Perceptual Mapping using attribute based Discriminant Analysis

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ABSTRACT

Identifying Points of Difference (POD) is a challenging task for any brand manager. Though Points of Parity (POP) can be easily identified, research needs to be undertaken to identify distinguishing points of difference. In order to get a view of how customers perceive different brands on various parameters perceptual mapping can be used. This paper studies the use of attribute based perceptual mapping for major mobile service provider brands. Three major attributes were identified namely; Service quickness, Service friendliness and Service fairness and these attributes were used to create a perceptual map and to identify which mobile service provider brand fares better in a multidimensional space.

Introduction

Perception about service attributes is difficult to adjudge especially because services are intangible in nature. There have been several studies undertaken to study service quality but there are other attributes which are essential and service category specific. In this paper an attempt has been made to identify these attributes which differentiate brands on the perceptual map considered for the study. Especially in case of the mobile service provider industry there has been fierce competition with each brand providing different customized options for various segments of customers. So some critical attributes were identified and studied using attribute based discriminant analysis so as to get a spatial map of the brand positioning of various service provider brands.

Rationale of the study

Across all service industries the issue of service quality remains a critical one. Companies that excel in quality service can have a distinct marketing edge, since improved levels of service quality are related to higher revenues, higher customer retention and expanded market share. Over the past decades; service quality, customer satisfaction and customer loyalty have occupied a dominant position in research on the marketing of service industries. Especially in case of high technology markets which can be characterized by continuous and rapid change of the markets and short life cycles of products. Also it is seen that service industries are characterized by higher levels of intangibility requiring a higher quality of service to enhance customer satisfaction and to boost loyalty. In telecommunication services it is noted that once customers have been acquired and connected to a particular operator's network their long term relationship with the operator is very important. More over as brand loyalty increases the sensitivity of the customer to price decreases. So to create brand loyalty a subscriber has to ensure customer satisfaction by raising service quality.

With the role of customer changing gradually, Prahalad & Ramaswamy(2000) customer perceived quality has been given more attention for its specific contribution to the competitiveness of business. Service quality is a relatively stable perception of the service which is influenced as customers experience satisfaction or dissatisfaction with specific instances of the service over time (Boulding et.al,1993).The SERQUAL model suggests that the difference between customers' expectations about the performance of a general class of service providers and their assessment of the actual performance of a specific firm in that class results in perceptions of quality, Parsuraman(1981). Perceived service quality is assumed as the consumers' judgement about overall excellence or superiority of a service (Zeithmal,1988). Judging service quality is often very difficult for a customer because of the inherent attributes of services which differentiate them from products. According to Gronross(1990) some of the attributes of services include

• Services are intangible

• They are heterogeneous whereby their performance varies with respect to the provider and the customer.

• Services cannot be placed in a time capsule and hence it has to be tested and re-tested over time.

• The production of services is likely to be inseparable from their consumption.

These attributes of quality make it difficult for the customer to judge service attributes. As Gronross(1984) proposed two dimensions of service quality; technical quality and functional quality. Technical quality is "What a customer receives"? Functional quality is "How a service is provided or delivered"? Technical service quality is hypothesized to be an important determinant of customer loyalty than functional service quality as expertise increases.

Considering the importance of service quality on the grounds of technical quality, an effort has been made in this study to identify significant service attributes which would contribute towards improving technical service quality. Three attributes defined for the study are as follows

1. Service quickness: It has been defined as the degree of promptness shown by the service provider in attending to the customer queries, feedback, complaints or grievances.

2. Service friendliness: For the purpose of the study, service friendliness is the degree to which services are customized to meet the needs of various segments of the market. It focuses on the concept of the customers designing their own plan to meet individual needs; like the "My plan" concept developed by Airtel.

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3. Service fairness: This concept focuses on the perceived price fairness of the service package provided by the service provider. It also includes the value added services and the pricing strategy used to differentiate the service package from other service providers.

Using attribute based discriminant analysis this study focuses on perceptual mapping of mobile service providers on the service attributes.

Methodology

The paper is a part of the larger study undertaken to identify service quality and other constructs which influence brand loyalty. Quota sampling technique was used for the study .Quota sampling may be viewed as a two stage restricted judgment sampling. The first stage consists of developing quotas of population elements by considering the control characteristics and the second stage includes selection of sample elements based on convenience. Only companies having a market share of around 5% were included in the study. The control characteristics included market share of the service provider and gender of the respondent. Geographical clusters were also formed to get an essence of the loyalty behaviour exhibited by respondents from four III tier cities in Karnataka. The sample size was calculated by using the guidelines given by Hair et.al where they stated that for Structural equation Models(SEM) containing five or fewer constructs each with three or more observed variables sample size of 200 is enough. So considering missing data and other errors 320 questionnaires were administered with 250 completed ones on the editing desk. After further scrutiny 209 were used for the study. The service attributes namely; service quickness, fairness and friendliness were measured on a 5 point Likert scale. For instance respondents were asked the question as to whether they feel their service provider is quickin responding to customer queries and complaints with 1 denoting strongly disagree and 5 denoting strongly agree.

After compiling the data, attribute based perceptual map was plotted using IBM SPSS 20 statistical software. Discriminant analysis was used to develop attribute based perceptual map of respondents against each identified discriminanting function. This map facilitates marketers to identify attributes which best discriminate brands/groups in a perceptual map. Understanding the usefulness of the tool the following hypothesis H1 was tested to discriminate service provider brands on service attributes.

Hypothesis H1: There is a significant difference in brand positioning of service providers on different service attributes.

In order to identify brand positioning of service provider brands a spatial map was obtained by plotting the brands on the basis of canonical discriminant functions evaluated at group means (group centroids) and attributes on the basis of standardized discriminant function coefficients.To develop spatial maps by means of discriminant analysis; the dependent variable is the brand rated and the independent or predictor variables are the attribute ratings.

Analysis and interpretation

Table 1 provides data of the means and standard deviation of the different independent variables across the various brands which indicate that the performance of these brands varies greatly across the different attributes.

Univariate ANOVA test results as seen in table 2 indicates that the brands vary significantly across the various attributes.

However the importance of service fairness in distinguishing between the brands was found to be low.

The pooled within groups matrix in table 3 indicates low correlation among the independent variables. This implies that attributes used for analysis are distinct.

The tables for Wilk's lambda and Eigen values (Table4 and Table5) indicate that all the three functions explain the variance in the input data. So all the three functions were used for further interpretation.

Using the standardised coefficients of the attributes on the functions 1, 2 and 3 (Table 6) the plot for different attributes were plotted. Looking at the canonical discriminant functions, it is evident that three functions significantly discriminate brands. As 3 functions were identified two perceptual maps of two dimensions; first map with function 1 (F1) and function 2(F2) as dimensions and the second map with function1(F1) and function 3(F3) as dimensions. Standardised canonical discriminant coefficients of attributes were used to plot attributes and unstandardized canonical discriminant functions, evaluated at group means were taken to plot brands on the map in the excel sheet.
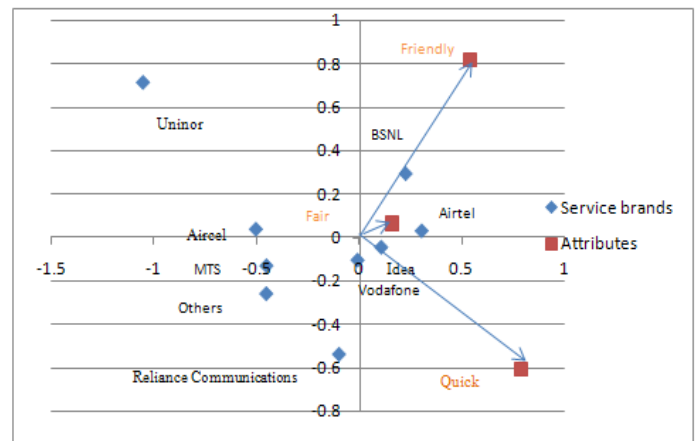

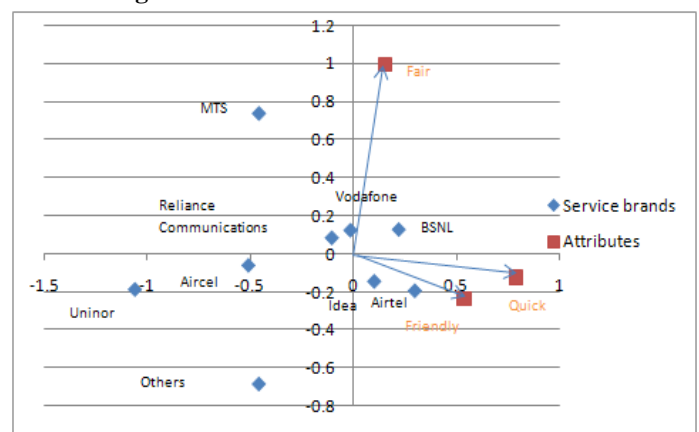**Figure 1: Plot of function 1 and Function 2**

Figure 2: **Plot of Function 1 and Function 2**

Figure 1 shows the plot of function1(X axis) and function2(Y axis) where function1 explains service quality and function2 explains service friendliness and Figure 2 shows the plot of function1(Xaxis) and function3 (Y axis) which explains service fairness. Based on the distances of the attribute vectors from the axis and their lengths it can be concluded from figure 1 that BSNL was perceived to be more customer friendly when compared to other brands while Idea was quick in attending to customer problems when compared to other brands. Figure 2 shows that Vodafone performed better than other brands on the service fairness attribute.

Table 1: Group Statistics

Attributes		Mean Unweighted	Std. Deviation Weighted	Valid N (listwise) Unweighted	Valid N (listwise) Weighted
1.00	Service Quickness	3.1064	1.28932	47	47.000
	Servicefriendly	3.0638	1.03008	47	47.000
	Servicefair	2.8723	.99164	47	47.000
2.00	Service quickness	3.0714	1.09082	42	42.000
	Servicefriendly	3.5476	1.01699	42	42.000
	Servicefair	2.9762	1.02382	42	42.000
3.00	Service quickness	3.2000	1.13241	35	35.000
	Servicefriendly	3.2286	1.13981	35	35.000
	Servicefair	2.6571	.96841	35	35.000
4.00	Service quickness	3.3333	.95743	33	33.000
	Servicefriendly	3.4242	1.19975	33	33.000
	Servicefair	2.6667	.95743	33	33.000
5.00	Service quickness	3.2941	.98518	17	17.000
	Servicefriendly	2.6471	1.22174	17	17.000
	Servicefair	2.7647	.83137	17	17.000
6.00	Service quickness	2.6000	.51640	10	10.000
	Servicefriendly	2.9000	.73786	10	10.000
	Servicefair	2.6000	1.07497	10	10.000
7.00	Service quickness	1.7143	.75593	7	7.000
	Servicefriendly	3.1429	1.06904	7	7.000
	Servicefair	2.4286	.78680	7	7.000
8.00	Service quickness	2.6667	.86603	9	9.000
	Servicefriendly	2.6667	.70711	9	9.000
	Servicefair	3.3333	.86603	9	9.000
9.00	Service quickness	2.8889	.92796	9	9.000
	Servicefriendly	2.7778	.83333	9	9.000
	Servicefair	2.0000	.86603	9	9.000
Total	Service quickness	3.0670	1.10302	209	209.000
	Servicefriendly	3.1770	1.08408	209	209.000
	Servicefair	2.7703	.97807	209	209.000

Table 2: Test of equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
Service Quickness	.918	2.219	8	200	.028
Servicefriendly	.927	1.965	8	200	.053
Servicefair	.938	1.658	8	200	.111

Table 3: Pooled Within-Groups Matrices

		Service quality	Service friendly	Service fair
Correlation	Service Quickness	1.000	.053	.044
	Servicefriendly	.053	1.000	.098
	Servicefair	.044	.098	1.000

Table 4: Wilks Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 3	.801	44.858	24	.006
2 through 3	.880	25.779	14	.028
3	.940	12.563	6	.051

Table 5: Eigen values

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.099(a)	42.9	42.9	.300
2	.068(a)	29.3	72.2	.252
3	.064(a)	27.8	100.0	.246

Table 6: Standardized Canonical Discriminant Function Coefficients

	Function		
	1	2	3
Service Quick	.785	-.610	-.126
Servicefriendly	.535	.818	-.236
Servicefair	.158	.064	.991

Table 7: Functions at Group Centroids

	Function		
Service provider	1	2	3
1.00	-.012	-.103	.125
2.00	.223	.296	.129
3.00	.104	-.043	-.143
4.00	.301	.032	-.192
5.00	-.102	-.536	.085
6.00	-.507	.040	-.059
7.00	-1.058	.717	-.185
8.00	-.456	-.129	.737
9.00	-.457	-.257	-.681

It can also be concluded that Idea and Airtel performed reasonably well on service quickness and service friendliness attributes.

Also service attributes regarding quickness, fairness and friendliness were measured on a five point Likert scale and attribute based perceptual map was used to study the relationship between the brands and the listed attributes. Conclusions drawn from the study showed the following

• BSNL was perceived to be customer friendly when compared to other brands.

• Idea was perceived to be quicker in attending to customer complaints than other brands considered for the study.

• Vodafone was perceived to be fairer in providing services on the perceptual map.

• Interestingly Idea and Airtel were brands which performed well on both service quickness and service friendliness attributes.

Conclusion

Perceptual mapping is a very important concept which can guide marketers on identifying relevant attributes essential for their functioning in the market. If relevant attributes are known then the marketer can incorporate them in their services so that they can survive in the competition. From the study it has been found that service attributes play an important role in the development of perception about service providers. So even the leading mobile service provider brands can identify and develop their own Points Of Difference (POD) for long term strategic growth.

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