

EMPIRICAL STUDY OF FACTORS AFFECTING THE VALUE OF TELECOM SERVICES: EXPLORING TELECOM SERVICES VALUE MODEL

Empirična študija dejavnikov, ki vplivajo
na telekomunikacijske storitve: vrednostni
model telekomunikacijskih storitev

Kirti Sharma

Management Development Institute, Gurgaon, India

Kirti.Sharma@mdi.ac.in

Abstract

This exploratory study investigated the evolution and changing definition of value proposition in the Indian telecom sector. Mobile phone users who had changed their mobile connection in the recent past were surveyed. The results indicated that, although the price in terms of call and SMS rates was previously regarded as dominant factors leading to consumer satisfaction, the definition of value has evolved with network connectivity, resulting in followed schemes emerging as the most influential factors. This paper proposes a value model and concludes with a discussion of contributions and proposed ideas for future studies in this area.

Keywords: Value proposition, customer value, customer satisfaction, factor analysis

Izvleček

V raziskavi sta bila proučena razvoj in spreminjanje opredelitve vrednosti za stranke na področju telefonskih operaterjev v Indiji. Usmerjena je bila v uporabnike mobilnih telefonov, ki so zamenjali mobilnega operaterja. V raziskavi je bilo ugotovljeno, da je bila do nedavnega cena telefonskih klicev in SMS-sporočil prevladujoči dejavnik zadovoljstva strank, v zadnjem času pa postajata prevladujoča dejavnika zadovoljstva strank povezljivost z omrežjem in značilnosti programov ponudbe. V članku predlagamo vrednostni model mobilnih operaterjev in analiziramo njegove vplive.

Ključne besede: vrednost, vrednost za stranko, zadovoljstvo strank, faktorska analiza

1 Introduction

The dawn of computer-based communication technologies and communication networks has become an important factor in global interactions. Telecommunication, for example, provides the basis for social interactions among individuals as well as linkages both within and among nations. Deutsch (1953) mentioned this as "a web of nations". Today's development of communication technology ignores global borders, turning the world into a "global village" (McLuhan, 2000). This reform of the communication technology has since been expanded to include the transformation of the traditional voice telecom network, resulting in an enhanced information infrastructure capable of communicating all forms of information content (Melody, 2003). Today, it is the electronic infrastructure for transmitting all kinds of information, such as voice, data, graphics, video, and music, and remains a rapidly growing medium of communication throughout the world.



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The telecommunication system has been the fastest growing medium of communication, rejuvenating global interface interactions. Currently, the telecommunication sector is experiencing a paradigm shift, with the liberalization and privatization of the sector further intensifying the competition (Beard & Hartmann, 1999) and opening up an ocean of opportunities that enable customers to enjoy versatile choices among service providers. The Indian telecom sector has undergone several reforms in the last two decades. The Telecom Policy Reform in India (Singh, Soni, & Kathuria, 2006) discusses the evolution and development of the telecom industry in India, describing the existent structure of the telecom sector. This era has seen major developments, including a shift from the existing licence fee system to one based on one-time entry fees combined with revenue-sharing payments in 1998, opening domestic long distance voice communication to competition since January 2000. The nature of today's competition in the global telecommunications industry seems to centre on market activities aimed at gaining competitive advantages through strategic combinations of resources and presences in multiple products and geographical areas (Chan-Olmsted & Jamison, 2001). Due to incredible competition, telecom service providers offer innovative services at very competitive prices to meet customers' requirements and expectations in price and service quality (Melody, 2001).

In the context of the telecom sector, India is second largest among the emerging economies of Asia and in terms of the number of wireless connections. Over the years, India has witnessed phenomenal growth in the use of telecommunication facilities. This development has become a catalyst for the growth of the nation's commercial and industrial sectors, contributing much to the nation's economic development. According to the Telecom Regulatory Authority of India (TRAI), the number of telephone subscribers based in the country reached 706,37 million as of August 30, 2010, an increase of 10,71 per cent from 638,05 million in April 2010, and is estimated to cross the 1 billion mark by 2014 as quoted by Pricewaterhouse Coopers report titled, 'Indian 3G broadband subscribers'. As a result, the overall teledensity (telephones per 100 people) has reached 59,63 per cent. The wireless subscriber base increased to 670,60 million at the end of August 2010, up from 601,22 million in April 2010, registering a growth of 11,54 per cent. As far as broadband connections (≥ 256 kbps) are concerned, India currently has a subscriber base of 9,45 million, which is seen to be significantly under-penetrated, mainly due to factors like insufficient wire line infrastructure, fragmented local cable operators network, lack of a broadband policy to regulate the pricing of rental and usage rates, and delays in awarding spectrum to wireless broadband deployments. The same is estimated to reach about 275 million by 2015 as submarine cable capacity is likely to increase significantly with the adoption of Wireless Broadband Access (Assocham, Frost, & Sullivan, 2010). Growth has remained robust in the GSM mobile space, growing its subscriber base to 457 million and contributing approximately 70 per cent of the total in-

cremental subscriber addition for the entire Indian telecom market. There are primarily 9 GSM and 5 CDMA operators providing mobile services in 19 telecom circles and 4 metro cities, covering 2000 towns across the country.

This phenomenal growth of the Indian telecom industry during the past few years has been backed by a confluence of factors, such as progressive regulatory regime, favourable demographic features, and a conducive business environment. Tariff reduction and decline in handset costs has helped the segment grow in scale. The cellular segment has revolutionized the telecommunications system in India. Due to increased mobility and the emergence of a complex business environment, people are moving from one place to another and increasingly taking decisions for business and other purposes based on their movement. Therefore, they want to talk with connected people to ensure the right decision at the right time during their movement. People are interested in maintaining communication with their business partners, friends, and families around the clock, which is very difficult to achieve via fixed or land phones. Mobile or cell phones are a vehicle that made communication easier. Moreover, the cellular segment plays an important role in the industry by making itself available in rural and semi-urban areas, where teledensity is lowest.

2 Literature Review

Customer value saw its evolution as an integral concept to the marketing activities of any business organization in the early 1990s. This concept is considered to be one of the most significant factors in the success of an organization and has been pointed to as an important source of competitive advantages for firms (Mizik & Jacobson, 2003; Spiteri & Dion, 2004; Woodruff, 1997). Customer value has been recognized as the fundamental basis in every marketing activity (Holbrook, 1996, 2009) and has been envisioned as a critical strategic weapon in attracting and retaining customers (Lee & Overby, 2004; Wang, Lo, Chi, & Yang, 2004). In the Indian context of technological advancements and market liberalization, the cost of providing telecom services has reduced substantially, yet the extent of these cost reductions has not been fully reflected in lowering prices and market structure. The operators have to resort to non-pricing competition strategies to retain customers and provide value in terms of various calling schemes designed to suit the needs and preferences of a varied group of customers. Even in the context of other sectors of the service industry, it has been found that the players mainly focus on the content packaging and distribution stages of value change and aggregate the supply and demand in the industry to collect, organize, evaluate, and disperse information, thereby stressing the value-creating activities and their returns across the sectors (Aguila-Obra, Padilla-Melendez, & Serarols-Tarres, 2007)

Recognition of the relevance of the concept of value has generated important research focused on the study of its composition and its relationship with other concepts

of interest to marketers, such as customer satisfaction, service quality, trust, and loyalty. Customer satisfaction is an output, resulting from the customer's pre-purchase comparison of expected performance with perceived actual performance and incurred cost (Churchill & Surprenant, 1982). However, Parasuraman et al. (1994) put forward a simple and clear definition for satisfaction, suggesting that it is influenced by service quality, product quality, and price. They researched satisfaction at the transaction level, implying that overall satisfaction is a function of transactions. Yi (1990) asserted that customer satisfaction operates in two different ways: transaction-specific and general overall. The transaction-specific concept concerns customer satisfaction as the assessment made after a specific purchase. Overall satisfaction refers to the customer's rating of the brand, based on all encounters and experiences (Johnson & Fornell, 1991).

Despite the significant body of knowledge about the concept of customer value, the research is rather fragmented to the extent that heterogeneity of the various studies has created a dispersed, sometimes confusing and still-inconclusive base of knowledge about customer value. As Wang et al. (2004) contended, different points of view about the meaning of value are advocated in the literature, with no widely accepted way of pulling views together. In this same sense, Ulaga (2001, p. 318) concluded that "the fundamental question of how to conceptualize value still merits further investigation". Moreover, relevant studies have not yet yielded any unambiguous interpretations of the nature of customer value. Inconsistency still pervades the terminology used, confusing the meaning of the concept and, thus, its conceptual component parts. Studies on mobile phone usage patterns by Gebreab (2002), Madden and Coble-Neal (2003), and Ward and Woroch (2004) have shown that the demographic factors are important in the analysis of consumption pattern of the households and individuals. Rodini, Ward, and Woroch (2002) studied the mobile phone usage pattern by considering the demographic information of the household in terms of the age and gender of the head of household, and various studies by Eldridge and Grinter (2001), Igarashi Tasuku et. al. (2005), analysed young mobile phone consumers along with the gender variation to understand their usage patterns. The review of all these papers indicates that value creation and sustenance in service industry are critical phenomena. Keeping this in mind, we have undertaken an exploratory research of the value phenomenon in service industry—namely, a telecom sector case study. The study focuses on exploring the value phenomenon in the service industry using the illustrations of the telecom sector.

3 Objectives and Research Methodology

The objective of the study is to investigate the value proposition in the Indian telecom sector. The study objective also includes proposing a value model for customers of the telecom sector. The prevailing satisfaction regarding the telecom service provider is also studied. A questionnaire-

based survey was administered among mobile phone users from the Delhi-NCR region who had changed their mobile connection in the recent past, and the data gathered were analysed to study the relative importance of various factors which could define customer satisfaction in terms of the mobile services industry.

In order to analyse the changing definition of value proposition in the Indian telecom industry, a structured questionnaire was developed and administered to the targeted population. The form instrument was specifically designed to assess customer satisfaction and provide implications to telecom service providers for formulating future strategies. For the purpose of this study, the respondents were chosen to include mobile phone users who had switched connections in the recent past. The questionnaire was based on 13 variables, which we believe have an impact on customer satisfaction with regard to mobile service providers. The respondents were asked to rate these variables on a 5-point Likert scale for both their past as well as present perception of mobile service providers. In addition, we asked respondents to rate their overall satisfaction with the current service provider and tried to model the same as a function of the various independent variables identified for the purpose of this study. The draft questionnaire was administered on a sample of 15 individuals to assess its design and clarity, and the final questionnaire was redesigned and distributed to more than 150 respondents in the Delhi-NCR region. Due to constraints like incomplete data, complete responses were received from only 108 respondents. The data gathered were analysed using the SPSS statistical software package and various tools like *t*-tests, multiple regression, and exploratory factor analyses.

4 Data Analysis and Interpretation

The data gathered were checked for reliability using the reliability coefficient (Cronbach's alpha). As proposed by Nunnally (1978), the value should be above 0.7 for satisfactory results. Thus, the obtained 0.782 can be considered satisfactory for the purpose of the analysis.

Table 1: Reliability Analysis of Data

Reliability Analysis			
		N	%
Cases	Valid	108	100.0
	Excluded	0	.0
	Total	108	100.0
Reliability	Cronbach's alpha	No of Items	
	0.782	38	

The responses pertaining to customers' past and present perceptions of the various attributes related to customer satisfaction were used to conduct a paired sample *t*-test to check the null hypothesis of no difference in the mean level of satisfaction between customers' past and present

perceptions with regard to the factors. Table 2 demonstrates that the mean scores for all variables were higher in the context of the present perception than the past perception, and the difference in the mean scores was found to be significant at the 95 per cent level of confidence for most factors.

In order to check for the evolution of value proposition, we conducted a factor analysis on consumers' past and present perceptions. The Kaiser-Meyer-Olkin measure of sampling adequacy was found to be satisfactory for both the past and present perceptions with regard to satisfaction on various attributes. This measure was used to ascertain

Table 2: Paired Samples t-test

Paired Samples Test						
Pairs	Variables	Paired Differences			t-statistic	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean		
Pair 1	Past Perception of Network - Present Perception of Network	-.43519	1.09607	.10547	-4.126**	.000
Pair 2	Past Perception of Call Rates - Present Perception of Call Rates	-.10185	1.01337	.09751	-1.044	.299
Pair 3	Past Perception of SMS Rates - Present Perception of SMS Rates	-.33333	1.26047	.12129	-2.748**	.007
Pair 4	Past Perception of Roaming Charges - Present Perception of Roaming Charges	-.61111	1.26663	.12188	-5.013**	.000
Pair 5	Past Perception of Voice Quality - Present Perception of Voice Quality	-.27778	1.14250	.10994	-2.526*	.013
Pair 6	Past Perception of Ease of Availability - Present Perception of Ease of Availability	-.12037	1.07406	.10335	-1.164	.247
Pair 7	Past Perception of Brand Image - Present Perception of Brand Image	-.20370	1.15814	.11144	-1.827	.070
Pair 8	Past Perception of Flexibility of Plans - Present Perception of Flexibility of Plans	-.69444	1.21869	.11727	-5.922**	.000
Pair 9	Past Perception of Customer Care Service - Present Perception of Customer Care Service	-.57407	1.20903	.11634	-4.934**	.000
Pair 10	Past Perception of G3 Service - Present Perception of G3 Service	-.96296	1.49094	.14347	-6.712**	.000
Pair 11	Past Perception of Internet Services - Present Perception of Internet Services	-1.13889	1.48801	.14318	-7.954**	.000
Pair 12	Past Perception of Caller Tunes - Present Perception of Caller Tunes	-.37963	1.24343	.11965	-3.173**	.002
Pair 13	Past Perception of CDMA-GSM Preferences - Present Perception of CDMA-GSM Preferences	-.28704	1.28289	.12345	-2.325*	.022

** Value Significant at 99% level of confidence with 107 degrees of freedom

* Value Significant at 95% level of confidence with 107 degrees of freedom

Table 3: KMO and Bartlett's Test of Sphericity for Determining Appropriateness of Factor Analysis

Past Perception of Consumers		
KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.711
	Approx. Chi-Square	395.961**
Bartlett's Test of Sphericity	df	78
	Sig.	0.000

** Value Significant at 99% level of confidence

Present Perception of Consumers		
KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.705
	Approx. Chi-Square	467.294**
Bartlett's Test of Sphericity	df	78
	Sig.	0.000

** Value Significant at 99% level of confidence

Table 4: Factor Loadings on Consumers' Past Perceptions

FACTOR 1		FACTOR 2		FACTOR 3		FACTOR 4	
Variables	Loadings	Variables	Loadings	Variables	Loadings	Variables	Loadings
3G Services	0.873	Network	0.637	Call Rates	0.725	Voice Quality	0.816
Internet Connectivity	0.848	Brand Image	0.598	SMS Rates	0.834	Ease of Availability	0.689
Value Added Services	0.711	Flexibility of Plans	0.727	Roaming Rates	0.612		
CDMA-GSM Preferences	0.55	Customer Care	0.663				

	Initial Eigen Value	Explained Variance	Proposed Name
Factor 1	3.435	26.43%	Other Factors
Factor 2	2.271	43.90%	Support Factors
Factor 3	1.346	54.25%	Cost Factors
Factor 4	1.101	62.72%	Convenience Factors

the appropriateness of the factor analysis on the given data. A value of 0.5 or higher indicates that factor analysis is appropriate. After having ascertained the appropriateness of factor analysis, we proceeded with the Bartlett's test of sphericity, which is a test statistic used to check the null hypothesis of no correlation between the variables. The test statistic was found to be significant at the 99.999 per cent level of confidence for the data pertaining to both past and present perceptions. We therefore proceeded further with the dimension reduction of variables.

While conducting the factor analysis, we used a principal component analysis with varimax rotation and Kaiser nor-

malization to generate factors. The optimal number of factors was based on the Eigen-value criteria (i.e., only those factors having eigen-values greater than one were to be retained). Table 4 shows that, in the case of consumers' past perceptions, we were able to group the 13 variables into 4 broad factors able to explain 62.72 per cent of the total variation.

In contrast, the analysis of the present perceptions revealed five broad factors into which the variables were grouped, with network connectivity emerging as an independent factor explaining 8.3 per cent of the variation in absolute terms. The five factors explained 72.65 per cent of the variation in consumers' present perceptions.

Table 5: Factor Loadings on Consumers' Present Perceptions

FACTOR 1		FACTOR 2		FACTOR 3		FACTOR 4		FACTOR 5	
Variables	Loadings	Variables	Loadings	Variables	Loadings	Variables	Loadings	Variables	Loadings
3G Services	0.879	Call Rates	0.715	Brand Image	0.857	Voice Quality	0.736	Network	0.852
Internet Connectivity	0.898	SMS Rates	0.826	Flexibility of Plans	0.625	Ease of Availability	0.574		
Value Added Services	0.676	Roaming Rates	0.754	Customer Care	0.576	CDMA-GSM Preferences	0.728		

	Initial Eigen Value	Explained Variance	Proposed Name
Factor 1	3.843	29.57%	Other Factors
Factor 2	2.145	46.07%	Cost Factors
Factor 3	1.220	55.45%	Support Factors
Factor 4	1.156	64.35%	Convenience Factors
Factor 5	1.079	72.65%	Network Connectivity

Table 6: Output of Multiple Regression on Customers' Present Perceptions

Model Summary				
R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.796	.634	.620	.66438	1.604

ANOVA					
	Sum of Squares	df	Mean Square	F-statistic	Sig.
Regression	78.859	4	19.715	44.664**	.000
Residual	45.465	103	.441		
Total	124.324	107			

** Value Significant at 99% level of confidence

Predictor Variables: Network Rate, Schemes Offered, Call Rates & SMS Rates

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients (Beta)	t-statistic	Sig.
	B	Std. Error			
(Constant)	-.387	.350		-1.106	.271
Network Connectivity	.402	.051	.480	7.938**	.000
Schemes Offered	.223	.063	.263	3.551**	.001
Call Rates	.231	.073	.240	3.176**	.002
SMS Rates	.167	.060	.205	2.789**	.006

** Value Significant at 99% level of confidence

Dependent Variable: Current Level of Customer Satisfaction

Regression Method: Enter

As the summary of data in the tables indicates, compared to past perceptions, present perceptions about mobile service providers experienced a phenomenal change, with network evolving as an independent factor. This fact is also supplemented by the descriptive statistics of the data, where we can see that, in the past, call rates had the highest mean score followed by network connectivity (4.23 and 4.19 on a scale of 5, respectively), while in the present, network connectivity dominated all other factors (mean of 4.63).

While conducting the analysis, we also tried to model customers' overall satisfaction as a function of the independent variables associated with customer satisfaction, as taken in this research. Accordingly, a multiple regression analysis was conducted to check for the null hypothesis that the independent variables had no relation to overall customer satisfaction. We conducted a stepwise regression first and identified the variables which significantly explain the change in the dependent variable; we then carried out a regression analysis using the enter method with these variables.

The model summary shows that the R-square value is 0.634, implying that a 63.40 per cent variation in the dependent variable can be explained by the variation in the independent variables. The Durbin-Watson statistic has a value of 1.604, which indicates that no problem of autocorrelation exists in the given dataset. The ANOVA summary reflects that the proposed value model is significant. Table 6 shows the results of the multiple regression, where the call rates, network connectivity, SMS rates, and the schemes offered are seen to have their regression coefficients (β) significant at the 99 per cent level of confidence, with network connectivity having the highest β value (0.48, significant at the 99 per cent level of confidence), followed by schemes offered, call rates, and SMS rates, respectively.

Based on this analysis, the following value model can be proposed:

$$\text{Customer Satisfaction} = 0.48 \text{ Network Connectivity} + 0.26 \text{ Schemes Offered} + 0.24 \text{ Call Rates} + 0.205 \text{ SMS Rates}$$

5 Conclusion

As it can be seen from the analysis of the responses gathered, the customer's value proposition with regard to satisfaction from mobile service providers has experienced a paradigm change, with network connectivity evolving as a dominant factor determining a customer's level of satisfaction. A significant amount of this change could be attributed to the increased competition among various telecom service providers. The increased competition has led to heavily reduced call rates and service providers no longer competing in terms of the price charged for the service. Roaming fees, which used to be another charge, is now free. Although in the past customers were required to pay for activating roaming abilities, today auto-roaming is provided free, as are local calls. Increased competition has taken its

toll to such an extent that the operators are now earning normal profits in the business, and the potential source of revenue now comes from different value-added services offered. But for this potential source to be productive, they have to ensure customer loyalty towards their service offering, which can be achieved by providing excellent service so that customers stay loyal and committed towards their mobile service providers. By strengthening the core offering (i.e., network connectivity), companies would be able to retain the existing customer base while simultaneously attracting new customers, as evidenced from the results of the current analysis. Network connectivity has, indeed, evolved as the single dominant factor significantly affecting overall customer satisfaction with mobile service. Companies should therefore ensure better connectivity to retain customers in order to generate profits by offering various value-added services.

With the world becoming a global village, connectivity among individuals is of prime importance, and there is increased emphasis on information sharing. Information and its communication drive all activities in the world today. Thus, better network connectivity would ensure the transmission and receipt of information in a smooth and effective manner, thereby resulting in better customer satisfaction.

In addition, with the changing demographics of the Indian populace, higher literacy rates, and migration across the globe for work and travel, mobile service providers have to ensure that the varying demands of various target sets of customers are duly met through the various schemes being offered. For example, some mobile subscribers might prefer a scheme in which local call rates are reduced whereas others might want reduced rates for international calls and still others prefer reduced call rates during off-peak hours. Hence, the various schemes offered, which significantly affect overall customer satisfaction, must be designed to meet target customers' expectations. Call rates and SMS rates still have a significant impact on overall customer satisfaction, but network connectivity and the schemes and services offered have clearly superseded them.

In light of the empirical evidence highlighted through this study, managers can have a better understanding of the concept of value, thereby enabling organizations to diagnose subscribers shifting behaviours. Furthermore, with the changing regulations in the telecom sector, marketing decisions and strategies should be made after conducting sound marketing research.

6 Limitations

Although the empirical evidence shows the evolution of value proposition in the context of the telecom service, this study cannot be considered exhaustive or generalized due to the following limitations. First, the survey was confined only to the Delhi-NCR region, and the results could not be generalized to the entire population. Individuals' responses across various states might vary, given the differences in the level of service and the level of customer expectations,

as the latter is a function of the level of competition and the number of players operating in the given area. Second, the survey findings could not be extended to the rural areas because of the differences in the level of development and the coverage area between the rural and urban areas. Although the rural area is developing, the definition of value can still vary between the two areas. Third, although managerial implications could be drawn from the study, with the advent of 3G services—which have yet to make a mark in the Indian telecom industry—we cannot comment on the relative importance of the identified factors in modelling customer satisfaction. Finally, with the phased implementation of mobile number portability, the value proposition is expected to experience further changes that cannot be inferred from this study.

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Dr. Kirti Sharma holds a Ph.D. in marketing management. She has been an academic for 12 years and is currently at the Management Development Institute, Gurgaon. Her current research interests include consumer perception, customer value, loyalty and retention, consumers' switching behaviours, and service strategies. She has published several articles in journals worldwide. She has been involved in case research studies and has two cases registered with the European case clearinghouse The Case Centre. She has taught courses in consumer behaviour, marketing practices and implementation, international marketing, and advertising management.

Dr. Kirti Sharma ima doktorat znanosti iz trženjskega menedžmenta. Z akademskim delom se ukvarja dvanajst let. Trenutno je zaposlena na 'Management Development Institute' v Gurgaonu. Raziskovalno se ukvarja s percepcijami strank, vrednostjo za stranke, lojalnostjo in retencijo, spremenljivim obnašanjem strank in storitvenimi strategijami. Objavila je številne članke v mednarodnih revijah. Vključena je v raziskovanje študijskih primerov. Dva primera je registrirala pri European case clearing house 'The Case Centre'. Predava o vedenju strank (consumer behavior), marketinških praksah in implementaciji (marketing practices and implementation), mednarodnem marketingu (international marketing) in menedžmentu oglaševanja (advertising management).