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Analysis of gaps in telecommunication services – a study with respect to service gaps in fixed-line segment

Abstract

With liberalization and subsequent demonopolization in the fixed-line telephone service segment in India, the market scenario changed from that of single-player to multi-players. As the number of players increased, the level of expectations of the users has also increased, since in a competitive environment, the consumers not only have luxuries of choice but also have enough freedom to exert their preferences and thus enjoy a higher bargaining power.

To match the expectations of the consumers, the Indian telcos have started providing them with a plethora of value additions, apart from the basic service offerings. At this juncture it is important to analyze the behavior of the service users, in the context of their expectations pertaining to fixed-line services versus their satisfaction levels of the same. This will provide enough insights on the gaps based on which suggestions can be provided to the players to sketch out new strategies, based on the demands of the hour.

The paper examines the expectations and satisfaction levels of the service users, using fixed-line telephone services, and identifies the service gaps. It also provides the recommendations to the service providers to gain an edge in the highly competitive telecom market of India.

Keywords: gap analysis in services, user behavioral research, analysis of fixed-line services, competition in telecom service segment, Indian telecom policy, growth of telecommunication services in India.

Introduction

Telecommunications is one of the prime support services needed for the rapid growth of any developing country. Telecommunications is one of the fastest developing sectors in India, growing at an average annual rate of 140-150%. The world began to witness the changing phase of the telecom industry in the country since 1994, when the Indian Government initiated the New Telecom Policy (NTP), with a broad objective to enable availability of affordable means of communication for the citizens of the country.

One of the important objectives of NTP 1999, was to separate the service providing and regulatory functions of Department of Telecommunications (DoT). Subsequently, exclusive telecom service providers were floated to deploy the restructuring strategies in the sector, complying with the objectives laid down by NTP-1999. The policy separated the service providing function and the policymaking & licensing function of the DoT. Subsequent to the announcement made in NTP 1999, the government started issuing licenses to multiple private service providers to provide services in each telecom circle. Consequently, the private service providers kick-started their operations in fixed-line segment in 2000.

Though entry of private players in the cellular segment can be stated as the initiating force that led to the transformation of the telecom industry of India, it was the private player's entry in the fixed-line segment that actually collapsed the monopoly regime in the telecom sector. With liberalization and subsequent demonopolization in the fixed-line segment, the scene changed from single-player market to multiple-player market. The private players not only disturbed the monopoly position of the government owned service provider, but also stole a big share of their market.

While the private players are building their strengths on the value-added services to capitalize on the existing situation, the government owned service provider, Bharat Sanchar Nigam Limited (BSNL) is pulling up its sleeve to fight the competition. As the number of players increased in the fixed line segment, the level of expectations of the users has also increased, since in a competitive environment, the consumers not only have the luxuries to exert their preferences, but also possess a better bargaining power. To match the expectations of the consumers, the players have started providing them with a plethora of value additions, apart from the basic service offerings. This is acting as one of the major differentiators in the process of service delivery that promises a competitive edge to the service providers.

At this juncture it is important to analyze the behavior of the service users, so as to suggest strategies to the players to sketch out new strategies, based on the demands of the hour. Therefore, it is imperative to understand the expectations and satisfaction levels of the users on the services delivered to them, which is attempted by the researcher and the methodology and findings are presented in detail in the following sections.

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1. Insights from literature review

Leonard L. Berry and A. Parasuraman (1991) showed that inspired leadership, a customer-minded corporate culture, excellent service-system design and efficient use of information and technology are crucial for achieving superior service quality and service marketing. They argued that superior quality is vital to sustaining success. They insisted that customer satisfaction through integration of service quality throughout the system must be the focus of any company.

Ruth M. Bolton and James H. Drew (1991), developed a model of how customers with prior experiences and expectations assess service performance levels, overall service quality, and service value. The model was applied to residential customers' assessments of local telephone service. The model was estimated with a two-stage least squares procedure through survey data. Results indicated that residential customers' assessments of quality and value are primarily a function of disconfirmation arising from discrepancies between anticipated and perceived performance levels. However, perceived performance levels also were found to have an important direct effect on quality and value assessments.

Kenneth Teas (1993) examined conceptual and operational issues associated with the "perceptions-minus-expectations" (P-E) perceived service quality model. The examination indicated that the P-E framework was of questionable validity because of a number of conceptual and definitional problems involving the (1) conceptual definition of expectations, (2) theoretical justification of the expectations component of the P-E framework, and (3) measurement validity of the expectation (E) and revised expectation (E*) measures specified in the published service quality literature. Consequently, alternative perceived quality models that address the problems of the traditional framework were developed and empirically tested.

Pratibha A. Dabholkar (1993) iterated that customer satisfaction and service quality are both important tools for creating competitive advantage. However, there is a lack of consensus on whether the two are separate constructs and how they should be measured. The research presented a number of conceptualizations of customer satisfaction and service quality based on disconfirmation, a transactional versus global view and the inclusion of cognitive and/or affective factors. Possible antecedents and consequences of both constructs were examined, and suggestions for future conceptualization and measurement of the constructs were provided.

Eugene W. Anderson (1996) investigated the association between customer satisfaction and willingness-to-pay or price tolerance. The goal was not only to determine whether the association between customer satisfaction and price tolerance is positive or negative but also to gauge the degree of association. The empirical analysis indicated a negative association between the level of customer satisfaction provided by the firm and the degree of price tolerance exhibited by its customers. However, a positive association was found between year-to-year changes in the levels of customer satisfaction and price tolerance.

Stephen S. Tax et al. (1998) said that many companies are considering investments in complaint handling as means of increasing customer commitment and building customer loyalty. Firms are not well informed, however, on how to deal successfully with service failures or the impact of complaint handling strategies. The results of the paper supported a quasi “brand equity” perspective-whereas satisfaction with complaint handling had a direct impact on trust and commitment, to a limited extent, on the effects of poor complaint handling. Implications for managers and scholars were also discussed.

Bepko (2000) says that among the areas which need to be addressed in service quality research is the nature of consumer expectations across the range of intangibility. Previous research had compared consumers’ service quality expectations across services, but different groups of subjects were evaluated for each different service. The problem with using different subjects for each service is that the subject’s demographic characteristics may be responsible for the significant differences in expectations of quality. The paper used a controlled, repeated measures design where subjects were each asked to evaluate three services, varying in their degree of intangibility, over a ten week period.

David M. Szymanski and David H. Henard (2001) said that the growing number of academic studies on customer satisfaction and the mixed findings they report complicate efforts among managers and academics to identify the antecedents to, and outcomes of, businesses having more versus less-satisfied customers. These mixed findings and the growing emphasis by managers on having satisfied customers point to the value of empirically synthesizing the evidence on customer satisfaction to assess current knowledge. To this end, the authors conducted a meta-analysis of the reported findings on customer satisfaction. They documented that equity and disconfirmation are most strongly related to customer satisfaction on average. They also found that measurement and method factors that characterize the

research often moderated relationship strength between satisfaction and its antecedents and outcomes. The authors discussed the implications surrounding these effects and offered several directions for future research.

Carsten Fink et al. (2001) examined the liberalization of the basic telecommunications sector in Asian countries in their research paper for World Bank, with a view to identify the elements of good policy and examine how it can be promoted through multilateral negotiations. They found that despite the move away from traditional public monopolies, most Asian governments are still unwilling to allow unrestricted entry, eliminate limits on private and foreign ownership, and establish strong independent regulators. Where comprehensive reform – including privatization, competition and regulation – has been implemented, there are significantly higher levels of main line availability, service quality and labor productivity.

Maran et al. (2004) studied the consumer perceptions about fixed telephone lines in Chennai. The objectives of the study was (1) to find the most influencing factor in selection of service provider, and (2) to measure customer perception and satisfaction as regards the service provided. The study on a sample of 550 telephone users indicated that some problems exist that deserve the attention of the company. The company needs to bridge the gap between the services promised and services offered. And to conclude, "Delivering service without measuring the impact on the customer is like driving a car without a windshield".

Shanthi (2005) throws light on the telecommunications market of India – post privatization. In the scenario of falling prices, hyper-competition and increasing attrition rates and the author says that identifying possible churn before it actually happens enables telcos detect and control churn. The author provides a predictive churn model for telecom segment, to allow a qualitative insight for understanding the structure and methodology of churn management in the Indian telecom sector, and also discusses the level of applicability of such models in the Indian context.

The literature reviewed above indicates major inadequacies in the areas like

1. Identifying the expectation-satisfaction gaps in the telephone services provided in Indian Telecommunication industry.
2. Identifying the difference in the expectation and satisfaction levels of users of different telephone lines with respect to India.

The study aims to bridge the research gaps identified as above.

2. Research methodology

The study was administered in Chennai (formerly known as Madras) – the capital city of Tamil Nadu State, India. The fixed-line telephone service providers in Chennai during the study period were as follows:

- BSNL (Bharat Sanchar Nigam Limited);
- Airtel;
- Tata Indicom.

BSNL (Bharat Sanchar Nigam Limited) is the Government owned service provider and the others are private players. While BSNL and Tata Indicom provide both fixed wired and fixed wireless (WLL) services, Airtel provides wired-line services only. Presently Reliance Infocomm is also in the foray.

The pilot study was administered on 50 samples, taken through convenient sampling method. The adequacy, accuracy and appropriateness of the data collection tool were ensured after incorporating necessary corrections, before administering the questionnaire for the final data collection. The sampling for the final study was based on Convenience Sampling Method, taking into account the operational difficulties associated in the process of data capturing. However, by going through this method of sampling it was ensured that all units of the population were adequately represented.

From each category, samples were randomly selected to arrive at a total sample size of 500. The distribution of the samples between the various categories of users is as follows:

Table 1. Distribution of the sample

Service provider	No. of respondents
BSNL	275
Private	225
Total	500

In determining the sample size the following factors were taken into consideration:

- dispersion of the population;
- time taken by the respondents to complete the questionnaire;
- resources required to complete the survey;
- respondents' willingness to part with information.

The final sample size is 468 (32 questionnaires were found incomplete). The reliability of the interview schedule was ensured by means of Cronbach's Alpha Test of Reliability.

3. Analysis and interpretation

To identify the generic expectation patterns of the users, Data Reduction Method was used to group the variables based on their unique characteristic features. It was observed that there are two broad categories of services delivered to the users, viz., BASIC and VALUE ADDED.

Since Telephone service is not a pure service and derives its utility only through product, namely the telephone instrument, there are two broad spectrums of services that are offered to the users, viz., INSTRUMENT ENABLED SERVICES and EXCHANGE ENABLED SERVICES. Based on this classification, four groups were obtained for the purpose of data reduction.

1. Instrument Enabled Basic Services (IeBS): Those services that are embedded as programs in the telephone product, which is available to all the users of the telephone, namely the instrument to enhance convenience of usage. The following are the Instrument Enabled Basic Services offered by the service providers:

- caller identification (CLIP);
- call forwarding;
- call wait;
- digital display;
- call alert;
- dynamic locking;
- silent mode;
- voice mail box.

2. Instrument Enabled Value Added Services (IeVAS): These are those services, which are also embedded programs in the telephone instrument, but need to be enabled by the service provider or they are provided on request. Some of these services are also paid services. The following are the Value Added Services offered by the service providers on the instruments provided to the users:

- data storage;
- touch dial;
- selectable ring tones;
- conferencing;
- wireless option;
- short messaging service (SMS);
- remote telephony management;
- built-in-speaker;
- parallel ringing;
- multiple subscriber numbers;
- auto call back.

3. Exchange Enabled Basic Services (EeBS): These are those services, which are provided by the service provider to achieve the primary objective of the telecommunication system, namely the voice transmission service. These services are provided to all the users of the telephone lines. The following are the basic services delivered to the users:

- exchange services;
- installation;
- voice clarity;
- product demonstration;
- tariff options;
- billing accuracy;
- complaint redressal.

4. Exchange Enabled Value Added Services (EeVAS): These are services that are provided as additions to the users, apart from the basic services. These are either provided at a cost, or on special requests or universally to all the users as a value addition.

- 24*7 customer care;
- online information;
- internet access services;
- dial-a-service.

The measures of Expectation and Satisfaction for individual variables are provided in Appendix A. While the tables below give grouped measures and supportive interpretations show the results of the analysis post the data reduction method, for each of the service user category.

Table 2. Expectation levels of the users of BSNL telephone lines

Expectations	Mean	Ranks
Expectation – IeBS	29.03	3
Expectation – IeVAS	38.31	1
Expectation – EeBS	34.08	2
Expectation – EeVAS	15.19	4

The table shows that the BSNL user expectations are the highest for Instrument enabled Value Added Services, followed by Exchanged enabled Basic Services, Instrument enabled Basic Services and Exchange enabled Value Added Services.

From the analysis of the satisfaction levels, it was seen that service related variables have obtained better satisfaction, when compared to product related features. On further analysis done based on data reduction method, the ranks obtained are given in the table below.

Table 3. Satisfaction levels of the users of BSNL telephone lines

Satisfactions	Mean	Ranks
Satisfaction – IeBS	10.42	2
Satisfaction – IeVAS	3.02	4
Satisfaction – EeBS	27.59	1
Satisfaction – EeVAS	4.95	3

The Mean Satisfaction of Instrument enabled Value Added Services shows zero since most of the value added services were not available to the BSNL users. But the satisfaction levels of the BSNL users is the highest in the case of Exchange enabled Basic Services.

3.1. Gap analysis – BSNL telephone services. The gaps, if any between the expectations from a telephone service and the satisfaction derived from the use of BSNL telephone service were ascertained by testing the following hypotheses.

H0: There is no significant difference between the expectation levels and satisfaction levels of the users of BSNL telephone lines.
H1: There is significant difference between the expectation levels and the satisfaction levels of the users of BSNL telephone lines.

Paired t-test of samples was used to examine the difference between the means. The tests were conducted at a significance level of 5%. The following tables show the expectation-satisfaction gaps in the service delivery with respect to individual services and grouped service variables. The analysis of the gaps identified in service delivered is diagrammatically represented in Figure 1.

From the above figure it can be clearly seen that the expectations for all the four types of services provided are higher than the satisfaction levels of the users. It was observed from the gap analysis, that there is a significant difference in the expectation and satisfaction levels of the users with regard to all the service variables and as such the null hypothesis is rejected. With respect to the grouped variables also the null hypothesis is rejected in the case of all the four pairs namely, IeBS, IeVAS, EeBS and EeVAS.

Table 4. Expectation-satisfaction gaps in service delivery

PAIRS		Paired differences					t (df=225)	Sig.
		Mean	S.D.	Std. error Mean	95% C.I. of the difference			
					Lower	Upper		
Pair 1	Expectation IeBS-Satisfaction IeBS	18.5885	5.82742	.38763	17.8246	19.3524	47.954	0
Pair 2	Expectation IeVAS-Satisfaction IeVAS	35.2876	3.83916	.25538	34.7844	35.7908	138.179	0
Pair 3	Expectation EeBS-Satisfaction EeBS	6.4956	3.23075	.21491	6.0721	6.9191	30.225	0
Pair 4	Expectation EeVAS-Satisfaction EeVAS	10.2345	2.68210	.17841	9.8829	10.5861	57.365	0

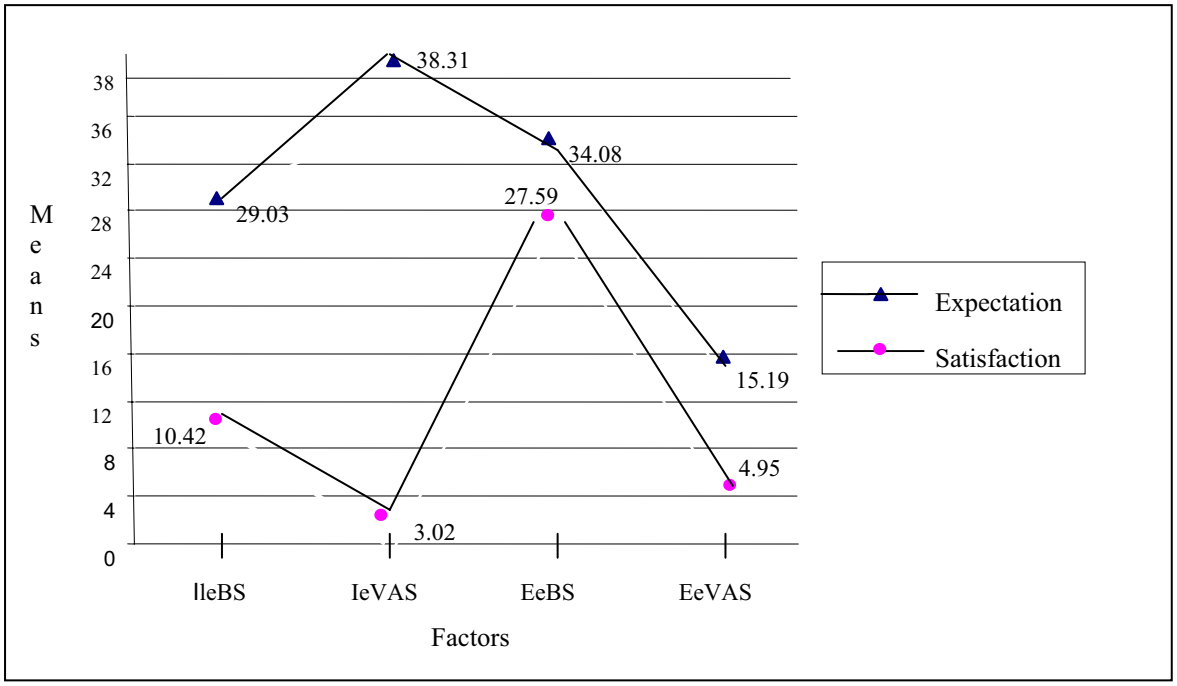

Fig. 1. Gap analysis for BSNL telephone

Table 5. Expectation levels of the private telephone users

Expectations	Mean Airtel	Ranks	Mean Tata Indicom	Ranks
Expectation – IeBS	28.74	3	28.68	3
Expectation – IeVAS	35.08	1	35.31	1
Expectation – EeBS	34.05	2	34	2
Expectation – EeVAS	15.27	4	15.08	4

From the table above it is inferred that the Private telephone users' expectation levels are high as far as the Instrument enabled value added services are concerned, followed by Exchange enabled basic services, Instrument enabled basic services and Exchange enabled value added services. On the whole it is inferred that the user expectations of the exchange services are high in the case of both the private telephone service providers.

Table 6. Satisfaction levels of the private telephone users

Satisfaction	Mean Airtel	Ranks	Mean Tata Indicom	Ranks
Satisfaction – IeBS	29.34	2	30.57	2
Satisfaction – IeVAS	30.69	1	36.82	1
Satisfaction – S	28.74	3	28.47	3
Satisfaction – AS	9.20	4	11.20	4

From the above table it is observed that the private telephone users have highest level of satisfaction as regards the Instrument enabled value added services provided to them, followed by Instrument enabled basic services, Exchange enabled Basic services and Exchange enabled Value Added Services.

3.2. Gap analysis – private telephone services. The gaps, if any between the expectations from a telephone service and the satisfaction derived from the use of private telephone service were ascertained separately for the service providers namely, Airtel and Tata Indicom, by testing the following hypotheses.

H0: There is no significant difference between the expectation levels and satisfaction levels of the users of private telephone lines.
H1: There is significant difference between the expectation levels and the satisfaction levels of the users of private telephone lines.

Paired t-test of samples was used to examine the difference between the means. The tests were conducted at a significance level of 5%.

Table 7. Expectation-satisfaction gaps in service delivery – Airtel

PAIRS		Paired differences					t (df=225)	Sig.
		Mean	S.D.	Std. error Mean	95% C.I. of the difference			
					Lower	Upper		
Pair 1	Expectation IeBS-Satisfaction IeBS	-.5934	5.39543	.56559	-1.7171	.5302	-1.049	.297
Pair 2	Expectation IeVAS-Satisfaction IeVAS	4.3956	7.93148	.83145	2.7438	6.0474	5.287	.000
Pair 3	Expectation EeBS-Satisfaction EeBS	5.3077	2.99144	.31359	4.6847	5.9307	16.926	.000
Pair 4	Expectation EeVAS-Satisfaction EeVAS	6.0769	4.25109	.44564	5.1916	6.9623	13.637	.000

On further analysis done through data reduction method, by grouping the variables into four distinct heads, and for performing the analysis separately for both the private telephone service providers, it was identified that there is a significant difference in the expectation and satisfaction levels of the users with regard to IeVAS, EeBS and EeVAS in which cases the null hypothesis is rejected. In the case of IeBS, there is no significant difference, and the satisfaction levels of the users exceed the expectation levels (S>E), since the mean difference is showing a negative value.

From the figure below it can be clearly seen that satisfaction obtained by the users from the Airtel telephones is higher than expectations with respect to Instrument enabled Basic Services (IeBS), in the case of other services, the expectation exceeds the satisfaction levels. The following table gives the gap analysis for Tata Indicom Telephone service.

While performing a gap analysis for Tata Indicom users, it was observed that there is a significant difference in the expectation and satisfaction levels of the users with regard to IeBS, EeBS and EeVAS in which cases the null hypothesis is rejected. In the case of IeVAS, there is no significant difference and the satisfaction levels of the users exceed the expectation levels (S>E), since the mean difference is showing a negative value. The gap analysis is presented in the figure below.

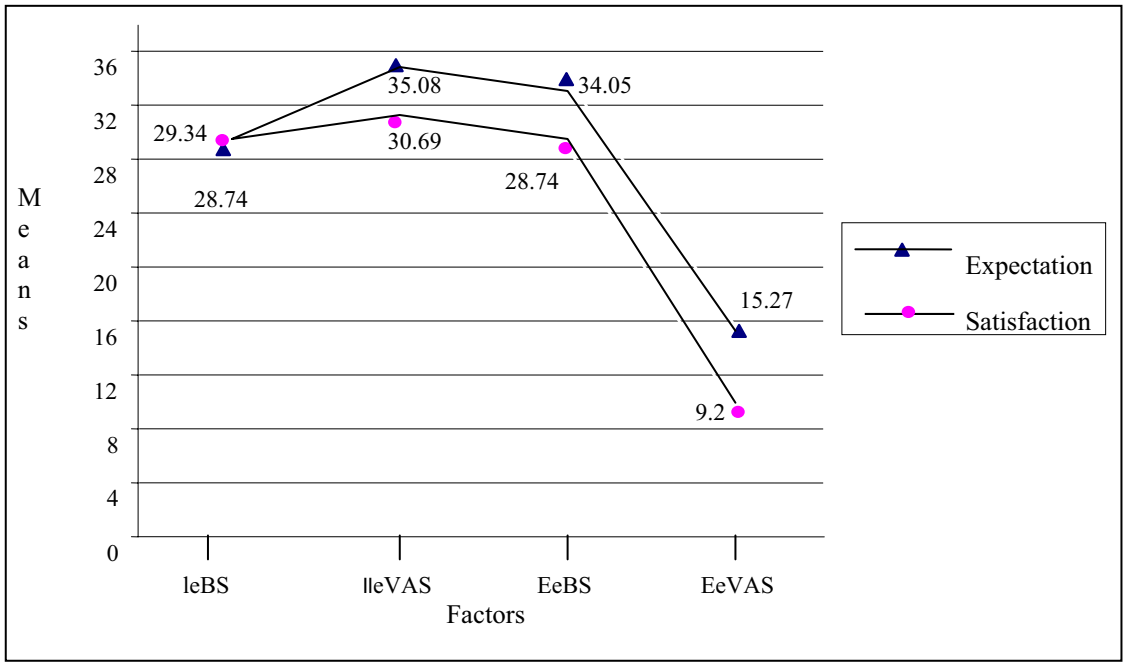

Fig. 2. Gap analysis for Airtel telephone services

Table 8. Expectation-satisfaction gaps in service delivery – Tata Indicom

PAIRS		Paired differences					t (df=225)	Sig.
		Mean	S.D.	Std. error Mean	95% C.I of the Difference			
					Lower	Upper		
Pair 1	Expectation leBS-Satisfaction leBS	-1.8936	4.50716	.65744	-3.2170	-.5703	-2.880	.006
Pair 2	Expectation leVAS-Satisfaction leVAS	-1.5106	8.10226	1.18184	-3.8896	.8683	-1.278	.208
Pair 3	Expectation EeBS-Satisfaction EeBS	5.5319	2.73346	.39872	4.7293	6.3345	13.874	.000
Pair 4	Expectation EeVAS-Satisfaction EeVAS	3.8936	3.76040	.54851	2.7895	4.9977	7.099	.000

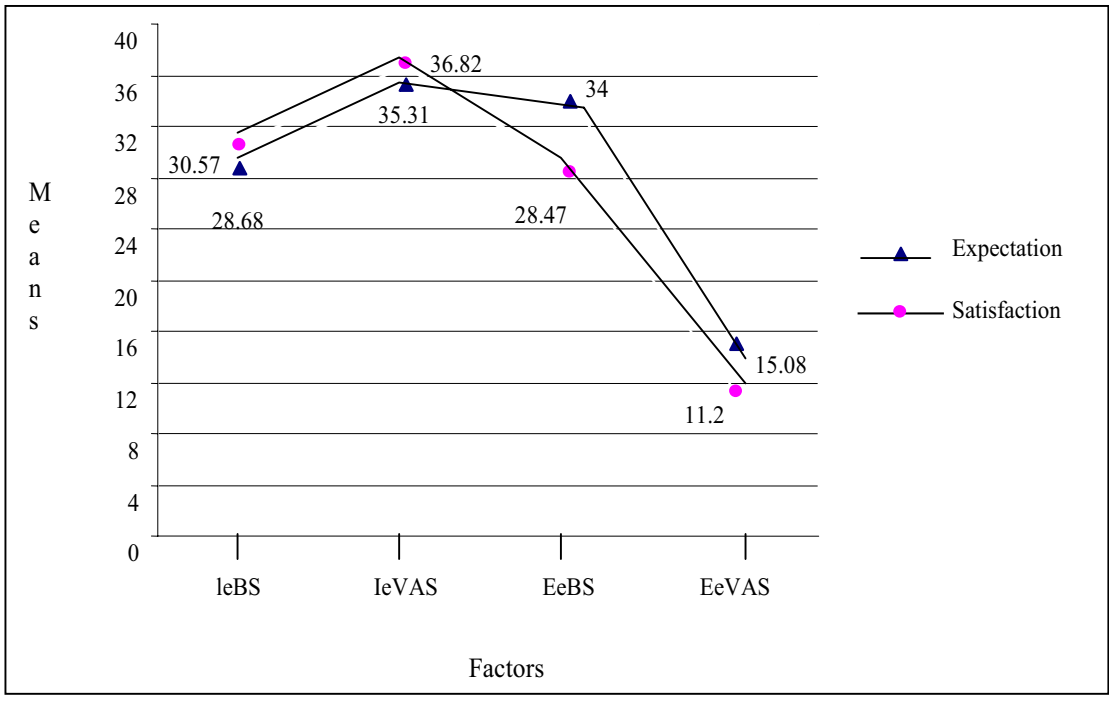

Fig. 3. Gap analysis for Tata Indicom telephone services

It is inferred from the above figure that the gap between the expectation and satisfaction exists in the case of all the types of services but the gap is in favor of expectations in the case of EeBS and EeVAS and in the favor of satisfaction in the case of IeBS and IeVAS functions.

4. Inferences & recommendations

It was found that the Instrument Enabled Value Added Services were very highly expected followed by Exchange Enabled Basic Services, by all the service users. As regards satisfaction levels, the respondents using BSNL phones stated that all the Instrument Enabled Value Added Services were unavailable to them.

Among the other services provided the respondents are most satisfied only with the Exchange Enabled Basic Services, followed by Instrument Enabled Basic Services. In the case of private telephone users, it was found that the users are most satisfied with the Instrument Enabled Value Added Services followed by Instrument Enabled Basic Services.

As regards the user categories, the BSNL users are found to be most satisfied with respect to the Exchange enabled Basic Services offered to their telephones. The users of Private telephone line are quite satisfied with respect to availability of value-additions in their fixed-line telephone service. The users are also dissatisfied with the Tariff structure adopted by the players.

Recommendations to BSNL:

- The initial and immediate action the BSNL needs to take is to replace the old instruments with the state-of-art instruments with compatibility to all the value additions offered by the service provider.
- Additions in the form of augmented services like Short Messaging Service, Remote Messaging Service will add great value to the product and the brand.
- Vigorous sales promotion activities need to be undertaken by the service provider, by building on its strength of being the largest telephone service provider of the peninsula, in order to reduce the switch-over rate.
- CRM strategies and quality management tools like Six Sigma are found to be effective tools in managing data and for maintaining quality in the service delivery process, which the service provider can adopt to control churn.

Recommendations to private users:

- Being relatively new when compared to their PSU counterpart, the private service providers need to explore newer avenues of the market and capitalize on its present upswing. The market potential of more than 60% is unexplored which the private players need to target.
- The private players should mainly concentrate on the services offered to the users, since the users are satisfied with the value-additions in the form of additional features offered by the players.
- The service providers need to concentrate more on customer retention measures. Implementing a good CRM solution and training its support staff to update the data base will solve the problem to a great extent.
- The private players should also involve in sales promotion activities, in order to educate the users on their relative strengths, and capitalize on the switch-over attitude of the user in order to increase their market share.

Conclusion

The study thus reveals that privatization and subsequent opening up of the telecom sector to competition, have led to some very encouraging changes in the user behavioral pattern, since the users are given a choice, which was hitherto unavailable. Variety coupled with plethora of value-additions offered by the players, is leading to switch-over and churn. The competitive environment is necessitating re-structuring the strategies of the players, to sustain in the market. Undoubtedly, the telecom players are marching ahead by constantly luring delightful customers into their fold. Consequently the teledensity of India is improving fast. The efficiency associated with service delivery system is almost on a par with global standards. The turnaround in the telecommunication industry drives India to the realm of excellence. Yes, yet another dream of India is gradually getting translated into reality.

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Appendix A

Variables used for data analysis and their individual measures

The following are the 30 variables identified to study the expectation and satisfaction levels of the telephone users.

S.No.	Variables
1	Caller identification (CLIP)
2	Call forwarding
3	Call wait
4	Data storage
5	Digital display
6	Call alert
7	Dynamic locking
8	Touch dial
9	Selectable ring tones
10	Conferencing
11	Wireless option
12	Dial-a-service
13	Silent mode
14	24 X 7 Customer care
15	Installation
16	Voice clarity
17	Short messaging service (SMS)
18	Remote telephony management
19	Built-in speaker
20	Parallel ringing
21	Product demonstration
22	Online information/payment
23	Multiple subscriber numbers
24	Auto call back
25	Internet access services
26	Voice mail box
27	Complaint redressal
28	Exchange services
29	Tariff Options
30	Billing Accuracy

To find out the most expected product/service variable the various levels of expectations were valued as under[1]:

- Most essential (ME) – 5;
- Somewhat essential (SE) – 4;
- Neutral (N) – 3;
- Least essential (LE) – 2;
- Not required (NR) – 1.

The following table gives the individual scores based on the respondents' level of expectations for BSNL.

Table 1. Scores based on the level of expectation – BSNL

S.No.	Variables	Sum	Mean
1	Caller identification (CLIP)	954	4.22
2	Call forwarding	760	3.36
3	Call wait	817	3.62
4	Data storage	1020	4.51
5	Digital display	785	3.47

[1] The scaling methodology is uniform for all the categories of service providers.

Table 1 (cont.). Scores based on the level of expectation – BSNL

6	Call alert	570	2.52
7	Dynamic locking	1014	4.49
8	Touch dial	372	1.65
9	Selectable ring tones	649	2.87
10	Conferencing	910	4.03
11	Wireless option	997	4.41
12	Dial-a-service	467	2.07
13	Silent mode	654	2.89
14	24 X 7 Customer care	1130	5.00
15	Installation	1130	5.00
16	Voice clarity	1130	5.00
17	Short messaging service (SMS)	787	3.48
18	Remote telephony management	593	2.62
19	Built-in speaker	984	4.35
20	Parallel ringing	501	2.22
21	Product demonstration	923	4.08
22	Online information/payment	803	3.55
23	Multiple subscriber numbers	538	2.38
24	Auto call back	624	2.76
25	Internet access services	1032	4.57
26	Voice mail box	1006	4.45
27	Complaint redressal	1130	5.00
28	Exchange services	1130	5.00
29	Tariff options	1130	5.00
30	Billing accuracy	1130	5.00

In order to analyze the satisfaction levels of the telephone users, the respondents were asked to express their level of satisfaction on a five point scale[1] ranging from "Most satisfied" to "Most dissatisfied". The respondents were initially asked to state if a particular features was available to them. The value for unavailable feature is given as zero. The feature, which were available were measured using the following scale:

- Most satisfied (MS) – 5;
- Somewhat satisfied (SS) – 4;
- Neutral (N) – 3;
- Not satisfied (NS) – 2;
- Most dissatisfied (MD) – 1.

The following table gives the individual scores based on the respondents' level of expectations for BSNL.

Table 2. Scores based on satisfaction levels – BSNL

S.No.	Variables	Sum	Mean
1	Caller identification (CLIP)	356	1.58
2	Call forwarding	0	0.00
3	Call wait	353	1.56
4	Data storage	0	0.00
5	Digital display	0	0.00
6	Call alert	0	0.00
7	Dynamic locking	1063	4.70
8	Touch dial	0	0.00
9	Selectable ring tones	0	0.00
10	Conferencing	0	0.00
11	Wireless option	0	0.00
12	Dial-a-service	0	0.00

[1] The scaling methodology is uniform for all the categories of service providers.

Table 2 (cont.). Scores based on satisfaction levels – BSNL

13	Silent mode	320	1.42
14	24 X 7 Customer care	160	0.71
15	Installation	840	3.72
16	Voice clarity	1064	4.71
17	Short messaging service (SMS)	0	0.00
18	Remote telephony management	0	0.00
19	Built-in speaker	0	0.00
20	Parallel ringing	0	0.00
21	Product demonstration	846	3.74
22	Online information/payment	16	0.07
23	Multiple subscriber numbers	0	0.00
24	Auto call back	0	0.00
25	Internet access services	943	4.17
26	Voice mail box	267	1.18
27	Complaint redressal	769	3.40
28	Exchange services	685	3.03
29	Tariff options	1047	4.63
30	Billing accuracy	984	4.35

The following tables give the expectation and satisfaction levels of the two private telephone users considered for the study.

Table 3. Scores based on the level of expectation – private

S. No.	Service provider	Touchtel		Tata Indicom	
	Variables	Sum	Mean	Sum	Mean
1	Caller identification (CLIP)	382	4.20	199	4.23
2	Call forwarding	302	3.32	160	3.40
3	Call wait	320	3.52	166	3.53
4	Data storage	408	4.48	218	4.64
5	Digital display	313	3.44	161	3.43
6	Call alert	227	2.49	111	2.36
7	Dynamic locking	406	4.46	209	4.45
8	Touch dial	146	1.60	77	1.64
9	Selectable ring tones	267	2.93	135	2.87
10	Conferencing	360	3.96	183	3.89
11	Wireless option	404	4.44	208	4.43
12	Dial-a-service	196	2.15	99	2.11
13	Silent mode	260	2.86	133	2.83
14	24 X 7 Customer care	455	5.00	235	5.00
15	Installation	455	5.00	235	5.00
16	Voice clarity	455	5.00	235	5.00
17	Short messaging service (SMS)	319	3.51	175	3.72
18	Remote telephony management	241	2.65	117	2.49
19	Built-in speaker	396	4.35	205	4.36
20	Parallel ringing	206	2.26	99	2.11
21	Product demonstration	369	4.05	188	4.00
22	Online information/payment	324	3.56	159	3.38
23	Multiple subscriber numbers	208	2.29	115	2.45
24	Auto call back	238	2.62	128	2.72
25	Internet access services	415	4.56	216	4.60
26	Voice mail box	406	4.46	209	4.45
27	Complaint redressal	455	5.00	235	5.00
28	Exchange services	455	5.00	235	5.00

Table 3 (cont.). Scores based on the level of expectation – private

29	Tariff options	455	5.00	235	5.00
30	Billing accuracy	455	5.00	235	5.00

Table 4. Scores based on satisfaction levels – private

S.No.	Service provider	Touchtel		Tata Indicom	
	Variables	Sum	Mean	Sum	Mean
1	Caller identification (CLIP)	155	1.70	127	2.70
2	Call forwarding	178	1.96	80	1.70
3	Call wait	401	4.41	212	4.51
4	Data storage	347	3.81	188	4.00
5	Digital display	406	4.46	216	4.60
6	Call alert	336	3.69	187	3.98
7	Dynamic locking	427	4.69	215	4.57
8	Touch dial	259	2.85	164	3.49
9	Selectable ring tones	388	4.26	197	4.19
10	Conferencing	283	3.11	156	3.32
11	Wireless option	158	1.74	121	2.57
12	Dial-a-service	164	1.80	160	3.40
13	Silent mode	357	3.92	187	3.98
14	24 X 7 Customer care	377	4.14	194	4.13
15	Installation	353	3.88	178	3.79
16	Voice clarity	431	4.74	222	4.72
17	Short messaging service (SMS)	201	2.21	126	2.68
18	Remote telephony management	135	1.48	130	2.77
19	Built-in speaker	372	4.09	193	4.11
20	Parallel ringing	171	1.88	142	3.02
21	Product demonstration	408	4.48	214	4.55
22	Online information/payment	206	2.26	102	2.17
23	Multiple subscriber numbers	60	0.66	95	2.02
24	Auto call back	419	4.60	219	4.66
25	Internet access services	90	0.99	70	1.49
26	Voice mail box	410	4.51	213	4.53
27	Complaint redressal	325	3.57	158	3.36
28	Exchange services	279	3.07	143	3.04
29	Tariff options	424	4.66	218	4.64
30	Billing accuracy	396	4.35	205	4.36