Service Quality in the Telecommunication Industry : Analysis with Special Reference to DSL Services

** S. Rajeswari*
*** Yarlagadda Srinivasulu*
**** S. Thiyagarajan*

Abstract

The research study was conducted to analyze the service quality in the telecommunication sector because in the present intensive broadband market, the survival of wire line telecommunication sector depends on the service quality offered to the end user that serves as a key tool for competition and survival. Though there exist various constructs to measure service quality, the study used performance items of service quality, and survey method was used to collect data from the sample. Based on the analysis, the tiered classification of service quality was represented, which gave a clear scheme for the telecom service providers to identify the service quality attributes that leads to enhancement in their performance in a highly competitive market.

Keywords: **broadband, performance, service quality, telecommunication**

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Till the invention of the telephone, communication was not just an easy task across the globe. Even after its invention, it was recognized as one of the basic amenities like water and electricity only after a century, that is, by the 1970s. Recognizing its need, many incumbent operators made a huge investment in erection of such a wide wired infrastructure. But within a time period of two to three decades, the wire line sector experienced a tough competition due to the entry of private operators for promotion of various other telecom services. It was the emergence of broadband, by the end of 1990s, which showed a positive sign for the declining wire line services. As broadband is a multi-technology service, it was not just limited to only one technology as wire line or mobile services. To be particular, the upcoming technologies such as fiber, satellite, mobile, and the already existing cable networks have created and intensified competition for the incumbent wire line service providers to withstand in the competitive broadband environment. In such a situation, the success or failure of the organization depends only on the delivery of high-quality service and affordability of the service.

While fixed broadband subscribers have already reached a saturation phase in many of the developed nations, there is chance for promotion in developing countries. With this consideration, the present study aims to analyze the service quality of DSL services offered by the wire line operators in India, which account for a major portion of the market share.

* *PhD Scholar,* Department of International Business, Pondicherry University, Puducherry. E-mail : raj9karthik@gmail.com
** *Associate Professor,* Department of International Business, Pondicherry University, Puducherry.
E-mail : yarlagadda_srinivasulu@rediffmail.com
*** *Assistant Professor,* Department of International Business, Pondicherry University, Puducherry.
E-mail : sthiyags@yahoo.com

Overview of the Telecom Sector in India

Though the history of the telecommunication sector in India traces back to the period of the 1880s, it witnessed significant growth only after the 1980s. As in any country, the wireline incumbents in India also enjoyed a monopoly position, which lasted only for a time period of two to three decades, but after that, they entered into a declining phase. One of the major reasons for that was the formulation of the NTP (National Telecom Policy) in 1994 and 1999, which paved the path for privatization to promote various value-added services in the sector. In particular, the wireless services, due to their vast availability and affordability, achieved a drastic growth and positioned the country globally on the second position. This stood as one of the major causes for the decline in wire line services. In the meantime, the emergence of the Internet (narrowband), though made use of wire line services to promote Internet services, the actual sign signalling of the decline of wireline services came only after the emergence of broadband by the end of the 1990s across the globe and by 2000 in India.

The major advantage of broadband services is that the user can simultaneously make use of both the telephone and the Internet, which was not possible over narrowband (Gaskin, 2004). Compared to other telecom services, the actual challenge for wireline incumbents rose only after the emergence of broadband, because the competitors were not only from the sector, but also from various other sectors such as cable, fiber, satellite, and so forth. As a result, there are around 110 ISPs (Internet service providers) in India, of which the top 10 players account for more than 90% of the total subscriber base, and the wireline incumbents lead by 72 % (TRAI, 2013). In order to hold on to its leadership position in the broadband sector, a firm is required to offer/deliver high quality services to its customers, which serves as the key tool for organizations to achieve success and also for their survival (Lewis & Mitchell, 1989). The emergence of broadband has thrown a wide variety of choices for the customers to choose from, and in such a scenario, delivering a reliable service is the base to establish a long-lasting relationship with the customers (Joshi, 2011).

Studies have determined that increase in service quality leads to customer satisfaction, which is the ultimate goal of any organization. However, from the organization viewpoint, in addition to it, they also look forward to contribution in sales. It has been proved by Foster and Newman (1998) that enhancement in service quality by telecommunication companies accounts for an increase in sales revenue between 30% and 50%. As service quality is identified as a key tool, emergence of globalization has compelled telecommunication companies to offer superior quality of services across multiple nations.

Review of Literature

(1) Service Quality : Quality is the term which acts as one of the major differentiating factors either for a product / service, while it seems to be quite an easy task to evaluate the quality of a product than service because of its varied assessing factors such as color, durability, shape, size, and so forth, which do not prevail in services. Thus, compared to goods quality, customers feel quite tough to evaluate the service quality, because goods are tangible in nature, but services are intangible in nature (Gronroos, 1990). Due to the involvement of people/human construct, Zeithaml and Bitner (1996) simply defined services as the "deeds, processes, and performances" of the employees in the organization.

In addition to the involvement of humans, that is, people (5th P) and also the nature of service which involves the real-time production and consumption of service during service delivery, there are certain unique characteristics which service actually possesses. These have been coined differently by various researchers. Parasuraman, Zeithaml, and Berry (1985) reported factors such as intangibility, inseparability, and heterogeneity ; Zeithaml and Bitner (1996) added three more characteristics, that is, perishability, variability, and lack of ownership. Behind all these unique characteristics, there exists one common term, that is, the '5th P - People' (employees/customers) which does not make the service to be the same, even if it is delivered by the same person

for the next time. Services not only vary from time to time, but also vary from person to person and place to place.

As assessment of service quality mostly depends on the interaction between the employees and customers in the service encounter (Zeithaml, Berry, & Parasuraman, 1988). Zeithaml and Bitner (1996) defined service quality as the delivery of excellent or superior service relative to customer expectations, which leads to customers' perception of the service offered by the firm (Gronroos, 2006). Moreover, service quality, which mostly relies on expectations and perception of customers, is defined as the disparity of both (Parasuraman et al., 1985). In particular, service quality refers to the judgement of the customers' expectations which excels the company's distinction in service quality. Simply stated, if perception exceeds expectations, then customers evaluate the service as excellent and get a feel of satisfaction. If perception does not meet the expectations, then they experience a kind of dissatisfaction (Parasuraman et al., 1988). While expectations are influenced by pre-purchase of goods/services, in services, it is mostly impacted by the interaction that takes place with the service employees. Moreover, most of the people consider what they perceive as reality, so it has become a must for the marketers to understand the concept of perception and its related factors (Reddy, 2005). Rao (2011) stated that service quality perceived by the customer is of utmost importance for any service programme in the service organization.

Service quality, though complex in nature, was recognized as strategically necessary not only for the service sector, but also for the manufacturing industries (Lewis, Orledge, & Mitchell, 1994). Though organizations consider service quality as a key tool for success, in some cases, it has become a necessity for survival of firms in a competitive environment (Chen, Gupta, & Rom, 1994; Srivastava, Bhangde, Bhatt, Gogri, & Marfatia, 2006). Zeithaml et al. (1988) stated that as quality in many services is determined only during service delivery, it has emerged as a key differentiator and competitive weapon for an organization (Berry, Parasuraman, & Zeithaml, 1988). This drew the attention of researchers, academics, and management practitioners to create and develop models to measure service quality from 1980 onwards due to its greater influence on customer satisfaction, loyalty, return on investment, higher profit, and so forth (Cronin Jr. & Taylor, 1992 ; Seth, Deshmukh, & Vrat, 2005).

(2) Service Quality Models : The first model to assess service quality was developed by Gronroos in 1982 using two main constructs, that is, technical quality (how customer gets) and functional quality (what customer gets). Later, a new construct - corporate image was added to assess service quality in 1984. Parasuraman et al. (1988) initially devised a scale with 10 items (reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding customers, and tangibles) to measure service quality, which was observed as the difference between expectations and performance of service offered. Later, the 10 items were reduced to five items, that is, tangibility, reliability, responsiveness, assurance, and empathy to measure service quality. Many critics have spoken against the SERVQUAL construct, stating it would not be appropriate to use the same across various sectors because expectations are based on prior service.

SERVPERF was developed by Cronin Jr. and Taylor (1992) using only the performance (21) items of SERVQUAL to prove that performance is just sufficient to measure service quality. It empirically sounded that the validity and reliability of SERVPERF was greater than that of SERVQUAL (Cronin & Taylor, 1994). In addition to these, various other models such as attribute service quality model, synthesized model of service quality, ideal value model of service quality, evaluated performance and normed quality model, IT alignment model, attribute and overall effect model, model of perceived quality and satisfaction, internal service quality model, and Internet banking model (Seth et al., 2005) were developed to measure service quality and some of them were designed specifically for certain industries. Though various models have evolved over a period of time, Foster and Newman (1998) stated that no other construct as SERVQUAL has been used in service marketing to measure service quality.

Due to the vast growth in the service sector, it has become a necessitated fact to develop industry-specific constructs, which coincided with Babakus and Boller's (1992) statement that there is a need to develop industry specific measures for service quality. Within two to three decades, using SERVQUAL as baseline constructs, various industry specific constructs were developed. For example, LIBQUAL was specifically designed to assess

service quality in libraries, DINESERV was designed to measure service quality of the restaurant industry, SELEB was developed to measure service quality in educational services (Sandhu & Bala, 2011). Despite the emergence of various models, SERVQUAL and SERVPERF are widely used by researchers in the telecommunication sector with slight modification to suit specifically this industry.

Leisen and Vance (2001) underwent a cross-national study to assess how far SERVQUAL suits to measure the service quality of the telecommunication sector with respect to varied cultural contexts. They found that SERVQUAL suited for the telecommunication sector with slight modifications. Though SERVQUAL has five constructs, certain studies identified added items to measure service quality. Network quality was identified by Wang, Lo, and Yang (2004) as an added dimension. Lai, Hutchinson, Li, and Bai (2007) included convenience as an added dimension with respect to China's mobile telecom industry.

Through an open questionnaire, Negi (2009) identified network quality, complaint handling, and service convenience as three more added dimensions. While a question was raised of what is the need for varied dimensions to measure service quality, a study by Macstravic (1977) out-threw a view by stating that it enabled firms to identify which of the constructs were to be improved in order to improve their service quality. This emerged as a key tool for organizations, not only to establish a customer-oriented approach (cited in Khan, 2010), but also to compete in a highly competitive situation. Moreover, delivery of high quality service is considered to be one of the major customer satisfaction factors, which is the ultimate goal of any organization (Anderson, Fornell, & Lehmann, 1994 ; Jones & Sasser, 1995). In the prevailing competitive environment, the wireline telecom service providers are in a must position to satisfy their customers, and they have to provide high quality service because on the one hand, a telecom service provider has to hold on to its leader ship position in the broadband sector, and on the other hand, it is the only source to generate revenue for the declining wireline services.

Naidu and Ponduri (2015) stated clearly that the incumbent wireline operators in India have to realize the need to satisfy and retain their customers for which service quality will serve as the key tool. Studies related to measurement of service quality have been carried mostly with respect to mobile services across countries, but not with DSL service. So, the study aims to empirically analyze the service quality of DSL services offered by the wire line telecom service providers using AMOS.

Methodology

There exists a wide wired infrastructure across the country which is broadband enabled. The study considered Puducherry, which has a minimum of 1% broadband penetration. Though there are wireline service providers, but in Puducherry, there is no competition for DSL services for the public sector. The organization considered for the study is BSNL. Furthermore, based on the confirmed resources, the population was noted to be around 27000, for which 379 was noted as the sample size in Sekaran and Bougie's (2010) sample table at the 5% margin error, and as 381 in the sample table by research advisors (The Research Advisors, 2006). As it was not possible to survey the exact sample, 425 questionnaires were issued, and based on the completed responses, 381 was noted as the final sample size for the study. The purposive sampling technique was adopted for collecting the data (June to August 2014), and we employed the survey method with questionnaire as the data collection tool. The questionnaire was classified into two main parts, that is, the first part included the questions related to the demographic variables, and the second part included the performance items of the SERVQUAL scale with network quality as an added item to measure the service quality. It has been stated that for continuous service, it is sufficient to measure only the performance (Oliver, 1989). As broadband is also a continuous service that operates for 24*7, only the performance item of the SERVQUAL construct was considered.

In order to test the reliability of the instrument, a pilot study was undertaken on a sample of 50 respondents. The overall reliability was 0.938 (Cronbach), which signified that there exists high internal consistency. With respect to individual constructs, the reliability ranged from 0.669 to 0.843 (Table 1). As the constructs were observed as first

Table 1. Reliability Analysis

Variable Name	No of Items	Alpha Value
Service Quality	26	0.938
Tangibility	5	0.790
Reliability	5	0.843
Responsiveness	4	0.667
Assurance	4	0.803
Empathy	5	0.840
Network Quality	3	0.669

order constructs, CFA (confirmatory factor analysis) was performed to establish the convergent and divergent validity of the first order constructs.

Analysis and Results

CFA or measurement model was applied to test reliability, validity, and also to test the uni-dimensionality of the constructs. Though CFA is also a kind of factor analysis, it confirms the items to the factors, while EFA (exploratory factor analysis) converges the items into factors (Raza & Rehman, 2012). To be stated in simple words, CFA is a tool that is used either to confirm or reject the perceived theory (2010). As CFA is used to confirm the factors which have been confirmed in previous studies, convergent validity and discriminant validity are used to ensure the validity of the construct dimensions. While convergent validity tests how far the items of the scale get converged to the same factor based on the factor loadings for each item in the construct, composite reliability and AVE (average variance extract) do it for each dimension. Discriminant validity proves that the items of one construct do not get converged to the other construct.

In order to ascertain convergent validity, there are certain basic criteria that are to be met out, that is, the item loading should be greater than 0.5, composite reliability should be greater than 0.6, and AVE should be greater than 0.5 (Fornell & Larcker, 1981; Hair et al., 2010). In case if the item loadings are less than 0.5, then they are considered as weak loading and are to be removed from the model. In the current study, two items - one item from responsiveness (Employees are too busy to respond to customers) and one item from network quality (I have frequent problems with my MODEM) were removed (weaker loading) and the rest of the item loadings which ranged from 0.537 to 0.903 were greater than the suggested value and signified the statistical evidence of item reliability for the scale.

In addition to Cronbach's reliability, composite reliability is assessed to establish the convergent validity of the constructs in CFA. From the results, it is observed that the composite reliability values were greater than the threshold value and ranged between 0.75 and 0.83 (Hair, Black, Babin, & Anderson, 2010). In addition to this, AVE also has a greater contribution in explaining the convergent validity of the constructs. It is suggested that the AVE of the constructs should at-least explain 50% of it, that is, it should be greater than 0.5 (Fornell & Larcker, 1981). The AVE values of all constructs except tangibility (0.484) were greater than 0.5 (Table 2).

↳ **Discriminant Validity :** In addition to convergent validity, the discriminant validity of the constructs was examined in order to state that the items do not get converged to other factors. In simple terms, it explains how far one construct is distinct from the other. Though there are different ways of analyzing it, the study assesses by comparing the AVE of the constructs and the squared correlation coefficient of the constructs as stated by Hair et al. (2010) and Fornell and Larcker (1981).

From the Table 3, it can be observed that the squared correlation coefficient is less than the AVE, which is

Table 2. Results of CFA Item Loadings, Composite Reliability, and AVE

	Estimate	S.E	C.R (*p* value)	Composite Reliability	AVE
TANGIBILITY				0.77	0.484
Telephone provided by BSNL for broadband services is in good working condition.	1.000				
Cable wire is of good quality.	.764	.083	13.217***		
MODEM is in good working condition.	.661	.068	11.606***		
Instruments provided by BSNL for broadband services are visually attractive.	.596	.084	10.536***		
Employees of the company are well groomed.	.583	.075	10.311***		
RELIABILITY				0.82	0.52
The activation time for Broadband services was as promised by BSNL.	1.000				
When you have any problem in the broadband services, BSNL shows interest to solve it immediately.	.504	.101	13.730***		
BSNL broadband service employees are technically competent in solving the problems.	.743	.089	12.842***		
BSNL resolves the network failures within the promised time.	.778	.099	13.358***		
BSNL provides the bandwidth as promised.	.616	.091	10.912***		
RESPONSIVENESS				0.75	0.59
BSNL informs customers when maintenance will be performed.	1.000				
Employees of BSNL provide prompt services.	.850	.072	14.610***		
BSNL employees are always willing to help customers.	.773	.069	13.500***		
ASSURANCE				0.79	0.525
BSNL employees' behavior creates confidence in the customers.	1.000				
I feel safe in availing services from BSNL.	.705	.075	12.887***		
BSNL broadband service employees are polite.	.702	.075	12.841***		
Broadband service employees are knowledgeable in solving the problems.	.721	.077	13.172***		
EMPATHY				0.83	0.519
BSNL gives individual attention to its customers.	1.000				
The working hours of BSNL are convenient to the customers.	.537	.065	10.628***		
Broadband service employees give personal attention to its customers.	.778	.958	16.542***		
BSNL safeguards my interests.	.754	.059	15.911***		
BSNL employees know the specific needs of the customers.	.726	.061	15.178***		
NETWORK QUALITY				0.78	0.718
Network connectivity to my modem is good.	1.000				
My modem works well in all seasons.	.788	.064	15.486***		

Note: *** indicates significance at the 1% level

Table 3. Discriminant Validity

	Tangibility	Reliability	Responsive	Assurance	Empathy	Network Quality
Tangibility	0.484					
Reliability	0.405	0.524				
Responsive	0.477	0.405	0.595			
Assurance	0.460	0.495	.553	0.525		
Empathy	0.403	0.411	0.422	0.482	0.519	
Network Quality	0.464	0.422	0.482	0.519	0.445	0.718

Note: The diagonal values represent the AVE values

Table 4. Results of Goodness of Fit Indices for Confirmatory Factor Analysis

Model	Chi-square Value	Df	Normed chi-square	*p* - value	CFI	RFI	RMSEA
Study Model	678.59	237	2.863	0.000	0.912	0.851	0.070
Recommended value	-	-	< 3	>0.05	0.8 - 0.9	0.8 - 0.9	<0.08

represented in the diagonal. As all the intercorrelation coefficients are less than the AVE value, discriminant validity exists. While the above are used to evaluate the validity and reliability of the measures, it is only the model fit numbers that indicate the significance of the model and its fit. Despite various fit indices, chi-square is one of the basic statistics used to assess the model fit with respect to its *p* -value. As it is not possible for all the models to have a significant chi-square value, researchers have suggested normed chi-square as an alternate method, which should be less than 3. In addition to it, to assess the GOF (goodness of fit), some of the most commonly used fit indices such as CFI (comparative fit index), GFI (goodness of fit), AGFI (adjusted goodness of fit), NFI (normed fit index), and RMSEA (root mean square of approximation) were considered to assess the model fit (Hair et al., 2010).

If the fit indices are greater than 0.90, it indicates a good fit model, though it is not quite possible for all the models to have a good fit. Thus, researchers have listed certain criteria to assess model fit based on the indices. Hair et al. (2010) stated that if CFI, GFI, NFI, and AGFI are greater than 0.90, then the model is absolutely fit ; if it ranges from 0.80 to 0.89, then the model is of good fit ; if the value is in the range of 0.60 to 0.79, it indicates the model has a poor fit ; and if it is less than 0.60, it is termed as very poor fit (Knight, Virdin, Ocampo, & Roosa, 1994). Among all the fit indices, CFI is suggested as an overall fit index (Byrne, 1998 ; Gerbing & Anderson, 1992) to assess the model. Hence, the model fit is assessed on the CFI value.

In addition to these, the other major consideration to assess the model fit is RMSEA, which measures the average of the residuals between the observed correlation/covariance from the sample and expected model from the population (Byrne, 1994). It also provides information in terms of difference per degree of freedom per model (Steiger, 1990), and in particular, to reject models with a large sample size and large number of variables. Thus, it is considered as an important and informative criterion in covariance structure modeling. As RMSEA value also ranges between 0 to 1, Meyers, Gamst, and Guarino (2006) specified RMSEA < 0.08 as good fit, RMSEA from 0.08 to 0.1 as moderate, and greater than 0.10 as poor fit. Hair et al. (2010) suggested RMSEA value less than 0.08 as good fit and less than 0.10 as acceptable fit.

The data in the Table 4 implies that the CFA or measurement model is a good fit because the study index results are within the recommended values, that is, the normed chi-square is 2.863 (<3), CFI is 0.912 (> 0.90), RFI is 0.851 (> 0.80), and RMSEA is 0.070 (< 0.080). CFA ensures that the items represent the same construct, but to determine the estimates of the parameters and to test whether service quality factors are significant drivers of service quality dimension, second-order confirmatory factor analysis was performed between overall service

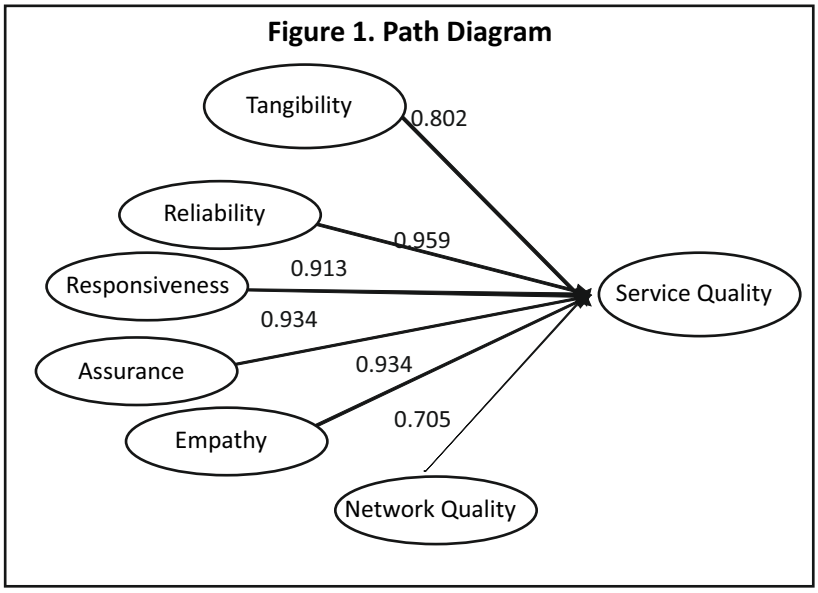


Figure 1. Path Diagram
Tangibility
0.802
Reliability
0.959
Responsiveness
0.913
Service Quality
0.934
Assurance
0.934
Empathy
0.705
Network Quality

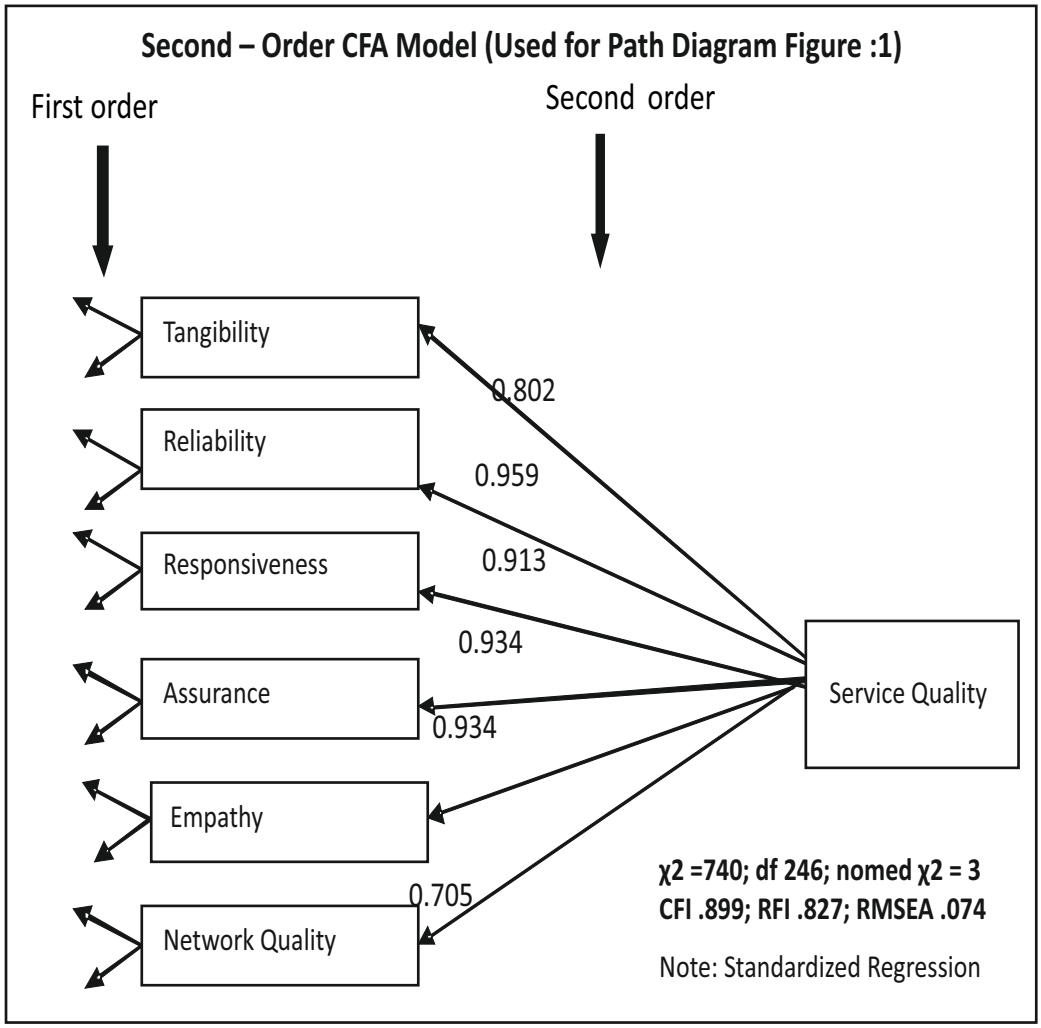
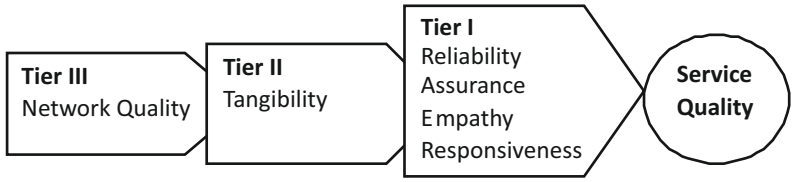

Second – Order CFA Model (Used for Path Diagram Figure :1)
First order
Second order
Tangibility
0.802
Reliability
0.959
Responsiveness
0.913
0.934
Assurance
0.934
Service Quality
Empathy
0.705
Network Quality
χ2 =740; df 246; nomed χ2 = 3
CFI .899; RFI .827; RMSEA .074
Note: Standardized Regression

Figure 2. Tiered Structure of Service Quality Constructs



Source: Adapted from Lai, Hutchinson, Li, and Bai (2007)

quality and various dimensions of it. To execute it, six hypothetical statements are framed, which are as follows :

Hypotheses for second-order CFA model are :

- **H01.1 :** Tangibility has no significant influence on service quality.
- **H01.2 :** Reliability has no significant influence on service quality.
- **H01.3 :** Responsiveness has no significant influence on service quality.
- **H01.4 :** Assurance has no significant influence on service quality.
- **H01.5:** Empathy has no significant influence on service quality.
- **H01.6:** Network quality has no significant influence on service quality.

In order to execute the above hypotheses, SEM was performed using AMOS (ver 20). To measure the service quality, tangibility, reliability, responsiveness, assurance, empathy, and network quality were observed as first order constructs from the measured variables. From the Figure 1, it is found all the dimensions of service quality are highly significant, with reliability having the highest loading of 0.959 (standard regression weight) compared to other constructs. It is followed by assurance and empathy with loading of 0.934, responsiveness : 0.913, tangibility : 0.802, and network quality : 0.705.

Discussion

Though all the dimensions are significant, the main aim of the study was to identify which dimension of service quality has a greater influence. Parasuraman et al. (1988) specified that SERVQUAL depicts the relative importance of its various dimensions towards customer perception of service quality. The study considered the same and found that the standard estimates of reliability, assurance, empathy, and responsiveness are greater than 0.90, so they are placed in the first tier ; tangibility greater than 0.80 is placed in the second tier ; and network quality with the lowest loading, that is, 0.705 is placed in the third tier (Figure 2). The major reason for classification of varied dimensions of service quality in tiered structures is that it gives a clear picture for the organization to identify and improve the service quality that is to be delivered to its customers.

The study adopted this classification (Figure 2) as it was used by Lai, Hutchinson, Li, and Bai (2007) to analyze the perception of service quality in China's mobile telecommunication industry. They identified empathy, responsiveness, and assurance in the first tier; reliability and convenience in the second tier ; and tangibility in the third tier. Looking into the study results of the present study and the results obtained by Lai et al. (2007), it is observed that when compared with tangible components, customers prefer service quality based on empathy and responsiveness. The study carried by Parasuraman et al. (1988) across four sectors (bank, credit card, telephone, repair and maintenance) also identified responsiveness as the most important factor across the three firms except banks, where tangibility was considered as the most important factor.

The findings of the present study do not coincide with the study carried out by Wang and Lo (2002), where they studied the service quality of mobile telecom companies. Though the study identified network quality and empathy as key drivers of service quality followed by tangibility, assurance, and reliability, responsiveness was found to be insignificant. In addition to the already used six constructs in the study, Khan (2010) included convenience as an added construct, and found that reliability, though positive, was found to be insignificant and only the network quality, assurance, responsiveness, and empathy factors were found to have a positive and significant relation with CPQ (customer perceived quality).

The study results are found to be coinciding with previous studies (Khan, 2010 ; Lai et al., 2007 ; Wang & Lo, 2002) in terms of assurance, empathy, and responsiveness. However, with respect to the reliability construct, the results of the study show a significant relationship towards overall service quality, which is found to be quite contrary to previous studies. The major reason for this is could be that in case of other telecom services, customers did not rely entirely on the organization or the employees for the problem to be solved. However, it is not so in the case of fixed broadband services (DSL) because it is fixed and used by the customers any time (24*7) and there are chances for certain technical problems that are to be solved immediately. In such a situation, though the customer may try to solve it, many a times, it becomes impossible, so they ultimately depend on the employees to solve their problems immediately. In such situations, an organization should be in a position to deliver the service in reliable time to its customers.

Service quality dimensions identified from the study and represented in tiered structures indicate that the constructs related to the employees' attitudes such as reliability, assurance, empathy, and responsiveness are placed in the first tier. All these factors are related to the attitudes and behaviours of the employees, which have a greater influence towards perceived service quality. Recognizing the contribution of each factor and making efforts to provide effective and reliable service itself is a success factor for firms, for example, to increase the reliability, service providers should train the employees, which would enable them to execute the promised service within time ; to increase the responsiveness, employees are to be motivated towards customer – orientation so that the ready attitude of the employees comes in handy while dealing with customers, and to offer prompt service should be an immediate response. Though both are highly significant factors towards service quality, their contribution towards customer satisfaction and effectiveness of service quality are also to be analyzed. On the one hand, while studies related to relationships state that reliability is major factor for long-term relationships, responsiveness is for short-term. On the other hand, studies focusing upon satisfaction have stated responsiveness as the key factor for satisfaction. It has been specifically stated that if a firm lacks the responsiveness component of service quality, it surely leads to dissatisfaction, which ultimately leads to negative word of mouth (WOM). In addition to these factors, empathy also plays a key role in reducing job tension, which leads to an increase in service quality.

Furthermore, for the provision of a continuous service like broadband which operates 24*7, customers expect a reliable service from the service provider because if any problems occur, though customers try to find a solution for it, most of the times, they need some technical assistance, which is to be provided immediately or at least within a specified time limit. In such a situation, employees are to be knowledgeable in providing a solution, should create a confidence in the minds of the customers which leads to an increase in assurance and empathy. So, the firms should not only focus on increasing sales, because in the present customer-centric marketing, retaining customers is a great challenge, which ultimately depends on effective service delivered to the customers. In addition to the above, for firms to satisfy their customers, they should focus on service after sales, which is a key competitive factor for success of an organization. This could be achieved only if the firms are taking efforts to motivate and train employees towards customer orientation.

Looking into other two significant factors, the tangible component, though recognized as the most important factor for facility based industries, it has equal contribution in people based industries because in the people-oriented service sector, the fruitfulness of the service is realized only through the products used for its promotion. In the study also, the effectiveness of service quality relies on the wire line cable, the telephone used, MODEM, and splitters in specific are must to be used to avoid noise signals. With respect to DSL services, as the distance

between the exchange and service quality is highly associated in terms of the latency effect, the quality of cable is eventually important. In our country, the wire line cables were mostly laid two to three decades back, which could be damaged either naturally or manually due to the digging of the roads by the electricity, transportation, water department, and so forth, but the result is a decrease in service quality. Hence, firms need to provide high quality products for high quality service.

In order to improve service quality and in turn increase customer satisfaction, the firms should first focus on training the employees regarding the marketing of the products/services, which ultimately leads to effective external marketing. Telecom service providers should also take efforts to increase job satisfaction of the employees, which results in delivery of high service quality because it is the one which enables a firm to identify its strengths and weaknesses, and enables a firm to focus and improve on the prominent traits of customer perceived service quality, which is the key factor for customer satisfaction. As studies have stated (including this study) that service quality is significant, a firm should take effective measures to retain its service quality, and this could be achieved by recruiting and training employees towards the customer orientation process.

Managerial Implications

Parasuraman et al. (1988) stated that the SERVQUAL signifies the relative importance of its dimensions towards the influence of customer perceived service quality. The tiered structure representation of the service quality constructs gives a clear picture for the managers of the organization, that is, in specific, which factors are to be given major importance in order to improve service quality. From the study, it is seen that the constructs related to the attitudes and behaviors of the employees are to be given more importance than the tangibility and network quality. Except for the reliability factor, rest of the constructs in the first tier were found to be coinciding with the study of Lai et al. (2007), who carried out their study in the mobile telecom sector in China. Further looking into the broadband service, its varied usage necessities the need for immediate solutions and response by the employees to its customers. Thus, the managers should focus on their employees who serve as a key tool for effective service delivery in the prevailing competitive environment.

Conclusion

While customer satisfaction is considered as a marketing tool to achieve the goal of the customer-centric organization, service quality acts as major determinant of customer satisfaction (Angelova & Zekiri, 2011) and also as a key tool for organizations to achieve success. In such a situation, categorization of service quality constructs give a clear picture for an organization and enables the managers to identify which of the constructs are to be given major focus in order to improve its service quality. The study has identified that in addition to reliability, assurance, and empathy, an organization should take efforts to improve its responsiveness because it is the key determinant of customer satisfaction (Ahmed, Nawaz, Usman, Shaukat, Ahmad, & Iqbal, 2010). Empathy plays a vital role in reducing job tension, which ultimately leads to an increase in customer satisfaction (Rogers, Clow, & Kash, 1994).

In most of the service organizations, employees act as the representative of the organization and their attitude has a greater influence on service quality delivered. Their interaction with customers creates a kind of confidence, and caring for them would lead to satisfaction among them. Hence, it is a must for all service organizations to take efforts to improve the reliability, assurance, and empathy in addition to responsiveness as it would create a feel of confidence among the customers. Moreover, broadband customers want their problems to be solved immediately or at-least within a specified time without much delay. Therefore, responding to their needs itself would increase the level of satisfaction of the customers, and in turn, customers would be willing to use the services of the firm in the future. This would lead to retention of subscribers, and in turn, increase profit. Organizations should create

happy customers and happy employees which would ultimately lead to an increase in service quality. In specific, it is the responsibility of the incumbent wireline operators to market their employees before they market to customers.

Limitations of the Study and Scope for Further Research

Though the study aims to identify the factors that influence the customer perceived service quality of broadband services (DSL) offered by the incumbent wireline service provider, there exists certain limitations in the generalization part of the study. First, the study considered only one telecom service provider, so data was collected only from them. So, the results may not be true for other telecom service providers. Second, the data collection was limited only to the subscribers of the incumbent wireline operators in Puducherry region. So, the results cannot be considered as the statement of DSL subscribers across the country. Third, the study analyzed the influence of service quality factors towards customer perceived service quality, which could be extended to study its influence towards customer satisfaction and customer loyalty. Hence, future researchers could consider the limitations of the study as a step forward for future studies, that is, they can consider to carry out studies across different telecom service providers. In case of the same service provider, a study could be carried across the country as a whole.

References

Ahmed, I., Nawaz, M. M., Usman, A., Shaukat, M. Z., Ahmad, N., & Iqbal, H. (2010). Impact of service quality on customer's satisfaction: Empirical evidence from telecom sector of Pakistan. *Interdisciplianry Journal of Contemporary Research in Business , 1* (12), 98 - 113.

Anderson, E. W., Fornell, C., & Lehmann, D. R. (1994). Customer satisfaction, market share, and profitability: Findings from Sweden. *Journal of Marketing , 58*(3), 53 - 66.

Angelova, B., & Zekiri, J. (2011). Measuring customer satisfaction with service quality using American customer satisfaction model. *International Journal of Academic Research in Business and Social Sciences , 1* (3), 232 - 258.

Babakus, E., & Boller, G. W. (1992). An empirical assessment of the SERVQUAL scale. *Journal of Business Research, 24* (3), 253 -268. DOI : 10.1016/0148-296390022

Berry, L. L., Parasuraman, A., & Zeithaml, V. A. (1988). The service-quality puzzle. *Business Horizons , 31* (5), 35 - 43. DOI :10.1016/0007-6813(88)90053-5

Byrne, B. M. (1994). *Structural equation modelling with EQS and EQS/ Windows: Basic concepts, applications and programming*. Thousand Oaks, CA, USA : Sage Publications, Inc.

Byrne, B. M. (1998). *Structural equation modelling with LISREL, PRELIS and SIMPLIS: Basic concepts, applications and programming*. Mahwah, N.J: L. Erlbaum Associates.

Chen, I. J., Gupta, A., & Rom, W. (1994). A study of price and quality in service operations. *International Journal of Service Industry Management , 5* (2), 23 - 33. DOI : http://dx.doi.org/10.1108/09564239410057663

Cronin, J. J. Jr., & Taylor, S. A. (1992). Measuring service quality: A re-examination and extension. *Journal of Marketing , 56* (3), 55 - 68. DOI: 10.2307/1252296

Cronin, J. J., & Taylor, S. A. (1994). SERVPERF versus SERVQUAL : Reconciling performance based and perceptions - minus - exceptions measurement of service quality. *Journal of Marketing , 58* (1), 125 - 131. DOI : 10.2307/1252256

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research , 18* (1), 39 - 50. DOI : 10.2307/3151312

Foster, G., & Newman, K. (1998). What is service quality when 'service' equals regulation? *The Service Industries Journal , 18* (4), 51 - 65. DOI:10.1080/02642069800000041

Gaskin, J. E. (2004). *Broadband Bible.* Indianapolis, IN: Wiley Publishing, Inc.

Gerbing, D. W., & Anderson, J. C. (1992). Monte Carlo evaluations of goodness of fit indices for structural equation models. *Sociological Methods Research , 21* (2), 132 - 160. DOI : 10.1177/0049124192021002002

Grönroos, C. (1982). An applied service marketing theory. *European Journal of Marketing , 16* (7), 30 - 41. DOI : http://dx.doi.org/10.1108/EUM0000000004859

Gronroos, C. (1990). Service management: A management focus for service competition. *International Journal of Service Industry Management , 1* (1), 6 - 14. http://dx.doi.org/10.1108/09564239010139125

Gronroos, C. (2006). Adapting a service logic for marketing. *Marketing Theory, 6* (3), 317 - 333. doi: 10.1177/1470593106066794

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis : A global perspective* (7th ed.). Upper Saddle River, New Jersey: Prentice Hall.

Jones, T. O., & Sasser, W. E. (1995). Why satisfied customers defect. *Harvard Business Review , 73* (6), 88 - 99.

Joshi, S. (2011). A study of service quality and customer satisfaction across various service providers in the telecom sector. *Indian Journal of Marketing , 41* (9), 55-61.

Khan, M. A. (2010). An empirical assessment of service quality of cellular mobile telephone operators in Pakistan. *Asian Social Science , 6* (10), 164 - 177. DOI: 10.5539/ass.v6n10p164

Knight, G. P., Virdin, L. M., Ocampo, K. A., & Roosa, M. (1994). An examination of the cross- ethnic equivalence of measures of negative life events and mental health among Hispanic and Anglo-American children. *American Journal of Community Psychology , 22* (6), 767- 783. DOI : 10.1007/BF02521558

Lai, F., Hutchinson, J., Li, D., & Bai, C. (2007). An empirical assessment and application of SERVQUAL in mainland China's mobile communications industry. *International Journal of Quality and Reliability Management , 24* (3), 244 - 262. DOI : http://dx.doi.org/10.1108/02656710710730852

Leisen, B., & Vance, C. (2001). Cross- national assessment of service quality in the telecommunication industry : Evidence from the USA and Germany. *Managing Service Quality , 11* (5), 307 -317. DOI : http://dx.doi.org/10.1108/EUM0000000005904

Lewis, B. R., & Mitchell, V. W. (1989). Defining and measuring the quality of customer service. *Marketing Intelligence and Planning , 8* (6), 11 - 17. DOI : http://dx.doi.org/10.1108/EUM0000000001086

Lewis, B. R., Orledge, J., & Mitchell, V. - W. (1994). Service quality : Students' assessment of banks and building societies. *International Journal of Bank Marketing, 12* (4), 3 - 12. DOI : http://dx.doi.org/10.1108/02652329410057978

Meyers, L. S., Gamst, G., & Guarino, A.J. (2006). *Applied multivariate research: Design & interpretation.* Thousand Oaks: Sage Publications.

Naidu, Y. K. M., & Ponduri, S. B. (2015). A comparative study on customer relationship management practices in the telecom industry. *Indian Journal of Marketing , 45* (4), 43 -55.

Negi, R. (2009). User's perceived service quality of mobile communications experience from Ethiopia. *Journal of Quality and Reliability Management , 26*(7), 699 - 711. DOI : http://dx.doi.org/10.1108/02656710910975769

Oliver, R. L. (1989). Processing of the satisfaction response in consumption: A suggested framework and research propositions. *Journal of Consumer Satisfaction, Dissatisfaction, and Complaining Behavior, 2,* 1- 16.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing , 49* (4), 41 - 50 . DOI: 10.2307/1251430

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL : A multi item scale for measuring consumer perception of service quality. *Journal of Retailing , 64* (1), 12 - 40.

Rao, K. R.M (2011). *Services marketing.* New Delhi, ND: Pearson Education.

Raza, A., & Rehman, Z. (2012). Impact of relationship marketing tactics on relationship quality and customer loyalty: A case study of telecom sector of Pakistan. *African Journal of Business Management , 6* (14), 5085 - 5092. DOI: 10.5897/AJBM11.3022

Reddy, G. S. (2005). Customer perception towards private life insurance companies' policies with reference to Bangalore city. *Indian Journal of Marketing , 35* (4), 9 - 14.

Rogers, J. D., Clow, K. E., & Kash, T. J. (1994). Increasing job satisfaction of job personnel. *Journal of Services Marketing , 8* (1), 14 - 26.

Sandhu, H.S., & Bala, N. (2011). Customers' perception towards service quality of Life Insurance Corporation of India : A factor analysis approach. *International Journal of Business and Social Science, 2* (18), 219 - 231.

Sekaran, U., & Bougie, R. (2010). *Research methods for business : A skill building approach* (5 ed.). West Sussex, UK: John Wiley & Sons Ltd.

Seth, N., Deshmukh, S. G., & Vrat, P. (2005). Service quality models: A review. *International Journal of Quality and Reliability Management , 22* (9), 913- 949. DOI : http://dx.doi.org/10.1108/02656710510625211

Srivastava, R., Bhangde, J., Bhatt, N., Gogri, K., & Marfatia, H. (2006). Role of competition in growing markets: Telecom sector. *Indian Journal of Marketing , 36* (9), 8 -16.

Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Approach , 25* (2), 173 - 180. DOI:10.1207/s15327906mbr2502_4

The Research Advisors.(2006). *Tools : Sample size.* Retrieved from http://www.research-advisors.com/tools/SampleSize.htm.

TRAI. (2013). *The Indian telecom services performance indicators.* TRAI : India.

Wang, Y., & Lo, H.-P. (2002). Service quality, customer satisfaction and behavior intentions: Evidence from China's telecommunication industry. *Info , 4* (6), 50 - 60. DOI : http://dx.doi.org/10.1108/14636690210453406

Wang, Y., Lo, H.P., & Yang, Y. (2004). An integrated framework for service quality, customer value, satisfaction : Evidence form China's telecommunication industry. *Information Systems Frontiers , 6* (4), 325 - 340. DOI : 10.1023/B:ISFI.0000046375.72726.67

Zeithaml, V. A., & Bitner, M. J. (1996). *Services marketing.* New York, NY: McGraw- Hill.

Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1988). Communication and control processes in the delivery of service quality. *Journal of Marketing , 52* (2), 35 - 48.