

PROJECT ON TELECOM **COMPANIES**

OBJECTIVE

The aim of our project is to determine the most preferred telecom network amongst students in the age group 18-25.

AUTHORS

Komal Saini	41
Sahiba Kaur	48
Faeem Saifi	07
Abhishek Kumar	12

DATE: 28.10.2016

THE ABSTRACT

In order to determine the most preferred telecom network amongst students in the age group 18-25, our team conducted a survey and collected a sample. The size of the sample is 95 after removing outliers. The method of sampling used here is SRSWOR i.e. Simple Random Sampling Without Replacement. Here, we have qualitative variables with more than 2 sub options, thus we used multinomial logit model, where telecom companies were dependent variable and ratings and expenditure on calls & data are independent variables.

So, using SPSS we modelled the data, and for analyzing dual sim users & reasons for it we used SPSS tool called CROSSTABS & Bar chart. For inferring “RELIANCE JIO” impact, we used pie chart. Hypothesis Testing was also done to check if average monthly call & data expenditure for Airtel and Vodafone users is significant or insignificant. After all the analysis techniques we found that Vodafone is coming out to be most preferred network among the students of age group 18-25, whether it is for primary sim or for dual sim.

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INTRODUCTION

The objective of our project is to determine the most preferred telecom network amongst students in the age group 18-25. There were two fundamental reasons that motivated us to choose this topic for our project. Firstly, a mobile phone has become one of the most used commodities of our times, especially for students with each consumer having different needs. Secondly, the announcement of Reliance Jio, which astounded everyone with its consumer friendly tariff plans made us surer about choosing this topic. The telecom network companies that we have involved in our analysis (mainly) are, Airtel, Vodafone, Aircel, Idea and Reliance.

To start with our project, we chose our relevant target population and built up a concise, easy to understand questionnaire which helped us to get all the required information. In order to make inferences from the collected data, we applied some data representation tools and concepts of econometric modeling and hypothesis testing. For data representation, we made relevant pie charts, line graphs and crosstabs. For performing statistical analysis, firstly we used multinomial logit modeling to build a regression model for our data (due to presence of qualitative variables) and in order to draw further inferences from our model, we performed various hypothesis testing procedures like Z-test and chi-square test.

METHODOLOGY

➤ DATA COLLECTION

To fulfill our objective, our first step was the identification of the population and frame. The population that we drew our sample from comprises of the students in the age group 18-25 who are active mobile users. Thus, here, each student in the age group 18-25, is a unit. To proceed with the data collection part, we started with creating a comprehensible questionnaire, given as follows, which would provide us the desired information.

QUESTIONS 1 TO 6 are to be answered for primary sim only.

Name

1. Which of them is your mobile network operator?*

- VODAFONE
- AIRTEL
- IDEA
- AIRCEL
- RELIANCE
- ANY OTHER

2. How much are you spending on voice call per month? *

- Rs.0-100
- Rs.100-200
- Rs.200-500
- Rs.500-1000
- more than Rs.1000

3. How much are you spending on the data card (internet) per month?*

- Rs.0-100
- Rs.100-200
- Rs.200-500
- Rs.500-1000
- more than Rs.1000

4. Rate your operator in terms of voice call network (connectivity).*

Lowest

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

Highest

5. Rate your operator in terms of internet network (connectivity + speed).*

Lowest

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

Highest

6. Rate your overall satisfaction level (including prices, schemes, customer service)*

Lowest

- 1
- 2
- 3
- 4
- 5
- 6
- 7

- 8
- 9
- 10

Highest

7. How much does the RELIANCE JIO campaign sounds appealing to you?*

- not really
- somewhat
- very

8. Are you a dual sim user?*

- yes
- no

If yes then select the operator.

- VODAFONE
- AIRTEL
- IDEA
- AIRCEL
- RELIANCE
- ANY OTHER

9. Reason for using secondary sim:

(Can select more than one option)

- For data pack schemes
- For voice call/msgs schemes.
- Due to requirement of local number
- Other _____ (specify).
-

We used Simple Random Sampling Without Replacement (SRSWOR) technique for collecting our sample.

- What? – SRSWOR is a technique of selecting a sample where each unit has equal chance of being selected in the sample and each time a unit is drawn in the sample, it is not replaced back in the population.
- Why? - Simple random sampling is the simplest and an easy to comprehend sampling technique. Also, we chose SRSWOR over simple random sampling with

replacement (SRSWR) because it is a better technique in terms of lowering the variance of the estimator.

- How?- After selecting our target population i.e. ,students in the age group 18-25 who are active mobile users, we carried out our survey using the questionnaire provided above, through Google Forms and received 102 responses in total.

▪ **PROBLEMS ENCOUNTERED**

There were some discrepancies in our collected data. Some respondents provided irrelevant answers to questions. Also, in order to apply multinomial logit method to build our model, we had to make sure our data doesn't contain outliers. So we removed some responses from our data for to build an accurate model. Further, data corresponding to all companies besides Airtel and Vodafone are very few, so we performed hypothesis testing only for these two companies.

RESULTS & DISCUSSIONS

- Developing an appropriate model.

To draw inferences from our data and reach to a decision of most preferred telecom network, our first step was to develop a model that would represent our data the best. The decision of the most preferred network is taken on the basis of the data provided by the respondent for primary sim only. The variables involved in our analysis are:-

DEPENDENT VARIABLE

Operator: It represents the telecom network companies. This variable can take 5 values, namely, Vodafone, Airtel, Reliance, Idea, Aircel and Any other.

INDEPENDENT VARIABLES

1. **call_rate**: It represents the average monthly expenditure of a student on calls.(continuous variable)
2. **net_rate**: It represents the average monthly expenditure of a student on data packs. (continuous variable)
3. **call_rating**: It represents the satisfaction rating given by the student to a particular telecom network for calling facilities. It ranges from 1-10 with 1 meaning highly dissatisfied and 10 meaning highly satisfied. (discrete variable)

4. **net_rating**: It represents the satisfaction rating given by the student to a particular telecom network for internet facilities. It ranges from 1-10 with 1 meaning highly dissatisfied and 10 meaning highly satisfied. (discrete variable)
5. **overall_rating**: It represents the satisfaction rating given by the student to a particular telecom network for prices, schemes, customer service. It ranges from 0-10 with 0 meaning highly dissatisfied and 10 meaning highly satisfied. (discrete variable)

Our next step was the choice of an appropriate method to develop the model. Because our dependent as well as many independent variables are qualitative in nature, with each variable having for than two possibilities, we opted for *the multinomial logit regression model*. The assumptions for using this model are:-

- **Assumption #1**: The dependent variable should be measured at the qualitative variable.
- **Assumption #2**: There should be one or more independent variables that may be continuous or qualitative.
- **Assumption #3**: There should be independence of observations and the dependent variable should have mutually exclusive and exhaustive categories.
- **Assumption #4**: There should be no multicollinearity.
- **Assumption #5**: There needs to be a linear relationship between any continuous independent variables and the logit transformation of the dependent variable.
- **Assumption #6**: There should be no outliers, high leverage values or highly influential points.

To make our data appropriate for fitting a multinomial logistic model, we made a few alterations:-

1. Our data initially contained 2 outliers in terms of monthly data and call expenditure. Consequently, they were removed. After removal of outliers and irrelevant data, we were left with 95 responses.
2. As one can see from the description of the variables, there is a relationship between each pair of variables. Such a relationship sometimes leads to multicollinearity. So, to check whether their interrelationship will affect our analysis or not, we carried out multiple multinomial logit regressions, each time including different combinations of variables. Most regressions

were coming out to be insignificant besides the one excluding only the net_rating. Thus, the variable net_rating was dropped from our model.

All of the computational work was carried out using SPSS and Microsoft Excel.

The final data is given as follows in Table 1.

TABLE 1

Operator	call_rate	net_rate	call_rating	overall_rating
AIRTEL	3	2	7	8
VODAFONE	3	4	8	7
AIRTEL	2	3	8	7
AIRTEL	1	2	5	4
AIRCEL	1	2	5	7
VODAFONE	2	2	10	9
AIRTEL	1	2	6	8
VODAFONE	1	1	7	7
AIRTEL	3	1	8	5
AIRTEL	2	1	9	8
RELIANCE	1	2	6	6
AIRTEL	4	1	7	8
AIRTEL	3	1	3	3
IDEA	3	1	9	9
RELIANCE	2	3	4	4
VODAFONE	2	1	8	6
AIRTEL	1	3	8	4
AIRTEL	4	4	9	8
VODAFONE	2	1	9	5
IDEA	3	3	8	7
VODAFONE	1	4	6	5
VODAFONE	3	2	7	7
VODAFONE	2	2	8	7
AIRTEL	3	3	6	7
AIRTEL	2	1	8	6
AIRTEL	4	3	8	3
AIRTEL	3	3	8	8
VODAFONE	2	2	9	8
VODAFONE	3	1	8	8
RELIANCE	3	3	6	7
AIRCEL	3	1	8	7
VODAFONE	3	2	7	7

VODAFONE	3	1	7	7
ANY OTHER	3	2	7	6
VODAFONE	1	1	5	5
VODAFONE	1	1	5	6
VODAFONE	3	2	7	6
VODAFONE	3	2	7	7
VODAFONE	3	3	6	7
AIRTEL	3	1	10	7
VODAFONE	2	3	10	10
VODAFONE	3	3	10	10
AIRTEL	2	3	8	8
AIRTEL	2	2	7	5
IDEA	2	2	7	6
IDEA	3	1	9	7
VODAFONE	2	2	4	4
VODAFONE	3	2	4	6
AIRTEL	3	1	7	7
VODAFONE	3	1	8	9
RELIANCE	1	1	7	6
AIRTEL	3	3	7	6
VODAFONE	3	2	5	5
AIRTEL	3	3	5	5
AIRTEL	3	3	8	7
AIRTEL	3	1	9	7
AIRTEL	3	4	9	8
AIRTEL	3	3	8	8
AIRTEL	3	3	7	5
VODAFONE	3	3	7	7
AIRTEL	1	1	7	6
IDEA	2	2	9	5
AIRTEL	1	1	9	4
IDEA	4	3	8	7
VODAFONE	2	1	9	9
AIRTEL	4	4	6	8
AIRTEL	2	3	7	5
AIRTEL	3	3	8	9
AIRCEL	2	1	6	6
AIRTEL	3	3	9	8
VODAFONE	1	2	5	6
AIRTEL	3	1	3	2
VODAFONE	2	1	7	7

AIRTEL	1	1	8	7
VODAFONE	2	1	4	4
AIRTEL	3	1	9	6
VODAFONE	3	4	8	6
AIRTEL	3	1	8	5
VODAFONE	3	3	10	7
RELIANCE	1	1	10	6
VODAFONE	2	1	8	8
AIRTEL	2	3	7	7
AIRTEL	2	3	9	9
AIRTEL	3	2	8	4
VODAFONE	3	1	4	2
VODAFONE	3	3	3	5
AIRTEL	1	1	8	6
AIRTEL	3	4	6	5
AIRTEL	3	3	6	5
VODAFONE	3	1	7	7
VODAFONE	3	3	6	6
VODAFONE	1	2	3	7
VODAFONE	4	3	8	8
VODAFONE	1	3	9	8
VODAFONE	3	4	3	3

Here the following codes are used for expenditures

- Rs.0-100 1
- Rs.100-200 2
- Rs.200-500 3
- Rs.500-1000 4

After fitting our model to the data, we got the following results as shown in Table 2.1

TABLE 2.1

Case Processing Summary			
		N	Marginal Percentage
operator	AIRCEL	3	3.2%
	AIRTEL	41	43.2%
	ANY OTHER	1	1.1%
	IDEA	6	6.3%
	RELIANCE	5	5.3%
	VODAFONE	39	41.1%
call_rating	3.00	5	5.3%
	4.00	5	5.3%
	5.00	7	7.4%
	6.00	11	11.6%
	7.00	21	22.1%
	8.00	25	26.3%
	9.00	15	15.8%
	10.00	6	6.3%
overall_rating	2.00	2	2.1%
	3.00	3	3.2%
	4.00	7	7.4%
	5.00	14	14.7%
	6.00	18	18.9%
	7.00	27	28.4%
	8.00	16	16.8%
	9.00	6	6.3%
	10.00	2	2.1%
Valid		95	100.0%
Missing		57	
Total		152	
Subpopulation		82 ^a	

TABLE 2.2

• **Model Fitting Information**

	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	218.067			
Final	106.849	111.217	85	.030

To get an overall measure of our model we need to consider the statistics presented in the **Model Fitting Information** table,

The "**Final**" row presents information on whether the coefficients are statistically significant. Another way to consider this result is whether the variables you added statistically significantly improve the model compared to the intercept alone (i.e., with no variables added). **As $p=0.30 < 0.05$, it means that the full model statistically significantly predicts the dependent variable better than the intercept-only model alone.**

TABLE 2.3

• **Goodness-of-Fit**

	Chi-Square	df	Sig.
Pearson	115.705	320	1.000
Deviance	95.288	320	1.000

The **Goodness-of-Fit** table provides two measures that can be used to assess how well the model fits the data. A statistically significant result (i.e., $p < .05$) indicates that the model does not fit the data well. Thus, from the table, as p -values for both statistics > 0.05 , **our model fits the data well.**

TABLE 2.4

• **Likelihood Ratio Tests**

Effect	Model Fitting Criteria	Likelihood Ratio Tests

	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	1.068E2	.000	0	.
data_rate	1.306E2	23.741	5	.000
call_rate	1.240E2	17.169	5	.004
call_rating	176.543	69.693	35	.000
overall_rating	166.454	59.604	40	.024

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

- a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.
- b. Unexpected singularities in the Hessian matrix are encountered. This indicates that either some predictor variables should be excluded or some categories should be merged.

This table shows which of the variables are statistically significant. **As p value for all the variables <0.05, they all are statistically significant.**

TABLE 2.5 **Parameter Estimates**

operator ^a		B	Std. Error	Wald	df	Sig.	Exp(B)
AIRCEL	Intercept	174.846	15209.775	.000	1	.991	
	data_rate	-79.773	1998.416	.002	1	.968	2.265E-35
	call_rate	14.894	1175.911	.000	1	.990	2939493.013
	[call_rating=3.00]	108.916	13533.031	.000	1	.994	2.003E47
	[call_rating=4.00]	29.049	.000	.	1	.	4.129E12
	[call_rating=5.00]	141.355	8797.310	.000	1	.987	2.452E61
	[call_rating=6.00]	164.167	8742.164	.000	1	.985	1.980E71
	[call_rating=7.00]	2.011	8838.002	.000	1	1.000	7.471
	[call_rating=8.00]	34.395	8441.240	.000	1	.997	8.663E14
	[call_rating=9.00]	2.183	9674.969	.000	1	1.000	8.870
	[call_rating=10.00]	0 ^c	.	.	0	.	.
	[overall_rating=2.00]	-251.528	.000	.	1	.	5.791E-110

	[overall _rating =3.00]	-266.136	15824.982	.000	1	.987	2.622E- 116
	[overall _rating =4.00]	-172.438	15424.475	.000	1	.991	1.291E- 75
	[overall _rating =5.00]	-266.311	15162.478	.000	1	.986	2.201E- 116
	[overall _rating =6.00]	-264.588	15105.090	.000	1	.986	1.232E- 115
	[overall _rating =7.00]	-158.115	14841.000	.000	1	.991	2.145E- 69
	[overall _rating =8.00]	-209.957	15494.191	.000	1	.989	6.560E- 92
	[overall _rating =9.00]	-191.121	16306.472	.000	1	.991	9.934E- 84
	[overall _rating =10.00]	0 ^c	.	.	0	.	.
AIRTEL	Interce pt	-18.875	5905.913	.000	1	.997	
	data_r ate	-.004	.292	.000	1	.990	.996
	call_rat e	.325	.365	.794	1	.373	1.384
	[call_ra ting=3. 00]	-17.383	2870.503	.000	1	.995	2.822E- 8
	[call_ra ting=4. 00]	-50.075	5739.453	.000	1	.993	1.790E- 22

[call_rating=5.00]	-1.983	1.886	1.105	1	.293	.138
[call_rating=6.00]	.267	1.551	.030	1	.863	1.306
[call_rating=7.00]	.170	1.379	.015	1	.902	1.185
[call_rating=8.00]	.446	1.368	.106	1	.744	1.563
[call_rating=9.00]	.543	1.465	.137	1	.711	1.721
[call_rating=10.00]	0 ^c	.	.	0	.	.
[overall_rating=2.00]	51.629	7430.633	.000	1	.994	2.643E22
[overall_rating=3.00]	35.293	6566.551	.000	1	.996	2.125E15
[overall_rating=4.00]	36.952	6716.000	.000	1	.996	1.117E16
[overall_rating=5.00]	19.159	5905.913	.000	1	.997	2.093E8
[overall_rating=6.00]	18.023	5905.913	.000	1	.998	6.716E7
[overall_rating=7.00]	17.346	5905.913	.000	1	.998	3.413E7

	[overall _rating =8.00]	18.370	5905.913	.000	1	.998	9.510E 7
	[overall _rating =9.00]	17.257	5905.913	.000	1	.998	3.124E 7
	[overall _rating =10.00]	0 ^c	.	.	0	.	.
ANY OTHER	Interce pt	-25.208	17519.207	.000	1	.999	
	data_r ate	-11.377	295.902	.001	1	.969	1.145E- 5
	call_rat e	13.075	432.652	.001	1	.976	476847. 477
	[call_ra ting=3. 00]	-6.881	20292.497	.000	1	1.000	.001
	[call_ra ting=4. 00]	-23.445	20042.670	.000	1	.999	6.575E- 11
	[call_ra ting=5. 00]	-.341	18734.251	.000	1	1.000	.711
	[call_ra ting=6. 00]	3.169	17606.620	.000	1	1.000	23.774
	[call_ra ting=7. 00]	5.618	17567.557	.000	1	1.000	275.254
	[call_ra ting=8. 00]	-6.991	17570.770	.000	1	1.000	.001
	[call_ra ting=9. 00]	-18.289	17590.581	.000	1	.999	1.141E- 8

	[call_rating=10.00]	0 ^c	.	.	0	.	.
	[overall_rating=2.00]	2.582	12405.449	.000	1	1.000	13.219
	[overall_rating=3.00]	-14.197	.000	.	1	.	6.829E-7
	[overall_rating=4.00]	16.632	11972.665	.000	1	.999	1.671E-7
	[overall_rating=5.00]	-8.172	9060.696	.000	1	.999	.000
	[overall_rating=6.00]	4.039	9054.014	.000	1	1.000	56.793
	[overall_rating=7.00]	-22.401	9097.160	.000	1	.998	1.867E-10
	[overall_rating=8.00]	-32.752	9067.505	.000	1	.997	5.971E-15
	[overall_rating=9.00]	-13.459	.000	.	1	.	1.428E-6
	[overall_rating=10.00]	0 ^c	.	.	0	.	.
IDEA	Intercept	-24.664	3.159	60.959	1	.000	
	data_rate	.412	.611	.454	1	.501	1.509
	call_rate	1.328	1.078	1.517	1	.218	3.773

[call_rating=3.00]	-.417	7150.388	.000	1	1.000	.659
[call_rating=4.00]	-2.245	10173.005	.000	1	1.000	.106
[call_rating=5.00]	-.528	7356.326	.000	1	1.000	.590
[call_rating=6.00]	.004	6048.273	.000	1	1.000	1.004
[call_rating=7.00]	17.091	1.586	116.051	1	.000	2.644E7
[call_rating=8.00]	17.889	1.604	124.348	1	.000	5.874E7
[call_rating=9.00]	20.237	.000	.	1	.	6.147E8
[call_rating=10.00]	0 ^c	.	.	0	.	.
[overall_rating=2.00]	3.627	.000	.	1	.	37.610
[overall_rating=3.00]	-.074	9600.718	.000	1	1.000	.929
[overall_rating=4.00]	3.317	6561.231	.000	1	1.000	27.583
[overall_rating=5.00]	2.006	1.898	1.116	1	.291	7.430

	[overall _rating =6.00]	1.036	1.883	.303	1	.582	2.818
	[overall _rating =7.00]	.883	1.634	.292	1	.589	2.418
	[overall _rating =8.00]	-17.730	3221.393	.000	1	.996	1.995E-8
	[overall _rating =9.00]	.161	.000	.	1	.	1.175
	[overall _rating =10.00]	0 ^c	.	.	0	.	.
RELIANCE	Interce pt	27.574	14829.689	.000	1	.999	
	data_r ate	24.493	645.785	.001	1	.970	4.338E10
	call_rat e	-60.129	1366.241	.002	1	.965	7.700E-27
	[call_ra ting=3. 00]	-97.937	11286.233	.000	1	.993	2.929E-43
	[call_ra ting=4. 00]	20.683	17921.882	.000	1	.999	9.602E8
	[call_ra ting=5. 00]	-97.648	8409.036	.000	1	.991	3.910E-43
	[call_ra ting=6. 00]	15.686	4313.780	.000	1	.997	6492740.136
	[call_ra ting=7. 00]	-55.603	4590.282	.000	1	.990	7.110E-25

[call_rating=8.00]	-70.871	5106.251	.000	1	.989	1.664E-31
[call_rating=9.00]	-22.684	7650.864	.000	1	.998	1.408E-10
[call_rating=10.00]	0 ^c	.	.	0	.	.
[overall_rating=2.00]	89.241	25314.191	.000	1	.997	5.715E-38
[overall_rating=3.00]	135.505	20325.577	.000	1	.995	7.064E-58
[overall_rating=4.00]	10.816	23231.098	.000	1	1.000	49812.736
[overall_rating=5.00]	-95.724	15772.990	.000	1	.995	2.677E-42
[overall_rating=6.00]	63.616	15465.577	.000	1	.997	4.246E-27
[overall_rating=7.00]	63.042	15465.577	.000	1	.997	2.393E-27
[overall_rating=8.00]	-48.201	16063.573	.000	1	.998	1.166E-21
[overall_rating=9.00]	26.383	16267.208	.000	1	.999	2.871E-11
[overall_rating=10.00]	0 ^c	.	.	0	.	.

Reference Category-VODAFONE

This table presents the parameter estimates (also known as the coefficients of the model). However, there is no overall statistical significance value. As there were 6 categories of the dependent variable, one can see that there are 5 sets of logistic regression coefficient. The first set of coefficients are found in the "Aircel" row (representing the comparison of the Aircel category to the reference category, Vodafone). The second set of coefficients are found in the "Airtel" row (this time representing the comparison of the Airtel category to the reference category, Vodafone). The statistically significant sets coefficients occur only in IDEA category with comparison to Vodafone and those are

TABLE 2.6

Dummy Variable	Coefficient	Significance
call_rating=7	17.091	0
call_rating=8	17.889	0

As the signs for coefficients is positive this means that whenever call rating =7 or 8 for a company i.e. the customer is highly satisfied with the call services provided by the company, its likely to be Vodafone than Idea.

Thus if a student wants a highly satisfying call quality, he/she may go for Vodafone.

➤ Hypothesis Testing

1) *Call expenditure hypothesis testing*

$H_0 = \mu_x = \mu_y$ i.e. call expenditure of Vodafone and Airtel are not significantly different.

$H_1 = \mu_x \neq \mu_y$ i.e. call expenditure of Vodafone and Airtel are significantly different.

mean(\bar{x}) 298.7805

var(s_x) 36157.05

n1 41

mean(\bar{y}) 250

var(s_y) 21538.46

n2 39

$$Z = \frac{(\bar{x} - \bar{y})}{\sqrt{(s_1^2/n_1) + (s_2^2/n_2)}} = -0.12066$$

$$|Z| = 0.12066187 < 3$$

Thus, we accept H_0 at 5% level of significance and conclude that average call

TABLE 3.1 Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Operator * Reasons	33	100.0%	0	.0%	33	100.0%

Table 3.2 Operator * Reasons Cross tabulation

Count

	Reasons				Total
	1	2	3	4	
Operator AIRCEL	3	0	3	0	6
AIRTEL	4	0	2	0	6
ANY OTHER	1	1	0	0	2
IDEA	1	3	0	1	5
RELIANCE	2	2	2	0	6
VODAFONE	2	4	1	1	8
Total	13	10	8	2	33

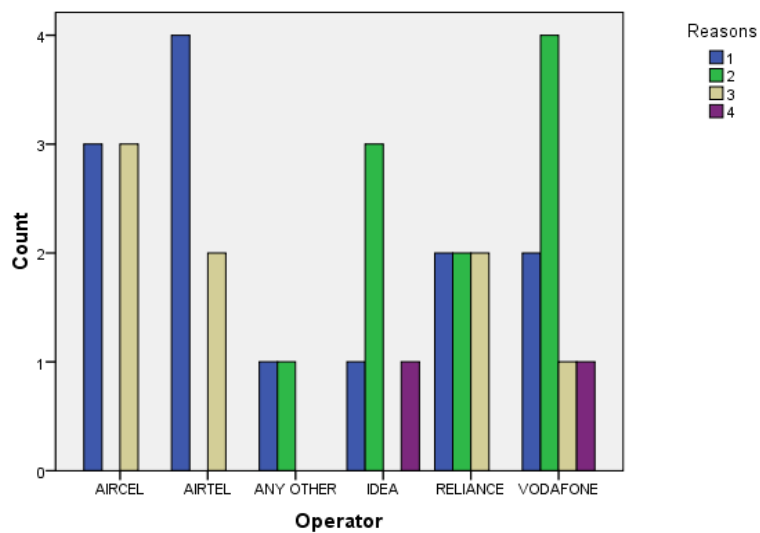
Bar Chart

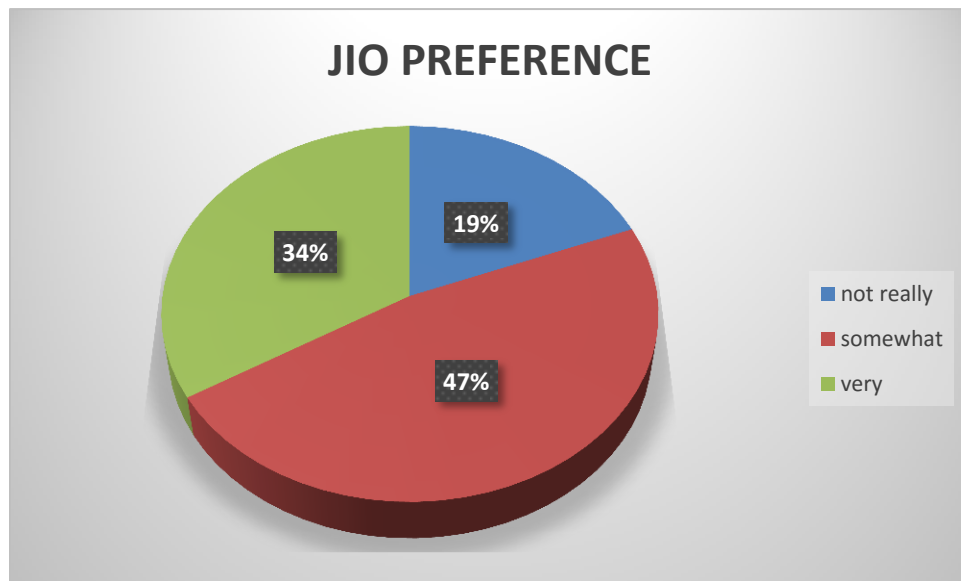
Chart 1

Bar chart between the operator and number of dual sim users

From the table 3.2, we see that Vodafone is most preferred operator, due to its data pack schemes.

➤ **Reliance Jio**

In order to judge whether the Reliance Jio campaign is influential amongst students or not, we made the following pie chart on the basis of their responses.



This pie chart shows that the launch of RELIANCE JIO has created an impact of the students of the age group 18-25 and in our sample of 95 students, we observed that 34% of the sample are “very” interested for JIO network, 19% of them are “not really” interested, and 47% are “somewhat” interested in the JIO network.

Summary & Conclusions

- 1) Our model suggests that Vodafone is the most preferred telecom operator among all the telecom operators taken into consideration for the students of age 18-25.
- 2) Hypothesis Testing proves that :
 - a) Average call expenditure for Vodafone & Airtel are not significantly different.
 - b) Average data expenditure for Vodafone & Airtel are not significantly different.
- 3) Pie Chart shows that the launch of “RELIANCE JIO” has created an impact on the concerned population as 47% of the sample are “somewhat” interested in this network.
- 4) Among Dual Sim users, Vodafone is most preferred network as dual sim and analysis suggested that this is **due to their data pack schemes**.

➤ Remedy

- 1) Sample size should have been more for this project so we could have done more of hypothesis testing and analysis for other operators.
- 2) Ratings scale should have been reduced to 1-5 instead of 1-10, so that our model would have been more efficient.
- 3) For “RELIANCE JIO” we cannot analyze or say anything with certainty as at the time of the project it had not gained any stability in the market.

References

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- 2) <https://statistics.laerd.com/spss-tutorials/multinomial-logistic-regression-using-spss-statistics.php>
- 3) BASIC ECONOMETRICS, D.N. Gujarati
- 4) <https://www.youtube.com/watch?v=aeVR-WdRM7Y>