

6.7.2.2 Suggestions on the factor Billing Convenience:-

- A. **Billing Complaints (Time and Process):** - The process of solving billing complaints seems to be complicated and time consuming. The process of solving billing complaints can be made simple by appointing special nodal officer for billing complaints who will handle the complaints received from corporate customers only. This will reduce the time to solve complaints.
Telecom service provider should carry out a root cause analysis for each complaint. The operators should also build mechanism to avoid the same type of complaint to arise again.
- B. **Billing Plans:** - It is recommended that no tariff plan should be advertised in a manner that is likely to mislead the Customers. The Tariff Plans should be explained properly before subscribing. There should be complete flexibility in billing plan. The customers shall be able migrate from one plan to another without any hassles from the Telecom Service provider.
- C. **Self sufficient Website:** - The website of the Telecom Serviced Provider should have the facility to compare the various billing plans in terms of monthly billing arising by availing these plans.
- D. **Recharge coupons:** - Recharge coupons of all the denominations should be available in case of prepaid services.
- E. **Provide Discount:** - Discount in the billing should be provided in proportion to usage. More the use more the discounts. This will utilize the spare capacity of the network.

6.7.3. Cost of the Service: - Telecom tariffs in India include a deposit at the time of registration, a non-reimbursable fee for initial connection, monthly rentals for data and voice services, charges for calls, charges for data upload and download.

6.7.3.1 Finding on the factor Cost of the Service:

- A. Average Score received for this factor is 82.4 % for voice and 71.8 % for data. **(Reference Table 5.36)**
- B. The overall satisfaction score is significantly and relatively weakly correlated with Cost of services (Voice) Score. (**Reference Section 5.9.2, Chapter 5**)
- C. The satisfaction on Cost of services (Both Voice and Data) is not significantly different for the Low billing and high billing customers. **(Reference Section 5.8 of Chapter 5)**
- D. Research reveals that Satisfaction in Cost of Service for Voice is more than Cost of Service for Data. **(Reference Section 5.8 of Chapter 5)**
- E. Less scoring attributes in Factor Cost of Service are Charges for Data Circuit Services (with Mean Score 2.54) and Charges for Data downloading / uploading in Wireless Broadband services (With Mean Score 2.92) **(Reference Appendix II)**

6.7.3.2 Suggestions on the Factor Cost of the Service:

- A. Customer is also not happy about the rentals of data circuit as well as data downloading charges in case of wireless data services. The telecom service operator needs to install the robust optic fiber network to make data services available at lower cost. The Government can take initiative and install the Optic Fiber network. All telecom service operators can rent it from the Government. This will reduce the cost of data services.
- B. Local authorities should reduce the cost of reinstatement which Telecom Service operators have to pay for digging the roads. This reduced cost will motivate them to install robust optical fiber Network.

6.7.4 Customer care Access

6.7.4.1 Findings on the factor Customer care Access:

- A. It is found that the overall satisfaction score is significantly correlated with Customer care Access. (**Reference Section 5.9.2 , Chapter 5**)

- B.** Average Score received for this factor is 67 %. **(Reference Table 5.37)**
- C.** The level of customer satisfaction on the factor Customer care access is not significantly different for low billing customers and high billing customers. **(Reference Section 5.8 of Chapter 5)**
- D.** Less scoring attributes in this factor are ‘Time taken to answer your call by Call Center Executive or time taken to attend you at customer care center’ Mean Score received for this attribute is 3.08. Second attribute which scored least is ‘Amount of bureaucratic requirement for New Connection’. This attributes has received a mean score 3.01. **(Reference Appendix II)**

6.7.4.2 Suggestions on the factor Customer care Access:

- A.** Telecom Service Operators should employ the sufficient number of call center agents so that at any time they should not be too busy to respond customers.
- B.** As per Government rules the amount of the bureaucratic requirement can not be reduced but Telecom service operator’s staff can help to the customers to complete the bureaucratic requirement.
- C.** The Service centers should be opened in such area of the city which is easily accessible. It is also recommended to increase the number of the customer service centers in the city to avoid the rush on bill dates.
- D.** The number of cash counters at service centers should be adequate. No customer has to wait for more than 10 Minutes to pay the bill in cash.
- E.** The business hours of the customer care centers should be from 0800 AM to 0800 PM. The cash as well as cheques should be accepted within these hours. They should be open on Holidays also.
- F.** The call center executives should be able to speak in English, Hindi and as well as in regional language.

6.7.5 Customer care

6.7.5.1:-Findings on the factor Customer care

- A.** Average Score received for the factor Customer care is 68.6 % **(Reference Table No 5.37)**
- B.** It is found that the overall satisfaction score is significantly correlated with Customer care. **(Reference Section 5.9.2 , Chapter 5)**

- C. The level of customer satisfaction on the factor Customer care facilities is not significantly different for low billing customers and high billing customers. **(Reference Section 5.8 of Chapter 5)**
- D. Least scoring attribute is ‘Accuracy of Information available with the Call Center / Service Center Executives’ with mean score 2.92. Second attribute which has received second lowest score is ‘Adequacy of information available with customer care executive’. This attribute has received mean score 3.03. **(Reference Appendix II)**

6.7.5.2 Suggestions to improve satisfaction on the factor Customer care:-

1. The call center executives should be sufficiently train in their working area so that they should be able to provide accurate and adequate information.
2. As company is earning lot of revenue from the corporate customers it is needed to provide personal attention to the corporate customers when they visit customer service centers.
3. The call center / service center employees should be trained so that they will be able to understand the customer’s problems. Call center executives should be polite and should have excellent customer handling skills.
4. The call center staff should be adequately compensated so that there moral always remains high.
5. Sufficient information should be available on official website of Telecom Service Provider. This will reduce the number of calls made to the customer care for the want of information. Customer care portal should be mobile friendly as it loads faster.

6.7.6 Responsiveness

6.7.6.1 Findings of the factor Responsiveness:

- A. The average satisfaction score received for this Factor is 69 %. **(Reference Table No. 5.37)**
- B. It is found that the overall satisfaction score is significantly correlated with Responsiveness. **(Reference Section 5.9.2 , Chapter 5)**
- C. The level of customer satisfaction on the factor Responsiveness of Telecom Service Operators is not significantly different for low billing customers and high billing customers. **(Reference Section 5.8 of Chapter 5)**

- D.** Least scoring two attributes in this factor are ‘Response to your requirement’ (Availability of Customized solutions) with mean score 2.95. Second attribute which has received less score is ‘Company Keeps promise about the provision of services in respect of time’. This attribute has received a mean score 3.04. **(Reference Appendix II)**

6.7.6.2 Suggestions to improve the satisfaction on the factor Responsiveness:

1. Telecom service provider should provide the customized solution to fit the requirement of the customers.
2. The Service provider should provide the right service at the first time (At the time of provision of services / Installation phase). The company should convey when the desired services will be provided and also should keep the promises made to the customers.
3. The Service operator should provide the information about the progress of the request in respect of service request made by corporate customers.

6.7.7. Redressal of Customer Grievances

6.7.7.1 Findings of the factors Redressal of Customer Grievances

- A.** Average Score received for the factor Redressal of Customer Grievances is 77.2 %. **(Reference Table No 5.37)**
- B.** The level of customer satisfaction on the factor Redressal of Customer Grievances by the Telecom Service providers is not significantly different for low billing customers and high billing customers. **(Reference Section 5.8 of Chapter 5)**

6.7.7.2 Suggestions: The nodal officer should be easily accessible and he should have adequate information available with him. He should be well trained to be capable of understanding the customer’s problems. He should be polite and able to solve the problem speedily.

6.7.8. Uninterrupted Service:

6.7.8.1:-Findings of the factor Uninterrupted Service

- A.** Uninterrupted service is the second most important factor as viewed by the corporate customers. **(Reference Section 5.8 of Chapter 5)**
- B.** It is found that the overall satisfaction score is significantly correlated with Uninterrupted Service. **(Reference Section 5.9.2 , Chapter 5)**

- C. The level of customer satisfaction on the factor Uninterrupted Services is not significantly different for low billing customers and high billing customers **(Reference Section 5.8 of Chapter 5)**
- D. Average score received for the factor Uninterrupted Services is 69.3 %. **(Reference Table No 5.37)**
- E. The Least scoring attributes in this factor is ‘Time taken to restore faults’ (Landline) with mean score 2.26 and second less scoring attribute is ‘In building Mobile Network Coverage’ with mean score 2.81. **(Reference Appendix II)**
- F. **City Coverage:** - As per Survey, 25.7 % customers are very satisfied and 52.2 % customers are satisfied about the city coverage. 17.9 % customers were neutral about their opinion on City coverage. 3.4 % Customers are dissatisfied and 0.8 % customers are very dissatisfied about the City Coverage. **(Reference Table No.5.38)**
- G. **On Road Coverage:** - As per survey 22.6 % customers are very satisfied and 50.7 % customers are satisfied about the On Road coverage. 20.8 % customers were neutral about their opinion on Road coverage. 4.9 % Customers are dissatisfied and 1.0 % customers are very dissatisfied about the On Road Coverage. **(Reference Table No.5.38)**
- H. **Rural Coverage:** - In a Survey, 18.5 % customers said that they are very satisfied about the Rural coverage, 40.0 % customers are satisfied about the Rural coverage. 22.3 % customers were neutral about their opinion the Rural coverage. 14.5 % Customers are dissatisfied and 4.7 % customers are very dissatisfied about the Rural Coverage. **(Reference Table No.5.38)**

6.7.8.2 Suggestions to improve satisfaction on the factor Uninterrupted Service:-

A. Coverage Issues: - The coverage area is a geographical area where the network of the Mobile service operator is available. The survey reveals that rural coverage is poor than the city. There are pockets with zero or poor coverage in city areas also. Along the National and state highways there are pockets of zero or poor coverage. Following majors can be taken to address the coverage issue.

1. The number of BTS sites (Popularly called as Towers) should be increased as per the coverage requirement in City, Rural as well as along the highway. The sharing of towers between the operators is recommended.

2. Where it is not possible to install BTS (Tower) is recommended to install indoor solutions. (Indoor Solutions are devices which receive the signal from the nearest BTS and amplify signal so that all the Mobile customers in the said area get the proper mobile signal Coverage.)
3. To improve the customer satisfaction it is recommended to install the Tunnel solutions for continuity of coverage along highway. (The tunnel solutions are devices which improves the coverage in Tunnels along the highways.)
4. Efforts should be taken to improve the Coverage in Parking lots, Basements, Airports, Shopping malls, High rise building.

B. Time taken to restore faults (Landline):- To attend landline underground cable faults operators has to take permission from Local Authorities to dig the roads. Some delay is involved in it. This delay can be reduced to minimum by appointing separate agency to complete the formalities in respect of road digging permissions. This is how operator can improve the score of attribute ‘Time taken to restore faults’

6.7.9 Network Quality (Broadband, Landline Voice, Mobile Voice and data)

6.7.9.1 Findings of the factor Network Quality:-

- A. Network quality is the most important Factor as reported by the Corporate Customers. **(Reference Section 5.8 of Chapter 5)**
- B. Average Score received for the Network Quality Landline is 80.5 % and for broadband (Wire-line) it is 79.4 %. **(Reference Table No. 5.36)**
- C. The level of Customer satisfaction on the factor Network Quality Broadband is not significantly different for low billing customers and high billing customers. **(Reference Section 5.8 of Chapter 5)**
- D. The level of customer satisfaction on the factor Network Quality Landline voice services is not significantly different for low billing customers and high billing customers. **(Reference Section 5.8 of Chapter 5)**
- E. It is found that the overall satisfaction score is significantly correlated with Network Quality Broadband and Network quality Landline Voice services. **(Reference Section 5.9.2, Chapter 5).**
- F. Average Score received for the Network Quality Mobile 68.5 % for voice and it is 69.7 % for data. **(Reference Table No. 5.36)**

- G. The level customer satisfaction on the factor Network Quality (Mobile Voice & Data services) is not significantly different for low billing customers & high billing customers. **(Reference Section 5.8 of Chapter 5)**
- H. It is found that the overall satisfaction score is significantly correlated with Network Quality mobile for voice and data services. **(Reference Section 5.9.2, Chapter 5).**
- I. Least scoring attribute in case of Landline Voice is ‘Network congestion Inter operator at busy hour’ with Mean Score 3.59. Least scoring attribute in case of Broadband service is ‘Consistency of Speed’ with mean score 3.52. **(Reference Appendix II)**
- J. Least scoring attribute in case of Mobile Voice is ‘Call drop rate Voice’ with mean score 3.01. Second least scoring attribute is ‘Consistency of Speed’ with mean score 3.12 **(Reference Appendix II)**

6.7.9.3 Suggestions to improve satisfaction on the factor Network Quality:-

- A. **Call Drops:** The call drop in the network can not be reduced to zero. But needs to be kept those within limit. Call drops happen due to following reasons.
 - 1. **Call drop due to poor coverage:** - If the Telecom service provider has not installed sufficient number of towers there will be poor coverage. This poor coverage gives rise to call drop.
 - 2. **Handover Definitions :-** If the customer is moving one BTS (Tower) coverage area to another BTS’s (Tower) coverage area, the technology allows the smooth handover of customer call to another tower, only if the second tower is defined as a neighbor to the first tower. Otherwise call drop will happen if proper neighbor definition is not in the software.
 - 3. **Antennae related problem:** - If the water enters in the Antennae of the Tower, it disturbs the smooth flow of the signal. Because of this call drop happens.

Suggestions for Call Drops:-

- 1. The planning and adding the Cell sites (Towers) is a continuous process. It is recommended to plan the BTS (Base Trans-receiver stations popularly known as towers) sites in anticipation of the Traffic and as per development of the city. Telecom Service operator should confirm that there is no poor coverage areas in the city.

2. The definition of adjacent neighboring towers should be done properly and updated on regular basis to avoid handover failures those leading to call drops.
3. Antennae should be maintained properly and efforts should be taken to avoid the water entry in RF cables connected to Antennae. Telecom Service operators can apply weather proofing material on antennae cables.

B. One Way Speech: - One way speech is very much related to the transmission network. A fault condition in the interfaces of different transmission links leads to the one way speech. These links should be tested and set right during late night hours on daily basis.

C. Speed and consistency of Downloading speed: It is recommended to provide the constant and promised downloading and uploading speed to the corporate customers on 24 X 7 basis. The speed should not reduce at busy hours. Following efforts are needed from Telecom Service Provider side.

1. In case of wireless broadband it is found that customer has to make number of attempts to get access to the internet. The Poor capacity of the backhaul equipment is the reason behind it. Service operators should install the modern equipment in sufficient capacity considering the sharp increase in data traffic in near future.
2. It is also observed that when Data call is established on wireless network it is frequently disconnected. This problem is due to poor coverage which can be sorted out with the increase in number of Tower.
3. It is needed to have a qualified support staff for customer care in respect of data services.
4. It is recommended to install robust backbone and transmission network. This will improve the consistency of the speed.

6.8 Results of Hypothesis Testing and related Suggestions:-

1. **Important drivers to Customer satisfaction:** - The Network Quality followed by Uninterrupted Services are the most important drivers leading to Customer satisfaction. **(Reference Section No 5.8 of Chapter 5)** The Telecom Service operators should try to improve the level of satisfaction

on these two factors on priority basis. This will improve overall satisfaction. The operators should put efforts to improve the satisfaction on all the attributes related to these factors.

2. **Congestion Inter Operator and Intra-Operator:** Not providing sufficient number of circuits between the operators leads to inter-operator congestion and customer dissatisfaction. The result of the survey reveals that the degree of congestion in between the operators is on higher side. **(Reference Section 5.8 of Chapter 5)**. It is recommended that sufficient numbers of circuits should be provided in between two telecom service operator.
3. **Poor Satisfaction on Cost of Data Services :** - It is found that Satisfaction in Cost of Service for Voice is more than Cost of Service for Data. **(Reference Section No 5.8 of Chapter 5)**. The Telecom Service should take efforts to reduce cost of service for data. The Government of India has formed the two Companies named NOFA and SOFA which will install robust optical Fiber network in the country. The Telecom Service can rent this telecom infrastructure in future.

Secondly Telecom service operator has to lay underground Telecom Cables, for laying of underground cables telecom service operators has to dig the roads. The reinstatement charges charged by local authorities for the digging of roads are on higher side. These charges need to be reduced. These efforts will help operators to reduce the data service charges.
4. **Provision of Services Data:** - Satisfaction in Provision of Services is better in voice services than data services. **(Reference Section No 5.8 of Chapter 5)**. The speed provision of data services needs to be improved. The provision of data services is done from the central locations like Bangalore, New Delhi. The regional centers for data provisioning need to installed in major cities of India.
5. **Level of Satisfaction and amount of Billing:** - The level of Customer Satisfaction on different Factors does not vary according to the amount of billing. **(Reference Section No 5.8 of Chapter 5)**. The Telecom Service operators do not differentiate between the high billing and low billing

customers as their satisfaction on different factors does not vary as per billing amount. It is recommended that high billing customers should be treated differently considering the higher revenue which company is earning from them. It is recommended to provide the preferential treatment to High Billing customers while maintaining their Network.

- 6. Correlation of Overall Satisfaction:** - The overall satisfaction score is significantly correlated with all the individual factors except tangible aspects score. **(Reference Section 5.9.2, Chapter 5)**. It is recommended that operator should improve on all factors (except tangible) so that the overall satisfaction will be improved.

6.9 Directions for future studies: - This study can be used for further research.

Some of the suggestions for further studies are as follows.

- A.** There should be detailed techno commercial study on the recommendations generated from this work. The cost benefit analysis can be carried out as an extension of this study.
- B.** The study covers only Corporate Customers. The other customer segment not considered in this study. Study of other segments can be carried out as these segments also have considerable impact on the Telecom Industry.
- C.** Another study of the similar kind can be done with taking samples from different cities.

6.10 References:

1. TRAI, 2012, Press Release No. 179/2012, Page No 15 -16, available on : <http://www.trai.gov.in/WriteReadData/WhatsNew/Documents/PR179-07sep12.pdf>, [Accessed on 21 Oct 2012]

BIBLIOGRAPHY

A. Reference Books

- 1 Arvind Kumar, 2002, Research Methodology in social science, Sarup and Sons, New Delhi, first Edition,
- 2 Britha Mikkelsen, 2007, Methods for Development Work and Research, Sage Publishers, New Delhi
- 3 C. Bhattacharjee 2006, “Service Marketing: Concepts, planning & implementation” Excel Book, 1st edition
- 4 C. R. Kothari, Research Methodology : Methods & Techniques, New Age International Publishers, Second Revised edition, 2004
- 5 David A. Aaker, V. Kumar, George S. Day, 2008 Marketing Research, 9Th Ed, Wiley India Pvt Ltd, New Delhi, Accessed on 10 May 2013, from <http://books.google.co.in/>
- 6 Dr. J.K. Sachdeva: Business Research Methodology, Himalaya Publishing Limited, First Edition, 2008, New Delhi
- 7 Dr. K. Karunakaran, 2008 , Marketing Management, Himalaya Publishing House, Mumbai
- 8 Dr. Mrs. V.R. Prayag and P.G. Dixit, Statistics , Nirali Prakashan, fourth Edition , September 2005
- 9 Dr. Paradeshi P.C., 2004, Research Methodology and Project Work in Cost Accounting, Pune, Nirali Prakashan,
- 10 Dr. R.N. Trivedi and Dr. D. P. Shukla , Research Methodology, Radha Publishing , New Delhi, Edition 1996
- 11 Dr. S. K. Khandelwal, 2010, Business Statistics, International Book House Pvt. Ltd, New Delhi, I Edition,
- 12 Dr. V.P. Michael, 2008, Research Methodology in Management, Himalaya Publishing House, Mumbai,
- 13 George Kennedy, 1996, Electronic Communication Systems, New Delhi, TATA Mc GRAW-Hill Edition
- 14 Harsh V Varma, 2012, Services Marketing, Text and Case, Dorling Kindersley Pvt. Limited, Licensee of Pearson in south Asia, New Delhi , accessed on 21/12/2012 from : <http://books.google.co.in/books>
- 15 ICFAI University, Services Marketing, 2004, ISBN No 81-314-0280-0

- 16 J.K.sharma, 2010, Business Statistics Problem and Solutions, Dorling Kindersley Pvt. Limited, Licensee of Pearson in south Asia
- 17 Jai Narain Sharma, 2007, Research Methodology The Discipline and its dimensions, Deep and Deep Publications Pvt. Ltd, New Delhi,
- 18 Jaspal Singh, 2001, Methodology and Techniques of Social Research, Kanishka Publisher and Distributors, First Edition New Delhi,
- 19 K Rama Mohana Rao, 2005, Services Marketing, Pearson Education, First Indian Print , New Delhi
- 20 K.Chandrakandan & C. Karthikeyur, 2004 Behavioral Research Methodology, Classical Publishing Company, First Edition
- 21 Nabendu Pal, Sahadeb Sarkar , 2005, Statistics-Concepts & Applications By Prentice Hall of India Pvt. Ltd, New Delhi Accessed on 12 May 2013 from <<http://books.google.co.in/books>>
- 22 Nigel Hill, Jim Alexander, 2006, Handbook of customer satisfaction and Loyalty measurement, Gower Publishing limited, England,
- 23 P. L. Bhandarkar and T.S. Wilkison , 2009, Methodology and Techniques in Social Research, 23rd Edition,
- 24 Philip Kotler P.,2004 , 5th Indian Print, Principles of Marketing, Delhi, Pearson Education Pte Ltd, Indian Branch
- 25 R. Shrinivasan, Services Marketing Indian Context, 2012, PHI Learning Pvt. Limited, Third Edition , New
- 26 Rajan Suxena, 2006, Marketing Management, Tata McGraw Hill, Third Edition, New Delhi,
- 27 Ram Ahuja, 2011, Research Methods, Rawat Publications, Jaipur, First Print,
- 28 Ranjeet Chitale, 2005, Statistical and Quantitative Methods, Nirali Prakashan, Fourth Edition, Pune,
- 29 Ranjit Kumar, 2011, Research Methodology: A Step By Step Guide For Beginners, sage Publications, 3rd edition,
- 30 RAP Singh, 1990, Methods in Social Research, Print-well Publisher, Jaipur,
- 31 Richa Arora, Nitin Mahankale, 2013, Marketing research, PHI learning private Ltd, New Delhi
- 32 Royce A. Singleton Jr. Bruce C. Straits, 1999, Approaches to Social Research, III Edition, Oxford University Press Inc.

- 33 S. Balchandran, 2004, Customer-Driven Services Management, Second Edition, Response Book , Division of Sage Publication Limited
- 34 S. C. Gupta, 2009, Fundamental of Statistics, Himalaya Publishing House, Sixth Edition, Mumbai,
- 35 S.A. Chunawala, 2006, Marketing Principles and Practices, Himalaya Publishing House, Second Edition, Delhi
- 36 S.L. Gupta Marketing Research, 2004, Excel Books, First Edition, Delhi
- 37 S.M. Jha, 2008, Services Marketing, Himalaya Publishing House, Reprint , Mumbai
- 38 Sharma K. R., 2002, Research Methodology, National Publishing House, Delhi,
- 39 Suja R Nair, 2007, Marketing Research, Himalaya Publishing, First Edition
- 40 Todd Lammle, 2007, Cisco Study Guide, Second Edition, BPB Publication, New Delhi
- 44 Uma K. Srivastava, G.V. Shenoy, Subhash C. Sharma, 2005, Quantitative Techniques For Managerial Decision, New Age International (P) Limited Publishers, New Delhi
- 41 V.S. Ramaswamy, S. Namakumari 2009, Marketing Management, Global Perspective Indian context, Fourth Edition, Macmillan Publisher India Ltd.
- 42 Valarie A. Zeithaml & Mary Jo Bitner, 2004, Services Marketing, Integrating Customer Focus Across the Firm, Tata McGraw-Hill Edition, Fifth Edition

B. Research Papers and URL:-

- 1 About.com Wireless and Networking, (2011), Leased line, [online], <http://compnetworking.about.com/od/networkcables/g/bldef_leasedlin.htm> [Accessed on 7 August,2011]
- 2 Abraham Karimpanal (2003), The Mobile Customer Retaining customer loyalty in mobile telephony, [online], available at : < <http://economictimes.indiatimes.com/the-mobile-customer-retaining-customer-loyalty-in-mobile-telephony/articleshow/40164559.cms>>, [Accessed on 23 Nov 2011]
- 3 ACMA, 2011, Glossary C-D, [online], available at <http://www.acma.gov.au/WEB/STANDARD/1001/pc=PC_311127>, [Accessed on 21 Nov, 2011]
- 4 Aircel, 2013, About us, [online], available at :< http://www.aircel.com/AircelWar/appmanager/aircel/maharashtra?_nfpb=true&_pageLabel=aboutus_book> [Accessed on 12/03/2013]

- 5 Airtel, 2013, About Bharati Airtel, [online], available at: <http://www.airtel.in/wps/wcm/connect/about+bharti+airtel/Bharti+Airtel/About+bharti+airtel/> [Accessed on 10 May 2013]
- 6 Ajay Talwar (2009), Supply Chain Management Of Cellular Phone Industry, available at :< <http://shodhganga.inflibnet.ac.in/> > [Accessed on 21/02/2013]
- 7 Alpesh Nasit (2011), An Empirical Study On Marketing Strategy Of Telecom Sector In Gujarat State, [online], available on : <<http://shodhganga.inflibnet.ac.in>> [Accessed on 22/10/2012]
- 8 Aminu Ahmad, Tafawa Balewa, (2008) Marketing Mix Drivers of Clients Satisfaction in Technology-enabled Service: Study of Nigerian GSM Subscribers, Communications of the IBIMA Volume 1, 2008
- 9 Amjad Iqbal, Mubashar Hassan Zia and others, (2011), Antecedents and Outcomes of Customer Satisfaction in using Prepaid Cellular Service in Pakistan [online], available at : < <http://www.wbiconpro.com/Marketing/503-Iqbal,A%20& %20Others.pdf> > , [Accessed on 22/12/2012]
- 10 Anita Ramadass, Dr. C. Swarnalatha, (2012), Identification of Service Gaps in Bsnl, Madurai - A Step Towards Improving Service Quality. International Journal of Scientific Research, Vol.-1, Issue: 4, Sep 2012, Page No : 102 -105
- 11 Anita Seth, K Momaya, & H M Gupta (2008), Managing the Customer Perceived Service Quality for Cellular Mobile Telephony: An Empirical Investigation, Vikalpa, Vol. 33, Jan-Mar 2008, Page No 19-34 , Accessed on 12/04/2011 from http://www.vikalpa.com/pdf/articles/2008/V33102_019_03
- 12 Ashish Das and Sukesh Kumar, (2011) , Understanding Users of Mobile services in Rural area: A case of Bishalkhinda Village in Odisha, The IUP Journal of Marketing Management, Issue February 2011 ,Page No 54 to 63
- 13 Ashutosh Nigam, Rajiv Kaushik, Attribute Based Perceptual Mapping of Prepaid Mobile Cellular Operators: An Empirical Investigation Among Management Graduates in Central Haryana, International Journal of Computational Engineering & Mgmt, Jan- 2011 , Page No 71-81, [online], available on : < <http://www.ijcem.org/papers12011/1201126.pdf>>, [Accessed on 21/11/2011]
- 14 British Chambers of Commerce,(2003),BCG Broadband Survey, [online] Available at: <www.britishchambers.org> [Accessed on 24 Jun,2011]
- 15 BSNL, 2011, Enterprise Business, [online], Available at <http://www.upe.bsnl.co.in/index.php?option=com_content&view=article&id=138&Itemid=84> , [Accessed on 24 Aug,2011]
- 16 BSNL, 2011, Fixed Line Pre-Paid Telephone, [online], available at : http://www.bsnl.co.in/opencms/bsnl/BSNL/services/landline/flpp_bfone.html> [Accessed on 22/08/12]

- 17 BSNL, 2011, Fleet Management Service, [online], available on : <http://www.bsnl.co.in:9080/opencms/bsnl/BSNL/services/enterprises/fleetmanagement.html>, [Accessed on 26 Jul 2011]
- 18 BSNL, 2011, I-Net, [online], available at : <http://www.bsnl.co.in:9080/opencms/bsnl/BSNL/services/enterprises/inet.html>, [Accessed on 5/1/2011]
- 19 BSNL, 2012, BSNL's IP Backbone using MPLS Technology, [online], available on: <http://www.bsnl.co.in/opencms/bsnl/BSNL/services/enterprises/mplsvpn.html> [Accessed on 18 June 2012]
- 20 BSNL,2011, About BSNL, available on : http://www.bsnl.co.in/opencms/bsnl/BSNL/about_us/company/about_bsnl.html, [Accessed on 24/11/2011]
- 21 BSNL,2011,Mobile, [Online], available at: <http://www.bsnl.co.in:9080/opencms/bsnl/BSNL/services/mobile/overview.html>,[Accessed 14/11/2011]
- 22 Business Standard, BSNL Losses,[online], Accessed from <http://www.business-standard.com/india/news/bsnls-losses-widen-to-rs-8851-cr-in-fy12/185087/&tp=on>, [Accessed on September 02,2012]
- 23 Cacioppo, Kevin.(2000), Measuring and Managing Customer Satisfaction [online], <Available at: <http://www.qualitydigest.com/sept00/html/satisfaction.html>>, [Accessed on 30/11/2012]
- 24 [Calcutta Telephone, 2011, ISDN Circuits, \[online\], available at: http://www.calcutta-telephones.com/mln1.shtml](http://www.calcutta-telephones.com/mln1.shtml), accessed on 30 July 2011
- 25 C-DOT, (2011), Brief History, [online], available at: http://www.cdote.co.in/about_us/berif_history.htm , [Accessed on 11 August 2012]
- 26 Chaitany Vyas (2010), Marketing Communications Through SMS & Phone Calls Preferences and Perceptions of Young consumers, Marketing Mastermind February 2010 issue, Page No 39-42
- 27 Cisco, 2008, MPLS FAQ for Beginner , [online], avaiable at : http://www.cisco.com/en/US/tech/tk436/tk428/technologies_q_and_a_item09186a00800949e5.shtml#intro , Document ID: 4649 [Accessed on 11 July 2012]
- 28 Cisco, 2011, X.25, [online], available at : <http://docwiki.cisco.com/wiki/X.25>>, [Accessed on 11/06/2011]
- 29 COAI, 2012, List of Unified Access Licensees , [online], available at: <http://www.coai.com/List%20of%20unifiedaccess%20licensees.pdf>, [Accessed on 28 April 2012]
- 30 Debrun Chakraborty (2013) Customer Satisfaction and Expectation Towards Aircel: A Research conducted in West Midnapore , Abinav , International Monthly Refereed Journal of Research In Management & Technology , Abhinav Vol. II, Jan-13 ,Page No 114-127

- 31 Department of Telecom, (2011), Telecom Policy 1994, [online], from <http://www.dot.gov.in/ntp/ntp1994.htm>, [Accessed on 23 Jun,2011]
- 32 Department of Telecom, 2013, Inmarsat, [online], <<http://www.dot.gov.in /carrier-services/inmarsat>> [Accessed on 19 Feb , 2013]
- 33 Department of Telecom, 2013, Introduction to Unified Access Services / Cellular Mobile Services , [online], Available at : from < <http://www.dot.gov.in/access-services/introduction-unified-access-servicescellular-mobile-services>>, [Accessed on 11 January 2013]
- 34 Department of Telecom, National Telecom Policy-1999, [online], <http://www.dot.gov.in/ntp/ntp1999.htm>
- 35 Department of Telecom, National Telecom Policy-2012, [online], <http://www.dot.gov.in/ntp/NTP-06.06.2012-final.pdf>
- 36 Department of Telecom, TRAI Amendment Act, [online], available at : 09/08/2011 from http://www.dot.gov.in/Acts/TRAI_amendment_ACT.pdf
- 37 Department of Telecom, VTM Cell, [online], available at: <http://www.dot.gov.in/vtm/vtm.htm>, [Accessed on 22 April 2012]
- 38 Department of Telecommunication , 2013, Annual Report 2012-13, available at: < <http://www.dot.gov.in/>> , [Accessed on 09/08/2013]
- 39 Determining Sample Size for Research Activities', by Robert V. Krejcie & Daryle W. Morgan (1970), Accessed on 10 July 2011 from http://home.kku.ac.th/sompong/guest_speaker/KrejcieandMorgan_article.pdf
- 40 Dinesh Kamath,2011, A critical evaluation of customer satisfaction of cellular phone services in Pune, [online],Available at : <http://shodhganga.inflibnet.ac.in/handle/10603/8516> ,[Accessed on Jan-2013]
- 41 Discountcomms, 2011, Fixed Cellular Terminal, [online], Accessed on 1st October ,2011 from http://www.discountcomms.co.uk/gsm-fct-gateways/directory/What_is_GSM_gateways.htm ,
- 42 DOT, (2011), The Indian Telegraph Act,1885, [online], Accessed from <<http://www.dot.gov.in/Acts/telegraphact.htm>>, on 25th December,2011
- 43 DOT, 2011, Accounts and Finance Manual , Page No 4,[online], Available at: http://www.dot.gov.in/finstatus/Telecom%20Accounts%20&%20Finance%20Manual_Oct.07.pdf, [Accessed on 13 December 2011]
- 44 DOT, 2011, Universal Service Obligation Fund 2011, [online], Accessed from <http://www.dot.gov.in/uso/usoidex>. [Accessed on 23 January 2012]
- 45 DOT, Press Brief on National Telecom Policy-2011, Page No 14, [online], Accessed on 19/11/2011 from <http://dot.gov.in/NTP-2011/NTP2011.htm>,

- 46 Dr Sandhya Joshi, Parveen Khurana, Shashi Khurana (2010) , Service Quality in Telecom Sector – A study of Telecom Service Providers of Chandigarh , Panchkula and Moholi, International Journal of Management and Marketing research, Volume 1, Issue 1 (December, 2010) ,pp 90 -98
- 47 Dr. Amulya. M and Prof. D. Anand , (2012), Demographic Trends in Indian Telecom sector – A study from the perspective of Customers of Select Telecom service providers in Mysore City , Paripex - Indian Journal Of Research , Volume : 1 | Issue : 12 | December 2012, Accessed on 31 Jan 2013 from <http://theglobaljournals.com/paripex/file.php?val=NjY4>,
- 48 Dr. Nagasimha Balakrishna Kanagal (2009), Mobile Virtual Network Operator Model in India, [online], Available at < <http://tejas-iimb.org/articles/25.php> > [Accessed on 21/12/2011.]
- 49 Dr. V. Mallikarjuna and Dr. G. Krishna Mohan (2010) , Customer Switching Behaviour – An Evaluation Of Factors Affecting Mobile Users by Indian Journal of Marketing , Issue March 2010, Page No -42-49
- 50 Dr. Vivian Witkind Davis, Dr. Larry Blank, and others, (1996) National Regulatory Research Institute , The Ohio State University, Columbus, Accessed from <http://tp.osu.edu/index.shtml> , Accessed on 11/12/2011
- 51 G. N. Satish Kumar, 2011, Factors Influence Mobile Users In Selecting Cellular Service Providers in India : An Empirical Study Based On Structured Equation Model, International Journal of Research in Commerce and Management , Volume No2, 2011, Issue 6 (June)
- 52 Gazette of India, Ministry of Law and Justice ,TRAI (Amendment) 2000, Accessed on 23/03/2012 from <http://www.trai.gov.in/Content/Act2001.aspx>
- 53 Glenn D Israel, PEOD6, Institute of Food & Agricultural Sciences, University of Florida. Original publication date November 1992. Reviewed April 2009 , [online] Accessed from <http://www.gobooke.net/search.php?q=Determining+Sample+Size1>
- 54 Government of India, Department of Telecom, 2004, Broadband Policy 2004, [pdf], Available at <http://www.dot.gov.in/ntp/ntpindex.htm>, [Accessed on 21 Nov 2011] , Clause No 1.0
- 55 Govida Raj a, 2009, Broadband Services comparison in India, [online] , Available at <http://www.iitcoe.in/index.php?option=com_docman&task=doc_details&gid=84&Itemid=20> [Accessed on 12 08/2013]
- 56 Hiren J. Patel, Jigar Makwana, Shailesh Desai (2011) , An Empirical study on Factors Considered by Potential Users of 3G Mobile Services, Marketing Mastermind , Volume No. XI, Page No 42-55.
- 57 IAMAI & eTechnology Group@IMRB, Mobile VAS in India, (2008) , Accessed from on 16 July ,2011 <http://www.wpp.com/wpp/marketing/digital/mobile-vas-in-india.htm> ,

- 58** Idea, About Us Idea Cellular, available at: <http://www.ideacellular.com/wps/wcm/connect/aboutus/idea/info/overview>, [Accessed on 23 /06/ 2012]
- 59** Indian Brand Equity foundation (2007), Indian telecom Sector, [online], available at :< <http://www.ibef.org>>, [Accessed on 12/06/2012]
- 60** Internet and Mobile Association of India, 2008, Mobile VAS in India, [online], http://www.wpp.com/NR/rdonlyres/7B6D761F-4DE6-4FEE-B0B7-B9862EAE0B0B/0/mobile_vas_report_aug08.pdf, [Accessed on 7 December 2011], Page No 18-19
- 61** ITU, All about the Technology, 2011, [online], available at <http://www.itu.int/osg/spu/ni/3G/technology/index> [Accessed on 23 December 2011]
- 62** ITU, ITU & its activity to related to IP Network, April 2004, available at: http://www.itu.int/osg/spu/ip/chapter_seven.html, [Accessed on 23/07/2011]
- 63** Jean Lam, Susy S. Chan, Xiaowen Fang, Jacek Brzezinski, (2004), Proposed Research Model for Customization and Satisfaction with Mobile Commerce, Accessed from < facweb.cs.depaul.edu/research/techreports/tr04-009.doc>, [Accessed on 25/09/2011]
- 64** Jessy John , 2010 , An analysis on the customer loyalty in telecom sector: Special reference to Bharath Sanchar Nigam limited, India , African Journal of Marketing Management Vol. 3(1) pp. 1-5, January 2011, Page 2-5
- 65** Jupiter Research, 2007, Customer's Experience in Telecom, available at: < <http://www.rightnow.com/pdf/Jupiter-Telecom.pdf?cex=796>> [Accessed on 12/11/2011]
- 66** K Kumaresh , Dr.C.Sekar 2012, Mobile Number Portability In Coimbatore : an Empirical Analysis of Consumer Switching Behavior, International Journal of Research in IT & Management , Volume 2, Issue 2 (February 2012), accessed from <http://www.euroasiapub.org/IJRIM/Feb2012/405.pdf>, [Accessed on 06 May 2013]
- 67** M. Usharani & M Kavitha, 2012, Growth Analysis of Reliance Telecom Ltd,
- 68** M.Muthuswami, Dr. Thangavel and Dr. Y.L.chaudhari (2007) ,Consumer Preference on Mobile Connections and buyer behavior Towards Reliance Mobile in Chennai City , Journal of Contemporary Research in Management, July-December-2007,Page no 89-101
- 69** M.Sathish , K.Santhosh Kumar & others, 2011, A Study on Consumer Switching Behaviour in Cellular Service Provider: A Study with reference to Chennai, Far East Journal of Psychology and Business Vol. 2 February 2011, Accessed on 12 /12/ 2012 <http://www.fareastjournals.com/files/V2N2P5.pdf>

- 70** Makam S. Balaji (2009), Customer Satisfaction with Indian Mobile Services, The IUP Journal of Management Research, Vol. VIII, Page 52 to 62
- 71** Malhotra Gunjan, Mukherjee Amitava, Nandi Abhishek and Sinharay Soumyadeep (2011) , Consumer Behaviour towards Mobile Phone Service Provider- An Empirical Research on Mobile Number Portability in India , Advances in Management , Issue-June 2011 , Page 44-47
- 72** Merlin Thanga Joy A (2009) , Cell Phone Services In Kanyakumari District , Doctoral Thesis submitted to Manonmaniam Sundaranar University, Accessed from <http://hdl.handle.net/10603/682>, Accessed on 23 Dec 2011
- 73** Ministry of Communication and IT, Roadmap version II for IPV6, available at : <<http://www.dot.gov.in/>> , [Accessed on 12 April 2013]
- 74** MNP India, What is number Portability, [online], available on: <<http://mnpindia.in/number-portability.html>>, [Accessed on 21 August 2011]
- 75** Mohammed Upal, 2008, Telecommunication Service Gap: Call Center Service Quality Perception and Satisfaction , Communications of the IBIMA Volume 3, 2008, Page No.18-29
- 76** Motorola, Dealergrossary, 2003, [online], Available at <<http://www.motoglossary.com.au/motoglossary/motoglossary.asp>>, [Accessed on 22 Nov, 2011]
- 77** Mr. Sherah Kurnia ,Heejin Lee and song Yang (2007), Understanding Consumers Expectations of Mobile Data Services in Australia, pp.14, International Conference on the Management of Mobile Business , 2007.
- 78** Mr. Sourabh, P Chowdhuri, Dr. Shilpa and K. Bendale (2013), When Mumbai Shifts Loyalties Spectrum: A Journal of Multidisciplinary Research Vol.2 Issue 2, February 2013, Page No 36-45 , Accessed on 6 May 2013,from <http://www.pinnaclejournals.com/setup/socialscience/paper48.pdf>
- 79** Mrs. Aurna Devskar, (2009) A Study Of Mobile Services From Customer's Perspective [online], Accessed from <http://shodhganga.inflibnet.ac.in/handle/10603/1997> , [Accessed on 28 Feb 2012]
- 80** MTNL, 2012, About us, [online], available at : mtnlmumbai.in/index.php/about-us, [Accessed 16 April 2012]
- 81** Muhammad Mohsin Butt & Ernest Cyril de Run (2009) , Modeling customer satisfaction in cellular phone services , Jurnal Kemanusiaan bil, Issue -2009, Accessed on 01/09/2010 from < http://www.fppsm.utm.my/download/doc_view/24-modeling-customer-satisfaction-in-cellular-phone-services.htm>
- 82** Naman Shah (2008), To critically analyze the customer preference and satisfaction measurement, [online], avaiable at: www.slideshare.net/guest377d84/telecom-sector-thesis, [Accessed on 25 July 2011]

- 83** Nigel Hill, Jim Alexander , 2006, Handbook of customer satisfaction and Loyalty measurement, Gower Publishing limited, England, Page No 2
- 84** Ofir Turel and Alexander Serenko, (2006), Satisfaction with mobile Services in Canada: An empirical investigation, Accessed from <http://www.sciencedirect.com/science/journals>, [Accessed on 12/09/2011]
- 85** Ofir Turel, Alexander Serenko (2006), Satisfaction with mobile services in Canada: An empirical investigation, [online], available at: < [www. Science direct.com](http://www.sciencedirect.com)>, [Accessed on 11/09/2011]
- 86** Oxford Dictionary, Seventh Edition, 1997, Oxford University Press, New Delhi, Page No 310
- 87** Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1988), “SERVQUAL: a multiple item scale for measuring consumer perception of service quality”, Journal of Retailing, Vol. 64 No. 1, Page No. 12-37.
- 88** Parasuraman, Zeithaml and Berry, "A Conceptual Model of Service Quality and Its Implications for Future Research," Journal of Marketing, Fall 1985, pp. 41-50. Available at < [http://areas.kenan-lagler.unc.edu/marketing/faculty staff/zeithaml/selected%20publications/a%20conceptual%20model%20of%20service%20quality%20and%20its%20implications%20for%20future%20res earch.pdf](http://areas.kenan-lagler.unc.edu/marketing/faculty_staff/zeithaml/selected%20publications/a%20conceptual%20model%20of%20service%20quality%20and%20its%20implications%20for%20future%20research.pdf) >
- 89** Piotr Rzepakowski (2008) , Supporting telecommunication product sales by conjoint analysis, Journal of Telecommunication and Information Technology, Issue No.3, [online], available at: [http://dlibra.itl.waw. pl/dlibra -webapp/Content/197/JTIT-2008_3_28.pdf](http://dlibra.itl.waw.pl/dlibra-webapp/Content/197/JTIT-2008_3_28.pdf) , [accessed on 10 Jun2012]
- 90** Planning Commission of India, 2008, Eleventh Five Year Plan, Volume III : Agriculture, Rural Development, Industry, Services and Physical Infrastructure ,Oxford University Press, New Delhi, Page No 497 to 498
- 91** Pravin Patil (2011), 3G Wonderland: The world is Not Enough , Marketing Mastermind Volume 7, Page No 51-55
- 92** Pravin Prashant, (2006) Mobile Users' Satisfaction Survey (2006), VOICE&DATA [online], from < [http://voicendata.ciol.com/content/ top _ stories /107010606.asp](http://voicendata.ciol.com/content/top_stories/107010606.asp)>, [Accessed on 25/09/2011]
- 93** Press Information Bureau, Government of India ,2009,[online], available at : [http://trail.gov.in/WriteReadData/Recommendation /Documents/recom13fe b09 pdf](http://trail.gov.in/WriteReadData/Recommendation/Documents/recom13feb09.pdf), [Accessed on 25 Aug 2011]
- 94** R. Harish and Raman Kumar Sharma (2010), Use of 3G and 4G in Mobile Marketing , Marketing Mastermind, May 2010,Page 27-31

- 95** R.C.Upadhyaya & Vashundhra Sharma, 2012, A Comparative Study Of Telecom Service Providers BSNL & Airtel Operating In Gwalior Division India , International Journal of Business Management & Research, Vol. 2 Issue:4, Dec-2012, Page No. 13-20, Accessed from www.tjprc.org/download.php?fname=2-32-1354104919-2.BMR, [accessed from 13/07/2013]
- 96** Raiyani Jagadish R. and Joshi Nilesh K., 2011 , Service Sector in India : Performance, Problems and Prospects, Advances In Management , May 2011
- 97** Rajkumar Paulrajan and Harish Rajkumar, 2011, Service Quality and Customers Preference of Cellular Mobile Service Providers , Journal of Technology Management & Innovation , 2011, Vol. 6, Issue 1 Page 38-45 , <http://www.scielo.cl/pdf/jotmi/v6n1/art04.pdf> , [Accessed on 12 Jan ,2013]
- 98** Rakesh Kumar Sharma & R.K. Yadav (2007), Reforms in Indian Telecom Sector, [online], available at : [http://www.indianmba.com/Faculty_ Column /FC701/fc701.html](http://www.indianmba.com/Faculty_Column/FC701/fc701.html) , [accessed on 12/04/2013]
- 99** Reliance, 2012, Ethernet Connectivity Services, [online], available at: <http://www.rcom.co.in/Rcom/business/HTML/dsoELLOverview.html> > [Accessed on 12/05/2012]
- 100** Reliance, 2013, Reliance Business Services, Group, available at : <http://www.rcom.co.in> , [Accessed 10 May 2013]
- 101** Richa Arora, Nitin Mahankale, 2013, Marketing research, PHI learning private Ltd, New Delhi -12 , Page No 104, [online], available at: <http://books.google.co.in/books> > [Accessed on 7 May 2013]
- 102** S. G. Sureshraj and Dr. M. Selvachandra (2009) Factor Analysis of Rural Consumers' Preference Attributes in The Purchase of Cell Phone: An Empirical Analysis, Indian Journal of Management, Jan- 2011, Pp 50-54.
- 103** S. S. Agarwal (2009) , Brand Ambassadors And Their Impact On Consumer Behaviour: A case Study Of Mobile Companies In India , Indian Journal of Marketing, December 2009 issue, Page No 3-8
- 104** S.K Chadha and Deepa Kapoor (2009) , Effect of Switching Cost, service Quality and Customer Satisfaction on Customer Loyalty of Cellular Service Providers in Indian Market, The ICFCI University Journal of Marketing Management, Vol VIII, Page 24-29
- 105** Sabbir Rahman, Ahasanul Haque, Mohd Ismail Sayyed Ahmad (2011) , Choice Criteria for Mobile Telecom Operator: Empirical Investigation among Malaysian Customers., Page No 18-24 , Communications of the IBIMA, Volume No.3, Year 2008

- 106** Sahil Shah (2011), Is Mobile Internet is really growing in India, Accessed from <http://www.imediaconnection.in/article/321/Digital/Mobile/is-mobile-internet-really-growing-in-india-survey.html>, [Accessed on 22/08/2011.]
- 107** Sanjit Kumar Roy (2006), Mobile Marketing An Overview , Marketing Mastermin Magazine, Page No 51-58
- 108** Seema Gupta (2009), Telecom Industry Pricing : Who is Eating into whose share,
- 109** Shahzad Khan, Saima Afsheen , 2012 Determinants of Customer Satisfaction in Telecom Industry A Study of Telecom industry Peshawar KPK Pakistan , Journal of Basic and Applied Scientific Research, Accessed from <http://www.textroad.com/pdf/JBASR> , [Accessed on 10 April 2013]
- 110** Shanthi Venkatesh , (2008) , Analysis of gaps in telecommunication services – a study with respect to service gaps in fixed-line segment , Innovative Marketing, Volume 4, Issue 1, 2008 , page 64-72
- 111** Sharma, Kapil (2011), Advertisement sensitivity in the promotion of cellular services: a comparative study of rural and urban areas in Punjab , [online], available at : <http://shodhganga.inflibnet.ac.in/handle/10603/2886> Accessed on 21 Feb, 2013
- 112** Sheetal Singla (2011), Mobile use pattern among Indian Consumer, Asian Journal of Management Research, Volume I , No 2, 2011, pp 594- 599, [online], available at: <<http://www.ipublishing.co.in/ajmrvol1no2.html> > [Accessed on 31/12/2011]
- 113** Shirshendu Ganguly (2008), Drivers of Customer Satisfaction in the Indian Cellular Services Market, Icfaiian Journal of Management Research, Volume VII, page No 51-69
- 114** Shri Jayanta Banergi and Indraneel Bose (2011), Higher Education Through Mobile Learning, Indian Journal of Commerce & Management Studies, Volume II, Issue I, July 2011
- 115** Shri. G. Raghuram & Redha Jain(2009), Role of Universal Service Obligation Fund in Rural Telecom Services Lessons from the Indian Experience, Working Paper No 2009-06-03, IIM , Ahmedabad , Accessed online www.iimahd.ernet.in/publications/data/2009-06-03Jain.pdf,
- 116** Shri. Manasa Bhattacharya (2009), Committee on India: Vision 2020, Shri. Manasa Bhattacharya, (IES), DDG (finance), DOT
- 117** Singh, Gagan (2011) “Disinvestment and Telecom Sector of India”, Indian Journal of Commerce and Management Studies, Vol.- II, Issue 2, March, 2011, pp. 65-76. (ISSN-2229-5674)

- 118** Singh, Sanjeet, Sharma, Gagan Deep and Singh, Gurbhej, (2011) Customer Perception and Expectation of Mobile Number Portability (April 27, 2011). Available at SSRN: <http://ssrn.com/abstract=1852019>
- 119** Subhrajyoti Bora (2011), Mobile Infrastructure Sharing – An Indian Scenario, Indian Journal of Management , May 2011 issue, Page No 3-16
- 120** Sulekha Munshi (2011) , Expectations And Perceptions Of Mobile Phone Users , International Journal of Asian Social Science, 1(1), Page No. 10-16,
- 121** Suthar B.K., Dr. Sharma J.K., Dr. Anant Gwal , 2012, A Study on Consumer Behavior After Mobile Number Portability with Reference to Gujraht Telecom Circle, Bauddhik, Vol.3, No:-2, May-August-2012, [online], available at: <http://www.chimc.in/volume3No2/RESEARCH%20PAPER-1.pdf> , [Accessed on 10 April, 2013]
- 122** Tata Teleservices, 2013, Tata Group in telecommunications, available at: <http://www.tatateleservices.com/t-aboutus-ttsl-organization.aspx>, [Accessed on 12/01/2013]
- 123** TDSAT, 2011, [online], available at : <<http://www.tdsat.nic.in/profile2.htm>> [Accessed on 24 September, 2011]
- 124** Telecom Commercial Communications Customer Preference Portal , 2012, Welcome Page, [online], available at : <http://www.nccptrai.gov.in/nccpreistry/> [Accessed on 12 January 2012]
- 125** Times of India, 10 May 2013, [online] Available at: http://articles.timesofindia.indiatimes.com/2013-05-10/telecom/39167686_1_bsnl-and-mtnl-mtnl-employees-bsnl-losses, [Accessed on 13 May 2013]
- 126** TRAI , 2012, Consultation Paper No.: 19/2012, [online], available at: <<http://www.trai.gov.in>> , [Accessed on 12 May 2013]
- 127** TRAI , 2012, Press Release No 86/2012, Page No 5, [online], available on : <<http://www.trai.gov.in/>>, [Accessed on 18 June 2012]
- 128** TRAI , TRAI Press Release, 31/2013, Page No 1, [online], available at <<http://www.trai.gov.in/>>, [Accessed from on 13 May 2013]
- 129** TRAI ,2010, Recommendation on National Broadband Plan, Page -65 142, [online], available at : <<http://www.trai.gov.in/Content/RecommendationDescription>> [accessed on 21 /12/2012]
- 130** TRAI, (2010), Monitoring level of congestion at the point of Interconnection, [online],available at: < [tra.gov.in/ WriteReadData/PIR Report/.../POIREPORT12MAY.pdf](http://tra.gov.in/WriteReadData/PIRReport/.../POIREPORT12MAY.pdf)>, [Accessed on 21/09/2011]
- 131** TRAI, (2011), TRAI Act 1997, [online], available on: <http://www.trai.gov.in/Content/act_1997.aspx> [Accessed on 15 Jun,2011]

- 132** TRAI, (2011),New Telecom Policy-1999, [online], available at: http://www.trai.gov.in/Content/ntp_1999.aspx, [Accessed on 25 June,2011]
- 133** TRAI, 2004, New Delhi, Notification No. 301-37/2004-Eco, Page No 3 <http://www.trai.gov.in/trai/upload/TariffOrders/15/tto7oct.pdf>, genuineness of the bill [Accessed on 12 July 2012]
- 134** TRAI, 2007, Handbook for the consumer from Telecom Regulator, Page No 8, from <http://www.trai.gov.in> , [Accessed on 10 April, 2012]
- 135** TRAI, 2010,Recommendation Paper on National Broadband Plan, [online] available at < [www.trai.gov.in/.../Recommendation/.../Recommendation81210 .pdf](http://www.trai.gov.in/.../Recommendation/.../Recommendation81210.pdf)> , [Accessed on 15 May 2011]
- 136** TRAI, 2012, Consumer’s Handbook on Telecommunications, New Delhi-02, Page No 4, from www.trai.gov.in, [Accessed on 18 May 2013]
- 137** TRAI, 2012, Press Release No. 179/2012, [online], available at :< <http://www.trai.gov.in/WriteReadData/WhatsNew/Documents/PR179-07sep12.pdf> > , Page No 12, [Accessed on 21 Sept 2012]
- 138** TRAI, 2013, Broadband Policy-2004, [online], available on: < http://www.trai.gov.in/Content/broadband_policy.aspx, >[Accessed on 10 May 2013]
- 139** TRAI, 2013, Press Release No. 38/2013, Page No 11, [online], available on : <http://www.trai.gov.in/Content/PressReleases.aspx>, [Accessed on 30/5/2013]
- 140** TRAI, 2013, Press Releases No. 86/2012,171/2012,199/2012,08/2013, 38/2013,38/2013, available at: <http://www.trai.gov.in/Content/PressReleases.aspx>, [Accessed on 30 May 2013]
- 141** TRAI, Broadband Policy 2004, [online], available on : <http://www.trai.gov.in/Content/broadband_policy.aspx > [Accessed on 20/07/2011]
- 142** TRAI, Recommendations on National Broadband Plan December 2010, Page No 109-111, [online], Available on: <www.trai.gov.in>, [Accessed on 12 April 2012]
- 143** TRAI, TRAI Act 1997, Gazette of India, Preliminary Pages ,[online], available at: <http://www.trai.gov.in/WriteReadData/userfiles/file/Chapter-I.pdf> , [Accessed on 16 Dec 2011]
- 144** TRAI,2011, New Telecom Policy-1999, [online], available on : http://www.trai.gov.in/Content/ntp_1999.aspx, [Accessed on 25 July 2011]
- 145** Uninor, 2013, About Us, from <http://www.uninor.in/about-uninor/about-us/Pages/about-us.aspx> [Accessed on 10 May 2013]

- 146** Vabhav Misra and DR. R.K Shukla, 2011, The study of Relationship Between Reasons of Churn outs in Telecom Sector in Rural Markets of Lucknow District, Indian Journal of Research, (2011) 5, Page No 35-40,
- 147** Vani Haridasan & Shathi Venkatesh (2011) , CRM Implementation In Indian Telecom Industry – Evaluating The Effectiveness Of Mobile Service Providers Using Data Envelopment Analysis , International Journal of Business Research and Management , Vol.2, Issue 3 : 2011, Pp No 110-127, [online], available at : <http://cscjournals.org/csc/manuscript/Journals/IJBRM/volume2/Issue3/IJBRM-50.pdf>, [Accessed on 24 Dec 2012]
- 148** Vishwanath Kendurkar (2003), Strategic Positioning of Tarang BSNL WLL Service, Post Graduate Management Project submitted to Management Development Institute , Gurgaon, Page No 4 -5
- 149** Vivek Khattar, IMRB International (2006) QOS and Customer Satisfaction: A Study, [online], Available at : <from http://www.pipelinepub.com/0706/pdf/khattar_HP.pdf, [Accessed on 11/08/2011]
- 150** Vodafone, 2012, Business, [online], available at: <http://www.vodafone.in>,
- 151** VSNL (2003), About us , [online], available at : < <http://idcdelhi.vsnl.com/aboutus/whoweare.html>,> [Accessed on 24 November 2012]
- 152** Webopedia, BPS, 2011, [online], available on: <http://www.webopedia.com/TERM/B/bps.html>, [Accessed on 20 /05/2011]
- 153** Wikipedia, Mobile Phone, 2012, from [online], http://en.wikipedia.org/wiki/Mobile_phone, [Accessed on 22 December 2012]
- 154** William C. Johnson, Anuchit Sirikit, (2002) "Service quality in the Thai telecommunication industry: a tool for achieving a sustainable competitive advantage", Management Decision, Vol. 40 Issue: 7, pp.693 – 701
- 155** Yi Hao, Xiaoqin Yuan & Weiqing Zhang (2009), How to promote Loyalty of Chinese Mobile operator,available on: www.bth.se/fou/cupsats.nsf/0/3dae4fb1399cd1e8c125765f0044a7c5?OpenDocument [Accessed on 18/09/2011]
- 156** Yogesh K. Dwivedi and others, Understanding Factors Affecting Consumer Adoption of Broadband in India: A Pilot Study, Accessed from http://csi-sigegov.org/3/8_302_3.pdf, [Accessed on 22nd May 2013]
- 157** Zainurin Bin Dahari, Muhammad Sabbir Rahman & others, 2011, Customer Satisfaction With Mobile Phone Operators: An Exploratory study In Kuala Lumpur, Malaysia, Indian Journal of Marketing, May 2011,Page No 39-46

C. List of the referred Websites

- 1 <http://articles.timesofindia.indiatimes.com>
- 2 <http://books.google.co.in/books>
- 3 <http://bsnl.co.in>
- 4 <http://compnetworking.about.com>
- 5 <http://cscjournals.org>
- 6 <http://dlibra.itl.waw.pl/>
- 7 <http://en.wikipedia.org>
- 8 <http://shodhganga.inflibnet.ac.in>
- 9 <http://theglobaljournals.com>
- 10 <http://www.aircel.com/>
- 11 <http://www.airtel.in>
- 12 <http://www.business-standard.com>
- 13 <http://www.cisco.com>
- 14 <http://www.coai.com/>
- 15 <http://www.discountcomms.co.uk/>
- 16 <http://www.dot.gov.in>
- 17 <http://www.fareastjournals.com>
- 18 <http://www.gobookee.net>
- 19 <http://www.ibef.org>
- 20 <http://www.ideacellular.com>
- 21 <http://www.ipublishing.co.in>
- 22 <http://www.itu.int>
- 23 <http://www.mnpindia.in/>
- 24 <http://www.mtnlmumbai.in/>
- 25 <http://www.nccptrai.gov.in/nccpreistry/>
- 26 <http://www.pipelinepub.com>
- 27 <http://www.qualitydigest.com>
- 28 <http://www.rcom.co.in/Rcom/personal/home/index.html>
- 29 <http://www.sciencedirect.com/science/journals>
- 30 <http://www.slideshare.net/>
- 31 <http://www.tatateleservices.com/>
- 32 <http://www.tdsat.nic.in>
- 33 <http://www.trai.gov.in>
- 34 <http://www.uninor.in/Pages/Home.aspx>
- 35 <http://www.vodafone.in/pages/index.aspx>
- 36 <http://www.webopedia.com>

7.1 Appendix I

Questionnaire

Dear Sir/Madam,

I am carrying out Doctoral research on the Topic 'A study of Customer Satisfaction of Corporate Customers of Telecom Service Operators – With Special Reference to Pune City'. This is being done as a part of project work which I have to undertake for fulfilling the partial requirement of Ph.D. Degree in Management that I am pursuing at Tilak Maharashtra Vidyapeeth, Pune. I am enclosing a detailed questionnaire for this purpose.

I request your good self to kindly spare some time from your busy routine and complete questionnaire. Please be assured that details furnished by you will be kept absolutely confidential and will be exclusively used for the above said project only. Your honest answers are key to the success of this study.

I thank you in anticipation for your valuable contribution and co-operation.

Your's sincerely,

Mahajan Milind
Research Student
Tilak Maharashtra Vidyapeeth
Pune-38

Questionnaire

Section- I: Part A (General Information)

1. Name of Customer (Optional) :-

2. Address (Optional) :-

3. Main Business area of your Organization (Pl. Tick the appropriate answer)

Sr. No.	Main Business Area	Pl .Tick
1	Banks / Insurance /Financial Services	
2	IT , ITES , Data processing centers	
3	State or Central Government organization, Local Bodies, Public Sector Units, Educational Institutes, Colleges & Universities.	
4	Private Limited, Public Limited companies and others (Excluding Categories mentioned in Sr. No. 1, 2 and 3 of this table)	

4. Your Monthly Expenditure on Telecommunication needs

A. Up to Rs. 10,000/- B. More than Rs. 10,000/-

5. Tick the services you are availing from Telecom Service Providers.

A. Telephone B. Leased Line C. INET

B. Broadband E.ISDN F. Mobile

G. Centrex G. 3G

I. Any Other Pl. Mention -----

6. Which is your current service provider for Wire-line Broadband Service?

Sr. No.	Name of Service Provider	Please tick
1	BSNL	
2	Bharti Airtel	
3	YOU Broadband	
4	Hathway Broadband	
5	Any other	

7. Which is your current service provider for Mobile Telecom Services?

Sr. No	Name of Service Provider	Please tick
1	IDEA Cellular	
2	Vodaphone	
3	Reliance Telecom	
4	Tata Telecom	
5	Bharati	
6	BSNL	
7	Uninor	
8	Aircel	
9	Any Other	

8. How long you are using the services from your Telecom Services Provider?

Period of Association	Landline Voice	Wire-line Broadband	Mobile
Less than 6 Months			
6 Month to 1 Year			
1 Year to 2 Years			
More Than 2 Year			

Section I Part B General Information about the Respondent

1. Gender of the Respondent

A. Male B. Female

2. Age of the Respondent

A. Less than 25 Yrs. B. 25 to 35 Years
 C. 35 to 45 Years D. More than 45 Yrs.

3. Education of the Respondent

- A. Graduate B. Post Graduate
C. Other

Section II: Network Performance Information

1. Fault incidence per year faced by you when there is complete failure of voice and /or data communication

- A. Nil B. One to Two. C. Three to five D. More than five

2. Fault Repair Duration (In General)

- A. Less than 12 Hrs. B. 12 Hrs to 24 hours
C. 24 Hrs. to 48 Hrs D. More than 2 days

3. What is the answer given by your telecom service provider when you ask them about the reason behind failure of services?

- A. Cable cut due to digging done by different Authorities
B. Underground Cable Fault
C. Equipment failure
D. Power Failure
E. Spares not available to replace faulty cable or instrument
F. Any other pl. specify-----

4. In case of Landline which of the following problem you face frequently?

- A. Phone Dead B. Network / Line busy
C. Call drop D. Echo
E. Noise F. One way speech
G. Any Other

5. In case of Broadband which of the following problem you face frequently?

- A. Complete Disconnection B. Slow Speed
C. Data Call Drop D. Password Error
E. Modem Fault. F. Any Other

6. In case of Mobile service which of the following problem you face frequently?

- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| A. Call drop | <input type="checkbox"/> | B. Poor Coverage | <input type="checkbox"/> |
| C. Noise | <input type="checkbox"/> | D. Echo | <input type="checkbox"/> |
| E. Network Busy | <input type="checkbox"/> | F. One Way speech | <input type="checkbox"/> |
| G. VAS Trouble | <input type="checkbox"/> | H. Data Service Problems | <input type="checkbox"/> |
| I. Any Others than above | <input type="checkbox"/> | | |

7. Are you satisfied with the Network performance of following services?

Satisfaction	Landline (voice)	Mobile	Broadband
Very Satisfied			
Satisfied			
Neutral			
Dissatisfied			
Very dissatisfied			

Section III: Billing Performance

Sr. No.	Question	Yes	No
1	Do you expect that every bill should be detailed bill?		
2	Do you find mistakes in the billing?		
3	Do you expect the alert about the billing amount from Telecom Service Provider in between billing cycles, at different threshold levels set by you?		
4	Are you aware of the fact that prepaid customers can get detail bill on request?		
5	Are you ready to pay premium charges for treating yourself as a customer of prime importance?		
6	Are bills raised by telecom service provider transparent?		

7. Are you satisfied with the Billing Service of the Telecom Service Provider?

- | | | | | | |
|---------------------|--------------------------|------------------------|--------------------------|------------|--------------------------|
| a. Highly Satisfied | <input type="checkbox"/> | b. Satisfied | <input type="checkbox"/> | c. Neutral | <input type="checkbox"/> |
| d. Dissatisfied | <input type="checkbox"/> | e. Highly Dissatisfied | <input type="checkbox"/> | | |

Section IV. Provisioning of Services & Customer Care Services Performance

1. How much time did it take for activation of New Landline Connection?

A. Within 24 Hrs. B. Within 24 to 48 Hrs. C. More than 2 days.

2. How much time did it take for activation of New Mobile Connection?

A. Within 24 Hrs. B. Within 24 to 48 Hrs. C. More than 2 days.

3. How much time did it take for activation of New Broadband Connection?

A. Within 24 Hrs. B. Within 24 to 48 Hrs. C. More than 2 days.

4. Which of the following medium generally you prefer to book the faults?

Sr. No.	Medium	Please Tick
1	SMS Complaint	
2	Visit to Service Provider's Office	
3	Telephonic Complaint	
4	Online	
5	Any Other	

5. Are you aware of the contact details of the Nodal Officer*¹?

A. Yes B. No

6. Are you aware of the contact details of the appellate authority*²?

A. Yes B. No

7. Do you expect that your operator should depute single official to whom you can report the interruption in services and who will take care of your need?

A. Yes B. No

8. Whenever there is interruption in services, do you expect that your telecom service operator should convey information about the nature of fault and approximate time needed for restoration of services?

A. Yes B. No

9. Do expect that your telecom service operator should provide alternative means of communication in case of is prolonged failures?

A. Yes B. No

10. Have you registered your telephone number with Do Not Call (DNC) registry so that you do not receive unsolicited commercial calls / SMS?

A. Yes B. No

11. Are you satisfied with After Sales Services provided by your Telecom Service Operator?

A. Highly Satisfied B. Satisfied C. Neutral
 D. Dissatisfied D. Highly Dissatisfied

Section V. Miscellaneous Information:

1. From which media you will prefer to get information about the services?

A. T.V. B. Radio C. Magazines
 D. Friends E. Internet / Website F. Service Centers
 G. News paper H. Banner/Hoadings I. Any other -----

2. How well is the Publicity of products and services ?

A. Very Good B. Good C. Adequate

3. Do you expect the direct communication from your service operator regarding the New Rental schemes / Changes in rental / New Services etc?

A. Yes B. No

4. What is your overall satisfaction about the services provided by Operator? (Consider all areas like Network, billing, cost of services & after sales service)

Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Satisfied
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. To what extent the services have met your expectation? (Pl. Tick)

Much Better than Expected	Better than Expected	As per Expectation	Worse than Expected	Much worse than Expected
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section VI Part A: - Kindly rate your satisfaction on the following attributes of different factors on five point scale as described below

1. Very dissatisfied 2. Dissatisfied 3. Neutral 4. Satisfied 5. Very Satisfied

A. Factor : - Provision of Services

	Attribute of Service	Voice					Data				
		1	2	3	4	5	1	2	3	4	5
1	Time taken to install and activate a New Landline (Voice / Data Broadband) Connection after you apply for it	1	2	3	4	5	1	2	3	4	5
2	Time taken to reactivate the Landline (Voice / Data) connection if it is disconnected due to non payment	1	2	3	4	5	1	2	3	4	5
3	Time taken to activate or deactivate VAS (Value Added Services) after you requested for it (In Wire-line Services)	1	2	3	4	5	1	2	3	4	5
4	Time taken to activate a New Mobile Connection after you apply (Voice/ Data)	1	2	3	4	5	1	2	3	4	5
5	Time taken to reactivate the Mobile connection if it is disconnected due to non payment (Voice/ Data)	1	2	3	4	5	1	2	3	4	5
6	Time taken to activate or deactivate VAS (Value Added Services) after you requested for it (In Wireless Services)	1	2	3	4	5	1	2	3	4	5

B. Billing Convenience

	Attribute of Service	Combine (Voice and data)				
1	2	3	4	5	6	7
1	Timely delivery of the bills	1	2	3	4	5
2	Transparency in the billing	1	2	3	4	5
3	Clarity of the bills in terms of understandability	1	2	3	4	5
4	Flexibility of Billing plans	1	2	3	4	5
5	Accuracy in the billing	1	2	3	4	5
6	Process of resolution of billing complaints	1	2	3	4	5
7	Time taken to attend billing complaints	1	2	3	4	5
8	Recharge voucher availability of all Denominations	1	2	3	4	5
9	Ease of mode of payment	1	2	3	4	5

C. Cost of Service

	Attribute of Service	Voice					Data				
		1	2	3	4	5	1	2	3	4	5
1	Price to be paid for registration and security deposit	1	2	3	4	5	1	2	3	4	5
2	Monthly Rental Charges	1	2	3	4	5	1	2	3	4	5
3	Charges for Value Added Services	1	2	3	4	5	1	2	3	4	5
4	Pulse Rate Local (Fixed wire-line)	1	2	3	4	5	X	X	X	X	X
5	Pulse Rate for ISD (Fixed wire-line)	1	2	3	4	5	X	X	X	X	X
6	Pulse Rate Local (Mobile)	1	2	3	4	5	X	X	X	X	X
7	Pulse Rate for ISD (Mobile)	1	2	3	4	5	X	X	X	X	X
8	Rental for of Data Circuit Services	X	X	X	X	X	1	2	3	4	5
9	Charges for Data downloading / Uploading in Wire-line services	X	X	X	X	X	1	2	3	4	5
10	Charges for Data downloading / Uploading in Wireless services	X	X	X	X	X	1	2	3	4	5

D. Customer Care Access

	Attribute of Service	Combine (Voice and data)				
		1	2	3	4	5
1	Ease of access to customer service center	1	2	3	4	5
2	Convenient business hours of service centers	1	2	3	4	5
3	The comfort at the waiting areas of service centers	1	2	3	4	5
4	Communications in the language of your choice at call center / Customer care service centers	1	2	3	4	5
5	Time taken by Call Center Executive to answer your call / or time taken to attend you at customer care center	1	2	3	4	5
6	The variety of methods to access the service centers (e.g., Phone, In-person, E-mail,)	1	2	3	4	5
7	The amount of bureaucratic requirements for new connections	1	2	3	4	5

E. Customer Care

	Attribute of Service	Combine (Voice & data)				
1	Individual attention paid by Customer care Executive for being a Corporate Customers	1	2	3	4	5
2	Ability of the customer care executive to understand the problem	1	2	3	4	5
3	Accuracy of Information available with the Executives	1	2	3	4	5
4	Quality of Website	1	2	3	4	5
5	Comprehensiveness of information content provided by Service provider on his website	1	2	3	4	5
6	Customer's feeling of safety while dealing online	1	2	3	4	5
7	Adequacy of information available with customer care executive	1	2	3	4	5
8	Politeness of Customer care Executive	1	2	3	4	5
9	Effect on the frequency of commercial call after registering the number for DNC	1	2	3	4	5

F. Responsiveness

	Attribute of Service	Combine (Voice & data)				
1	Company will perform right service at first time	1	2	3	4	5
2	Company tells customers when exactly desired services will be provisioned	1	2	3	4	5
3	Company Keeps promise about the provision of services in respect of time	1	2	3	4	5
4	Information provided regarding progress of Customer's request	1	2	3	4	5
5	Response to your requirement (Whether Customized solutions are provided)	1	2	3	4	5

G. Tangible

	Attribute of Service	Combine (Voice & data)				
1	Visual appeal of the advertisement Material	1	2	3	4	5
2	Employees appear neat and clean at Service Center	1	2	3	4	5
3	Ambience of Service Center	1	2	3	4	5
4	Modern equipments available at service center	1	2	3	4	5
5	Appearance of maintenance person visiting to your premises	1	2	3	4	5

H. Redressal of Customer Grievances (Nodal officer Level)

A	Attribute of Service	Combine (Voice & data)				
1	Ease to contact the nodal officer	1	2	3	4	5
2	Adequacy of information available with the nodal officer	1	2	3	4	5
3	Ability of nodal officer to understand the problem	1	2	3	4	5
4	Politeness of the Nodal officer	1	2	3	4	5
5	Time taken by Nodal Officer for Redressal of complaint	1	2	3	4	5

I. Uninterrupted Service

A	Attribute of Service	Combine (Voice & data)				
1	Mobile Network Coverage in City area	1	2	3	4	5
2	Mobile Network Coverage in Rural area	1	2	3	4	5
3	In building Network Coverage	1	2	3	4	5
4	Mobile Network Coverage On Road	1	2	3	4	5
5	Number of Fault Incidences (In case of Mobile)	1	2	3	4	5
6	Number of Fault Incidences (In case of Landline)	1	2	3	4	5
7	Time taken to restore faults (In case of Mobile)	1	2	3	4	5
8	Time taken to restore faults (In case of Landline)	1	2	3	4	5
9	Working of the Customer Premises Equipment	1	2	3	4	5

J. Network Quality Broadband

A	Attribute of Service	Combine (Voice & data)				
1	Availability and quality of VAS	1	2	3	4	5
2	Data Call Drop Rate (In Wire line Data Service)	1	2	3	4	5
3	Speed of downloading (In wire line Data Service)	1	2	3	4	5
4	Speed of Uploading (In wire line Data Service)	1	2	3	4	5
5	Consistency of Speed (In wire line Data Service)	1	2	3	4	5

K. Network Quality Landline

A	Attribute of Service	Combine (Voice & data)				
1	Voice Quality	1	2	3	4	5
2	Availability and quality of VAS	1	2	3	4	5
3	Call Drop Rate	1	2	3	4	5
4	Network congestions at busy hour (In case of Intra Network Calling)	1	2	3	4	5
5	Network congestion Inter operator at busy hour	1	2	3	4	5

L. Network Quality Mobile

A	Attribute of Service	Voice					Data				
		1	2	3	4	5	X	X	X	X	X
1	Voice quality (In case of Mobile)	1	2	3	4	5	X	X	X	X	X
2	One Way Speech occurrence	1	2	3	4	5	X	X	X	X	X
3	Call Drop Rate Voice	1	2	3	4	5	X	X	X	X	X
4	Availability and Quality of VAS	1	2	3	4	5	1	2	3	4	5
5	Network congestions Intra Operator at busy hour (For Voice)	1	2	3	4	5	X	X	X	X	X
6	Network congestion Inter operator at busy hour (For Voice)	1	2	3	4	5	X	X	X	X	X
7	Network congestion on special occasion (For Voice)	1	2	3	4	5	X	X	X	X	X
8	Speed of Downloading (In Wireless data)	X	X	X	X	X	1	2	3	4	5
9	Speed of Uploading (In Wireless data)	X	X	X	X	X	1	2	3	4	5
10	Consistency of Speed (In Wireless data)	X	X	X	X	X	1	2	3	4	5
11	Data Call Drop Rate (In Wireless data)	X	X	X	X	X	1	2	3	4	5

Section No 6 Part B :- Kindly rate importance of Service Quality Factors on scale of 1 to 5, with 1 being Not at all important and 5 being Very Important.

Sr. No.	Factor of Service Quality	Circle Only one Option				
		1	2	3	4	5
1	Provision of Service	1	2	3	4	5
2	Billing convenience	1	2	3	4	5
3	Cost of Service	1	2	3	4	5
4	Customer Care Access	1	2	3	4	5
5	Customer Care	1	2	3	4	5
6	Tangibles	1	2	3	4	5
7	Responsiveness	1	2	3	4	5
8	Redressal of Customer Grievances	1	2	3	4	5
9	Network Quality	1	2	3	4	5
10	Uninterrupted Service	1	2	3	4	5

1. **Nodal Officer:** - In case the complaint has not been resolved by the call centre, Customer can contact the next level called as Nodal Officer.
2. **Appellate Authority:** In case the complaint has not been resolved by the Nodal Officer Customer can contact the next level of authority called as Appellate Authority.

Thanks for your Valuable Time

7.2 Appendix II

Mean score of the Attributes

Mean Scores of attributes:- In this Annexure researcher has reported the mean score of the different attributes which are rated by the respondents on a Likert five point scale. Researcher has identified the two attributes from each Factor and suggestions are provided to improve the score of these two attributes in chapter no. Six.

1. Provision of Services

Table No 7.1 Mean Scores received for the Factor Provision of Services

Codes	Provision of Service	Mean Score Received out of 5	
		Voice	Data
PS1	Time taken to install and activate a New Landline (Voice / Data Broadband) Connection after you apply for it	3.25	2.64
PS2	Time taken to reactivate the Landline (Voice / Data) connection if it is disconnected due to non payment	3.58	2.76
PS3	Time taken to activate or deactivate VAS (Value Added Services) after you requested for it (In Wire-line Services)	3.60	3.15
PS4	Time taken to activate a New Mobile Connection after you apply for it (Voice/ Data)	4.51	3.72
PS5	Time taken to reactivate the Mobile connection if it is disconnected due to non payment (Voice / Data)	4.32	3.88
PS6	Time taken to activate or deactivate VAS (Value Added Services) after you requested for it (In Wireless Services)	4.11	3.85

(Source: Primary Data collected and Processed by the Researcher)

2. Billing convenience

Table No 7.2 Mean Scores received for the Factor billing convenience

Codes	Billing Convenience	Mean Score Received out of 5
BC1	Timely delivery of the bills	4.22
BC2	Transparency in the billing	4.51
BC3	Clarity of the bills in terms of understandability	3.85
BC4	Flexibility of Billing plans	3.66
BC5	Accuracy in the billing	3.83
BC6	Process of resolution of billing complaints	2.21
BC7	Time taken to attend billing complaints	2.03
BC8	Availability of the Recharge voucher of all Denominations	3.77
BC9	Ease of mode of payment	4.17

(Source: Primary Data collected and Processed by the Researcher)

3. Cost of Service (Data)

Table No 7.3 Mean Scores received for the Factor Cost of Service (Data)

Codes	Cost of The Service (Data)	Mean Score Received out of 5
CS1	Price to be paid for registration and security deposit	4.67
CS2	Monthly Rental Charges (Broadband)	4.56
CS3	Charges for Value Added Services	3.9
CS8	Charges / Rental for of Data Circuit Services	2.54
CS9	Charges for Data downloading / Uploading in Wire-line services	2.96
CS10	Charges for Data downloading / Uploading in Wireless services	2.92

(Source: Primary Data collected and Processed by the Researcher)

4. Cost of Service (voice)

Table No 7.4 Mean Scores received for the Factor Cost of Service-Voice

Codes	Cost of Service (Voice)	Mean Score Received out of 5
CS1	Price to be paid for registration and security deposit	4.67
CS2	Monthly Rental Charges (Voice Services)	4.56
CS3	Charges for Value Added Services	3.9
CS4	Pulse Rate Local (Fixed wire line i.e. Landline)	3.6
CS5	Pulse Rate for ISD (Fixed wire-line i.e. Landline)	3.7
CS6	Pulse Rate Local (Mobile)	4.45
CS7	Pulse Rate for ISD (Mobile)	3.98

(Source: Primary Data collected and Processed by the Researcher)

5. Customer Care

Table No 7.5 Mean Scores received for the Factor Customer Care

Codes	Customer Care	Mean Score Received out of 5
CC1	Individual attention paid by Customer care Executive being a corporate Customers	3.2
CC2	Ability of the customer care executive to understand the problem	3.73
CC3	Accuracy of Information available with the Call center/service Center Executives	2.92
CC4	Quality of Website	3.58
CC5	Comprehensiveness of information content provided by Service provider's website	3.09
CC6	Customer's feeling of safety while dealing online	4
CC7	Adequacy of information available with customer care executive	3.03
CC8	Politeness of Customer care Executive at Service center / Call center	3.11
CC9	Effect on the frequency of commercial call after registering the number for DNC	4.21

(Source: Primary Data collected and Processed by the Researcher)

6. Customer Care Access

Table No 7.6 Mean Scores received for the Factor Customer Care Access

Codes	Customer Care Access	Mean Score Received out of 5
CA1	Ease of access to customer service center	3.12
CA2	Convenient business hours of the service centers	3.18
CA3	The comfort at the waiting areas of service centers	3.31
CA4	Communications in the language of your choice at call center / Customer care service centers	3.73
CA5	Time taken by Call Center Executive to answer your call / or time taken to attend you at customer care center	3.08
CA6	The variety of methods to access the service center (e.g., Phone, In-person, E-mail,)	4.04
CA7	Amount of bureaucratic requirements for new connections	3.01

(Source: Primary Data collected and Processed by the Researcher)

7. Uninterrupted Service

Table No 7.7 Mean Scores received for the Factor Uninterrupted Service

Codes	Uninterrupted Service	Voice and Data Combine
US1	Mobile Network Coverage in City area	3.99
US2	Mobile Network Coverage in Rural area	3.53
US3	In building Network Coverage	2.81
US4	Mobile Network Coverage On Road	3.89
US5	Number of Fault Incidences (In case of Mobile)	3.43
US6	Number of Fault Incidences (In case of Landline)	3.79
US7	Time taken to restore faults (In case of Mobile)	3.2
US8	Time taken to restore faults (In case of Landline)	2.26
US9	Working of the Customer Premises Equipment	4.3

(Source: Primary Data collected and Processed by the Researcher)

8. Responsiveness

Table No 7.8 Showing mean Scores received for the Factor Responsiveness

Codes	Responsiveness	Mean Score Received out of 5
RP1	Company will perform right service at first time	3.78
RP2	Company tells customers when exactly desired services will be provisioned	3.84
RP3	Company Keeps promise about the provision of services in respect of time	3.04
RP4	Information provided regarding progress of Customer's request	3.63
RP5	Response to your requirement (whether Customized solutions are provided)	2.95

(Source: Primary Data collected and Processed by the Researcher)

9. Network Quality Mobile (Voice)

Table No 7.9 Mean Scores for the Factor Network Quality Mobile - Voice

Codes	Network Quality Mobile (Voice)	Mean Score Received out of 5
NQM1	Voice quality (Mobile)	3.39
NQM2	One Way Speech occurrence	3.23
NQM3	Call Drop Rate Voice	3.01
NQM4	Availability and quality of VAS	3.73
NQM5	Network congestions intra operator at busy hour	3.29
NQM6	Network congestion Inter operator at busy hour	4.08
NQM7	Network congestion on special occasion	3.25

(Source: Primary Data collected and Processed by the Researcher)

10. Network Quality Mobile (Data)

Table No 7.10 Mean Scores received for Factor Network Quality Mobile - Data

Codes	Network Quality Mobile (Data)	Mean Score Received out of 5
NQM4	Availability and quality of VAS	4.35
NQM8	Speed of Downloading (In Wireless Services)	3.33
NQM9	Speed of Uploading (In Wireless Services)	3.42
NQM10	Consistency of Speed (In Wireless Services)	3.12
NQM11	Call Drop Rate Data (In Wireless Services)	3.19

(Source: Primary Data collected and Processed by the Researcher)

11. Network Quality Landline - (Broadband Data)

Table No 7.11 Mean Scores received for the Factor Network Quality Broadband

Codes	Network Quality Landline (Data)	Mean Score Received out of 5
NQB1	Availability and quality of VAS	4.01
NQB2	Data Call Drop Rate (In wire-line Data Service)	3.83
NQB3	Speed of downloading (In wire-line Data Service)	4.18
NQB4	Speed of Uploading (In wire-line Data Service)	4.31
NQB5	Consistency of Speed (In wire-line Data Service)	3.52

(Source: Primary Data collected and Processed by the Researcher)

12. Redressal of Customer Grievances

Table No 7.12 Showing Attribute of the Factor Redressal of Grievances

Codes	Redressal of Customer Grievances	Mean Score Received out of 5
CR1	Ease to contact the nodal officer	3.64
CR2	Adequacy of information available with the nodal officer	4.48
CR3	Ability of nodal officer to understand the problem	4.13
CR4	Politeness of the Nodal officer	4.12
CR5	Time taken to by Nodal Officer for the Redressal of complaint	2.92

(Source: Primary Data collected and Processed by the Researcher)

13. Network Quality Landline (Voice)

Table No 7.13 Mean Scores received for Network Quality Landline (Voice)

Codes	Network Quality Landline (Voice)	Mean Score Received out of 5
NQL1	Voice Quality (Landline Voice)	4.04
NQL2	Availability and quality of VAS	3.91
NQL3	Call Drop Rate	4.25
NQL4	Network congestions at busy hour (In case of Intra Network Calling)	4.35
NQL5	Network congestion Inter operator at busy hour	3.59

(Source: Primary Data collected and Processed by the Researcher)

14. Tangible (Physical Evidence of Services)

Table No 7. 14 Mean Scores received for the Factor Tangible

Codes	Tangible (Physical Evidence of Service)	Mean Score Received out of 5
TG1	Visual appeal of the advertisement Material (Pamphlets etc.)	4.38
TG2	Employees appear neat and clean at Service Center	4.51
TG3	Ambience of Service Center	4.26
TG4	Modern equipments available at service center	4.22
TG5	Appearance of maintenance person visiting to your premises	4.26

(Source: Primary Data collected and Processed by the Researcher)

7.3 Appendix III

Acronyms

Sr. No.	Acronyms	Description
1	2G	Second Generation (Mobile Network)
2	3G	Third Generation (Mobile Network)
3	3GPP	Third Generation Partnership Project
4	ADSL	Asymmetric Digital Subscriber Line
5	ARPU	Average Revenue Per User
6	BER	Bit Error Rate
7	BPS	Bits Per Second
8	BRI	Basic Rate Interface
9	BSC	Base Station Controller
10	BSE	Bombay Stock Exchange
11	BSS	Base Station Sub System
12	BTS	Base Transceiver Station
13	BWA	Broadband Wireless Access
14	CDMA	Code Division Multiple Access
15	C-DOT	Centre For Development of Telematics
16	CENTREX	Central Office Exchange (PBX-Like Service)
17	CLI	Calling Line Identification
18	CLIP	Calling Line Identification Presentation
19	CLIR	Calling Line Identification Restriction
20	CMTS	Cellular Mobile Telecom Services
21	CPE	Customer Premises Equipment
22	CSC	Customer Service Center
23	CUG	Closed User Groups
24	DCE	Data Communications Equipment
25	DOT	Department Of Telecom
26	DSL	Digital Subscriber Line
27	DTE	Data Terminal Equipment
28	DTS	Department Of Telecom Services
29	DTH	Direct to Home
30	EDGE	Enhanced Data For GSM Evolution
31	FDI	Foreign Direct Investment
32	FLPP	Fixed Line Pre-Paid
33	FTTH	Fiber To The Home
34	G bits	Giga Bits
35	GDP	Gross Domestic Product
36	GPRS	General Packet Radio Service

37	GPS	Global Positioning System
38	GSM	Global System For Mobile Telecommunications
39	HFCL	Himachal Futuristic Communication Limited
40	HLR	Home Location Register
41	HSDPA	High Speed Downlink Packet Access
42	HSUPA	High Speed Uplink Packet Access
43	IEEE	Institute Of Electrical And Electronics Engineers
44	ILD	International Long Distance
45	IMEI	International Mobile Equipment Identity
46	IN	Intelligent Network
47	INMARSAT	International Maritime Satellite Organization
48	IPv6	Internet Protocol Version 6
49	ISD	International Subscriber Dialing
50	ISDN	Integrated Services Digital Network
51	ISUP	ISDN Service User Part
52	ITES	Information Technology Enabled Services
53	ITU	International Telecommunication Union
54	KB	Kilobyte (One Thousand and Twenty Four Bytes)
55	Kbps	Kilo Bits Per Second
56	LAN	Local Area Network
57	LBS	Location Based Services
58	MAC	Media Access Control
59	MARR	Multi Access Radio Relay
60	MB	Megabyte
61	Mbps	Mega Bits Per Second
62	MMS	Multi Media Messaging Services
63	MNP	Mobile Number Portability
64	MPLS	Multi Protocol Label Switching
65	MS	Mobile Station
66	MSC	Mobile Switching Center
67	MTNL	Mahanagar Telephone Nigam Limited
68	MTU	Maximum Transmission Unit
69	NGN	Next-Generation Networks
70	NIB	National Information Backbone
71	NLD	National Long Distance
72	NOFA	National Optical Fiber Agency
73	NSE	National Stock Exchange
74	NTP	National Telecom Policy
75	OFC	Optical Fiber Cable
76	PBX	Private Branch Exchange
77	PCM	Pulse Code Modulation
78	PRI	Primary Rate Interface

79	PSTN	Public Switched Telephone Network
80	PSU	Public Sector Unit
81	QOS	Quality of Service
82	R & D	Research and Development
83	SACFA	Standing Advisory Committee for Frequency Allocation
84	SIM	Subscriber Identification Module
85	SLA	Service Level Agreement
86	SMS	Short Message Service
87	SOFA	State Optical Fiber Agency
88	SPSS	Statistical Package For Social Sciences
89	SSA	Secondary Switching Area
90	STD	Subscriber Trunk Dialing
91	STM	Synchronous Transfer Mode
92	TCP	Transmission Control Protocol
93	TDM	Time Division Multiplexer
94	TDMA	Time Division Multiple Access
95	TDSAT	Telecom Disputes Settlement & Appellate Tribunal
96	TERM	Telecom Enforcement, Resource and Monitoring
97	TRAI	Telecom Regulatory Authority Of India
98	UASL	Unified Access Service License
99	UMS	Universal Messaging System
100	UMTS	Universal Mobile Telecommunications System
101	UPS	Uninterruptible Power Supply
102	USO	Universal Service Obligation
103	UTRAN	UMTS Terrestrial Radio Access Network
104	VAS	Value Added Services
105	VLR	Visitor Location Register
106	VMS	Voice Mail Service
107	VoIP	Voice Over IP
108	VPN	Virtual Private Network
109	VSAT	Very Small-Aperture Terminal
110	VSNL	Videsh Sanchar Nigam Limited
111	VTM	Vigilance Telecom Monitoring
112	WAP	Wireless Application Protocol
113	WCDMA	Wideband Code Division Multiple Access
114	Wi-Fi	Wireless Fidelity
115	Wi-Max	Worldwide Interoperability For Microwave Access
116	WLAN	Wireless Local Area Network
117	WLL	Wireless Local Loop
118	WPC	Wireless Planning Committee

7.4 Appendix IV

Glossary of terms^{*1}

1. **Asymmetric Digital Subscriber Line:** - ADSL is a type of digital subscriber line technology that enables faster data transmission over copper telephone lines.
2. **Bandwidth:** The range of frequencies available to be occupied by signals. The higher the bandwidth, the greater the amount of information that can be transmitted in a given time.
3. **Base station:** A radio transmitter/receiver and antenna used in the mobile cellular network. It maintains communications with cellular telephones within a given cell and transfers mobile traffic to other base stations and the fixed telephone network.
4. **CDMA:** A technology for digital transmission of radio signals.
5. **Cell:** The geographic area covered by a single base station in a cellular mobile network.
6. **Cellular:** A mobile telephone service provided by a network of base stations, each of which covers one geographic cell within the total cellular system service area.
7. **Churn:** Term used to describe the turnover in the number of subscribers to a network, typically measured monthly.
8. **Coverage:** Refers to the range of a mobile cellular network, measured in terms of geographic coverage.
9. **Digital Subscriber Line (DSL):**- Digital subscriber line is the transmission of digital information, usually on a copper wire pair.
10. **Ethernet:** - Ethernet is a packet based transmission protocol that is primarily used in LANs. It is often characterized by its data transmission rate and type of transmission medium.

11. **EDGE:** Enhanced Data rates for GSM Evolution. An intermediate technology, still under development, that brings second-generation GSM closer to third-generation capacity for handling data speeds up to 384 Kbit/s.
12. **Fixed line:** A physical line connecting the subscriber to the telephone exchange. It is popularly called as Landline.
13. **Fiber to the Home (FTTH):-** A distribution system that uses optical fiber cable to connect telephone networks to nodes that are located in the homes of customers.
14. **GPRS:** General Packet Radio Service. An enhancement for GSM, based on packet-switched technology enabling high-speed data transmission (115 Kbit/s per second).
15. **Hand-off:** A central concept of cellular technology, enabling mobility for subscribers. It is a process by which the Mobile Telephone Switching Office passes a mobile phone conversation from one radio frequency in one cell to another radio frequency in another as a subscriber crosses the boundary of a cell.
16. **Interconnection:** The physical connection of telephone networks owned by two different operators. Network operators typically charge per minute fee for use of their network by other network operators (This is referred to as an “interconnect payment” or “access charge”).
17. **ISDN:** Integrated Services Digital Network. An integrated services network that provides digital connections between user-network interfaces.
18. **ISP:** Internet Service Provider. ISPs provide end users and other ISPs access to the Internet.
19. **Leased Line-**Leased lines are telecommunication links that have transmission capacity dedicated (reserved) for the exclusive use of a single customer or company. Leased lines often come with a guaranteed level of performance for connections between two points.

20. **Peak Hour:** - It is the hour of the day at which there is maximum traffic in the network.
21. **Private Branch Exchange (PBX):**- PBX systems are private local telephone systems that are used to provide telephone service within a building or group of buildings in a small geographic area.
22. **PSTN:** Public Switched Telephone Network. The public telephone network that delivers fixed telephone service.
23. **SMS:** Short Message Service. A service available on digital networks, typically enabling messages up to 160 characters to be sent or received via the message centre of a network operator to a subscriber's mobile phone.
24. **UMTS:** Universal Mobile Telecommunications System. The European term for third generation mobile cellular systems.
25. **USO:** Universal Service Obligation. Universal Service refers to availability, non-discriminatory access and wide-spread affordability of telephone service.
26. **Voice over Internet Protocol (VoIP):**- A process of sending voice telephone signals over the Internet or other data network.
27. **WAP:** Wireless Application Protocol. A license-free protocol for wireless communication that enables the creation of mobile telephone services and the reading of Internet pages from a mobile phone.

Reference:-

- 1 ITU, 2013, ITU Glossary of Mobile Cellular Terms, [online], available on: < <http://www.itu.int/osg/spu/ni/fmi/glossary/Glossary> > [Accessed on 10/01/2013]

7.5 Appendix V

List of TRAI Press Releases Referred

Sr. No.	Title of Press Releases
1	Different Press Releases on Telecom Subscription Data as on different dates like 31/03/2013, 28/02/2013, 31/12/2012, 31/08/2011, 30/06/2011, 31/05/2011, 31/03/2011, 30/11/ 2010.
2	Press Releases on “Indian Telecom Services Performance Indicator Report” for the Quarter ending December 2012 & December 2011.
3	Implementation of “ The Telecom Commercial Communications Customer Preference Regulations”.
4	Direction on Preventing Misleading Tariff Advertisements
5	Report of the independent agencies engaged for the objective assessment of Quality of Service and Customer Satisfaction Survey of Telecom Services in Maharashtra service area.
6	Direction on Publication of Tariff Plans.
7	Regulations for consumer complaints Redressal.
8	Consultation Paper on IMT – Advanced Mobile Wireless Broadband Services.
9	Press Release: Consultation paper on Mobile Value Added Services
10	TRAI recommendations on "National Broadband Plan".
11	Direction to Service Providers on provision of Value Added Services (VAS).
12	TRAI recommendations on "National Broadband Plan".
13	Press Release: Review of Implementation of Mobile Number Portability by TRAI.
14	Consultation Paper On Quality of Service requirements for delivery of basic financial services on Mobile Telephone.
15	Consultation Paper on Review of measures to protect interest of consumers in the Telecom Sector.
16	Consultation Paper on Review of Telecom Unsolicited Commercial Communications Regulations.

(Source: - <http://www.traai.gov.in>)*¹

Reference:-

- 1 TRAI, 2013, Press Release, [online], available at : <http://www.traai.gov.in/Content/PressReleases.aspx>, [Accessed on 16 December 2013]