

# Impact of Various Demographic Factors on Customer Satisfaction in Telecommunication Sector



Sukanta Saha , Yogesh C. Joshi

**Abstract:** Satisfaction of customers is extremely critical for any industry especially the highly competitive Telecom industry in India. This research examines statistical association of various demographic factors like age, gender, marital status, income, qualification, profession and locality with customer satisfaction of the mobile users of Gujarat, the 5<sup>th</sup> largest state of India in terms of area. In this research, responses of 800 mobile users with various demographic factors and from 4 different zones of Gujarat were gathered using various close ended questionnaires and simple random sampling. To capture the information and attributes related to satisfaction from mobile services a 5 point Likert Scale was used. The results were analyzed using ANOVA (Welch test, Brown-Forsythe and F test as applicable) and independent samples T test to reach to the desired objectives. Further post hoc tests (Games Howell and Tukey tests) as applicable were also carried out to pin point the group with significant difference in their mean values. These findings will be useful from telecom operator's perspective for enhancing the customer retention and acquisition of new customer base.

**Keywords:** Demographic factors, Homogeneity of variance, Customer satisfaction, Welch test, Brown-Forsythe test

## I. INTRODUCTION

Telecom service has become the life line of the society. In India the process of Telecom liberalization which evolved in the 90s, when the economy was opened up for private participation. Slowly but steadily with changes in policy front, changes in mentality of the policy makers and lots of investments, the sector became a part and parcel of everyday life. It has touched our daily life, our economy and our social fabric in all various possible ways. In short, it has brought in a new wave of growth in India. The unprecedented growth has generated a wave of cut throat competition in telecom market. To survive in this hyper competitive market, maintaining customer satisfaction is one of the most essential tools.

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Customer satisfaction is a perception that varies depending on different demographic factors like age, gender, marital status, income, qualification, profession and locality. Understanding these associations is very critical for the Telecom Industry in India. Gujarat represents a face of developed India and hence the research has been focused on the perception of satisfaction of various mobile users of Gujarat with respect to various demographic factors.

## II. LITERATURE REVIEW

Customer satisfaction is a perceived value which is dependent on several factors. In this hyper competitive market customer satisfaction is one their prime objectives for any telecom operator. Nurdault Nurysh, Navaz Naghavi, Benjamin Chan Yin Fah (2019) have found that perception and quality of service has some positive impact towards satisfaction front of the customers. But, the research has also derived that the interaction of both variables with attractiveness of alternatives has no effect to improve or enhance the satisfaction. Various factors have various levels of impacts on customers. Sendecka and Nysveen (2006) observed that more customized services fulfilling customer's needs and expectations lead to a greater customer satisfaction. Ramli Saad et.al (2013) in their study of customer loyalty and impact of demographic variables on loyalty has found that only income level has positive relationship with customer loyalty .Age,gender,occupation and life style doesn't have any relationship with loyalty in the credit card industry. Dahiya Richa(2012) in her study on impact of demographic factors towards online shopping behaviour has found that in India online shopping is significantly affected by various demographic factors like age, gender, marital Status, family size and income. Richu Juneja and Prachi.B. Mehta (2018) in her study on impact of customer's demographic characteristic on online customer satisfaction has found that qualification of customers is significantly associated with online customer satisfaction level but age, gender, occupation and experience of online buying show no sign of association with satisfaction level. The conclusion was reached by using cross tabulation and chi square test. Jerome Christia and Aaron Ard (2016) in their research have found that demographic factors influence the outcomes of patient's perception of quality of service experience.

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Sukanta Saha and Yogesh C Joshi(2019) in their research have identified five important factors of customer satisfaction related to mobile industry such as prompt service delivery and responsiveness of service provider, high speed internet service, image of service provider, billing performance and customer support. Urooj Ahmad Siddiqui and M S Khan (2017) have found that demographic factors like gender, education, age, income have significant impact on customer satisfaction and its determinants in E retailing. Sukanta Saha and Yogesh C Joshi (2018) in their study have highlighted the role of 4G technology on the usage pattern of mobile users and service providers in India. Langley C. John & Holcomb Mary C. (1996) have found that companies have the chance to increase customer's satisfaction level by creating customer value like comparative net value, efficiency level, and feeling of differentiated services. Anderson E. W., Fornell C and Lehmann D. R. (1994), McDougall, G. H. and Levesque T. (2000), Ravald, A. and C. Gronroos (1996) concluded that perceived value is the prime determinant of customer satisfaction.

### III. OBJECTIVE

The objective of this research is to determine the association between various demographic factors like age, gender, marital status, annual income, qualification, occupation, locality of customers and attributes of satisfaction towards mobile services in Gujarat.

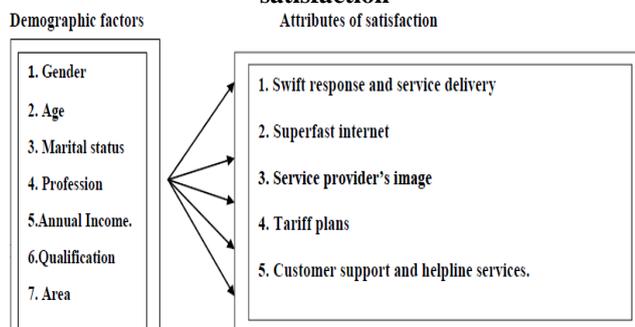
### IV. RESEARCH METHODOLOGY

To reach to the desired objective primary data sets were collected. A set of structured questionnaires were distributed among mobile services of Gujarat. The respondents with different gender, age, marital status, income, qualification, profession and locality. Questionnaires related to satisfaction analysis were focused on different attributes of satisfaction from mobile services as shown in Table 1

**Table 1 Details of the attributes related to satisfaction**

Sr No	Attributes
1	Prompt service delivery and responsiveness of service provider
2	High speed internet service
3	Image of service provider
4	Billing performance
5	Customer support

**Table 2 Demographic factors and attributes of satisfaction**



#### A. Research Hypothesis

H0: There is no significant association between demographic variables (Gender, Age, Marital Status, Profession, Annual Income, Qualification and Area) and their statistical

association with attributes of satisfaction among mobile users in Gujarat.

H1: There is significant association between demographic variables (Gender, Age, Marital Status, Profession, Annual Income, Qualification and Area) and their statistical association with attributes of satisfaction among mobile users in Gujarat.

#### B. Research Design

As the study is about finding out the statistical association of various demographic factors with various attributes of satisfaction among mobile users of Gujarat, the whole mobile user base of all the telecom operators in Gujarat are the prospective population. However, nearly 800 Samples were drawn from this population as per convenience.

The respondents were also picked based on different age, gender, marital status, income, locality, qualification and profession. The data thus collected helped in reaching to our desired objectives.

#### C. Data Collection Method

The primary data set were gathered using interception and interview of the respondents at various market area, colleges, retail stores, societies etc. as well as through email.

**Table 3 Zone wise distributions of respondents**

SR No	Zone	Count	Per cent
1	Central Zone	351	43.9
2	Saurashtra	202	25.3
3	North Zone	123	15.4
4	South Zone	124	15.5
	Total	800	100.0

Source: Primary data

Satisfaction of customer was captured using Likert Scale under 5- Point Scale System. Likert scale is generally a Five or Seven point scale. It is primarily used as one of the most basic psychometric tools in Social Science research. It is one of the mostly used tools for collecting data related to Perception, Attitudes, Values, Intentions, Habits and Behavior changes. In a Likert Scale, the objective of the research is for deriving the opinions/perceptions of participant's based on a predetermined scale and every element of Agreement or Disagreement is assigned a numeric code. It has been coded as "1 which stands for Strongly Disagree, 2 stands for Disagreed, 3 stands for Undecided, 4 stands for agreed and 5 stands for Strongly agreed."

### V. RESULTS AND DISCUSSIONS

The results are divided into three subsections A. Descriptive statistics B. ANOVA and C. Statistical independent T test.

#### A. Descriptive Statistics

Descriptive statistics described in Table 4 the frequency and percentage of profiles of the respondents. The demographic profiles of respondents according to variables like age, gender, marital status, profession, income, locality and qualification were tabulated.

**Table 4 Demographic Factors**

Factors	Particulars	Frequency	Percentage
Gender	Male	470	58.8
	Female	330	41.3
Area	Urban	370	46.2
	Semi urban	105	13.1
	Rural	325	40.6
Age	Less than equal to 12 years	25	3.1
	Between 13-25 years	212	26.5
	Between 26 to 40 years	249	31.1
	Between 41 to 60 years	232	29.0
	Greater than 60 years	82	10.3
Marital Status	Married	477	59.6
	Unmarried	323	40.4
Profession	Business man	152	19.0
	Government Job	124	15.5
	Private Job	194	24.3
	Retired person	26	3.3
	House wife	103	12.9
	Student	101	12.6
	Farmer	77	9.6
	Unemployed	23	2.9
Annual Income	Less than Rs.1 lakh	133	16.6
	Rs.1-3 lakh	124	15.5
	Rs.3-5 lakh	216	27.0
	Rs.5-10 lakh	163	20.4
	Above Rs.10 lakh	72	9.0
	Not earning	92	11.5
Qualification	Post Graduate	135	16.9
	Graduate	397	49.6
	Diploma/ITI	101	12.6
	Under graduate	167	20.9

Source:Primary data

**B. ANOVA Test**

**1. Association between customer satisfaction and age of the customers**

To check the association between age of customers and various attributes of customer satisfaction towards mobile services following hypothesis are assumed.

H0: There is no significant statistical association between age of the customers and their satisfaction level towards mobile services in Gujarat.

H1: There is significant statistical association between age of the customers and their satisfaction level towards mobile services in Gujarat.

**Table 5 Test of homogeneity of variance**

Factor	Attributes of Satisfaction	Levene Statistic	df1	df2	Sig.
1	Swift response and service delivery	19.551	4	795	.000
2	Superfast Internet	6.095	4	795	.000
3	Service Provider's image	51.486	4	795	.000
4	Tariff plans	7.495	4	795	.000
5	Customer support and helpline services	.975	4	795	.000

The test of homogeneity of variance above shows that equal variance of attributes of satisfaction are not assumed in all the attributes of satisfaction other than customer support and helpline services as significance value of all the attributes of satisfaction other than factor 5 are less than 0.05.Hence to check the association of age with attributes of satisfaction robust Welch and Brown –Forsythe tests were conducted on factor 1, 2, 3 and 4. For **factor 5**, ANOVA F test was conducted as equal variance is assumed.

**Table 6 Welch and Brown-Forsythe test**

Dependent variables	PosthocTest	Statistic <sup>a</sup>	df1	df2	Sig.	Inference
Swift response and service delivery (Factor 1)	Welch	8.059	4	157.222	.000	Association
	Brown-Forsythe	6.282	4	419.474	.000	Association
Superfast Internet (Factor 2)	Welch	29.380	4	229.981	.000	Association
	Brown-Forsythe	30.982	4	661.700	.000	Association
Service Provider's Image (Factor 3)	Welch	4.743	4	142.826	.001	Association
	Brown-Forsythe	3.859	4	162.826	.005	Association
Tariff plans (Factor 4)	Welch	13.297	4	151.112	.000	Association
	Brown-Forsythe	14.381	4	519.316	.000	Association

a. Asymptotically F distributed.

As per Welch and Brown-Forsythe test in Table 6, it is found that significance level (p value) of all the attributes of satisfaction are less than 0.05. Since significance values in the above table are less than 0.05, association of age with satisfaction factors 1, 2, 3 and 4 are proven. Hence null hypothesis is rejected and alternate hypothesis is accepted for these factors i.e. there is significant statistical association between age of the customers and their satisfaction level towards their mobile service providers in Gujarat when attributes of satisfaction like Swift response and service delivery, Superfast internet, Service provider's image and Tariff plans are considered.

**1.1. Post hoc test (Games-Howell):**

Games –Howell post hoc test is used for checking group wise association of age with satisfaction factors 1,2,3 and 4 as equal variance is not assumed in these cases. However in case of factor 5 i.e Customer support and helpline services Tukey post hoc test is used as equal variance is assumed.

**Table 7 Games-Howell Post hoc test**

	Age group1	Age group 2	Mean difference	Std error	Sig	95% confidence level	
						Lower bound	Upper bound
Factor 1	Less than 12 years	Between 41-60 years	0.352	0.109	0.020	0.0409	0.663
	Between 13-25 years	Between 41-60 years	0.415	0.077	0.000	0.202	0.627
	Between 26-40 years	Between 41-60 years	0.299	0.092	0.012	0.044	0.553
Factor 2	Less than 12 years	Between 13-25 years	0.861	0.0924	0.000	0.607	1.115
	Less than 12 years	Between 41-60 years	0.462	0.0788	0.000	0.245	0.679
	Between 13-25 years	Between 26-40 years	-0.799	0.095	0.000	-1.106	-0.537
	Between 13-25 years	Between 41-60 years	-0.390	0.108	0.002	-0.694	-0.102
	Between 13-25 years	Greater than 60 year	-0.507	0.103	0.000	-0.791	-0.224
Factor 3	Between 26-40 years	Between 41-60 years	0.400	0.082	0.000	0.174	0.626
	Between 13-25 years	Between 41-60 years	0.262	0.086	0.021	0.025	0.498
	Between 41-60 years	Greater than 60 year	-0.388	0.107	0.004	-0.685	-0.091
Factor 4	Less than 12 years	Between 26-40 years	-0.584	0.141	0.002	-0.989	-0.179
	Between 13-25 years	Between 26-40 years	-0.545	0.083	0.000	-0.775	-0.316
	Between 26-40 years	Between 41-60 years	0.462	0.062	0.000	0.199	0.726

The Post hoc analysis of age and attributes of satisfaction(factor 1,2,3 and 4) shows that there are significant statistical differences among the means of all age groups found and are shown in Table 7.

Since homogeneity of variance of Customer support and helpline services (Factor 5) is assumed, ANOVA F test is used in table 8 to check statistical association between age and customer support and helpline services.

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**Table 8 ANOVA to test association of age with satisfaction attribute Customer support and helpline services (factor 5)**

	Sum of Squares	df	Mean Square	F	Sig.	Inference
Between Groups	12.302	4	3.076	3.108	.015	Association
Within Groups	786.698	795	.990			
Total	799.000	799				

Since the significance value in Table 8 is less 0.05, thus the association of age with satisfaction attribute Customer support and helpline services is proven and hence null hypothesis is rejected for this factor i.e. there is significant statistical association between age of the customers and their satisfaction level towards mobile services in Gujarat when attribute of satisfaction Customer support and helpline services is considered.

## 1.2 Post hoc test (Tukey Test)

Tukey test is conducted for checking association of age with attribute of satisfaction i.e Customer support and helpline services as equal variance is assumed.

**Table 9 Tukey Post hoc test for factor 2**

	Age group1	Age group 2	Mean difference	Std error	Sig.	95% confidence level	
						Lower bound	Upper bound
Factor 2	Between 26-40 years	Between 41-60 years	-0.254	0.090	0.42	-0.502	-0.006

The above table 9 shows that significant statistical difference is present between means in age group 26-40 years and between 41-60 years when satisfaction attribute Customer support and helpline services is considered.

## 2. Association between customer satisfaction and income level of the respondents

To check the association between income of customers and customer satisfaction towards mobile services following hypothesis are assumed.

H0: There is no significant statistical association between income of the customers and their satisfaction level towards mobile services in Gujarat.

H1: There is significant statistical association between income of the customers and their satisfaction level towards mobile services in Gujarat.

**Table 10 Test of homogeneity of variance**

Factor	Attributes of Satisfaction	Levene Statistic	df1	df2	Sig.
1	Swift response and service delivery	13.964	5	794	.000
2	Superfast internet	10.869	5	794	.000
3	Service provider's image	13.839	5	794	.000
4	Tariff plans	6.796	5	794	.000
5	Customer support and helpline services	4.641	5	794	.000

The test of homogeneity of variance above shows that equal variance of attributes of satisfaction are not assumed as significance value of all the attributes of satisfaction are less than 0.05.Hence to check the association of income with factors of satisfaction further robust Welch and Brown –Forsythe tests were conducted as F test of ANOVA is not robust enough to be used.

**Table 11 Welch and Brown-Forsythe test**

Dependent Variables		Statistic <sup>a</sup>	df1	df2	Sig.	Inference
Swift response and service delivery(Factor 1)	Welch	12.338	5	310.436	.000	Association
	Brown-Forsythe	10.446	5	689.165	.000	Association
Superfast internet(Factor 2)	Welch	2.364	5	302.255	.040	Association
	Brown-Forsythe	2.213	5	556.533	.045	Association
Service provider's image(Factor 3)	Welch	.873	5	329.232	.499	Non Association
	Brown-Forsythe	.821	5	708.058	.535	Non Association
Tariff plans(Factor 4)	Welch	12.996	5	315.227	.000	Association
	Brown-Forsythe	12.524	5	584.933	.000	Association
Customer support and helpline services (Factor 5)	Welch	4.460	5	310.893	.001	Association
	Brown-Forsythe	4.949	5	659.781	.000	Association

a. Asymptotically F distributed.

As per Welch and Brown-Forsythe test in Table 11 , it is found that significance level (p value) of all the attributes of satisfaction are less than 0.05 in case of all the factors other than factor 3 i.e. service provider's image. Since significance values in the above table(factor 1,2,4 and 5) are less than 0.05, association of income with satisfaction factors 1,2,4 and 5 are proven. Hence null hypothesis is rejected and alternate hypothesis is accepted for these factors i.e there is significant statistical association between income of the customers and their satisfaction level towards mobile services when attributes of satisfaction like Swift response and service delivery, Superfast internet, Tariff plans and Customer support and helpline services are considered. However, in case of factor 3 i.e. service provider's image, null hypothesis is accepted i.e. there is no significant statistical association between income of the customers and their satisfaction level towards mobile services when attribute of satisfaction service provider's image is considered.

## 2.1 Post hoc test (Games-Howell):

Games –Howell post hoc test is used for checking group wise association of income with satisfaction factors 1, 2, 4 and 5 as equal variance is not assumed in these cases.

**Table 12 Games-Howell Post hoc test**

	Income group1	Income group 2	Mean difference	Std error	Sig.	95% confidence level	
						Lower bound	Upper bound
Factor 1	Less than 1 lakh	Between 1-3 lakhs	-0.495	0.134	0.004	-0.088	-0.11
	Less than 1 lakh	Above 10 lakhs	-0.836	0.130	0.000	-1.213	-0.460
	Between 1-3 lakhs	Between 5-10 lakhs	0.423	0.129	0.015	0.051	0.794
Factor 2	Between 3-5 lakhs	Above 10 lakhs	-0.563	0.105	0.000	-0.868	-0.259
	Between 5-10 lakhs	Between 1-3 lakhs	0.357	0.114	0.023	0.0299	0.685
Factor 4	Less than 1 lakh	Between 1-3 lakhs	0.692	0.155	0.000	0.245	1.137
	Less than 1 lakh	Above 10 lakhs	0.368	0.133	0.000	0.182	0.953
	Between 1-3 lakhs	Between 5-10 lakhs	-0.743	0.129	0.000	-1.11	-0.372
Factor 5	Between 3-5 lakhs	Above 10 lakhs	0.405	0.082	0.000	0.168	0.643
	Less than 1 lakh	Between 1-3 lakhs	-0.508	0.138	0.004	-0.906	-0.110
	Between 1-3 lakhs	Between 3-5 lakhs	0.410	0.115	0.006	0.077	0.743
	Between 1-3 lakhs	Between 5-10 lakhs	0.377	0.119	0.022	0.034	0.720

The Post hoc analysis of income and attributes of satisfaction(factor 1,2,4 and 5) shows that there are significant statistical differences among the means of all income groups when satisfaction factors 1,2,4 and 5 are considered and are shown in Table 12.

## 3. Association between customer satisfaction and qualification of the respondents

To check the association between qualification of customers and customer satisfaction towards mobile services in Gujarat following hypothesis are assumed.

H0: There is no significant association between qualification of the customers and their satisfaction level towards mobile services in Gujarat.

H1: There is significant association between qualification of the customers and their satisfaction level towards mobile services in Gujarat.

**Table 13 Test of homogeneity of variance**

Factor	Attributes of Satisfaction	Levene Statistic	df1	df2	Sig.
1	Swift response and service delivery	6.994	3	796	.000
2	Superfast internet	6.776	3	796	.000
3	Service provider's image	6.217	3	796	.000
4	Tariff plans	5.119	3	796	.002
5	Customer support and helpline services	5.351	3	796	.001

The test of homogeneity of variance above shows that equal variance of attributes of satisfaction are not assumed as significance values of all the attributes of satisfaction are less than 0.05. Hence to check the association of qualification with attributes of satisfaction further robust Welch and Brown –Forsythe tests were conducted as F test of ANOVA is not robust enough to be used.

**Table 14 Welch Brown-Forsythe Test**

Dependent Variables		Statistic <sup>a</sup>	df1	df2	Sig.	Inference
Swift response and service delivery (Factor 1)	Welch	8.947	3	309.271	.000	Association
	Brown-Forsythe	8.549	3	569.872	.000	Association
Superfast internet (Factor 2)	Welch	.631	3	293.983	.596	Non Association
	Brown-Forsythe	.725	3	546.223	.538	Non Association
Service provider's image (Factor 3)	Welch	7.175	3	305.467	.000	Association
	Brown-Forsythe	6.987	3	584.229	.000	Association
Tariff plans (Factor 4)	Welch	8.963	3	276.797	.000	Association
	Brown-Forsythe	7.949	3	449.715	.000	Association
Customer support and helpline services (Factor 5)	Welch	27.797	3	312.150	.000	Association
	Brown-Forsythe	34.541	3	560.378	.000	Association

a. Asymptotically F distributed.

As per Welch and Brown-Forsythe test in Table 14, it is found that significance level (p value) of all the attributes of satisfaction are less than 0.05 in case of all the factors other than factor 2 i.e. Superfast Internet. Since significance values in the above table are less than 0.05, association of qualification with satisfaction factors 1,3,4 and 5 are proven. Hence null hypothesis is rejected and alternate hypothesis is accepted for these factors i.e. there is significant statistical association between qualification of the customers and satisfaction level towards mobile services when attributes of satisfaction like Swift response and service delivery, Service provider's image, Tariff plans and Customer support and helpline services are considered. However, in case of factor 2 i.e. Superfast internet, null hypothesis is accepted i.e. there is no significant statistical association between qualification of the customers and their satisfaction level towards mobile services when attribute of satisfaction superfast internet is considered.

**3.1 Post hoc test (Games-Howell):**

Games –Howell post hoc test is used for checking group wise association of qualification with satisfaction factors 1, 3, 4 and 5 as equal variance is not assumed in these cases.

**Table 15 Games-Howell Post hoc test**

	Qualification group 1	Qualification group 2	Mean difference	Std error	Sig.	95% confidence level	
						Lower bound	Upper bound
Factor 1	Post graduate	Under graduate	0.393	0.113	0.003	0.100	0.686
	Graduate	Under graduate	0.414	0.086	0.000	0.190	0.638
	Dipoloma	Under graduate	0.413	0.102	0.000	0.149	0.677
Factor 3	Post graduate	Diploma	-0.497	0.118	0.000	-0.801	-0.190
	Post graduate	Under graduate	-0.409	0.108	0.001	-0.689	-0.129
Factor 4	Graduate	Post graduate	0.254	0.098	0.049	0.001	0.507
	Graduate	Diploma	0.413	0.121	0.005	0.096	0.729
	Graduate	Under graduate	0.389	0.086	0.000	0.166	0.613
Factor 5	Dipoloma	Graduate	-0.413	0.121	0.005	-0.729	-0.096
	Post graduate	Graduate	0.844	0.102	0.000	0.580	1.10
	Post graduate	Diploma	0.538	0.111	0.000	0.249	0.827
	Post graduate	Under graduate	0.890	0.110	0.000	0.604	1.17
	Graduate	Diploma	-0.305	0.084	0.002	-0.525	-0.086

The Post hoc analysis of qualification and attributes of satisfaction (factor 1,3,4 and 5) shows that there are significant statistical differences among the means of respondents with various qualification when satisfaction factors 1,3,4 and 5 are considered and are shown in Table 15.

**4. Association between customer satisfaction and profession of the customers**

To check the association between profession of customers and customer satisfaction towards mobile services following hypothesis are assumed.

H0: There is no significant association between profession of the customers and their satisfaction level towards mobile services in Gujarat.

H1: There is significant association between profession of the customers and their satisfaction level towards mobile services in Gujarat.

**Table 16 Test of homogeneity of variance**

Factor	Attributes of satisfaction	Levene Statistic	df1	df2	Sig.
1	Swift response and service delivery	7.139	7	792	.000
2	Superfast internet	7.598	7	792	.000
3	Service provider's image	24.251	7	792	.000
4	Tariff plans	4.680	7	792	.000
5	Customer support and helpline services	10.657	7	792	.000

The test of homogeneity of variance above shows that equal variance of attributes of satisfaction are not assumed as significance value of all the attributes of satisfaction are less than 0.05. Hence to check the association of qualification with attributes of satisfaction further robust Welch and Brown –Forsythe tests were conducted as F test of ANOVA is not robust enough to be used.

**Table 17 Welch Brown-Forsythe Test**

Dependent Variables		Statistic <sup>a</sup>	df1	df2	Sig.	Inference
Swift response and service delivery (Factor 1)	Welch	14.839	7	187.822	.000	Association
	Brown-Forsythe	12.681	7	228.718	.000	Association
Superfast internet (Factor 2)	Welch	7.398	7	190.644	.000	Association
	Brown-Forsythe	2.855	7	352.044	.007	Association
Service provider's image (Factor 3)	Welch	10.600	7	184.266	.000	Association
	Brown-Forsythe	7.837	7	150.745	.000	Association
Tariff plans (Factor 4)	Welch	3.705	7	178.020	.001	Association
	Brown-Forsythe	3.792	7	292.476	.001	Association
Customer support and helpline services (Factor 5)	Welch	17.382	7	190.512	.000	Association
	Brown-Forsythe	7.707	7	126.271	.000	Association

a. Asymptotically F distributed.



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As per Welch and Brown-Forsythe test in Table 17, it is found that significance level (p value) of all the attributes of satisfaction are less than 0.05 in case of all the factors. Since significance values in the above table are less than 0.05, association of profession with satisfaction factors 1,2,3,4 and 5 are proven. Hence null hypothesis is rejected and alternate hypothesis is accepted for these factors i.e. there is significant statistical association between profession of the customers and their satisfaction level towards mobile services when attributes of satisfaction like Swift response and service delivery, Superfast internet, Service provider's image, Tariff plans and Customer support and helpline services are considered.

### 4.1 Post hoc test (Games-Howell):

Games –Howell post hoc test is used for checking group wise association of qualification with satisfaction factors 1, 2, 3, 4 and 5 as equal variance is not assumed in these cases.

**Table 18 Games-Howell Post hoc test**

	Profession group1	Profession group 2	Mean difference	Std error	Sig	95% confidence level	
						Lower bound	Upper bound
Factor 1	Business man	Private Job	0.460	0.093	0.000	0.175	0.745
	Business man	House wife	0.917	0.117	0.000	0.558	1.277
	Business man	Farmer	0.787	0.121	0.000	0.414	1.161
	Government Job	House wife	0.720	0.142	0.000	0.282	1.157
	Government Job	Farmer	0.590	0.146	0.002	0.142	1.039
	Private Job	House wife	0.456	0.111	0.002	0.113	0.800
	Private Job	Unemployed	-0.333	0.075	0.022	-0.643	-0.030
	House wife	Student	-0.825	0.128	0.000	-1.129	-0.432
Factor 2	Business man	Unemployed	-0.561	0.102	0.000	-0.880	-0.209
	Private Job	Unemployed	-0.545	0.097	0.000	-0.839	-0.251
	House wife	Unemployed	-0.255	0.140	0.001	-1.061	-0.174
Factor 3	Business man	Government Job	-0.278	0.081	0.016	-0.296	1.331
	Business man	Retired	-0.368	0.096	0.006	-0.668	-0.068
	Business man	Student	0.561	0.137	0.002	0.138	0.984
Factor 4	Government Job	Private Job	0.343	0.094	0.009	0.053	0.633
	Government Job	Student	0.840	0.128	0.000	0.443	1.236
	Government Job	Farmer	0.423	0.098	0.001	0.119	0.726
	Private Job	Student	0.497	0.146	0.018	0.049	0.944
	Business man	Student	-0.429	0.129	0.023	-0.825	-0.033
	Private Job	Farmer	0.400	0.127	0.041	0.008	0.793
	Student	Business man	0.429	0.129	0.023	0.033	0.825
	Student	Farmer	0.610	0.152	0.002	0.141	1.071
Factor 5	Business man	Private Job	0.423	0.099	0.001	0.120	0.725
	Business man	Farmer	0.439	0.120	0.009	0.068	0.810
	Business man	Unemployed	0.761	0.093	0.000	0.467	1.055
	Government Job	Farmer	0.666	0.130	0.000	0.265	1.067

The Post hoc analysis of qualification and attributes of satisfaction (factor 1,2,3,4 and 5) shows that there are significant statistical differences among the means of respondents with various profession when satisfaction factors 1,2,3,4 and 5 are considered and are shown in Table 18.

### 5. Association between customer satisfaction and area/locality of the customers

To check the association between locality of customers and various attributes of customer satisfaction towards mobile services following hypothesis are assumed.

H0: There is no significant statistical association between locality of the customers and their satisfaction level towards mobile services in Gujarat.

H1: There is significant statistical association between locality of the customers and their satisfaction level towards mobile services in Gujarat.

### Table 19 Test of homogeneity of variance

Factor	Attributes of Satisfaction	Levene Statistic	df1	df2	Sig.
1	Swift response and service delivery	8.315	2	797	.000
2	Superfast internet	3.700	2	797	.025
3	Service provider's image	.246	2	797	.782
4	Tariff plans	3.097	2	797	.046
5	Customer support and helpline services	11.550	2	797	.000

The test of homogeneity of variance above shows that equal variance of attributes of satisfaction are not assumed in all the attributes of satisfaction other than service provider's image as significance value of all the attributes of satisfaction other than factor 3 are less than 0.05. Hence to check the association of locality with attributes of satisfaction robust Welch and Brown –Forsythe tests were conducted for factor 1, 2, 4 and 5. For factor 3, ANOVA F test was conducted as equal variance is assumed.

**Table 20 Welch Brown-Forsythe test**

Dependent Variables		Statistic <sup>a</sup>	df1	df2	Sig.	Inference
Swift response and service delivery (Factor 1)	Welch	2.500	2	196.231	.085	Non Association
	Brown-Forsythe	2.633	2	281.515	.074	Non Association
Superfast Internet(Factor 2)	Welch	2.840	2	187.012	.061	Non Association
	Brown-Forsythe	2.546	2	231.043	.081	Non Association
Tariff plans (Factor 4)	Welch	10.332	2	211.257	.000	Association
	Brown-Forsythe	10.425	2	437.125	.000	Association
Customer support and helpline services (Factor 5)	Welch	2.171	2	191.452	.117	Non Association
	Brown-Forsythe	1.953	2	238.457	.144	Non Association

a. Asymptotically F distributed.

As per Welch and Brown-Forsythe test in Table 20, it is found that significance level (p value) of all the attributes of satisfaction other than factor 4 i.e. tariff plan is greater than 0.05. Since significance values of satisfaction factors 1,2 and 5 in the above table are greater than 0.05, association of locality with satisfaction factors 1,2 and 5 are not proven. Hence null hypothesis is accepted and alternate hypothesis is rejected for these factors i.e. there is no significant statistical association between locality of the customers and their satisfaction level towards mobile services when attributes of satisfaction like Swift response and service delivery, Superfast internet and customer support and helpline services are considered. However, for factor 4 i.e. tariff plans, null hypothesis is rejected and alternate hypothesis is accepted i.e. customer locality has statistical significant association with tariff plans.

### 5.1 Post hoc test (Games-Howell):

Games –Howell post hoc test is used for checking group wise association of locality with satisfaction factors 4 as equal variance is not assumed in this case.

**Table 21 Games-Howell Post hoc test**

	Locality group1	Locality group 2	Mean difference	Std error	Sig	95% confidence level	
						Lower bound	Upper bound
Factor 4	Urban	Semi urban	0.408	0.104	0.000	0.160	0.656
	Urban	Rural	0.255	0.076	0.003	0.075	0.435

The Post hoc analysis of locality of customers and attributes of satisfaction (factor 4) shows that there are significant statistical differences among the means of customers of different locality as shown in Table 21.

Since homogeneity of variance of service provider’s image (Factor 3) is assumed, ANOVA F test is used to check statistical association between locality and Service provider’s image.

**Table 22 ANOVA to test association of locality with satisfaction attribute service provider’s image (factor 3)**

	Sum of Squares	df	Mean Square	F	Sig.	Inference
Between Groups	2.729	2	1.365	0.256		Non Association
Within Groups	796.271	797	.999			
Total	799.000	799				

Since the significance value in Table 22 is greater than 0.05, thus the association of locality with satisfaction attribute service provider’s image is not proven and hence null hypothesis is accepted for this factor i.e. there is no significant statistical association between locality of the customers and their satisfaction level towards mobile services when attributes of satisfaction service provider’s image is considered.

**C. Independent samples T Test**

**1. Association of customer satisfaction and gender of the respondents**

To check the association between gender of the customers and various attributes of customer satisfaction towards mobile services following hypothesis are assumed.

H0: There is no significant statistical association between gender of the customers and their satisfaction level towards mobile services in Gujarat.

H1: There is significant statistical association between gender of the customers and their satisfaction level towards mobile services in Gujarat.

**Table 23 Independent samples T Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means			Inference
		F	Sig.	T	df	Sig. (2-tailed)	
Swift response and service delivery(factor 1)	Equal variances assumed	13.941	.000	7.946	798	.000	Association
	Equal variances not assumed			7.691	621.161	.000	
Superfast internet (Factor 2)	Equal variances assumed	3.777	.052	-2.963	798	.003	Association
	Equal variances not assumed			-2.905	656.049	.004	
Service provider’s image(factor 3)	Equal variances assumed	11.169	.001	-5.336	798	.000	Association
	Equal variances not assumed			-5.425	747.076	.000	
Tariff plans (factor 4)	Equal variances assumed	3.604	.058	-1.392	798	.164	Non association
	Equal variances not assumed			-1.413	742.669	.158	
Customer support and helpline services (Factor 5)	Equal variances assumed	12.822	.000	1.015	798	.310	Non association
	Equal variances not assumed			1.047	773.288	.295	

Table 23 shows that significance value (p value) of all the attributes of satisfaction other than factor 4 and 5 i.e. tariff plans and customer support and helpline services are less than 0.05. Since significance values of satisfaction factors 1, 2 and 3 in the above table are less than 0.05, association of gender with satisfaction factors 1, 2 and 3 are proven. Hence null hypothesis is rejected and alternate hypothesis is accepted for these factors i.e there is significant statistical association between gender of the customers and their satisfaction level towards their mobile service providers in Gujarat when attributes of satisfaction like Swift response and service delivery, Superfast internet and tariff plans are considered. However, for factor 4 and 5 i.e. tariff plans and customer

support and helpline services ,null hypothesis is accepted and alternate hypothesis is rejected i.e. customer gender has no statistical significant association with tariff plans and customer support and helpline services.

**2. Association of customer satisfaction and marital status of the respondents**

To check the association between marital status of the customers and various attributes of customer satisfaction towards mobile service providers following hypothesis are assumed.

H0: There is no significant statistical association between marital status of the customers and their satisfaction level towards mobile services in Gujarat.

H1: There is significant statistical association between marital status of the customers and their satisfaction level towards mobile services in Gujarat.

**Table 24 Independent samples T Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means			Inference
		F	Sig.	T	df	Sig. (2-tailed)	
Swift response and service delivery (factor 1)	Equal variances assumed	.094	.760	-.454	798	.650	Non association
	Equal variances not assumed			-.460	718.985	.646	
Superfast internet (Factor 2)	Equal variances assumed	1.915	.167	-1.685	798	.092	Non association
	Equal variances not assumed			-1.656	648.522	.098	
Service provider’s image(factor 3)	Equal variances assumed	8.792	.003	1.673	798	.095	Non association
	Equal variances not assumed			1.634	633.465	.103	
Tariff plans(factor 4)	Equal variances assumed	.068	.794	-1.570	798	.117	Non association
	Equal variances not assumed			-1.547	655.313	.122	
Customer support and helpline services(factor 5)	Equal variances assumed	15.810	.000	.314	798	.753	Non association
	Equal variances not assumed			.322	747.550	.747	

Table 24 shows that significance value (p value) of all the attributes of satisfaction are greater than 0.05. Since all significance values of satisfaction factors 1, 2, 3, 4 and 5 in the above table are greater than 0.05, association of marital status with satisfaction factors are not proven. Hence null hypothesis is accepted and alternate hypothesis is rejected for these factors i.e. there is no significant statistical association between marital status of the customers and their satisfaction level towards mobile services in Gujarat when attributes of satisfaction like Swift response and service delivery, Superfast internet, service provider’s image, tariff plans and customer support and helpline services are considered.

**VI. CONCLUSION AND SUGGESTIONS**

From the results of the analysis, it is found the attributes of satisfaction towards mobile services in Gujarat are statistically associated with age. As far as income is concerned, significant statistical associated is observed between all attributes of satisfaction other than service provider’s image. From the analysis, it is also found that qualification has significant statistical association with factors of satisfaction of mobile users in Gujarat other than Superfast internet. Profession of the mobile users in Gujarat has shown significant statistical association with all the attributes of satisfaction.



# Impact of Various Demographic Factors on Customer Satisfaction in Telecommunication Sector

Further locality of the mobile users has not shown any significant statistical association with customer satisfaction other than tariff plans. Marital status of the respondents has shown no association with satisfaction level, however, gender has shown significant association in cases of attributes of satisfaction like Swift service delivery and response of the service provider, Superfast internet and service provider's image. The results have shown significant statistical association towards customer satisfaction as far as mobile industry in Gujarat is concerned. The associations of these variables can be quite handy for the telecom service providers to chalk out innovative marketing and retention strategies in this cut throat hyper competitive telecom market, where the telecom players are struggling to retain and gain customers. Further the results can also be a path finder for the regulators to devise new regulations which can create a harmonious and balanced telecom eco system.

## VII. LIMITATIONS

The study is focused on mobile users of Gujarat due to constraint of time and resources. Gujarat is considered as one of the developed states in India. However, with more samples across other states of India which are lagging behind in development front, the results could have been more realistic.

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