



A Conjoint Analysis of Customer Preferences for VoIP Service in Pakistan

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ABSTRACT

In Pakistan, the VoIP service is gaining popularity. By the end of 2014, the total number of broadband subscribers exceeded 3.35 million and the total number of mobile 3G subscribers were approximately 4 million. The service providers in Pakistan continue to invest in infrastructure and supporting regulatory policies fueling the development of infrastructure. It is expected that such an environment would be able to provide good quality Voice over IP (VoIP) service. In this context, this study analyzed Pakistani consumer preferences for VoIP service. The findings have significant implications for service providers looking to develop effective marketing strategies and design VoIP service that meets consumers' demand.

Keywords

Last mile access; Pakistani telecom market; Discrete choice model; Market share; Mobile phone; Stated preference, Number portability, Mobile telecommunication services; Willingness to pay.

1. INTRODUCTION

The technology of number probability (NP) has made it very convenient to switch from traditional public switched telephone network (PSTN) to Voice-over-IP (VOIP) with no need of changing your phone number [1]. The NP provides several benefits for VOIP service. The NP can reduce switching costs [3] and promotes competition among service providers by reducing switching barriers [23] [11]. The NP can also increase VOIP service attractiveness for mobile customers [8]. Around the globe, customers of traditional PSTN are switching to VOIP. In Korea alone, there was 100% increase in customers moving to VOIP in year 2008 and the expected number of VOIP users were 5.2 million by end of 2008 [13] [7].

The global VOIP market estimated at US\$ 70.9 billion in 2013. It was expected that the market would grow to US\$136.8 billion by 2020 [19]. The modern internet infrastructures are capable of providing good quality VOIP services. For the future success of VOIP, it is important that service providers maintain the quality of VOIP service and adopt effective marketing



strategies. In this context, it is important to understand consumer preferences for VOIP Service. The purpose of this study is to explore important VOIP service attributes desired by the consumer in Pakistan.

This paper proceeds as follows. In the next section, the literature review is presented. Section 3 describes research methodology. Section 4 presents results and discussion. Conclusion is presented in Section 5.

2. LITERATURE REVIEW

2.1 Voice-over-IP (VoIP)

VOIP refers to voice communication that takes place over the internet [21]. VOIP uses data packets containing compressed digital signals of voice. These data packets are transmitted using internet protocol (IP) [23]. The concept of VOIP was developed in the 1970's [18]. However, the commercial development of VOIP was started in the 1990s [23]. The VOIP service is available in a variety of combinations of devices such as phone-to-phone, computer-to-phone and computer-to-computer. The most widely used combination is computer-to-computer [4]. In this combination a software and headset is required for communication. In the phone-to-phone combination, an exclusive consumer device is used that connects to the internet for voice communication.

From a technical standpoint, VOIP provides many advantages over PSTN including reduced call charges and many additional value-add services (VAS) [12] [15] [17] [23] [18] [9] [27]. The cost of using VOIP can be as low as half the cost of traditional PSTN. Since VOIP provides simultaneous data and voice communication over the Internet, many VAS can be provided (Such as SMS, video telephony, caller ID, Call forwarding etc.) [17]. Despite all such advantages, quality-of-service (QoS) is still a major concern of consumers. Services providers have been making continuous efforts to improve QoS by upgrading their network infrastructures using modern network technologies [21] [16].

2.2 VoIP in Pakistan

In Pakistan, the VOIP market has grown after Pakistan telecomm Authority (PTA) deregulated the telecom sector. Due to reduced entry barriers, many small-scale companies entered into the VOIP market and started providing the service. These service providers however failed to achieve a broader diffusion due to QoS-related problems such as jitter, latency, and packet loss. As such, these companies were unable to provide reliable service [5]. Many companies also entered into the market to reap the benefits of VOIP by providing grey traffic. In such arrangements, companies used VoIP to



bypass international gateway exchanges and make cheap international calls [2]. The situation resulted in crackdown from PTA against such companies and more stringent requirements for companies starting to provide VOIP service. Home consumer market greatly benefited from availability of free VOIP software such as Skype. Many telecom companies also started to provide video telephony services after the availability of 3G network in Pakistan. The household consumers of VOIP service were interested in service attributes such as reduced call charges, simultaneous voice and data communication, and VAS [20]. From a demographic point of view, education level, residence, and purchasing power were significant predictors of consumer intention to use VOIP (15). With the introduction of number portability in Pakistan in 2009, the VOIP market is expected to grow. This number portability is expected to increase competition in fixed-phone services market, make VOIP service more attractive to consumers, and activate VOIP service market [20].

3. RESEARCH METHODOLOGY

The study sample consisted of 300 household consumers. This was a convenience sample and all respondents were selected from Karachi. All respondents were user of some type of VOIP service. The survey questionnaires were distributed in hard copy to all the participants. Two hundred forty six participants' completed and useful questionnaires were received achieving a response rate of 82%. The data was coded and analyzed using SPSS version 22 software.

To analyze consumer preferences for various attributes of VOIP service, this study used the conjoint analysis technique. This technique can be used when we want to predict consumer preferences among alternative of multiple attributes options [6][13] [29] [30]. Using this technique, it is possible to estimate the structure of consumer's preferences given the consumer's evaluation of a set of alternatives with pre-specified levels. The conjoint analysis is an accepted and popular technique among academicians and practitioners that is used for a variety of marketing purposes such as new product evolution and market segmentation.

There exist many studies in the context of developed world that have used conjoint analysis to estimate consumer's preferences for VOIP service. One such study by [18] suggested that voice quality and service reliability were the critical attributes of VOIP service. The study of [14] estimates Japanese consumer's preferences for VOIP service. This study identified QoS, guarantee, number portability, fax usage, and emergency access as critical attributes of VOIP service.



[24] evaluated the South Korean consumer preferences for 4G technology by conducting personal interviews. They used 4 attributes of 4G technology in their study namely rates of data transfer, Quality of Service, number of broadcasting channels, video-on-demand (VOD) service, and supplementary services. They found that consumer attached most significant weightage to VOD service. The conjoint analysis study of [25] used a different approach to investigate the bundling of mobile telecommunication services such as talk time (in minutes), text messages, and internet access. The study was conducted among German consumers and results indicated that consumers perceived price as the most significant attribute in the service bundle. The second most important attribute was talk time.

To begin with, conjoint analysis we first need to define attributes and their levels. The VoIP service attributes included in the research survey of this study were derived from [15] [18] [14]. The survey instrument included four attributes of VOIP service: the VOIP consumer device cost, savings of monthly call charges number portability and VAS. It is observed that consumers can have difficulties in simultaneously processing the alternatives provided to them if the number of attributes is greater than six [14] [26]. Therefore, the number of selected attributes in this study (i.e. 4) was appropriate. Table 1 shows these attributes and their levels.

TABLE 1: VOIP SERVICE ATTRIBUTES AND LEVELS

Attribute	Description	Level		
Consumer device cost	Cost of an exclusive consumer device	Free with 3-year contract	PKR 6000	PKR 9000
Savings in monthly call charges	Monthly savings in call charges as compared to PSTN	PKR 600	PKR 800	PKR 1000
Number portability	Provision of number portability	Available	Not available	



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Value-added services	Value-added service provided by VoIP	Provided	Not provided
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To use VOIP a consumer would need to purchase a device capable of providing VOIP service. In many parts of the world, service providers do not charge customers for this device but require a long-term service contract. However, this may not be a case in developing world and therefore this consumer device cost could act as a switching cost and can act as an attribute considered by consumers who are thinking to switch to VoIP.

We mentioned earlier that savings in call charges is one significant advantage of VoIP. This is one significant attribute of VoIP service consumers are interested in [7]. The charge system of VoIP is more attractive in terms of initial set up costs, monthly charges, long-distance/international call charges, and mobile call charges. Many service provider also offer free calls by phone between their users. The monthly savings can be increased if a user makes many long-distance and international calls.

Number portability is a significant attribute that can affect customer preference for VoIP service. We have mentioned earlier that number portability allows a customer to retain his phone number when he switches to VoIP. Therefore, number portability can be considered a significant attribute of VoIP service [2] [22] [28].

In conjoint analysis, a compositional model is assumed in order to infer part-utility of attributes. This model specifies how the scores of different attributes interact and are related to each other. A further assumption is made that the bases on which a consumer selects an alternative is the utility of the alternative and this utility can be determined using the following equation shown in Figure 1.



$$U_{ij} = \sum_{k=1}^n f_{ik}(x_{jk}) \quad (i=1, \dots, n; j=1, \dots, q; k=1, \dots, m) \quad (1)$$

where, U_{ij} = the overall utility of alternative j for individual i .

f_{ik} = a real valued function defining the utility on the k th attribute for the i th individual, and

x_{jk} = the level on attribute k characterizing the j th alternative.

Figure 1: The Utility Equation

The Figure 2 shows the conceptual model used for conjoint analysis in this study.

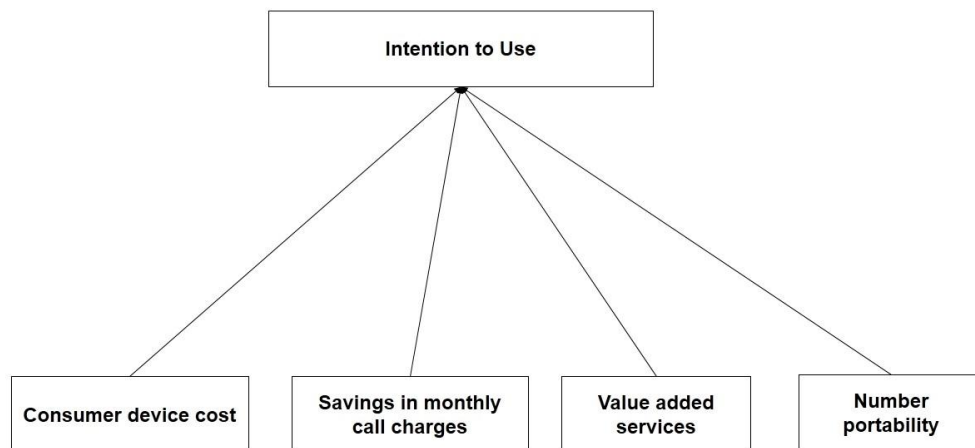


Figure 2: The Conceptual Model

4. RESULTS AND DISCUSSION

Table 3 lists the results of conjoint analysis using the SPSS orthogonal procedure. We generated nine subsets of preferences. Respondents listed their preference among these subsets. It can be seen from the results shown in table 3 that cost of VoIP consumer device is the most important attribute of VoIP service for consumers. The second most significant factor is



savings in monthly call charges. Number portability and VAS are the third and fourth most important attribute respectively.

There results provide significant implication for VoIP service provides. First, the VoIP service provides need to come up with a strategy to reduce VoIP consumer device cost. Service providers can reduce VoIP consumer device cost by either provide the device free in return of a long-term contract keep the consumer device cost at a satisfied level, or subsidize the device cost with some conditions. Service provides need to maintain competitive call charges. In this regard, provably free VoIP calls between users of the same service provides would be essential. The relatively low significance attached with VAS indicates that the prime focus of consumer of VoIP service is the basic call functionality. Therefore, service provides should focus on improving QoS of their basic VoIP service and refrain from excessive investment on developing VAS that could reduce saving in monthly call charges, the second most important attribute of VoIP service.



TABLE 2: RESULTS OF CONJOINT ANALYSIS

Attributes	Level	Utility Estimates	Sig.
Consumer device cost	Free with 3-year contract	2.081	58.50
	PKR 6000	0.0713	
	PKR 9000	-2.513	
Savings in monthly call charges	PKR 600	-0.0701	21.44
	PKR 800	-0.1024	
	PKR 1000	0.8143	
Number portability	Available	0.5441	16.56
	Not available	-0.5432	
Value-added services	Provided	0.2913	8.74
	Not provided	-0.2814	

5. CONCLUSION

This study attempted to analyze Pakistani household consumer's preference of VoIP service. It was found that consumers regard VoIP device cost and monthly call charges as the most important attribute when deciding to use VoIP. Therefore, service providers should come up with strategy to provide an acceptable consumer device cost with good QoS of basic call functionality of VoIP service.

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