Original Article

An empirical investigation of customer preferences in mobile services

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ABSTRACT Expanding and maintaining a loyal customer base appears to be a daunting task for mobile service providers. This article purports that service providers could try to gain valuable insight into consumer preferences, and design mobile service packages accordingly, the objective being determination of the relative importance of attributes in consumer choice processes related to service packages. Conjoint Analysis was used to analyze how customers' trade off among various salient factors in selecting a package. Further, conjoint models have been suggested for different demographic subgroups. This provides implicit opportunities to mobile service providers for deploying *benefit segmentation* as a strategy and developing customized mobile service packages for different customer segments.

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INTRODUCTION

Effective marketing requires insights into the consumer's psyche. This ensures that the appropriate product or service is conceived, produced and offered to the right consumer (target market), in the most appropriate way. With specific reference to the telecommunication market, the

forces of liberalization and globalization have pressured the companies to maintain their market share by focusing on retaining their current customers. They are increasingly confronted with challenges to attract their subscribers by providing high-quality services (in accordance with their preferences). With the increase in the cost of acquisition of new customers, cellular mobile companies continually seek new ways to acquire, retain and increase their subscriber base. Thus, the ability to retain existing subscribers is increasingly crucial in this industry.

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In this scenario, the role of customer loyalty becomes critical in the mobile phone market, as operators lose approximately 30 per cent or more of their subscribers every year and have large customer acquisition expenditures.^{1,2} Various researchers^{3–5} have also advocated that developing and maintaining customer loyalty is the key to the survival and growth of service firms. Mobile operators have realized that consistently high levels of customer loyalty can not only create long-term relationships with customers, but can also lead to competitive advantage. Researchers also agree that customer loyalty is one of the major sources of sustainable competitive advantage for service firms.⁶ Reichheld and Sasser⁷ also showed that a 5 per cent decrease in customer attrition translates to a 25–85 per cent increase in profits, depending on the service industry. Attaining and retaining the loyalty of customers essentially needs to be preceded by incorporating consumer preferences into the product/service design and offer.

Vanishing mass markets and the proliferation of products and services and new technologies require many companies to redefine the core business doctrine ‘Give customers what they want’. At the same time, consumer decisions are becoming increasingly complex, thanks to an abundance of choices. The underlying problem in predicting customer choices is that many people make purchasing decisions on the basis of many different criteria simultaneously (including brand, quality, performance, price and service). However, it is virtually impossible for any firm to excel in all product aspects at once. Therefore, firms need to make trade-offs on the basis of what they do best, what their competitors are offering, and what criteria they think matter most to their customers. The authors review the research on choice modeling and how it can be used to explore the differences between managers’ beliefs about the customer’s needs and wants and the customer’s actual needs and choices.⁸ Several researchers have contributed to studies focusing on consumer preferences and the design of associated propositions. Organizations are confronted with dual dilemmas associated with business innovation: the perceived need to bring

new products to market while simultaneously respecting consumer preferences; and the perception that innovators can become obsolete once their innovation is overtaken by a disruptive technology.⁹ Flores¹⁰ proposes a dramatically different way of listening to customers in today’s rapidly changing business world. According to Flores, company representatives need to go beyond the stated wants and needs of potential customers, focusing on their unspoken concerns. This will equip the company to produce the best value for the customer.

Another dimension to be taken into consideration is the massive expenditures by companies on research and development of new products and innovations. Hence, the use of prediction markets in launching new products has been explored by Teck-Hua and Kay-Yut.¹¹ These provide financial incentives to participants for the accuracy of their predictions, removing problems associated with the accuracy of consumer surveys and experts’ panels.

MARKETING OF TELECOM SERVICES

Telecom is a service industry, and therefore there are inherent challenges with the marketing of services that affect how the telecom product is communicated to the consumer public. There is, according to Clow *et al.*,¹² a ‘difficulty in communicating effectively the attributes of a service because of the unique characteristics of services, especially intangibility’. Indeed, the intangible nature of any service presents immense challenges to marketers insofar as communicating a product’s offering favorably to a potential market. Consider trying to communicate the thrill of a roller coaster ride, the buzzing atmosphere in a busy city restaurant or the range of emotions felt while watching a theatre production.

‘Tangibilising the intangible’^{13,14} to engage your target audience is understandably complex. However, the buyer decision-making process for the service product compounds marketing challenges even further.¹⁵ Without being able to touch, see or test a service, prepurchasing

decisions are much riskier than for tangible products.¹⁶ In many ways, it is venturing into an unknown and untested territory unless the consumer has purchased the product before or the product has received positive word of mouth.¹⁷

Therefore, while telecommunication firms may already use a number of planned and controlled marketing activities, this article purports that they could try to gain valuable insight into consumer preferences, and design telecom service packages accordingly.

THE INDIAN TELECOM MARKET

India, with a population of over 1.1 billion, has become one of the most dynamic and promising telecom markets in the world. In recent times, the country has emerged as one of the fastest growing telecom markets in the world. Between 2003 and 2007, the country witnessed the number of phones increasing by more than three times and the total tele-density, rising from 5.1 per cent to 18.2 per cent, according to 'Indian Telecom Analysis (2008–2012)', a new research report by RNCOS Industry Research Solutions (www.rncos.com/Report/IM096.htm).¹⁸ The two major factors that have fueled this growth are low tariffs and falling handset prices.

The other factor that has helped the telecom industry tremendously is the regulatory changes and reforms that have been pushed for the past 10 years by successive Indian governments. The total telecom subscription in India surged at a compounded annual growth rate of over 38 per cent from fiscal 2003 to fiscal 2007, making the country the third largest telecom market in the world.

Telecom reforms have allowed foreign telecommunication companies to enter the Indian market, which has huge potential. International telecom companies like Vodafone have made an entry in a big way.

The Ministry of Communications and Information Technology has very aggressive plans to increase the pace of growth, targeting 500 million people by 2010. Most of the expansion in the subscriber base is set to occur in rural India. India's rural telephone density has been languishing at around 1.9 per cent;

therefore, if 70 per cent of the total population is rural, the scope for growth in this industry is unprecedented ([trak.in/tags/business/2007/06/.//indian-telecommunication-story-from-10-million-to-150-million-mobile-subscribers-in-5-ye... - 88k](http://trak.in/tags/business/2007/06/.//indian-telecommunication-story-from-10-million-to-150-million-mobile-subscribers-in-5-ye...-88k)).¹⁹

KNOW YOUR CUSTOMER

In a dynamic and growing business environment, predicting consumer preferences for multi-attribute products and services is critical for any successful marketing effort. Consumers are more educated and informed than ever, and have the tools to verify service providers' claims and seek out superior alternatives. The question to be pondered upon is that of how they make their decision. Customers tend to be value maximizers, within the bounds of search costs and limited knowledge, mobility and income. They tend to estimate which offer will deliver the most perceived value and act on it. Therefore, knowing where consumer preferences and their values reside, companies can design products/services incorporating all the requisite components in order to ensure customer satisfaction and loyalty, thus strengthening their competitive position. It is impossible today to remain cost-competitive and offer every feature desired by customers.²⁰ Therefore, marketing, engineering and operations need to work together to determine the profit-maximizing bundle of product features. Several researchers have deployed the conjoint analysis (CJA) technique for identifying consumer preferences. Kohne, Totz and Wehmeyer²¹ have examined consumer preferences and information on product choice behavior with reference to location-based services in mobile commerce, while Kim²² has estimated consumer preferences for new telecommunication services by a Korean mobile company. In the tourism sector, Siomkos, Vasiliadis and Lathiras²³ have tried to measure customer preferences in the winter sports market, at a Greek tourist resort. Similarly, Ross, Norman and Dorsch²⁴ have used CJA to determine the preferences for development of a new recreation facility.

RATIONALE FOR CJA

Marketers are more likely to use CJA to help design new product feature sets. Green and Krieger suggest the use of the CJA technique in the detection of competitive actions and reactions in introducing new products or services and extensions, through the analysis of consumers' preferences and perceptions.²⁵

CJA is a survey-based multivariate technique that measures consumer preferences about the attributes of a product or a service. The goal is to identify the most desirable combination of features to be offered or included in the product or the service. Conjoint broadly refers to any decomposition method that estimates the structure of a consumer's preferences, given his/her overall evaluations of a set of alternatives that are pre-specified in terms of levels of different attributes.²⁶ Hence, it is best suited to understanding consumers' reactions to and evaluations of predetermined attribute combinations that represent potential products or services.

DESIGNING A CJA EXPERIMENT (Figure 1)

Specifying attributes and levels

The first step of the conjoint decision-making process is the specification of the objectives of the CJA. The objective of this was the determination of the relative importance of attributes in the consumer choice process related to telecom service packages so as to identify the most desirable combination of features/attributes that can be offered for inclusion in the package. Twenty-six attributes were compiled to formulate the CJA problem. These attributes were identified through a detailed exploratory identification process. This included discussions with telecom industry experts, secondary analysis of reports of the telecom industry and content analysis of the pilot survey. An attempt has been made to include all the determinant factors (pivotal in the actual judgment decision) regarding the consumer choice process.

The three steps followed in the pilot study were:

- a small-scale survey of customers/mobile users to obtain approximate results for the desired and important attributes to be used in the mobile service package;
- focus group discussions held with mobile customers and representatives of mobile service providers in India; and
- pre-testing of the initial (rough) questionnaire developed as a consequence of the stages mentioned above.

The purpose of this was to ensure the inclusion of all the essential attributes and levels of the mobile service package. Simultaneously, a cautious approach was adopted to avoid fundamental flaws (misunderstanding of items, unreadable options and so on) in the CJA questionnaire. In order to ensure the authenticity of the data, the pilot survey was carried out for a wide (demographic) variety of mobile users.

In content analysis of the pilot survey, the responses (oral as well as written) were categorized and classified. They were then coded for tabulation purposes. The purpose of this was to quantify and analyze the presence, meaning and relationship of the desired attributes, in accordance with the choices/preferences of consumers for a mobile service package. Thereafter, the frequency counts (of different categories) were compared. The method deployed was qualitative content analysis (inductive category development and deductive category application).²⁷

After content analysis and detailed discussions and deliberations, the list of attributes and their levels was modified, eliminating some and including those that had been omitted initially. To finalize the choice of attributes, we used Oval Mapping Techniques²⁸ along with frequency counts and comparison.

To eliminate redundancies in the list of the 26 (selected) attributes, a pre-test was conducted. Sixty mobile customers were asked to rate the importance of these attributes, as selection criteria

Figure 1: CJA decision-making process.

for choosing a mobile service package, on a nine-point scale (1 = Not at all Important, 9 = Extremely Important).

This data set was analyzed using principal component analysis (factor analysis). Six salient

components (attributes) emerged from the factor analysis. The total variance accounted for by these six components explains 78.3 per cent of the variability in the original 26 variables (Tables 1 and 2).

After the identification of the salient attributes, their appropriate levels were selected. The number of attribute levels determines the number of parameters that will be estimated, and also influences the number of stimuli (attribute combination) to be evaluated by the respondents. Therefore, following in-depth interviews with telecommunication experts, telecom service providers and officials in the telecom industry, the levels estimating the attributes were selected in such a way that they covered the whole spectrum of products and services that are plausible. We have taken three different levels for each of the six attributes (Table 3). These attribute levels satisfied all the requirements for sufficiency, appeal and application.

Selecting CJA methodology and construction of stimuli

Multi-factor evaluation CJA methodology²⁹ was used. The reason behind this choice revolved around three characteristics of the proposed research: number of attributes, level of analysis and the permitted model form. As six attributes are dealt with, the level of analysis is aggregate, and the model form additive. Hence, a full-profile approach, involving construction of complete profiles of the service/product offerings

for all the attributes, was used here. There are three levels for each of the six attributes. Hence, there will be a total of $3^6 = 729$ product descriptions (stimuli). However, the number of stimulus profiles was greatly reduced from 729 to 22 by means of a fractional factorial design. This appeared to be a manageable number for the respondents, and also exceeds the minimum number of stimuli (Total number of levels across all attributes – Number of attributes + 1 = 13) that must be evaluated by the respondents to ensure the reliability of the estimated parameters. A special class of fractional design called orthogonal

Table 3: Investigated attributes and their levels

Investigated attributes and their levels:

Connectivity of network

- Low call drop
- Wide area of coverage
- Low congestion

Tariff of mobile services

- Call rates
- Variety of tariff plans
- Denomination of recharge coupons

Customer service

- Resolution of queries
- Customized information
- Complaint handling

Value added services

- Ringtones/callertunes
- Services like jokes, astrology and so on
- Daily updates about news, sports and so on

Variety of plans

- Postpaid
- Lifetime
- Prepaid

Technology deployed by network

- GSM
- CDMA
- BOTH (BOTH GSM AND CDMA)

Table 1: Kaiser-Meyer-Olkin and Bartlett's test

<i>Kaiser-Meyer-Olkin measure of sampling adequacy.</i>		0.712
Bartlett's Test of Sphericity	Approx. Chi-Square	864.429
	df	378
	Sig.	0.000

Table 2: Total variance explained

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation Sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.692	29.491	29.491	7.692	29.491	29.491	8.198	31.532	31.532
2	4.329	16.597	46.008	4.329	16.597	46.008	5.887	22.644	54.176
3	3.434	11.449	57.537	3.434	11.449	57.537	2.173	8.358	62.534
4	2.774	10.520	68.057	2.774	10.520	68.057	1.961	7.542	70.076
5	1.630	6.249	74.306	1.630	6.249	74.306	1.190	4.575	74.651
6	1.048	4.018	78.324	1.048	4.018	78.324	.955	3.673	78.324

Extraction method: principal component analysis.

arrays was used. It assumes that all interactions present in the stimuli are negligible. Here, two sets of data were obtained. One estimation set, consisting of 18 stimuli, was used for calculating part-worth functions for the attribute levels. The other, a holdout set, consisting of four stimuli, was used to assess reliability and validity. The orthogonal arrays (orthoplan) were generated by SPSS-15.0 software. Thus, a total of 22 design cards was generated for evaluation by respondents.

Deciding on the form of input data

Metric CJA was used. The respondents were required to provide preference ratings for the telecom service package described by 18 profiles in the estimation set and four profiles in the holdout set. The ratings were obtained using a nine-point Likert scale (1 = Least preferred, 9 = Most preferred).

Survey administration

The survey instrument was a closed-ended questionnaire. The questionnaire had 22 stimuli profiles for preference rating. There were also questions related to demographic and behavioral information on the respondents. Quota (multi stage) and shopping mall intercept sampling schemes were employed, with the questionnaires sent to approximately 2000 respondents. However, only 1540 questionnaires were found complete in all respects. The response rate was 77 per cent. An attempt has been made to keep the sample fairly representative across the demographic variables by constructing quotas according to the following factors: age, gender, marital status, occupation, income and city of residence (Table 4). The areas of our sampling are Lucknow, Delhi, Mumbai, Bangalore and Kolkata. The time frame of the study was September 2008–March 2009. Primary-stage sampling units were the mobile users, whereas the secondary-stage sampling units were markets, shopping malls, institutions and localities in the above-mentioned cities. In order to make the sample representative, sampling was performed in various market places, shopping malls, office complexes and some residential localities considering the desired quotas. The

Table 4: Demographic characteristics of respondents

<i>Demographic characteristics</i>		<i>Frequency</i>	<i>Percentage</i>
Age	Below 20	169	11
	20–30	493	32
	31–40	385	25
	41–55	308	20
	Above 55	185	12
Gender	Male	909	59
	Female	631	41
Monthly income	Below 15 000	185	12
	15 000–20 000	277	18
	20 000–25 000	400	26
	25 000–30 000	324	21
	Above 30 000	354	23
Educational qualification	Undergraduate	277	18
	Graduate	693	45
	Post graduate	354	23
	Professional	216	14
Profession	Student	416	27
	Services	462	30
	Business	445	29
	Others	217	14
Current service providers	Government	909	41
	Private	585	59
Total		1540	100

questionnaires were administered personally to ensure the authenticity of information provided by the respondents. The questionnaires were pre-tested to determine the orthogonality and other aspects, and were thereafter suitably modified.

CJA procedure

The basic model was estimated with the ordinary least squares (OLS) regression parametric mathematic algorithm³⁰ using dummy variable regression.

FINDINGS AND DISCUSSIONS

Estimating the conjoint model

The results as presented in Figure 2 represent the mean preference structure or the grading provided by the mobile customers (of various telecom companies). These preference scores are based on the data collected from 1540 customers through a structured questionnaire.

Analyzing the preference structure or the relative importance accorded by customers to the six salient attributes, the customers assigned the

Figure 2: Mean preference structure for the telecom service package.

maximum utility/importance to the attribute *connectivity of network* (with percentage importance of 30.15 per cent), that is, mobile service providers need to provide seamless connectivity in order to ensure customer satisfaction and consequent loyalty. Taking into consideration the part-worth functions, the customers primarily defined good network connectivity in terms of *low congestion* in the network, *wide area coverage* and *low call drop rate*. For mobile service

companies, in order to be profitable it is just not sufficient to satisfy the customers, but also to retain old customers and attract new and potential customers. Network quality is one of the most important drivers of overall service quality, and customer satisfaction.^{31,32} Thus, superior network connectivity is important for cellular mobile service providers in order to retain their customers and achieve a competitive advantage in the market place.

The second most important attribute is the *customer service* (importance 23.90 per cent) provided by the mobile service providers. The main components of customer service (in order of importance) were *complaint-handling*, *resolution of queries* and *customized information* (to customers). A majority of the customers were dissatisfied with customer care services (of their mobile service providers). They reported complaints regarding billing errors and delays in solving their problems, reflecting poorly on the complaint-redressing mechanism and billing process of their respective service providers. Another source of discontent among the customers was unfulfilled promises and poor after-sales service.³³ Customers who complain provide a chance for the service provider to rectify the problem and restore relationships. Therefore, service recovery efforts play a crucial role in achieving (or restoring) customer satisfaction. The true test of a firm's commitment to satisfaction and service quality is in the way it responds when a customer complains. Effective service recovery requires thoughtful procedures for resolving problems and handling disgruntled customers. Hence, an efficient complaint-redressing mechanism would go a long way in effectively handling customer complaints, providing appropriate solutions, and ensuring customer satisfaction and positive word of mouth.

In the third place in the worth hierarchy is the attribute *tariff of mobile services*, with a utility percentage of 21.25 per cent. Service quality is an important driver of customer loyalty, but for price-sensitive customers it is not the sole variable affecting the relationship. Price emerges as an important parameter in deciding customer satisfaction and loyalty in mobile communication. Considering the part-worth functions, customers attached the greatest significance to *call rates*, followed by *variety of tariff plans* available and various *denominations of recharge coupons*. Customer definitions of value may be highly personal and idiosyncratic. Some customers define value of service delivered in terms of low price. Hence, the crux of the issue lies in convincing the customer that what

he is receiving from the service provider is more than the monetary cost borne by him. The customer's perception needs to be managed such that he believes that he is getting true value for his money.

Following tariff was the attribute *value added services* (worth 16.72 per cent) being offered to customers. Within the purview of this attribute, the customers accorded the highest priority to *daily sports and news updates*, followed by *ringtones and callertunes* and *entertainment services like jokes, astrology and so on*. Although the customers did not accord high importance to this attribute, it can be safely assumed that customers perceive mobile phones as an information and entertainment (infotainment) device, in addition to a communication device. Thus, mobile service providers can add further value to their services through the provision of customized value added services. In addition, the concept of *Permission Marketing*³⁴ needs to be considered while providing these value added services. This will ensure customer satisfaction accompanied by sustainable revenue (from subscription to value added services) accruing to the mobile service provider.

Next in the preference hierarchy was the attribute *variety of plans* (worth 5.94 per cent) offered by the telecom companies. Within the purview of this attribute, *pre-paid plans* were accorded the highest importance, followed by *post-paid plans*, with *lifetime plans* deemed the least important (in the consumer's perception), the rationale being that consumers feel the least bound to the service provider in the case of a pre-paid plan. In addition, the switching costs are the lowest in this case. This preference hierarchy is also a reflection on the customer loyalty to mobile service providers, making retaining customers a daunting task.

The last attribute in the preference framework is *technology deployed by the network*, with a small percentage importance of 2.04 per cent. For mobile service providers, the *GSM* or *CDMA* technology platforms do not play a significant role in the consumer's decision-making process. Hence, the relative importance allocated to this attribute is insignificant.

Conjoint models for different segments

The aggregate model provides the overall preference structure of the mobile customers, based on the relative importance accorded (by customers) to the six salient attributes. Two broad groups of variables are used to segment consumer markets. Some researchers form segments on the basis of descriptive characteristics: geographic, demographic and psychographic. Thereafter, an attempt is made to examine the different product responses or needs of these segments. Other researchers try to form segments based on behavioral considerations, such as consumer responses to benefits, use occasions and so on.³⁵ In our study, we have attempted to gain a greater insight into the psyche of the customer, by constructing separate models for different demographic groups (Figure 3). Analyzing the relative importance of weights accorded across

government-owned service providers' customers vis-à-vis customers of private mobile service providers, it was found that both groups of respondents accorded the maximum importance to the attribute *connectivity of network*, reflecting the overall importance of this attribute. However, the importance of the other attributes varied across respondent groups. Subscribers to government mobile services considered *customer service* the second most important attribute, followed by *tariff of mobile services*; subscribers to private mobile services on the other hand accorded the second highest importance to *value added services*, followed by *customer service*. *Variety of plans* and *technology deployed by network* were accorded less importance by both groups of respondents.

A comparative analysis of the preference hierarchy of younger (below 30 years of age) and older (above 30 years of age) respondents was

ATTRIBUTES	Age<30	Age>30	Income<25K	Income>25K	Service Provider (Govt.)	Service Provider (Pvt.)
CONNECTIVITY OF NETWORK	30.67	26.02	22.02	22.87	45.01	36.58
TARIFF OF MOBILE SERVICES	13.99	19.46	31.34	15.18	12.65	12.94
CUSTOMER SERVICE	14.40	19.10	13.67	15.46	18.85	15.37
VALUE ADDED SERVICES	24.97	11.44	7.05	20.87	12.65	18.68
VARIETY OF PLANS	8.07	15.96	20.50	13.47	6.94	8.27
TECHNOLOGY DEPLOYED BY NETWORK	4.23	8.02	5.42	12.14	3.91	8.17

Figure 3: Preference structure of the telecom service package for different segments.

also performed. There were some interesting differences in the importance accorded to the attributes across these two groups, although both age groups assigned the maximum importance to the attribute *connectivity of network*, substantiating its overall importance. However, the second most important attribute for the younger respondents was *value added services*, followed by *customer service*, *tariff of mobile services* and *variety of plans*, with *technology deployed by network* deemed the least important. For the older respondents, it was *tariff of mobile services*, followed by *customer service*, *variety of plans* and *value added services*, with *technology* mattering the least. This analysis reveals that although across all age groups seamless network connectivity is the all-important attribute, the younger respondents perceive their mobile phones as a source of infotainment (information and entertainment) in addition to communication, and attach a great deal of significance to the quality of customer service delivered by various service providers. However, the tariff charged does not occupy an important place in their preference hierarchy, indicating that price is not a significant variable affecting their quality assessment of mobile service providers. In contrast, the older respondents considered tariff an important variable, and also tended to be sensitive to customer service elements like complaint resolution and query-handling.

Analyzing the preference hierarchy across the lower- (below Rs. 25 000 per month) and higher- (above Rs. 25 000 per month) income group respondents, it was found that there was a basic difference in their needs. The respondents in the lower-income group accorded the highest importance to *tariff of mobile services*, followed by *connectivity of network* and *variety of plans*. All these attributes reflect that the preference perception of the respondents in the lower-income group is largely influenced by the benefits accruing to them (in concrete terms), from their mobile service providers, and they are primarily looking for value for money in terms of good connectivity and the variety of tariff plans offered by the telecom companies. In sharp contrast is the preference hierarchy of the respondents in the higher-income group, who accorded the highest

importance to the *connectivity of network*, followed by *value added services* and *customer service*. This group of respondents primarily attached relevance to seamless connectivity and an array of value added services provided by the service providers with an efficient customer service set up, rather than the monetary cost borne by them.

Although thus far only the relative importance of the attributes has been analyzed, for various subgroups further insights can be obtained by analyzing how the part-worths of these attributes vary across the subgroups. The conjoint models developed for different demographic subgroups indicate that the subgroups differ in the relative importance accorded to the various attributes and the part-worths for different levels of these attributes (Table 5). This provides implicit opportunities to mobile service providers for deploying *benefit segmentation* as a strategy and to develop customized mobile services' packages for different customer segments.

Let us take the case of younger and older respondents. Although substantial importance is accorded to the attribute *customer service*, part-worths further reveal the respective age groups' preferred elements or dimensions of customer service. The younger respondents accorded the maximum importance to customized information solutions, followed by effective complaint resolution, whereas the older respondents accorded the highest preference to efficient handling of queries (or doubts), followed by effective complaint resolution. Thus, depending on the age group of the customers, the mobile service provider needs to offer customized solutions.

Similarly, considering the part-worths of the attribute *value added services*, it is found that the younger respondents displayed a greater preference for services like jokes, astrology and ringtones/callertunes, whereas the older respondents viewed services like daily news updates as more important. Hence, value added services can also be customized according to the tastes and preferences of the age groups of the mobile customers.

Another dimension to consider is that CJA and its behavioral insights can also provide indications

Table 5: Attribute levels and part utilities for different segments

Attributes	Levels	Age <25 years	Age >25 years	Income <25,000	Income >25,000	Ser-Provider Govt.	Ser-Provider Pvt.
Connectivity of network	Low call drop	-0.002	0.187	0.088	-0.097	0.022	0.140
	Wide area coverage	-0.147	-0.170	0.027	0.144	0.640	0.096
	Low congestion	0.149	-0.017	-0.115	-0.047	-0.086	-0.236
Tariff of mobile service	Call rates	0.049	0.055	-0.033	-0.016	0.042	-0.070
	Variety of tariff plans	0.037	-0.161	-0.128	-0.072	-0.123	0.007
	Denomination of recharge coupons	-0.086	0.106	0.161	0.088	0.081	0.063
Customer service	Resolution of queries	-0.068	0.154	-0.051	0.066	0.010	0.059
	Customized information	0.071	-0.108	-0.024	-0.097	0.147	-0.099
	Complaint handling	-0.003	-0.046	0.075	0.031	-0.157	0.040
Value added services	Ringtones/callertunes	-0.035	-0.038	0.011	0.130	0.052	0.042
	Services like jokes, astrology and so on	0.138	0.011	-0.038	-0.090	-0.128	-0.117
	Daily updates about news, sports and so on	-0.103	0.027	0.027	-0.040	0.076	0.075
Variety of plans	Postpaid	-0.011	0.135	-0.003	-0.062	0.064	-0.039
	Lifetime	0.056	-0.084	-0.093	-0.018	-0.048	-0.007
	Prepaid	-0.045	-0.051	0.096	0.080	-0.016	0.046
Technology deployed by network	Both	0.009	-0.051	0.016	0.038	-0.032	0.049
	CDMA	0.022	0.059	0.017	-0.083	0.001	-0.035
	GSM	-0.031	-0.008	-0.033	0.045	0.031	-0.014

for deriving behavioral segments like price-oriented customers, quality-oriented customers and so on. In accordance with the most important attribute (in the consumers' perception), this segmentation approach is very useful in identifying marketing opportunities and deciding on the value proposition to offer.

Reliability and validity

CJA results should be assessed for accuracy, reliability and validity. The objective is to ascertain how consistently the model predicts the set of preference evaluations under different situations. The results derived from the CJA are reliable and valid as:

Aggregate conjoint model

While evaluating the goodness of fit of the estimated conjoint model, we found that the value of Kendall's tau is 0.801 (asymptotic significance = 0.008). This value of Pearson's R is 0.916, and the value of the adjusted R^2 is 0.741 (asymptotic significance = 0.021). These values are reasonably high and the results are significant at a 5 per cent level of significance (Tables 6 and 7).

In order to determine internal validity, four stimuli as validation or holdout stimuli were also used. Parameters from the estimated conjoint model (using 18 stimuli) were used to predict preferences for the holdout set of stimuli and were then compared with actual responses by calculating correlation. Considering Table 6, the value of Kendall's tau is 0.764 for the four holdout cases. This value is significantly high (asymptotic significance = 0.035). Thus, the conjoint model has high predictive accuracy and internal validity.

Conjoint models for different segments

While evaluating the goodness of fit of the estimated conjoint models for different segments, it was found that all the values of Pearson's R, Kendall's tau, adjusted R^2 and Kendall's tau (for holdout cases) are reasonably high, and these results are significant at a 5 per cent level of significance (Tables 6–13). Therefore, we can state that all the conjoint models for different

Table 6: Model summary (a)

<i>Segment</i>	<i>Coefficient</i>	<i>Value</i>	<i>Sig.</i>
Aggregate model	Pearson's R	0.916	0.021
	Kendall's tau	0.801	0.008
	Kendall's tau for Holdouts	0.764	0.035
Age (below 30 years)	Pearson's R	0.951	0.038
	Kendall's tau	0.903	0.000
	Kendall's tau for Holdouts	0.741	0.009
Age (above 30 years)	Pearson's R	0.911	0.025
	Kendall's tau	0.812	0.006
	Kendall's tau for Holdouts	0.784	0.039
Income (below 25 000)	Pearson's R	0.825	0.000
	Kendall's tau	0.792	0.000
	Kendall's tau for Holdouts	0.781	0.014
Income (above 25 000)	Pearson's R	0.931	0.026
	Kendall's tau	0.903	0.014
	Kendall's tau for Holdouts	0.802	0.044
Service-provider (Govt.)	Pearson's R	0.866	0.022
	Kendall's tau	0.911	0.017
	Kendall's tau for Holdouts	0.802	0.000
Service-provider (Pvt.)	Pearson's R	0.889	0.000
	Kendall's tau	0.764	0.039
	Kendall's tau for Holdouts	0.751	0.026

Table 7: Model summary (b) – aggregate model

<i>Model</i>	<i>R</i>	<i>R²</i>	<i>Adjusted R²</i>	<i>Std. error of the estimate</i>	<i>Durbin-watson</i>	<i>Sig.</i>
1	0.916(a)	0.840	0.741	0.42373	1.763	0.021(a)

Table 8: Model summary (b) – Age (below 30 years)

<i>Model</i>	<i>R</i>	<i>R²</i>	<i>Adjusted R²</i>	<i>Std. error of the estimate</i>	<i>Durbin-Watson</i>	<i>Sig.</i>
1	0.951(a)	0.904	0.834	0.37411	2.219	0.038(a)

Table 9: Model summary (b) – Age (above 30 years)

<i>Model</i>	<i>R</i>	<i>R²</i>	<i>Adjusted R²</i>	<i>Std. error of the estimate</i>	<i>Durbin-Watson</i>	<i>Sig.</i>
1	0.911(a)	0.830	0.736	0.19981	2.020	0.025(a)

Table 10: Model summary (b) – Income (below 25 000)

<i>Model</i>	<i>R</i>	<i>R²</i>	<i>Adjusted R²</i>	<i>Std. error of the estimate</i>	<i>Durbin-Watson</i>	<i>Sig.</i>
1	0.825(a)	0.681	0.609	0.66535	2.329	0.000(a)

Table 11: Model summary (b) – Income (above 25 000)

<i>Model</i>	<i>R</i>	<i>R²</i>	<i>Adjusted R²</i>	<i>Std. error of the estimate</i>	<i>Durbin-Watson</i>	<i>Sig.</i>
1	0.931(a)	0.867	0.811	0.44419	2.328	0.026(a)

Table 12: Model summary (b) – Service-provider (Government)

Model	R	R ²	Adjusted R ²	Std. error of the estimate	Durbin–Watson	Sig.
1	0.866(a)	0.750	0.683	0.43622	2.097	0.022(a)

Table 13: Model summary (b) – Service-provider (Pvt.)

Model	R	R ²	Adjusted R ²	Std. error of the estimate	Durbin–Watson	Sig.
1	0.889(a)	0.790	0.626	0.17097	2.113	0.000(a)

demographic segments have high predictive accuracy and internal validity.

CONCLUSIONS AND MANAGERIAL IMPLICATIONS

This article attempts to aid mobile service providers in developing an insight into how consumers trade off among available attributes while selecting a mobile service package. It also provides concrete information about the specific attributes to be incorporated into mobile services, as per customers' preferences.

Unlike past focus on the self-elicitation of the importance of mobile services, this study uses a well-established methodology to derive the relative importance accorded to the identified six salient attributes *connectivity of network*, *customer service*, *tariff of mobile services*, *variety of plans*, *value added services* and *technology deployed by network*.

The results of the CJA indicate that customers go through a complex multi-attribute decision-making process by trading off among a relatively large number of attributes to select a mobile service package. The customers accorded the greatest importance to the *connectivity of network* attribute, followed by *customer service* and *tariff of mobile services*. However, they placed relatively less value on *variety of plans*, *value added services* and *technology deployed by network*.

Further insights into mobile customer preferences can be obtained by analyzing how the part-worths of these attributes vary across the subgroups. The conjoint models developed for different demographic subgroups indicate that the subgroups differ on the relative importance accorded to the various attributes and the

part-worths for different levels of these attributes. This provides opportunities for mobile service providers to deploy *benefit segmentation* and develop customized mobile service packages for different customer segments.

The study has important management and marketing implications. From a management perspective, the study can empower mobile service providers with information about customer preferences, so that they can add value to their relationship with customers, by incorporating the preferred combination of features. The mobile companies can also assess the information provided by the study to appropriately bridge the gaps between their perception of the value of services provide) and customers' perception of value (desired mobile service features), by developing corrective action plans. Such corrective actions will ensure greater customer satisfaction as well as a differentiable competitive advantage, vis-à-vis other mobile service companies.

From an academic perspective, this study deploys CJA for the prediction of consumer preferences for multi-attribute services (to identify product attributes and the levels that influence product/service choice). This is a critical aspect in gaining insight into consumer behavior. Delivering a better combination of intrinsic attributes in a service can be a source of a sustainable competitive advantage for an organization. This article also contributes to the study of market segmentation and target marketing. The basic premise for developing an understanding of consumer preferences involves identifying key product attributes and the

importance of the attributes that drive their preferences.

Considering that the study is restricted to some cities in India, the basic premise is to empower the mobile service companies (with valuable customer insight), so as not only to create high absolute value (from the firm's perspective), but also to develop a competitive advantage that will be perceived as an *advantage* by customers. This will in turn ensure the delivery of high customer value and satisfaction.

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