An Investigation of 3G Mobile Services Acceptance in Jammu & Kashmir

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Abstract— **This paper aims to find out the key factors influencing mobile users to adopt 3Gtechnology and affecting the subscriber's feedback while using third generation (3G) mobile services that are available for one year in J&K. An interesting fact that motivated this research was the significant low rate of 3G service usage among mobile operators in J&K though we get the completely opposite picture worldwide. To examine the user acceptance and to depict user behavioral pattern, data were collected from 200 respondents through a survey. The analysis was done into two categories: one was in general and the other one was department based. The results of the study revealed the user intention, awareness, attitude, expectation, key 3G service usage etc. The findings have future implications for existing as well as newly arrived service providers who have very recently started their journey. Considering these identified factors would provide the directions for telecom operators to achieve high rate of 3G service adoption and to provide more successful 3Gservices.However, the study covered a limited area where those findings are applicable. The result of this study might be helpful for the telecom operators while targeting the 3G subscriber market and also for the future research on this field.**

Index Terms— **Awareness; Adoption; 3G mobile service; usage pattern3G, User Acceptance.**

I. INTRODUCTION

3G was a long awaited thing that created high expectations among the mobile operators before its arrival in J&K. There has been a steady growth in worldwide 3G mobile adoption. To shine with the 3G growing world, J&K had started its journey of 3G on 14 June, 2011 by Bharti Airtel, the government-owned telecom operator. The 3G Service which is something very new for the people of Jammu and Kashmir, is expected to be very useful for them and so is expected to be availed by masses. By launching this service in J&K, Airtel has taken a right step to gain some more market share. in the state. About a year later, Reliance,Aircel,BSNL ,Vodafone and Idea started these services .Despite the availability of 3G services, basic mobile services are still the most popular services. BSNL became the fourth service provider to launch 3G in Jammu and Kashmir.

The development of mobile services – or mobile commerce or mobile Internet – has been intense for years but adoption has not progressed as expected [13]. Many studies have investigated the user acceptance and success factor of mobile

services in general, and 3G in particular [1]. Research on 3G technology acceptance in J&K will therefore be extremely worthy in providing useful information, especially at this early stage of 3G mobile internet development and implementation in this country. So far, no such research has been done on this area. Hence, the purpose of this study is to examine factors affecting subscribers' acceptance towards using 3G mobile service. From this study, the mobile service providers could use the findings to understand user demand and behavior.

II. LITERATURE REVIEW

Recently 3G services are tremendously developing. This section reviews literature related to current usage, customer behavior, customer segmentation, acceptance and features that affect usage in various countries, although some authors have presented their interpretations regarding the future of 3G and its prospective.3G services were first adopted in Japan in 2001. Deepti and Ajay present the patterns, awareness and adoption of 3g users among young generations in Botswana [1]. Research conducted in Malaysia by suki [2], suggests that, to adopt 3G mobile services,the 3G mobile telecommunication companies need to lift consumer's intention.

User's of 3G mobile services need to be offered with more diverse and entertaining ways of communicating, which are at the same time easily accessible and convenient to use. Kim [3] recognize various services of 3G like video calling, on line TV, global roaming and advance services via the mobile multimedia Internet for magnetizing mobile phone subscribers. Pagani [7] focused the reasons of adoption 3G and ranked "Price" as third after "usefulness" and "ease of use",

According to Greek market perspective, about the charges of 3G, Indrawati, S. Murugesan, and M. A Raman Chatziagapis [8] infer that mobile services may pledge revenue growth for the operators, but the features of usefulness, security and especially the price of the mobile services have to be considered seriously in order for future adoption. Pagani [7], Indrawati et al [8] have also found price as a determinant factor for 3G mobile services adoption.

Moreover, modern services are enhances by using 3G services. Like smart home, wireless intelligence video system. [5], [6].

Several facilities have been provided by 3G users. It allows simultaneous use of speech and data services [4]. The main services of 3G like high speed data transmission, entertainment and e-payment are interrupted due to lack of infrastructure in Japan, developing countries in Asia, Africa or even some parts of US. High subscription charges, earnings affordability, mobile network coverage and

telecommunication transportation to maintain all these activities classified with regard to findings is difficult for developing or even some developed countries in the world [9]. Li-Chen Cheng, Li-Min Sun, [10] proposed some diverse varieties of brand new application services to attract the new 3G subscribers. Despite of various benefits provided by the 3G services, it has not received great adoption rate as expected.

Margheaita [11] sketches a model of consumer adoption of third generation mobile multimedia services, by a qualitative exploratory study and empirically test the proposed model on the Italian market. Moreover Ong [12] investigates the factors affecting the purpose to adopt 3G services among the university students in Malaysia as they expected to be the group with great potential to adopt 3Gservices.

III. METHODOLOGY

In this paper we have focused on the grounds, demands of young generation who are actually concerned on new technology like 3G. Our work suggests that there is great deal of research on adoption of mobile phones and mobile related services. This study intended at reviewing the a wareness and usage of new 3G mobile services like high speed internet [14], mobile device features and services [15], like video calling, online TV, etc., usage of mobile applications [8, and 16] and usages of mobile data services [17].

Also emphasis on behavioral intention to use [13], and approach towards3G mobile services in J&K. A large scale of subscribers have adopted some basic mobile services such as SMS, ring tones, icons, wall papers, logos, caller tunes[18] and these services became their everyday's life styles.

Adoption patterns, present situation, problems and requirements of the 3G subscriber's have been tried to discuss in this paper and have sketched the overall scenario by reviewing the responses of the 3G usages.

IV. DATA COLLECTION AND ANALYSIS

In total, 200 students of Faculty of Science and IT from first to fourth year of the graduation participated in this study, by completing the questionnaire. The age range was from 20 to 25 years. Each of the participants was 3G user having a 3G supported cell phone. Since for providing 3Gtechnology, there was only one available telecom operator during the time of concerned research, each respondent was a subscriber of that operator.

There were two aspects of the research work. One part of focus was the general data analysis where the concerned area was the whole user domain. The other aspect was department wise analysis where each department was individually taken as area of interest and data were organized according to the departments. Through questionnaires and the statistically analysis has been by using SPSS.

A. General data analysis

70% users used mobile internet before adopting 3G while 30% users started using mobile internet with 3G.

Based on the use of internet connection, two categories of 3G users found. **Category-1** users have both internet connection at home and 3G connection (65%) and **Category-2** (35%) users do not have other internet connection that is only 3G users. Among **Category-1** users, 38.5% do browsing, 76.9% do uploading and 92.3% do downloading (Fig:1).
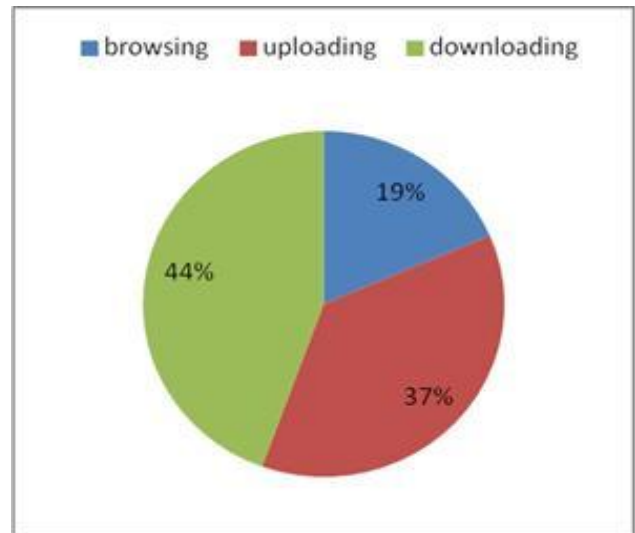

Fig. 1. Using different services at home by using 3g connection.

Among the reasons behind adopting 3G, 95% users use 3G for better services, 45% respondents use 3G influenced by their friends and the rest 25% had other reasons. Of all 3G services, the most used service was *speed of data transfer(89.5%)*, followed by *gaming application(78.9%)*, then *video calling(36.8%)*and lastly *mobile TV*(31.6%). For barriers, *poor network coverage* came out as the main problem (100%) of using 3G.*High rate of charging* rated as second (90%) followed by *insufficient service provider* (50%) and *lack of high speed* (35%).Another point was user expectations or desired facilities of 3G. Most desired service was *strong network coverage* (100%), followed by *low charge rate*(95%) and *high speed*(50%).

B. Department-wise analysis:

Four departments were considered for analysis: Computer Science and Engineering (CSE), Electrical and Electronic Engineering (EEE), Textile Engineering (TE) and Software Engineering (SWE. The scenarios of department wise 3G users were: CSE-40%, TE-30%, EEE-15% and SWE-15%.Onthe point of use of mobile internet before 3G, department wise user behavior had been recognized. The results were: For CSE department, 42.9% had used, 33.3% had not used. For TE department, 21.4% had used, 50% had not SWE and TE. The scenarios of department wise 3G users used. For EEE, used-14.3%,not used-16.7%. For SWE, 21.4%hadused. Then we figured out department wise most frequently used services(Table 3,4). Table 3 shows most frequently used services of individual departments. For CSE department, the highest used service was both speed of data transfer(75%) and gaming application(75%). For all the three departments of TE, EEE and SWE, speed of data trans ferranked as the top most used service.

TABLE I. DEPARTMENT-WISE MOST FREQUENTLY USED SERVICES ON 3G

Department	Most used Services	Response %
CSE	Speed of data transfer	75
	Mobile TV	12.5
	Video calling	25
	Gaming application	75
	Speed of data transfer	100

Department	Most used Services	Response %
TE	Mobile TV	50
	Video calling	50
	Gaming application	83.3
EEE	Speed of data transfer	100
	Mobile TV	33.3
	Video calling	33.3
	Gaming application	100
SWE	Speed of data transfer	100
	Mobile TV	50
	Video calling	50
	Gaming application	50

TABLE II.   DEPARTMENT-WISE PROBLEMS ENCOUNTERED BY THE

USERS

Department	Most used Services	Response %
CSE	High charging rate	87.5
	Poor network coverage	100
	Lack of high speed	50
	Insufficient service provider	75
TE	High charging rate	83.3
	Poor network coverage	100
	Lack of high speed	33.3
	Insufficient service provider	33.3
EEE	High charging rate	100
	Poor network coverage	100
	Lack of high speed	33.3
	Insufficient service provider	33.3
SWE	High charging rate	100
	Poor network coverage	100
	Insufficient service provider	33.3

V. FINDINGS AND DISCUSSION

From the empirical analysis, we have found some interesting results leading to informative facts.

Though many people in J&K have heard about 3G from media and other sources, the total number of 3G users is very poor. The structured and unstructured interviews with 3G nonusers revealed the reasons. One main factor for this is the insufficiency of service provider since at first only one telecom operator was permitted for providing 3G services. Another strong reason is; the short time period for 3G service availability. Therefore, it is understandable that as like as the arrival of any new technology, the rate of 3G adoption that is the number of subscribers may increase with time.

In the case of adopting 3G, variations in user background showed different outcomes. The rate of 3G adoption is quite high for those who previously used mobile internet comparing to the non users. While digging for reason, it came out that upgrading to higher standards or versions happens naturally for an existing system user. On the contrary, this is not the case for a fresher as it demands to deal with a completely new thing.

Another observation of user behavioral analysis is that the users who were using other internet connection along with 3G had chosen 'downloading' as their most prioritized activity compared to others. Now the question arises that why those users are keeping additional internet connection when they can use 3G.Price is an issue here. Users have to pay more for unlimited data volume in 3G where there are more options in cheaper rate.

3G provides many attractive and additional features like as video calling, mobile TV and of course, better services than the existing system e.g. high speed internet. All these things allure users to subscribe to 3G. The users of 3G voted high speed data transfer as their most used service. Poor network coverage was the biggest barrier that interrupts the enjoyment of using 3G services at great extent. Therefore, it is no wonder that the most desired service of 3G subscribers is the strong network coverage.

VI. USER ACCEPTANCE

Before discussing the applications and services related to 3G networks, it is important to consider user acceptance of 3G services and to classify different user needs.Generally speaking, in designing 3G applications and planning profitable business models, the end-users' needs and wants should be in the hot spot (e.g., Fenton et al., 2001;Gerstheimer & Lupp, 2004). The main challenge when exploring user needs and wants lies in the intersection of unknown future customers' needs and wants and new technology that is not even available for many users. Therefore, it is suggested that service developers can only meet the needs and wants with a profound understanding of the mobile communication system, ranging from voice-centric services to multimedia-centric services (Gerstheimer & Lupp, 2004). Furthermore, their study suggests that an interpretative-creative approach should be used when designing 3G services rather than taking linear or analytic problem solving approaches. Therefore designers should examine users' needs and requirements, with concrete reference to situation-oriented and social-spatial contexts; concentrating on open parameters like 'user', 'place', 'process',and 'time' (Figge, 2004; Gerstheimer & Lupp, 2004).

To get the big picture, it is essential to understand the different situations in which consumers and business users use mobile services. First, we can distinguish the different types of presence people typically have. Presence can be broadly defined as reachability,availability, and willingness to communicate with other users. Presence is one of the central factors in designing mobile services (Camarillo & Garcia-Martin, 2004: 303).Presence data includes information about whether users are online or not, if they are idle or busy, and various other information users have given to the presence service such as information about their communication means and capabilities concerning their mobile terminals, for example. At a basic level, presence information can be

classified to at home, at work and mobile (on the move) (Dholakia & Dholakia, 2004). To begin with, at home users are typically connected with at least two types of networks.

At work, users typically also have fixed Internet access that is used to access many informative services related to work. However, more people are relying on mobile terminals to manage their daily activities. With the diffusion of smart phones, computers and mobile terminals are more and more used in combination. As smart phones can be synchronized with laptops and table computers, followed by their ability to send and receive e-mails and use of other company related services, the line between different terminals is faded.

The third option, mobile, means that the services users can access are limited due to network constraints. On the go users mainly rely on mobile networks that to date offer limited data transmission speeds, although the rise of the 3G network and Wireless Local Area networks (WLAN) provide faster data transmission. The most important development in relation to mobile users and the services they need relate to the networks' ability to provide the same services globally. As mobile users are increasingly traveling worldwide, it is important to develop networks and services that can be accessed with one mobile terminal. This has been mentioned as one of the main challenges mobile network development will face in the coming years (e.g., Birchler et al., 2003). In conclusion,mobile data services undoubtedly have the most value for users on the go, or for users who are not currently able to access the services the Internet provides via other means such as fixed Internet connection (LAN) or wireless local area network (WLAN).

VII. LIMITATIONS AND FUTURE SCOPE

Our study has some limitations. All the respondents were all most same age group and came from almost same background, which is one of the limitations. The study is based on a limited number of respondents which is a limitation. To interpret the behaviors of all mobile phone users, the result cannot be generalized. Despite these limitations, however, this study provides insights into the adoption behavior of 3G services. For future analysis, bigger sampling data would be considered. Comparison based study could be conducted on the pattern changes in 3G service usage in time. Also, uses of high technology based on 3G like smart home, could be perform in future study.

VIII. CONCLUSION

In our research paper, we have sketched the adoption scenario of a new technology called 3G. The penetration of the usage and adoption of 3G mobile services has been done in this research. The recent addition of four new telecom operators in 3G market of J&K has created the competitive and challenging field in service providing. This phenomenon demands to adopt the correct marketing strategy and business model to catch on the potential customers. In this perspective, the findings of this study provide the directions. The service providers should concentrate on minimizing the negative factors at highest possible rate like poor network coverage that badly affect the user. Exploitation of cost and providing high speed constantly are some key demands that needed to be addressed. Today, the majority of mobile

services used via 3G networks are already available in current 2,5G networks (GPRS, EDGE) such as browsing the Web, sending and receiving multimedia messages (like pictures and video), and e-mailing. Therefore, 3G should not be viewed as a new technology surpassing the existing 2,5G networks, or a revolution in mobile communication. Instead, 3G should be considered to be evolution of existing mobile communications (Harmer, 2003). In the light of the discussion in this paper, there is strong evidence to suggest that the main outcome of
using 3G networks and services will be to get access to the same services with faster data connection speed. Furthermore,it seems that the success of 3G lies in its ability to serve not only mobile users but in providing access to the Internet with data cards inserted in laptops. Thus, 3G networks
will serve the same purpose as LAN and WLAN networks.

In terms of business opportunities, telecommunication companies' main source of income is still coming from voice-centric services. For example, the mobile operator Hutchinson, offering services purely in 3G networks, announced this autumn 2004 that its main source of income comes from discount packets that offer free speech time in 3G networks. Moreover, as long as the price of the network time is high in 3G, operators cannot wait fast diffusion of data centric mobile services.The findings presented should be interpreted in the light of certain limitations. The results are based on existing material found from various sources and thus concern the development of 3G globally.

Future studies should concentrate on country specific research to provide a more detailed understanding of the phenomenon at hand. Another limitation concerns the framework developed. Willingness to use 3G services is definitely dependent on various other factors beyond the framework presented, which could not all be addressed within this study. On this basis, future research that identifies additional factors or views the factors presented in different light would contribute to the understanding of 3G acceptance. Thus, a natural extension of this study is the collection of primary data about the use and acceptance of 3G services in both consumer and business markets.

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