Redefine the Service Quality Experience Dimensions of Indian Mobile Network Providers – A conceptual model

Girish M.C.[1]

Assistant Professor, P. M. Government College, Chalakudy, Kerala.
girishmechery@gmail.com

Reji M. A.

Research Supervisor, P.G. and Research Department of Commerce, St. Peter's College, Kolenchery, Kerala.

Abstract

Service quality in the telecom industry should be a predictable factor to satisfy the telecom customers. The variables of the study were framed after the review of the literature and it adopted SERVPERF model of service quality statements and QoS (Quality of Service standards) of TRAI (2019). Factor analysis is used to reduce for data reduction and to know the relation and underlying structure of the variables. In telecom industries, the defection is easy by the mobile number portability. The service providers look into innovative practices to attract and retain customers. The present study is conducted to measure the service quality perceptions of customers of the Indian telecom service providers in Kerala. Survey method is used to collect data; stratified random sampling was used to collect from the list of the customers available in the sampling area. The study tries to measure the service quality experiences among the different leading service providers and service quality perceptions of the customers in terms of their demographic factors. The male and female customers do not significantly differ in their satisfaction level in public or private company. Over the time, future of the Telecom industry cannot be predicted, but this study is beneficial to the customers in Kerala, to understand the quality of service providers and they can choose the service providers for better service.

I. Introduction

Liberalisation and privatisation made Indian telecom the leading industry in the service sector. The Indian Telecom industry is the second largest in the world in terms of subscriber base (1.18 billion). The telecommunications sector plays an increasingly important role in the Indian economy. It contributes more than 47.9% to the National GDP. The industry passing through a dynamic transitional phase (Economicstimes.indiatimes.com, 2019) generates revenue for the government and creates employment (TRAI, 2012). The telecom industry input to GDP is expected to reach 8.2% by the 2020 (DoT, 2019) and now the mobile industry supports about 6.5% of Indias G.D.P., the figure indicates direct economic activity generated by the network operators and an indirect effect on the remaining part of the economy from the increased use of mobile technology by the individuals and firms. The sector witnessed exponential growth during the last few years.

But stiff competition and price war between the public and private companies leads to the loss in the public sector and some of the private players have also suffered loss in the last year. BSNL is facing stiff competition from Jio, Airtel and Vodafone and Idea network providers. With the opening up of the private players in telecom industries and the high competition, the customers have high expectation of the service quality from private players.

As stated by Parasuraman et al. (1985), the gap model of service quality dimensions are used widely in the service sectors. But the number of scientists criticised Servqual expectations, and they opined that expectations are not properly met. The scale SERVPERF (Cronin, 1992) model of service quality succeeded over the Servqual and the perceived service quality model is adequate for measuring the service quality. The new survey of ZenDesk, (2019) discloses that customer expectation is very high and increasing, but customer satisfaction level is decreasing every day. If subscriber dissatisfied, the customers easily defect from their service provider, and this has forced many service providers to look into innovative ways of attracting

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[1] **Corresponding Author**:
Girish M.C, Assistant Professor, P. M. Government College, Chalakudy, Kerala.
girishmechery@gmail.com

and retaining customers. In Telecom industries besides frequently decreasing service changes, the telecom firms also have to look into innovative ways to attract customers and implement many customer relationship management programmes (TRAI, 2019). The fundamental idea (CRM) is to retain the customer and increase their lifetime value by building loyalty.

II. Statement of the Problem

The telecom industries are on the trot through a dynamic transitional phase; telecom companies face stiff competition in the telecom market. The technology drives the service providers into smart services. The mobile connection changed the status of luxury to essential services. The expectation of the customers are changing according to the level of education, income, taste, fashion and changes in technical knowledge. The telecom providers mainly concentrate on service pattern, service quality, and customers' expectation. Many companies are far from an advantageous position because of the inability to identify the service quality perception of customers. If they are not able to identify the problem of the customers effectively, service organisation will not be sustained easily in the competitive market. The SERVPERF (Cronin, 1992) model is not useful in the new technological age, so the adapted Servperf model and TRAI QoS are used to redefine the service quality model for telecom industries in Kerala.

III. Methodology

This study is descriptive and analytical. It is conducted in the Thrissur district of the State of Kerala. The study primarily is based on primary data collected from the leading cellular users to measure the service quality among the network service providers. 517 consumers were selected from Thrissur, as per the 2011 Census register. For data collection, the population are divided into Urban and Rural areas and categorised into agriculturist, professionals, business persons and householders through a multi-stage stratified random sampling

method. The data is analysed and interpreted using percentage, mean, t-test, one way ANOVA and Post Hoc test for multiple comparisons.

IV. Objectives of the Study.

1) To study the different service quality dimensions in the Explorative Factor model.
2) To study the service quality among the leading cellular service providers in Kerala.

V. Hypothesis of the Study

1) The service quality is similar in socio-economic factors of the respondents.
2) The service quality is similar in the cellular service providers in Kerala.

VI. Analysis and Discussion

Factor analysis is an interdependence technique used to define the underlying structure among the variables in the analysis. It provides a tool for analysing the structure of the inter relationship among a large number of collected variables, by defining the set of variables highly related known as factors. Here, the researcher tried Principal component analysis (*R factor* analysis) which is a common factor analysis used to identify the latent variables (Hair, 2013). This helps the researcher to reduce data and create a concept as per the theory developed or on the bases of literature review.

Table 1: Reliability Statistics of the 41 Variables

Reliability Statistics	
Cronbach's Alpha	N of Items
0.860	36

The Kolmogorov–Smirnov statistics examine the normality, the statistics show that the p-value is .051 for the sample, hence the sample for the service quality experiences is a normal distribution. The Cronbach's Alpha also shows that reliability statistics of the 36 items is 0.860.

Table 2: Responsiveness Dimensions of Service quality Experience Model

	Responsiveness	Loadings
1	The company keep direct contact with customers	0.852
2	Always connect with customers well being	0.679
3	Form a customer group to identify customer problem.	0.659
4	Company is thorough with my (Customer) complaint.	0.516
5	Uninterrupted customer services are available @24 hrs 7 days.	0.608
6	The company's supporting staff know how to solve every issue.	0.510
7	Solving issues friendly.	0.498
8	Online, live chat, supporting service available.	0.464
9	Create conditions as per our (customer) expectations.	0.422
10	If a person is not available at the time of call, the service provider informs you back when he is available.	0.655

 (Source: Primary data)

Extraction Method: Principal Component Analysis.

Table 3: Reliable network dimension in the Service Quality Experience Model

	II- Reliable and stable network services.	Loadings
11	Good speech quality	0.687
12	Good listening voice quality	0.660
13	Billing charges complaint within 8 weeks	0.584
14	Every attempt to call natural to achieve connection	0.548
15	Resolution on credit adjustment within 2 weeks	0.389
16	Number portability is a favour to customers.	0.453
17	Maintain call when call once established.	0.402
18	Extremely high-speed data availability.	0.695
19	Unlimited data usage.	0.614
20	Metering and billing are reliable	0.394

Source: Primary data 2019

Customer experience in terms of network quality as per the TRAI (2018) recommendations: Every customer can access their network quality, speed and its frequency rate from the web site of the service provider; Every service provider shall visualise their network signal strength and coverage of area through their web portal; this will help the customer and public to access the availability of the network with quality standards; Every cellular company shall design their web portal in an interactive and user-friendly manner; Every customer should be able to easily select the service signals as per their interest. The customers are using different type of handsets and 2G, 3G or 4G VoLTE networks so the customers have the right to select it as per their interest at the time of accessing the desired signal.

Table 4: Tangibles

	III- Tangible	Loadings
21	Select 2G,3G, 4G VoLTE as per the location and interest	0.825
22	Interactive and user-friendly web portal	0.644
23	Compare signal strength and network coverage through the portal	0.539
24	Web-based portal visualisation of network coverage	0.451
25	Uninterrupted network during my travelling.	0.845
26	Always provide Un-interrupted network availability	0.736
27	Extremely good signal strength	0.671

Source: Primary data 2019

Table 4 shows the network quality variables of the telecom sector related to the technical aspects in the services of the telecom sector, these variables have significant loadings with higher value than 0.40, and the Ave shows the value of 0.673, the construct validity of the dimension also showed with 0.857, this construct has significant reliable validity and construct validity in the measurement of scale.

Table 5: Factor loadings of Assurance, Technical quality and Service Stinks Dimensions in service quality Experience Model

	IV- Assurance	
28	No waiting time for services	0.794
29	No call back for complaint solution	0.727
30	Useful service apps used for services	0.538
	V- Technical quality experiences	
31	Register mobile number with do not disturb portal	0.868
32	Believe in personal interaction than technological interaction	0.679
33	Web portal helps to register a complaint	0.377
	VI- Service stinks	
34	Low price tariff than other Companies	0.847
35	Low Data tariff than others	0.691
36	They often ask about service problems/ troubles/ stinks	0.430

Source: Primary data 2019

The conceptual model of the service quality experience model in the cellular network in Kerala has 6 dimensions loaded in the explorative factor analysis. The dimensions variables of the study have adequate reliability in the dimensions.

Table 6: Construct Reliability (CR), Average Variance Extracted (AVE) and Discriminant Validity of Service Quality, in Cellular Telecom Sector in Kerala.

Sl.No.	Service Quality Dimensions	CR	AVE	Responsiveness	Reliable network	Tangible	Assurance	Technical quality	Service Stinks
						Squared Inter-correlation (SIC)			
1	Responsiveness	0.843	0.586		0.000	0.025	0.008	0.083	0.003
2	Reliable network	0.856	0.543	0.000		0.003	0.009	0.038	0.015
3	Tangible	0.857	0.673	0.025	0.003		0.070	0.010	0.033
4	Assurance	0.732	0.686	0.008	0.009	0.070		0.065	0.032
5	Technical quality	0.693	0.641	0.083	0.038	0.010	0.065		0.076
6	Service Stinks	0.705	0.656	0.003	0.015	0.033	0.032	0.076	

Source: Primary data 2019

Scale is sufficiently different from other related scales. The degrees to which two conceptually similar concepts are distinct, now the correlation should indicate below that the summated scale sufficiently differs from the other similar concept. The convergent validity can be checked with the percentage of variance extracted. The variance can be calculated by the number of squared loadings (communalities) divided by the number of variables in each factor.

$$VE \quad = \quad \frac{\sum_{i=1}^{n} \lambda_i^2}{n}$$

$\Sigma \lambda^2$ = sum of squared factor loadings, n = number of items in each factor.

In the formula above the λ represents the standardised factor loading, and i is the number of items. So, for n items, AVE is computed as the sum of the squared standardised factor loadings ($\Sigma \lambda^2$)

divided by the number of items, the result is shown as Table 5.

$$Construct \ \ Re\,liability \ (CR) = \frac{(\sum_{i=1}^{n} \lambda_i)^2}{(\sum_{i=1}^{n} \lambda_i)^2 + (\sum_{i=1}^{n} \delta_i)}$$

$(\Sigma \lambda i)^2$ =Sum of factor loading squared

$(\Sigma \delta i)$ =Sum of the error variance.

The rule of thumb for a construct reliability estimate is 0.70, or higher suggests excellent reliability. Reliability between 0.6 and 0.7 may be acceptable provided that other indicators of a model's construct validity are good. Except for technical quality, all other dimensions have high construct reliability that indicates that internal consistency exists in the measurement model.

Table 7: Service quality Experiences across Socio economic and Demographic Factors

Socio-economic factors		Number	Mean	SD	t value / F ratio	Sig
Gender	Male	251	3.0252	**0.445**		
	Female	266	2.9383	0.381	2.379	0.018**
	Total	517				
Age	15-25	150	2.9334	0.4231		
	26-35	120	3.0233	0.4593		
	36-45	99	3.0251	0.4529	1.182	0.318*
	46-55	67	2.9772	0.3220		
	56-65	81	2.9524	0.3443		
	Total	517	2.9805	0.4153		
Job Category	Student	135	2.9334	0.42306		
	Business	87	3.0233	0.45931		
	Employee	189	3.0251	0.45293	2.281	0.046**
	Profession	57	2.9772	0.32195		
	Household	27	2.9524	0.34432		
	Agriculture	22	2.9805	0.41535		
	Total	517	2.9334	0.42306		
Place of Living	Rural	232	2.9485	0.42708		
	Urban	133	3.0065	0.39286	3.836	0.022**
	Semi-Urban	152	3.2137	0.41742		
	Total	517	2.9805	0.41535		
Marital Status	Married	219	3.0184	0.43096		
	Single	286	2.9569	0.40735		
	Widowed	8	2.8286	0.25111	1.337	0.262
	Separated	4	2.8905	0.18813		
	Total	517	2.9805	0.41535		
Educational Qualification	Primary	16	2.6948	0.27705		
	SSLC	74	3.0327	0.28590		
	Intermediate	79	2.9031	0.37382		
	Graduation	120	2.9839	0.45077	2.987	0.007**
	Post-Graduation	207	2.9928	0.44995		
	Technical	15	3.2398	0.31966		
	Others	6	2.9755	0.36329		
	Total	517	2.9805	0.41535		
Monthly income	Below 10000	186	2.9622	0.38087		
	10000-25000	84	2.9732	0.44499		
	25000-50000	109	2.9803	0.45110	0.581	0.677
	50000-75000	98	2.9841	0.44207		
	Above 75000	40	3.0719	0.33627		
	Total	517	2.9805	0.41535		
No of SIM	Single SIM	268	2.9426	0.42409		
	Double SIM	228	3.0134	0.39505	2.796	0.062
	Triple SIM	21	3.1052	0.48015		
	Total	517	2.9805	0.41535		
Name of Primary service provider	BSNL	172	3.0307	0.38339		
	JIO	48	3.0364	0.40053		
	Airtel	62	3.0433	0.43799	3.556	0.014**
	Vodafone Idea	235	2.9157	0.42781		
	Total	517	2.9805	0.41535		
Name of second SIM	BSNL	101	3.0168	0.42994		
	JIO	64	2.9987	0.35196		
	AIRTEL	38	3.0095	0.44397	0.025	0.995
	Vodafone Idea	115	3.0097	0.43045		
	Total	318	3.0097	0.41546		
Type of Service	Pre-Paid	446	2.9834	0.41002		
	Post-Paid	71	2.9623	0.45008		0.692
	Total	517	2.9834	0.41002	0.397	
Type of Connection	2G	25	3.1064	0.39647		
	3G	123	2.8991	0.41094	3.924	0.020**
	4G	369	2.9991	0.41475		
	Total	517	2.9805	0.41535		

**1% significance level   Source: Primary data
*Significance @5% level

The male subscribers mean value of service quality is higher than female subscribers, the p-value is 0.018** this indicates that the null hypothesis is rejected at 1% significance level. Hence, it is concluded that male and female subscribers have significant differences in service quality variables. In the case of the different age group of the subscribers, they are not significantly different in service quality experiences. However, in the case of job category, the employees and business people having high mean value in service quality, the p-value of the job category is 0.046**; hence the null hypothesis is rejected at 1% significance level and concluded that the job category entirely significantly differ in service quality experiences.

In the case of urban, rural and semi-urban respondents, they differ significantly in the service quality of network provider. Urban and semi-urban subscribers have higher service quality perception, but in the case of the rural subscribers, mean value is deficient when compared to other subscribers. P-value is 0.022**, it indicates that the null hypothesis is rejected at 1% significance level.

The educational category shows significant differences in service quality among the different educational groups. The technical education category has a higher service quality perception than other educational groups. The p-value is less than 0.05. Hence, the null hypothesis is rejected at 1 % level of significance. In the type of connection, the subscribers have significantly differed in service quality; the 2G subscribers scored the higher mean value in service quality than 3G and 4G SIM holders. The p-value is 0.02** since the p-value is less than 0.05. Hence, it is concluded that the overall service quality significantly differs between service providers. The primary service providers also differ significantly in their service quality dimensions.

H$_0$: There are no significant differences in service quality among the service providers in Kerala.

H$_1$: There are significant differences in service quality among the service providers in Kerala.

Table 8: Service Quality Experiences

Service provider	N	Mean	Std. Deviation	F value	P value
BSNL	172	3.0307	0.38339		
JIO	48	3.0364	0.40053		
Airtel	62	3.0433	0.43799	3.556	0.014**
Vodafone Idea	235	2.9157	0.42781		
Total	517	2.9805	0.41535		

**1% significance level

The service quality among the leading service providers are shown as in Table 8 as above, BSNL, JIO and Airtel service providers mean value is above 3 in the five-point scale. Vodafone idea service provider (2.91, SD 0.427), the overall service quality among the service providers are low in Kerala telecom industries, and the F value is 3.556 with P-value 0.041**. Since the p-value is less than 0.05, the null hypothesis is rejected at 1% level of significance. Hence, it is concluded that there is a significant difference in service quality among the leading service providers in Kerala. Hence, the researcher resorts to the Post Hoc test for better clarification in the differences in service quality among the leading service providers.

Table 9: Post Hoc test of Service Quality

		Multiple Comparisons			
	^{a}LSD - Dependent Variable: Service Quality Experience				
LSD	(I) Name of the service provider.	(J) Name of the service provider.	Mean Difference (I-J)	Std. Error	Sig.
BSNL		JIO	-0.00579	0.06730	0.932
		Airtel	-0.01267	0.06107	0.836
		Vodafone Idea	0.11493*	0.04137	0.006**
JIO		BSNL	0.00579	0.06730	0.932
		Airtel	-0.00689	0.07927	0.931
		Vodafone Idea	0.12071	0.06531	0.065
Airtel		BSNL	0.01267	0.06107	0.836
		JIO	0.00689	0.07927	0.931
		Vodafone Idea	0.12760*	0.05887	0.031**
Vodafone Idea		BSNL	-0.11493*	0.04137	0.006**
		JIO	-0.12071	0.06531	0.065
		Airtel	-0.12760*	0.05887	0.031**

*The mean difference is significant at the 5% and ** 1% level, ^{a}LSD-Fishers Least significant differences
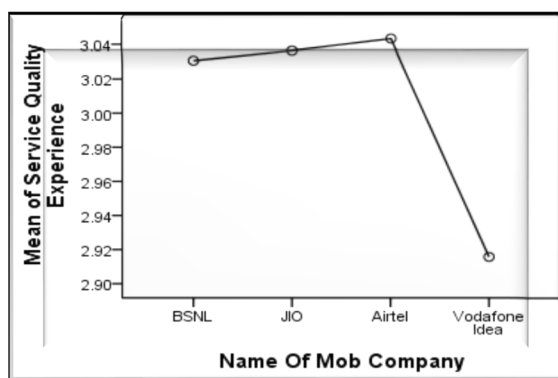
Figure 1: Mean differences in Service Quality Experiences among the Service Providers

The Post Hoc test result shows that (Table 8) the BSNL service quality is lower than the airtel and Jio service providers. However, BSNL is significantly differing with Vodafone and Idea as the p-value between the BSNL and Vodafone Idea is 0.006**, this value is less than p-value of 0.05; hence the null hypothesis is rejected at 1% level of significance, and concluded that BSNL has significantly differed in service quality with Vodafone service provider. However, BSNL does not significantly differ in service quality between the Jio and Airtel. Jio service provider does not significantly differ in service quality among the Airtel, BSNL and Vodafone and p-value is higher than 0.05. Hence, the null hypothesis is accepted at 5% level of significance.

Table 8 (Third row) compare Airtel with other service providers; Airtel significantly differs with BSNL and Jio service providers the p-value is higher than 0.05 at 5% significance level. Hence, the null hypothesis is accepted at 5% significance level. However, Airtel has significantly differed in service quality between the Vodafone and Idea, and the p-value is 0.006 **, since the p-value is less than 0.05, at 5% significance level, Hence, it is concluded that there are significant differences among the service quality between the Airtel and Vodafone idea.

The last row of table 6 and the Figure 1 shows that Vodafone Idea significantly differ with other service providers, the mean value of the Vodafone idea is shallow in overall service quality, the p-value of the Vodafone idea significantly differs with BSNL and Airtel (p < 0.05). Hence the null hypothesis is rejected at 5% significance level. The Vodafone idea does not significantly differ with Jio service providers. The overall service quality from the Vodafone idea is deficient when compared with other service providers. The overall service quality is very high in the case of Airtel subscribers.

VII. Conclusion

The study found that service quality experience dimensions have adequate construct reliability, discriminant validity, and adequate variance extracted in the dimensions of the service quality. The service quality experiences among the public and private service providers significantly differ. The BSNL and Airtel have good service quality, the Jio and Vodafone Idea cellular providers significantly differ and have moderate service quality. The service providers have to plan the strategies in accordance with age, education, job category and type of connection used. In Kerala, rural subscribers opine about the lack of quality service from all the service providers.

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