Modeling customer satisfaction in cellular phone services

Muhammad Mohsin Butt
mohsinbutt@hotmail.com

Ernest Cyril de Run
drernest@feb.unimas.my
Faculty of Economics and Business
Universiti Malaysia Sarawak

Abstract

Low tariffs, wider coverage and decent quality keep Pakistani cellular phone market growth at an alarming pace. Despite highest growth rate in the region, the lucrative Pakistani market is not free from challenges. The intensified competition is depicting a pattern of customer churn while the companies are still enjoying growth. This creates serious challenges for organizations in managing their existing customer while striving for growth. The common answer to such challenges is retaining customers through satisfaction. This research aims at answering what are the factors contributing towards customer satisfaction in Pakistani mobile cellular services? A typical two-stage survey was conducted. A qualitative research was conducted in first stage to collect factors, which contribute towards the customer satisfaction of a typical Pakistani cellular phone user. It was followed with a questionnaire to gather quantitative data for further analysis using conformity factor analysis. The results confirmed a multidimensional construct of customer satisfaction in Pakistani cellular phone communication sector. The findings suggest that customer satisfaction of cellular phone users in Pakistan constitute of four factors including price, transmission quality, usage ease and service support. This is in line with the previous research exploring the issue in other countries.

Introduction

Telecommunication technology enables business and industry to grow at a faster pace while simultaneously contributing to the economic development. Telecommunication infrastructure can be reliable indicator of economic development. It works as a factor that multiply economic growth by providing employment, improving business efficiency and contributing towards international investments (Anonymous, 2007). Growing customer's needs for cheap, accessible and efficient communication modes has resulted in to phenomenal growth of cellular phone industry around the world in general and especially in Pakistan

The cellular phone density in Pakistan increases from 0.22 percent at the turn of millennium to a current estimate around 32.07% (Anonymous, 2007) Table 1 shows the gradual increase of the sector. Pakistan cellular phone service market has currently six operators out of which five major service providers are using GSM technology.

Table 1: Pakistan's cellular phone market

Variable	2000	2001	2002	2003	2004	2005	2006
Number of subscribers	306493	742606	1698536	2404400	5022908	12771203	48289136
Growth rate	15.39	142.29	128.73	41.56	108.90	154.26	170.2
Mobile density	0.22	0.52	1.16	1.61	3.29	8.30	31.07

Source: Pakistan Telecommunication Authority

Despite this abnormal growth, there is no existing study exploring the parameters of customer satisfaction in the Pakistani cellular phone service. One can predict that the intensity of competition will soon force the service providers to focus on measuring and improving customer satisfaction, on regular basis. In a highly competitive market, such as telecommunications, delivering a service which satisfies customer perceptions is an antecedent of customer satisfaction and an ultimate strategy for retaining them (Cronin & Taylor, 1992; Parasuraman *et al.*, 1991). However the recognition of the various constructs of satisfaction and their possible invariance across nations poses a major problem, as constructs in one nation may not transfer to another (Byrne, 1990).

The aim of this research is to identify factors that contribute to of Pakistani's cellular phone service user's satisfaction. This will help to develop managerial recommendations for cellular service providers as a guideline to focus on customer retention through satisfaction (Anderson *et al.*, 1994). The rest of the paper is organized as follows: first, discussion of the relevant literature is presented; followed by a discussion of the methodology used, thirdly, the findings are presented and then discussed, followed by the conclusions that look at academic and managerial implications, limitations, and areas for future research.

Literature review

Customer satisfaction constitutes a mental stage in consumer mind where expectation regarding a service or product performance is fulfilled (Goode & Moutinho, 1996; Oliver, 1989). A review of literature reveled that at least two different conceptualizing of customer satisfaction construct exist. Transaction specific conceptualize customer satisfaction as one time post purchase evaluation (Oliver, 1977). On the other hand, cumulative satisfaction refers to overall evaluation after usage for a period of time (Anderson et al., 1994; Fornell, 1992; Fornell *et al.*, 1996). Cumulative construct of satisfaction is more relevant to service sector, especially in case of continuous service providers as is the case in telecommunication. Nevertheless, the contradiction in defining customer satisfaction generates further conflicts in defining how to measure it.

The need to measure customer satisfaction through measuring service quality was pioneered by Parasuraman et al., (1988). Their realization that service quality is primarily different from product quality resulted into five dimensional service quality model called as SERVQUAL (Cronin & Taylor, 1992; Parasuraman et al., 1991). The SERVQUAL model suggests that the service quality is fundamentally a gap between the expectation in customer mind regarding a general class of a service provider and their estimation of actual performance of a specific firm within that class (Cronin & Taylor, 1992; Parasuraman et al., 1991). Initially they identified ten dimension of service quality, which they collapsed to five in their later work namely as reliability, assurance, tangibles, empathy and responsiveness (Buttle, 1996; Parasuraman *et al.*, 1988).

However many others are skeptical for a straightforward adaptation of SERVQUAL model (Carman, 1990). The fundamental criticism of SERVQUAL is its adaptation of expectation disconfirmation model rather then simply measuring the attitude (Cronin & Taylor, 1992). The critiques of SERVQUAL model argue that performance base measure is more appropriate dimension for measuring service quality because it's a consumer attitude in its pure nature (Sureshchandar *et al.*, 2001).

Nevertheless, the intangible nature of service has forced many researchers to conclude that service performance served as key antecedent to customer satisfaction (Patterson *et al.*, 1997; Sharma & Ojha, 2004). However, in service sector literatures major emphasize is placed on service quality (Parasuraman *et al.*, 1991). The relationship between service quality and customer satisfaction is somewhat reciprocal. Previous research on this relationship can be divided into two school of thoughts, one considers a satisfied customer perceived high about service quality (Bolton & Drew, 1991), on the contrary other argue that service quality leads to customer satisfaction (Antreas & Opoulos, 2003; Cronin & Taylor, 1992; Spreng & MacKoy, 1996). Nevertheless both schools agree that there is a strong correlation between customer satisfaction and service quality.

Despite the high growth market of cellular phone communication the research in customer satisfaction is still in its initial stages (Aydin & Özer, 2006; Sharma & Ojha, 2004; Woo & Fock, 1999). A survey of cellular phone customers in Hong Kong revealed that transmission quality and coverage of network are most important (Woo & Fock, 1999). Others have examined the link between loyalty, switching cost and switching behaviour (Aydin & Özer, 2006; Lee & Feick, 2001). An exploratory study of factors contributing to customer satisfaction of mobile user in India has resulted in the construction of three distinct constituents i.e., network base service performance, retailer related process performance, and network operator related performance (Sharma & Ojha, 2004).

Delivering a service performance, which can satisfy customers, is critical for retaining customers and a tool to protect organizations from customer churn (Brown & Gulycz, 2001). Marketing scholars and practitioners equally emphasize on the issue of customer satisfaction for generating loyalty among customers, which helps in maintaining existing cash flows and guarantee stable future (Teas, 1994; Zeithaml *et al.*, 1996). While the manufacturing sector is concerned with the repurchase, most of the services depend on the continuity and thus focus on customer retention (Anderson *et al.*, 1994). In a competitive environment with minimum or ignorable switching cost, such as in the telecommunications sector in Pakistan, the issue of satisfying customer thus becomes vital.

Research methodology

Initially, a qualitative research was adopted to identify the factors contributing customer satisfaction of cellular phone subscribers. The previous research work of different scholars in cellular phone customer satisfaction was reviewed to initially determine the variable, which can be tested to measure satisfaction parameter (Sharma & Ojha, 2004; Woo & Fock, 1999). These variables worked as guideline for in-depth interview of fifteen respondents who were using services of different cellular phone service providers (Perry, 1998).

Once the common and significant variables for measuring customer satisfaction were selected, the second stage of research commenced. A questionnaire was developed based on the findings of the interview. The questionnaire inquired about the actual perception of performance on each item (Cronin & Taylor, 1992). A five point Likert scale was used to

measure the performance perception on each item, where 1 represented very poor to 5 for excellent. The questionnaire also included demographic and psychographic variables.

An initial test of the questionnaire was conducted on ten respondents who were later excluded from the final study. Respondents were existing customers of different cellular phone service providers operating in Pakistan. They were geographically scattered along four cities, Gujranwala, Daska, Gujarat and Wazirabad based on a quota allocated to each service provider on the basis of its market share (Woo & Fock, 1999). A total of 150 questionnaires were distributed.

An exploratory factor analysis was initially used to identify the significant items for measuring customer satisfaction. Later we ran conformity factor analysis. Structural equation modeling (SEM) was then run to model multiple independent and dependent variables and study their relationships.

Results

From the in-depth interviews, a list of 17 items was identified (Table 2). The items can be grouped into four groups. The first group is related to the technical side of service delivery, concerned with the service provider network capacity and the resulting quality of transmission. The second group of items is related to price and covered price phenomena from a customer perspective, and genuinely concern with both on and off net charges by a cellular phone service provider. The third group of items deals with ease of usage, involving reloading of their accounts and getting connected with ease. The last group of items represents support services. Interestingly most of the final items generated were identical with the previous research conducted in India (Sharma & Ojha, 2004). This similarity is probably due to the close cultural, economic, market growth as well as competition conditions.

Table 2: Statements from Qualitative Study

Coverage and signal quality on highways, Coverage inside the building, Coverage with the city and suburbs, Number of cities Covered by the network, Signal reception quality, Ease of getting through during busy hours, Speed of getting through, Easy to reload my account, International call rates, Call rates with in network, Call rates to other networks, Call rates to fixed line, Price of services, Billing Accuracy, Price package variety, Customer service center attitude, Staff speeds of solving problems.

Having conducted the initial test, the final questionnaires were distributed to the respondents. Out of 150 questionnaires distributed 124 usable questionnaires were obtained yielding a response rate of 82%. Table 3 provides the demographics details of the respondents.

Table 3: Sample characteristics

Demographic Characteristics		Frequency	Percentage
Gender	Male	90	72.6
	Female	34	27.4
Age	Less than 24	70	56.5
	24-34	39	31.5
	34-45	7	5.6
	45-65	7	5.6
	More than 65	1	.8
Education	Under Metric	5	4.0
	Under Graduate	47	37.9
	Graduate	27	21.8
	Post graduate	45	36.3
Occupation	Student	60	48.4
	Employee	34	27.4
	Businessman	15	12.1
	Other	15	12.1
Income (in Rupees per month)	Less than 10,000	71	57.3
	20,000 to 50,000	30	24.2
	50.000 to 100,000	11	8.9
	More than 100,000	12	9.7
Package Plan	Post Paid	25	20.2
	Pre Paid	98	79.0
Monthly Bill	Less than 500 Between 500 to 1000	40	32.3
		39	31.5
	Between 1000 to 3000	36	29.0
	More than 3000	9	7.3
Duration of usage	Last six Month	28	22.6
	Last One Year	33	26.6
	Last Two Years	12	9.7
	More than two years	51	41.1

The data was first analyzed using exploratory factor component analysis with Varimax rotation. A factor analysis was conducted to reduce the large number of variables into manageable factors for better understanding and interpretation. The over all KMO was 0.794, Bartlett's test was significant (Chi Square=756.413, df 136 $p<0.001$) and Cronbach alpha was slightly above 0.70 which is consider acceptable in social science research. The items for each factor are placed in a model form depicted in Figure 1.

Table 4: Exploratory Factor Analysis

	Component			
Variables	Price	Network Coverage and signal quality	Customer service	Usage ease
Call rates to other networks	.853			
Call rates to fixed line	.790			
Call rates with in network	.727			
International call rates	.581			
Price of services	.566		.515	
Number of cities Covered by the network		.774		
Coverage and signal quality on highways		.702		
signal reception quality		.674		
Coverage inside the building		.672		
Coverage with the city and suburbs		.634		
Customer service center attitude			.820	
Staff speed of solving problems			.808	
Price package variety			.702	
Billing Accuracy			.548	
Speed of getting through				.851
Easy to reload my account				.724
Ease of getting through during busy hours				.611
Eigenvalues	*5.32*	*2.54*	*1.58*	*1.25*
% of variance	*31.36*	*14.98*	*9.382*	*7.37*
Alpha	*.823*	*.788*	*.785*	*.742*

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 6 iterations.

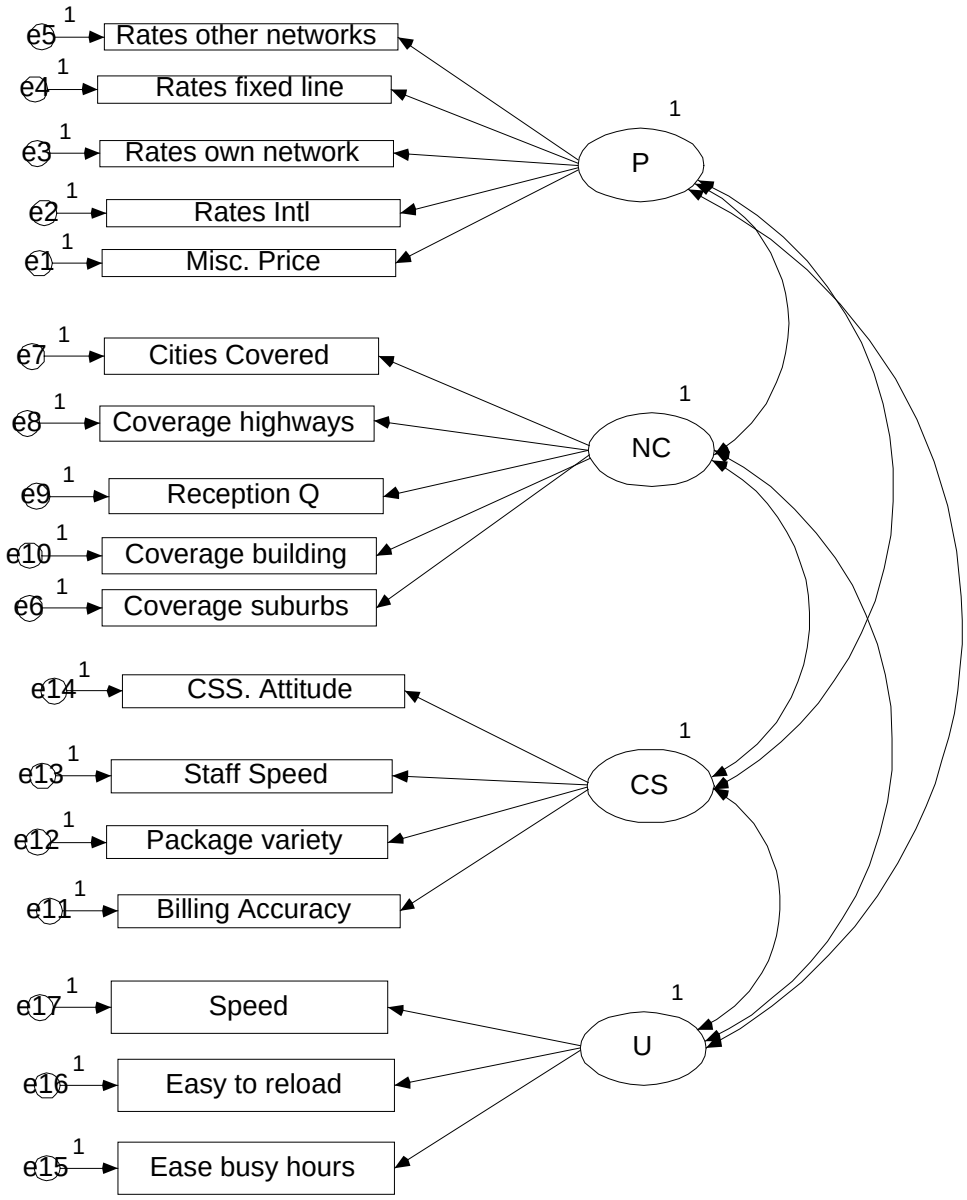

Figure 1: Initial model of Pakistani mobile cellular customer satisfaction

We then ran the conformity factor analysis on the measurement model (Table 5). The initial test for equality of covariance and means yielded a Chi-square value of 228.7 with 113 degrees of freedom ($p < .001$), and RMSEA of 0.091 (Table 5). Test of fit statistics were CMIN/df = 2.024, GFI = 0.827, AGFI = 0.765, and CFI = 0.855 (Table 5). Items were eliminated based on modification indices and standardized residual covariance indexes

(Byrne, 2001; Kaplan, 1989; SteenKamp & Baumgartner, 1998). Further analysis was done and the final Measurement Model tested by fixing a loading of one to the variable "Fixed Rates on other networks" for P (Price), the variable "Reception Q" for NC (Network Coverage), the variable "CSS attitude" for CS (Customer Service), and the variable "Easy to reload" for U (Usage) and its intercepts to zero. Evidence of configural invariance for mobile cellular satisfaction was shown.

In order to test for metric invariance, the matrix of all factor loadings was constrained. For test of fit, the data shows minimal change (CMIN/df = 201.2, GFI = 0.828, AGFI = 0.765, and CFI = 0.842). Therefore metric invariance is supported. The next step was to impose scalar invariance where intercepts of the invariant factor loadings were constrained to be equal. The final model retains nearly all of the original variables except for the variable Coverage Highway and Coverage Building (Figure 2).

Table 5: Model comparisons for Pakistani cellular phone customer satisfaction

Test*	Marker	Chi Sq	df	P	CMIN/df	GFI	AGFI	CFI	RMSEA
MM1	-	228.7	113	0.000	2.024	.827	.765	.855	.091
MM2	Remove Coverage Highway, .47	212.3	98	0.000	2.167	.831	.766	.850	.097
MM3	Remove Coverage Building. .47	182.1	84	0.000	2.169	.844	.777	.863	.097
CIM	Fixed Rates other networks for P, Reception Q for NC, CSS attitude for CS, and Easy to reload for U.	201.2	88	0.000	2.287	.828	.765	.842	.102
MIM	Fixed all parameters	201.2	88	0.000	2.287	.828	.765	.842	.102
SIM	Estimated means and intercepts	201.2	88	0.000	2.287	.708 (RFI)	.846 (IFI)	.842	.102

Notes:
* MM – Measurement Model, CIM – Configural Invariance Model, MIM – Metric Invariance Model, SIM – Scalar Invariance Model. CMIN/df – minimum discrepancy divided by its degrees of freedom with an acceptable ratio of 2 to 1 to as high as 5; GFI – Goodness of Fit Index, between 0 and 1, where 1 indicates a perfect fit; RFI – Relative Fit Index, where values close to 1 indicate a very good fit; IFI – Incremental Fit Index, where values close to 1 indicate a very good fit; AGFI – Adjusted Goodness of Fit Index, bounded above by 1, not bounded below by 0 where 1 indicates a perfect fit; CFI – Comparative Fit Index, where values close to 1 indicate a very good fit; RMSEA – Root Mean Square Error of Approximation, where a value of .05 indicate a close fit.

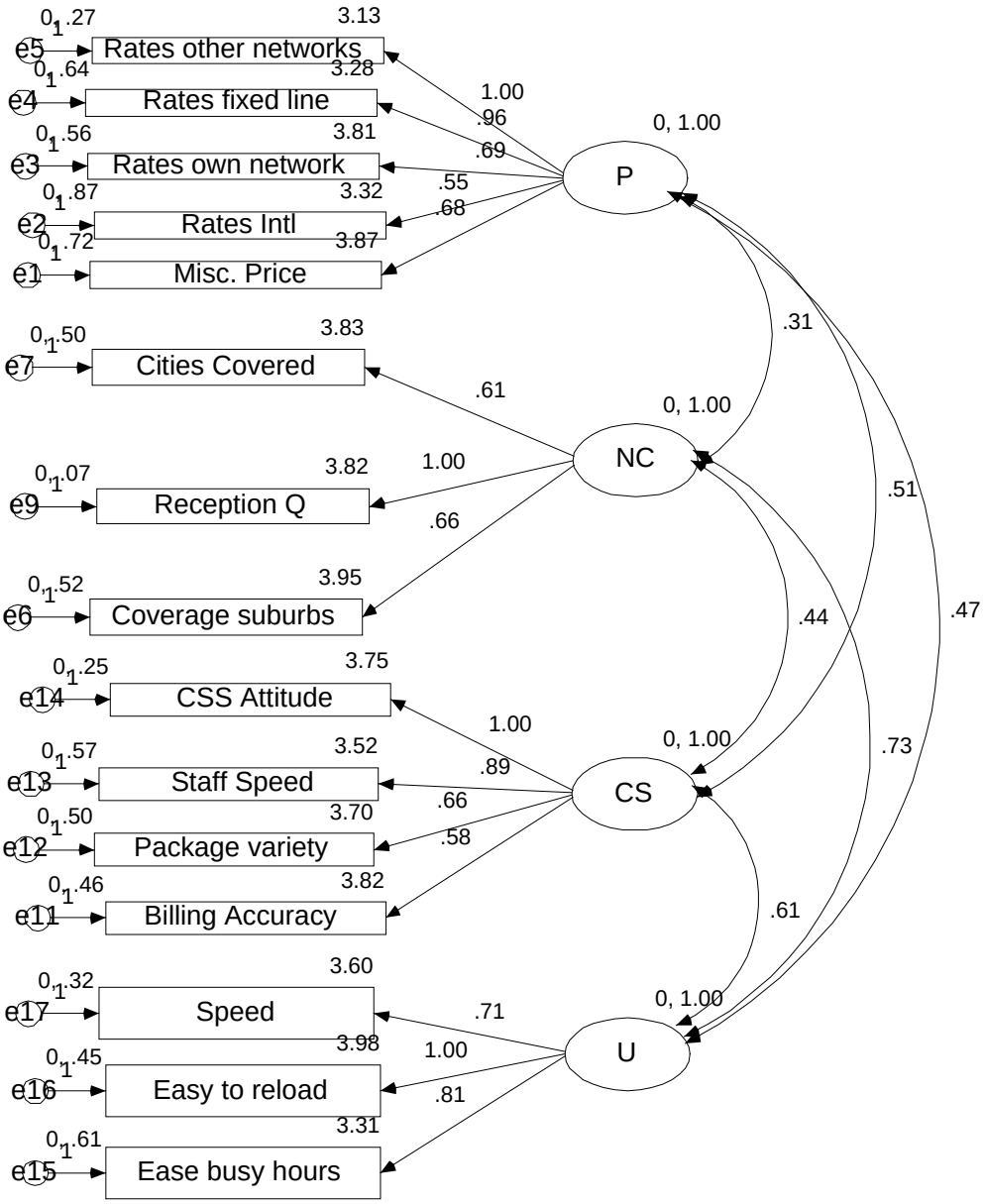

Figure 2: Final Model for Pakistani mobile cellular customer satisfaction

The mean values of each item and its related component of the final model was calculated and is presented in Table 6. The mean ranges from 3.12 to 3.97 reflecting a moderate difference across the different items on the performance parameters of cellular phone service providers. The transmission related items received the highest mean value of 3.86 reflecting customers are quite satisfied with the core service delivery which in this case is to assure wider network coverage and higher signal quality. The over all mean to price related items is 3.48, which is

lower then transmission related variables. However the major reason of this lesser value is due to the customer less favorable perception on the items related to call rates on fixed line and call rates on other network which score a mean of 3.28 and 3.12 respectively. However customers are relatively more satisfied with the customer service dimension where the average mean of items is 3.69. Similarly the average mean regarding the ease of use dimension also reflect a favorable response.

Table 6: Mean values

Variables	Mean	Std Dev	Mean	Std Dev
Call rates to other networks	3.12	1.16	3.48	1.138
Call rates to fixed line	3.28	1.26		
Call rates with in network	3.81	1.03		
International call rates	3.32	1.09		
Price of services	3.87	1.09		
Number of cities Covered by the network	3.83	.88	3.86	.88
Signal reception quality	3.82	.87		
Coverage with the city and suburbs	3.95	.91		
Customer service center attitude	3.74	.95	3.69	.94
Staff speed of solving problems	3.52	1.07		
Price package variety	3.70	.91		
Billing Accuracy	3.82	.84		
Speed of getting through	3.60	.82	3.62	1.01
Easy to reload my account	3.97	1.00		
Ease of getting through during busy hours	3.30	1.03		

Discussion

The results revealed that customer satisfaction is a multidimensional construct. The finding supports a four dimensional construct, constituting price, coverage & signal quality, customer service and usage ease. Only two items were removed from initial model, one each from network coverage and signal reception component. Highway coverage and signal quality inside building were the two items removed from the initial model. Several explanations can be put forward. In case of highway coverage ban on using cellular phone while driving on highways in Pakistan could be the one reason. Second coverage on highway is the exclusive requirement of frequent travelers and thus less relevant for the general public. On the other hand coverage inside the building was excluded due to the similar item loaded on the component measuring overall single reception quality.

The final model resulted from conformity factor analysis revealed that customers are most sensitive towards the call rate to other cellular networks and rate charge for calling fix line. This phenomenon depicts the customers concerns of price strategies adopted by the cellular companies in Pakistan. The cellular phone service providers heavily promote low cost packages within their own networks but charge heavily for calling on other networks. Similarly fixed line operation is run by state control corporation who has its own cellular service unit with approximately 20% share of the cellular phone market (Anonymous, 2007). This left majority of cellular phone users forced to pay high price for calling on fixed line.

The second reason can be drawn from the value concept in customer satisfaction where customer is concern with the benefits compared to the cost he bears (Monroe, 1991). Previous research advocate that value of money is positively correlates with the better satisfaction of customer as compared to those who perceived that they did not receive the proper value of their money (Zeithaml, 1988).

The second component reflects the concept of core service delivery (McDougall & Levesque, 1994). The second component contributes 14% of the variance. Conformity factor analysis suggests that signal reception is the most important contributor towards the customer satisfaction. This is followed by coverage in suburbs and the number of cities covered. This seems logical from an ordinary customer perception that need good voice transmission and wider network coverage to stay connected with his social and business network. A mobile service provider main focus is to provide excellent communication service which includes signal reception quality, and area coverage both in term of cities and suburbs

The third and fourth component falls into the area of augmented service. Both components collectively contribute around 17% of the variance. The third Component is concerned with support services including billing accuracy, customer service staff attitude and their speed of solving problems. The fourth component extracted represent the customer preference of easy use in terms of account reload and ease through which their calls can be connected, especially in peak hours.

The conformity factor analysis of the third component shows that customer service center staff attitude is the most critical, followed by their ability to solve problems. The last component, which constitutes of items related to easy use of service reveal that easy reload of account is most important and critical contributor. This was followed by the ease by which a customer gets connected during peak hours. This shows two important areas a cellular service provider should focus. First how to make easy availability of recharge vouchers for prepaid customers. Second how to develop a user-friendly bill payment system for post paid customers.

The results are much in line with previous research conducted in other countries (Sharma & Ojha, 2004; Woo & Fock, 1999). This is no surprise as of mobile users, regardless of their country requires quality communication at affordable cost. However the emphasize on components is different in different courtiers. For example people in Hong Kong are less price sensitive as compared to Pakistan and India. This is further supported by sharp decline in the prices by all service providers in Pakistan. Simultaneously the network operators shall be conscious in term how their employees treat customer complaints, and add variety in bundling packages for customer with different needs. Although the support service activities remain on the peripheral of any service organization, the cutthroat competition, cannot afford customer switching for placing less importance to such activities.

Conclusion

Measuring customer satisfaction is one of the key steps in improving service quality and retaining customers on a long-term basis. The study demonstrates that there are a few factors that affect satisfaction of cellular phone users in Pakistan. The results demonstrate a four-component model of customer satisfaction in Pakistani mobile industry. Price and network coverage are the two most important components contributing to the customer satisfaction. Customer service and ease of usage are two other components.

This research has a significant implication for the cellular phone industry. It will help them to realize that satisfying their customer is not a single dimensional activity. A successful customer relationship program requires a holistic view of the situation. The service providers in Pakistani cellular phone industry must realize that apart from competitive pricing, they should vigilantly monitor the core service delivery in term of signal quality and network coverage. This scale can work as initial model for monitoring customer satisfaction and shall be upgraded continuously.

Nevertheless, it is clear that price is an important issue. A close comparison of price war in relatively mature cellular phone markets might help managers to develop more innovative strategies to deal with this factor. The results indicate that in price customers are not only concern with the on net charges but put great emphasize on the off net charges by a service provider. The results of conformity factor analysis depict that price on other networks and fixed line is most important considerations for a cellular phone user. The mangers can concentrate on reducing such charges to a maximum with better collaboration with other networks. This will help in creating a win-win situation for all stakeholders.

The results revealed that signal reception is the most important performance indicator while measuring the transmission related components of a cellular service provider. This means the customers are actually concern with better and more sophisticated voice transmission quality. The companies that will invest in infrastructure to ensure full strength signals, which ultimately mean better voice quality, will reap higher brand image.

The second strategic performance indicator is the coverage in terms of number of cities. The wider the coverage the better it is. This can help service providers to use as key promotional strategy once the price war is no longer affordable for healthy competition.

Once the market becomes saturated, the coverage of the network reaches its maximum finding new point of difference will become vital for successful marketing. Despite rank third in component extraction customer service can serve as hidden strength for those who took it seriously. The trained and humble customer service staff is helpful in addressing customer's complaints promptly. One can imagine that a brand with superior image for its technical capabilities in communication and state of art customer service program can gain the competitive edge, which will be required in later stage of a booming market.

The research has its limitation in term of sample size as it was taken from only one province of Pakistan and might not represent the true and overall picture of Pakistani customers of mobile cellular communication. Simultaneously a larger sample size will better validate the outcome of the research.

The indices shown in the final model indicates that the model does not fit well, as the nomenclature for fit indices require a value of more than or at least .90 (Bollen, 1989). Nevertheless, the results indicate most of the indices reaching near the value of .90 and allows for a basis of understanding the cellular phone market in Pakistan. However, the question whether all the components are similarly important for each segment need to be answered. Further studies to explore the segment wise customer satisfaction will help in increasing the existing body of knowledge. A replication of this research in other countries might help to conclude if there exists a pattern of similarity in the countries regarding customer satisfaction construct of mobile cellular users.

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