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A Study of Factors affecting users preference towards adoption of 3G Telecom Services

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Abstract

The Indian telecom sector has recorded astounding growth over the past few years and this growth is expected to continue in near future which currently hovers at around 30-35 percent. Healthy growth in data volumes – spurred by increasing adoption of 3G services – will lift revenue growth to 14-16% in 2015-16 as per CRISIL Research estimates. Therefore, it's indicating to the immense potential of Indian mobile market for future growth. The important telecom market players in the country include: Mahanagar Telephone Nigam Ltd., Bharat Sanchar Nigam Ltd., Bharti Airtel Ltd., Reliance Communication Ltd., Vodafone Essar Ltd., etc. This study was conducted to identify the factors preferred by the users for the adoption of 3G services. For the study, primary data was collected from 140 respondents of 3G users of Indore city and self-design tool was prepared for data collection. The data was analyzed using factor analysis and five factors namely cost effective, convenience, customer satisfaction, network status and variety were identified in the study.

Keywords**:** *3G Services, Telecom Sector, Adoption.*

Introduction

Telecom services have increasingly been considered as the prime movers of the economy. The telecom sector in India has registered phenomenal growth rates in the past decade is undisputed. In statistical terms, overall tele-density (number of telephone connections per hundred people) that stood at 1.56% in March 1997 increased to 76.55% by November 2014. The telecom growth experience in India is essentially the story of mobile telecom services. As of now, growth in telecom services is heavily skewed towards urban areas; but telecom services are sparse in rural areas. Statistics indicate that while the urban tele-density stood at 72.47, the rural tele-density was just 12.72 at the end of September 2008. It has been well understood that telecom services play an important role in the development of rural and far-flung areas. Therefore, the development of telecommunications in rural areas on an equal footing with urban areas has become an important policy issue (Rao, 2009).

The advent of mobile telephony in India liberated the Indian soul. The first phase of the mobile revolution in India, i.e. the 2G / 2.5G mobile services allowed Indians to do what they love doing most – talk. Several initiatives by the government and the private sector improved the affordability of mobile services for a large section of the population. At the crossroads of its evolution, the Indian telecom sector is now poised to leap into its next phase of growth. If the phase-1 was voice, then phase-2 undoubtedly belongs to data (Taskar, 2011). In 1980s first-generation (1G) wireless telephone technology i.e. cell phones was introduced. These analog cell phone standards continued until being replaced by second generation (2G) digital cell phones.

2G networks (GSM, CDMA One, DAMPS) are the first digital cellular systems launched early 1990s. 2G services are frequently referred as personal communications service. 2G

technologies can be divided into TDMA-based and CDMA-based standards depending on the type of multiplexing used. The main difference between two succeeding mobile telephone systems, 1G and 2G, is that the radio signals that 1G networks use are analog, while 2G networks are digital. Both systems use digital signaling to connect the radio towers to the rest of the telephone system. But the call itself is encoded to digital signals in 2G whereas 1G is only modulated to higher frequency (Krishna and Ahmed).

Third Generation mobile telephone networks are the latest stage in the development of wireless communications technology. 3G stand for the third generation of wireless communication technologies, which support broadband, voice, data and multi-media communications over wireless networks. 3G combines a mobile phone, laptop PC and TV features include, phone calls/fax, global roaming, send/receive large email messages, high-speed web navigation/maps, videoconferencing, TV streaming, electronic agenda meeting, reminder, etc. 3G services are expected to drive the next phase of growth in the wireless segment with enhanced focus on providing data services and which use a host of high-tech infrastructure networks, handsets, base stations, switches and other equipment to allow mobiles to offer high-speed Internet access, data, video and CD quality music services (Kathirvel).

3G mobile technologies are the momentous capacity and broadband capabilities to support greater numbers of voice and data customers - especially in urban centers - plus higher data rates at lower incremental cost than 2G. 3G uses 05 MHz channel carrier width to deliver significantly higher data rates and increased capacity compared with 2G networks. The 05 MHz channel carrier provides optimum use of radio resources for operators who have been granted large, contiguous blocks of spectrum. On the other hand, it also helps to reduce the cost to 3G networks while being capable of providing extremely high speed data transmission to users. It also allows the transmission of 384kbps for mobile systems and 2mbps for stationary systems. 3G users are expected to have greater capacity and improved spectrum efficiency, which will allow them to access global roaming between different 3G networking. The main characteristics of 3G are to provide mobile multimedia services at transmission rate of 144kbps at the high speed 384kbps to the speed of walking 2mbps indoors.

3G represents the convergence of various 2G wireless telecommunications systems into a single global system that includes both terrestrial and satellite components. One of the most important aspects of 3G wireless technology is its ability to unify existing cellular standards, 3G combines high-speed mobile access with internet protocol based services, which will enable new ways to communicate, access information, conduct business and learn (Krishna and Ahmed). Telecommunications service providers and network operators are embracing the recently adopted global third generation (3G) wireless standards in order to address emerging users' demands and to provide new services. In addition, heavy demand for remote access to personalized data is fueling development of applications, such as wireless application protocol and multimedia management, to complement the 3G protocols. Complementary standards, such as bluetooth, will enable interoperability between a mobile terminal and other electronic devices, such as a laptop/desktop and peripherals, providing added convenience to the consumer and allowing for the synchronization and uploading of information at all times.

Through the 3G network, the user can access up to a speed of 3mbps transfer speed, which was available on the 2G @ 144kbps. The advantage of 3mbps speed is that one can download MP3 songs of the durations of 15 seconds to 3 minutes whereas the 2G's 144kbps took eight minutes for similar actions. The advantages of 3G on phones include users can access internet on a higher speed and play online games without buffering on U-tubes along with watching videos clips, options of quick music downloading, PDF files with attachments, easy option of video calls from one network to another 3G enabled network and enjoyed live TV telecasts. Apart from these, through the fast data transfer, information could be fetched regarding nearby

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ATMs, Malls, or shopping centre, and easy settings of network options of 3G supports the dual mode whereas GPRS supports GSM.

Review of Literature

Rogers (1995) tries to explain the observed adoption behavior using characteristics of the technology being introduced. He also describes the diffusion process as consisting of four elements; an innovation or new technology, a social system, the communication channels of the social system, and time. Of these elements, he focused on the innovation, the social system and the communication channels when explaining the observed adoption behavior. Townsend (2000) domestication studies of mobile end-user service adoption focus on studying service use and the consequences of use. However, domestication studies are not limited to studies of individuals or aggregates, but are found describing both the adoption and usage patterns of groups in society.

Shelly et al. (2007) study was restricted to wireless handheld devices such as PDAs and it was conducted for Medical care systems in two countries differing significantly in the areas of payment options, standards and government regulations. The recent studies in healthcare have indicated that traditionally identified factors 'perceived ease of use' and 'perceived usefulness' for technology adoption were not always reliable on their own and other issues may contribute to technology adoption. To establish the identity of these, this study investigated human psychological factors using interviews, and enumerated these factors using a quantitative study.

The study of ACMA (2008) found that despite many respondents having a 3G phone with internet capabilities, information from focus groups indicated consumers are not fully aware of the range of usage possibilities and therefore do not use the phone for anything other than voice calls. However, a quarter of survey respondents who do not currently have a 3G phone would seriously consider buying a 3G service in the future. Age has an impact on the intention to purchase a 3G service as identified from the literature.

Objective

Looking to the potential of deployment of 3G services in India, the objective of the study is as follows:

To explore factors preferred by users for adoption of 3G services.

Methodology

The Study: The study was exploratory in nature conducted to identify factors which were considered by users for adoption of 3G services.

The Sample: The sample size of the study was comprised of 140 respondents of Indore city selected using convenience sampling among users of 3G services. The profile of the respondents of 3G users was given in Chart 1 below:

Chart 1: Profile of the Respondents of 3G Users in Indore

	Category	Number of Users	Percent
Gender	Male	115	82.14
	Female	25	17.86
Age (in years)	16-25 years	68	48.57
	26-35 years	66	47.15
	36-45 years	06	4.28
	46-55 years	00	00
Income (monthly and in rupees)	Less than 5000	60	42.86
	5001-15000	22	15.71
	15001-30000	43	30.71
	More than 30000	15	10.72
Education	a) Graduate	83	59.29
	b) Post Graduate	53	37.86
	c) Any other (12^{th} and diploma)	4	2.86

Occupation	Students	49	35.00
	Service	50	35.72
	Business	29	20.71
	Unemployed	12	8.57
User of 3G service providers	BSNL	18	12.86
	Airtel	60	42.86
	Tata	29	20.71
	Reliance	21	15.00
	Vodaphone	12	8.57

Tools for Data Collection: To collect primary data for the study from the 3G services users, a self-designed survey form was prepared. The data collection process of the study has been carried out between January-April 2012. The tool classified in three parts i.e. Part-A, Part-B and Part-C. Part-A included personal information of the 3G services users i.e. name, gender, age, income, education and occupation, whereas in Part–B information criteria's asked from the respondents were: 3G service providers and response of usage of 3G services like video calls, email, high speed internet access, music downloading and video streaming. Part-C included 23 items, which were preferred by the users for the adoption of 3G services and the response was measured on five point Likert Scale in which '5' stood for strongly agree and '1' for strongly disagree for each item. The tool was prepared in such a way that respondents were able to express their opinions freely and frankly.

The Tools for Data Analysis: The collected data was analyzed using statistical package for social science version 18.0 to explore the factors. First item-total-correlations were calculated at level of significance value (0.194) at five percent for all the items to identify those which contributed significantly towards the adoption of 3G services. Out of all the 23 items, one item was dropped i.e. 'Use of 3G is expensive' and the remaining 22 items were significantly contributed. The Principal Component method of factor analysis was applied using varimax rotation.

Results and Discussion

Figure-1 below showing that among 3G services very frequently and most preferred service was Internet access (57.14%) as compared to E-mail (30%) and music downloading (28.57%), whereas rarely preferred services were video calling (52.85) and video streaming (48.57%). Usage preference for 3G services are given in Table 1 (see Annexure).

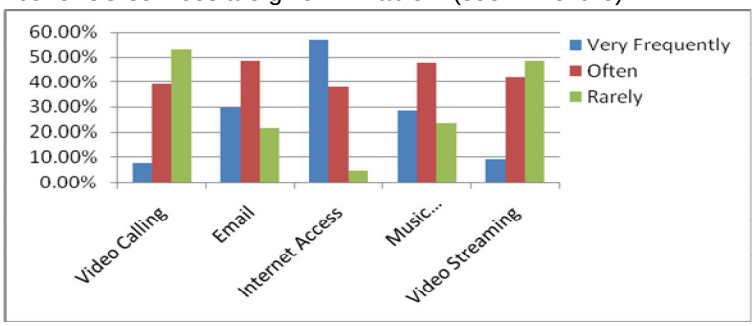

Figure 1: Usage of 3G Services among Users

As the result of factor analysis applied on 22 significant items, five factors were identified that affect users towards adoption of 3G services. These factors are cost effectiveness, convenience, customer satisfaction, network status and variety (see Table 2 in Annexure). Factor first is Cost Effectiveness. This factor emerged out with maximum factor load of 3.765. It was comprised of six items i.e. 3G data plans affordable (with 0.810 load), price of 3G technology is good deal (0.673), 3G services add to convenience (0.641), easy to use (0.614),

to purchase new mobile phone 3G is first choice (0.593), 3G services provided are more than expectations (0.434). This factor had 15.720 percent of variance.

Factor second is Convenience. This factor had 3.565 of factor load and 14.335 percent of variance. This factor was constituted of six items i.e. 3G provides high speed data transfer facility which save time (with 0.772 load), 3G save efforts to meet people (0.737), 3G services minimize hassle in day-to-day life (0.545), 3G service providers provide promised services (0.542), service help to expand social network (0.496), 3G service provider gives wide range of 3G data plan (0.473).

Factor third is Customer Satisfaction - This factor had 3.305 factor load and 13.713 percent of variance. This factor was comprised of five items with the item load i.e. satisfied with customer support services of 3G service provider (0.750), prompt service of 3G service provider (0.728), 3G provides connectivity with others (0.630), 3G technology delivers good value (0.616) and service providers provide trained employee for customer support (0.581).

Factor forth is Network Status. This factor comprised of three items with the factor load of 2.184 and 12.596 percent of variance. In this factor items were, 3G services gives feeling high-tech life style (with 0.747 load), provides entertainment facility (0.726), use of 3G preferred due to most of the circle shifted on 3G (0.711).

Factor fifth is Variety. This factor emerged out with factor load of 1.304 and 7.237 percent of variance. It was comprised of two items with the item load i.e. variety of services offered by 3G is significantly larger as compared to non-3G (with 0.834 load) and provides wide variety of services (0.470).

In this study users gave highest preference to the cost effectiveness factor, therefore mobile service providers are suggest to provide affordable data plans of 3G services. The second factor convenience indicated that users saves their time due to high speed data transfer facility of 3G services and saves efforts to meeting people using video calling facility. Third factor customer satisfaction was also indicated that users were satisfied with customer support services and prompt services of their 3G service providers, whereas in fourth factor titled network status indicted that due usage of 3G services users feel high-tech life style with the entertainment facility and most of the their circle was shifted on 3G. As compared to remaining four factors, in fifth factor named variety, highest preference was given to the feature of 3G services i.e. it provides significantly larger variety of services as compared to non-3G services.

Kathirvel conducted a study between December 2010 and February 2011 on 200 customers to there is association between family size and level of satisfaction with 3G services and between education and factors made to avail 3G connection. Jee, Jindal and Shah (2011) study focused on both supply and demand side factors of 3G implementation which are likely to impact the performance. The strategy adopted is to study 3G implementation in various countries and draw a comparative sketch followed by a study of the consumer purchasing behavior and identified the most critical factors for success of 3G technology in India.

Mahler and Rogers (2000) suggested that the difference in the adoption processes of mobile and fixed telephony maybe explained by differences in network effects (externalities) between the two technologies. Both types of comparative and explanatory diffusion research may also be highly relevant when trying to generalize diffusion models from simple mobile end-user services to 3G services. Prior research suggested that external variables like convenience, self efficacy, quality of services, variety of services, perceived value and price are significant factors in the adoption of a technology (Auger and Gallaugher 1997; Bradanch and Eccles 1989; Davis et al. 1989; Davis et al. 1992; Venkatesh et al. 2003).

Conclusion

Third generation telecom service provides much higher rates of data, voice and video transfer as compared to the 2G telecom system. In order to succeed in the 3G market space, it would be

useful for the service providers to understand the factors considered by potential customers for subscribing to the same. The present study was focused on the users preference for adoption of 3G services and primary data based findings indicated that five factors were considered by the user i.e. cost effectiveness, convenience, customer satisfaction, network status and variety. Usage of preferred 3G services was email, video calling, Internet access, music downloading and video streaming respectively. The study also stated that most of users were from younger generation and preferred to private 3G mobile service providers. As 3G adoption accelerates; the 3G operators, handset manufacturers, infrastructure equipment makers, and 3G application providers will stand to gain. Also, increasing penetration of 3G services will see the convergence in the field of telecommunications, mobile entertainment, software, and data services. 3G services also carry the hopes for improving the Internet penetration in India, which contributes to the country's GDP. The present study having time and cost constraints, thus confined to Indore city only. Therefore the results will vary according to the opinions of individuals residing in different cities of India.

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Annexure

Table 1: Usage preference for 3G services

3G Services	Very Frequently	Often	Rarely
Video Calling	7.85%	39.29%	52.86%
Email	30.00%	48.57%	21.43%
Internet Access	57.14%	37.86%	5.00%
Music Downloading	28.57%	47.86%	23.57%
Video Streaming	9.29%	42.14%	48.57%

Table 2: Five Factors Affecting Adoption of 3G Services with Item Load, Factor Load and Percent of Variance

Variable	Items	Item Load	Factor Load	%Variance
	Factor 1 : Cost Effectiveness			
VAR00012	3G data plans are affordable for me.	0.810	3.765	15.720
VAR00011	Prices which I pay to get 3G technology is a good deal.	0.673		
VAR00006	Use of 3G services add to my convenience.	0.641		
VAR00017	3G services are easy to use.	0.614		
VAR00016	If I need to purchase a new mobile phone, 3G mobile phone is my first choice.	0.593		
VAR00015	Number of services provided by 3G is more than my expectations.	0.434		
	Factor 2 : Convenience			
VAR00004	3G provides high speed data transfer facility which save my time.	0.772	3.565	14.335
VAR00003	3G saves my efforts of meeting people when I can see them on the 3G phone.	0.737		
VAR00005	3G services minimize hassle in my day-to-day life.	0.545		
VAR00008	3G service provider provides services as promised.	0.542		
VAR00002	3G services help me to expand social network.	0.496		
VAR00014	Service provider gives me a wide range of 3G data plan.	0.473		
	Factor 3 : Customer Satisfaction			
VAR00022	Satisfied with Customer support services of my 3G service provider.	0.750	3.305	13.713
VAR00009	3G service provider provides prompt service to users.	0.728		
VAR00021	3G provides sophisticated connectivity with other users.	0.630		
VAR00013	Using 3G technology delivers good value.	0.616		

VAR00010	Employees of 3G service provider are well trained to handle customer problems.	0.581		
	Factor 4 : Network Status			
VAR00018	3G gives feeling of high-tech life style.	0.747	2.184	12.596
VAR00020	3G provides me entertainment facility.	0.726		
VAR00019	Use of 3G preferred due to my most of the circle has shift on 3G.	0.711		
	Factor 5 : Variety			
VAR00007	Compared to non-3G services, the variety of services offered by 3G is significantly larger.	0.834	1.304	7.237
VAR00001	3G provides a wide variety of services.	0.470		

Table 3: Factor with Factor Load and Variance

Factor	Factor Name	Factor Load	% of variance
Factor-1	Cost Effective	3.765	15.720
Factor-2	Convenience	3.565	14.335
Factor-3	Customer Satisfaction	3.305	13.713
Factor-4	Network Status	2.184	12.596
Factor-5	Variety	1.304	7.237