

3G/ 4G Telecom Technology; User Acceptance Among Educated Youth of Pakistan

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Abstract-State of the art telecom technologies i.e. 3rd Generation/ 4th Generation (3G/ 4G) have been launched in Pakistan since 23rd April, 2014. Pakistan is one of the late adopters of these technologies. Research is needed to explore various factors influencing user acceptance of these technologies. This study makes use of a popular leading model i.e. Technology Acceptance Model (TAM) and validates it in the scenario of Pakistan. This research predicts user acceptance for 3G/ 4G mobile services and behavioral intention associated with it among educated youth in Pakistan (Islamabad/ Rawalpindi/ Wah regions due to richness of educational opportunities for youth.) not only because youth forms major portion of users of these services in Pakistan but also service providers have focused to attract educated youth through their advertising campaigns

Young generation in Pakistan uses telecom devices much more than any other age group as 77% of users lie in 21-30 age bracket, while 12% in 31-40, 9% in 10-20 and 1% in 41 and above aged people. Accordingly, young generation in Pakistan is the focus of mobile telecom operators with regards to customer base, hence the main focus of this study is also the educated youth. The research explores and analyses usage of 3G/ 4G services by educated youth to establish whether Perceived Ease of Use and Perceived Usefulness which are the key constructs of TAM are useful in predicting Behavioral Intention among educated youth for 3G/4G services?

Survey strategy is employed in this research by taking into account simple random sampling. A structured questionnaire has been adopted for this study with due concentrations for reliability and validity. Through statistical analysis, it was found that perceived usefulness and perceived ease of use have a positive direct relationship with Behavioral Intention to use 3G/ 4G technology. The research will be helpful for telecom service providers in Pakistan to contrive strategies for increasing the adoption trend of 3G/4G technologies.

Keywords-3G, 4G, User Acceptance, Perceived Usefulness, Perceived Ease of Use, Behavioral Intention, Technology Acceptance Model.

I. INTRODUCTION

3G/ 4G are generic names for description in advancement of mobile communication in terms of “generations” [i]. It can also be regarded as the advanced and latest infrastructure networks, telephones and other similar technologies to equip mobile consumers' with fast speed Internet, video calls, messaging and streaming services. These applications are recently made possible in Pakistan with increased data rates due to the 2-8MBPS bandwidth availabilities [ii].

The Technology Acceptance Model (TAM) is a highly recognized model which has been used by many researchers in their work. This model is based on different relationships given by the Theory of Reasoned Action (TRA) [iii]. TAM is the most widely used model for forecasting and clarifying user behavior on their attitudes and intentions. The TAM is used for determining user acceptability of various kinds of technologies e.g. TAM is also used to determine user acceptability of 3G services in Botswana, Taiwan, China and many other countries. The technology acceptance model is the best suitable model for understanding Behavioral Intention and showing the acceptance of 3G/4G mobile service.

Various researches have been seen such as: in Taiwan, Botswana and China, where user acceptance trend for 3G services was analyzed using TAM and its core constructs were found to be significant predictors of Behavioral Intention. As results can vary from one country to another, TAM model will be validated in this research paper considering the scenario of intention to use 3G/ 4G services in Pakistan (Islamabad/ Rawalpindi/ Wah). 3G/ 4G services have recently been launched in Pakistan in April 2014 and it is one of the late adopters of these technologies. This research aims to predict the Behavioral Intentions for 3G/ 4G technology among educated young generation as they possess the highest ratio of latest mobile telecom services usage. This research paper focuses on identifying the factors which influence user adoption of 3G/4G services among educated youth of Pakistan.

II. RATIONALE & SIGNIFICANCE

Acceptance of any technology in a society is an important factor which should be considered in detail to check the success of any technology [iv]. 3G/ 4G services are recently launched in Pakistan and are of utmost importance for the development of telecommunication sector. To make these services successful in Pakistan, we need to study in detail and learn how these services are contributing towards the betterment of our society and how are people responding towards them. A lot of research has been done in different countries to understand behavioral intention of 3G/ 4G technologies and it needed to be conducted in Pakistan as well because the results obtained for one country cannot be considered for another one due to different cultural and moral values.

The total number of mobile phone owners in Pakistan are 136.4 million in January, 2015 [v]. According to ITU, there are 20 million internet users in Pakistan and 50% of them access internet through their mobile devices. Mobile operators face a huge problem as the majority of smartphone users use Wi-Fi to access internet, 25% only access the internet while on the go and 12% don't use internet. Young generation of Pakistan uses cell phone much more than any other age group as 77% of cell phone users lie in 21-30 age bracket, while 12% in 31 to 40, 9% in 10-20 and 1% in 41 above aged people [vi]. Therefore the main focus of this research paper is also on the educated youth of Pakistan with the most cell usage.

This research paper will help us identify various factors which are influencing acceptance of this technology among educated young generation thus affecting users' Behavioral Intention. This research will pave way for the speedy adoption of 3G/ 4G services which will contribute towards progress of Pakistan. The factors affecting the 3G/ 4G adoption can be handled by mobile telecom service providers to successfully implement them by devising a strategic plan. Rapid adoption of 3G/ 4G services will open doors for various other technologies to be efficiently introduced in Pakistan. Pakistan will be able to face the global competition efficiently by adopting 3G/ 4G technology.

III. REVIEW OF THE LITERATURE

Wireless Communication initiated the age of communication without any wires. Cellular systems have gone through an exponential increase over the last decade.. Its adaption has been increased even more due to the introduction of laptops, palmtop computers and mobile phones as it helps and guarantees online access anywhere and anytime [vii]. The most popular use of wireless communication is through mobiles which can also be termed as mobile communication [viii]. Mobile is a remarkable technical advancement which offer

various services which fits all in your pocket and mobile communication will be the main focus of our research paper [ix].

A. Advancement in Mobile Communication

Mobile telecommunication has truly brought a revolution as it has not only brought efficient communication but also brought mobility due to which people can communicate with each other anywhere anytime [x]. Cell phones are no longer considered a luxury but a necessity and a lifeline in the time of an emergency [xi]. A fixed amount of spectrum is allocated to mobile communications and this spectrum must be re-used by re-using frequencies to accommodate massive demand of users [xii].

Zero generation (OG) can be regarded as the pre cellular systems or predecessor of first generation of cellular systems but do not support the handover and data transfer feature [xiii, xiv]. In 1st Generation (1G) analog mobile radio systems were introduced, and in 2nd Generation (2G) digital mobile systems were employed whereas in 3rd Generation (3G) broadband data handling was introduced for the first time [xv]. Ever increasing demand for internet usage also came during the popularity phase of 2G and 3G, thus leading to introduction of mobile broadband. To provide the same quality of services people were utilizing with fixed broadband was a huge task and a driving force for Long Term Evolution (LTE). LTE introduces less delay, high spectrum efficiency and huge data rate [xvi].

B. 3G/4G Mobile Communication

3G stands for the third generation of mobile communication standard and it evolved as the demand for better and faster services increased. It is also termed as International Mobile Telecommunications-2000 (IMT-2000) and regarded as the standards for 3G introduced by International Telecommunication Union (ITU). 3G allows for simultaneous use of data services and speech and high data rates with improved spectral efficiency [xvii]. These technologies require specialized equipment and handsets for their efficient working [xviii]. 3G standard was basically created to help support the effective delivery of a range of multimedia services [xix]. It provided high quality multimedia services and enabled global roaming [xvii]. It also brought a revolution in device technology and the era of smartphones started [ix].

4G stands for the fourth generation of mobile communication standard and the main difference between 4G and its predecessor was of speed and capacity. It is also regarded as Long Term Evolution (LTE) In 2008, International Mobile Telecommunications Advanced (IMT-Advanced) has been specified by ITU-R which are the requirements of 4G standard. It supports wider channels with Orthogonal Frequency Division Multiple Access

(OFDMA) and create spatially separated paths by employing Multiple Input Multiple Output (MIMO) antennas [ix]. IMT-Advanced has specified a peak data rate of 1 Gbps for downlink and 500 Mbps for uplink in case of 4G [x]. Users will be offered to fully avail these multimedia services with this high data rate which is about 260 times greater than 3G wireless networks [xx].

C. Comparison among Generations of Mobile Communication

Mobile communication has undergone many generations involving change in fundamental nature of technology as well as service like higher peak data rates, new frequency bands, wider channel bandwidth. The main difference between them is of throughput data rate. The data rates of important standards introduced in these generations are shown in Table I. The download (to the user) and upload (to the Internet) data rates given below are peak or maximum rates and end users will typically experience lower data rates.

TABLE I
DATA RATES OF MOBILE COMMUNICATION [xxi].

Generation	Standards	Data Rates
2G	Global System of Mobiles	22.8 Kbps
2.5G	General Packet Radio Service	56-114 Kbps
2.75G	Enhanced Data Rate for Global Evolution	384 Kbps
3G	Universal Mobile Telecom System	2 Mbps
3G	High Speed Packet Access	HSUPA(5.76 Mbps) HSDPA(14 Mbps)
4G	Long Term Evolution	100 Mbps or 1Gbps

D. Technology Acceptance Model

It is very crucial to understand why people reject/accept technologies and which factors are considered important for predicting user intentions. It plays a very significant role in making any technology a success and it helps in improving processes and systems thus improving user acceptability [xxii]. Technology acceptance model (TAM) was first introduced by Davis in 1989 which is actually based on the Theory of Reasoned Action (TRA) [xxiii]. The two of the main core determinants of TAM are Perceived Ease of Use and Perceived Usefulness. Later modifications were made in TAM to further investigate the determinants of Perceived Usefulness and Perceived Ease of Use in TAM2 or Extended TAM [xxiv] and TAM3 [xxv]. It is used to study the acceptance of various technologies and basically investigates the behavior of users

regarding technology acceptance.

TAM is best for those scenarios in which the main focus is on the customers' intention to adopt or reject a technology. TAM focuses on customers feelings and how they perceive things. It is used to check intentions of customers' to adopt/ reject a technology when it has been recently launched so that effective measures can be taken to ensure its success. TAM basically focuses on predicting future user behavior after interaction with a system on trial basis or for a short period of time. This model is best for scenarios where systems are evaluated in the early stages of their development and extensive user experience cannot be achieved [xxvi]. A substantial amount of researchers have supported TAM and found that it describes a substantial part of variance in usage intentions typically about 40% [xxiv]. TAM model will be validated in our research keeping the scenario 3G/ 4G user acceptance among educated youth of Pakistan (Islamabad/Rawalpindi/ Wah).

E. 3G/4G Mobile operators in Pakistan

Wireless telecommunication has evolved to a great deal in Pakistan and there are currently five mobile operators in Pakistan. All of them have been able to function smoothly and efficiently despite the increased atmosphere of competition among them. On April 23, 2014 Pakistan gained \$1.13 billion in an auction of 3G/ 4G licenses. 3G license were given to four existing operators of Pakistan namely The Pakistan unit of China Mobile Ltd. Zong, Pakistan Mobile Communications Ltd. Mobilink, Telenor ASA (TEL)'s local subsidiary and Ufone of Pakistan Telecommunication Co. China mobile. 4G license was acquired by only Zong at the auction but Warid has also started to provide 4G services. Significant research is lacking in Pakistan to study the behavior intention of users after 3G/ 4G implementation using TAM. The main focus of the mobile operators in Pakistan for 3G/ 4G success is upon the youth as they form the largest portion of customer base. This research paper will focus on understanding the behavior intention of young users of 3G/ 4G which will further aid the mobile operators in reaching their goal and will improve the economy of Pakistan.

IV. RESEARCH FRAMEWORK AND DESIGN

The basic TAM forms theoretical framework for this research as shown in Fig. 1. The TAM consists of two basic constructs i.e. Perceived Usefulness and Perceived Ease of Use which are affecting the Behavioral Intention of users.

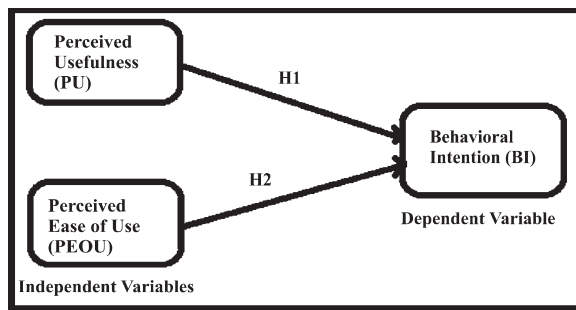


Fig. 1. Basic TAM - Theoretical Framework.

The corresponding research question drawn out is:
 “How does the core determinants of technological acceptance model stimulate user acceptance of 3G/ 4G technologies among educated youth in Pakistan (Islamabad/ Rawalpindi/ Wah)?”

A. Operational Definitions and Research Hypotheses

Operational definitions for various constructs in the proposed theoretical framework are as follows:

1) Behavioral Intention (BI)

Behavioral Intention can be regarded as the degree of a person's intention to perform a specific behavior. BI plays a vital role in determining the success of any technology so great emphasis is made to determine it for emerging technology. Determining BI, enable managers to make effective decisions and take efficient measures for greater adoption rate of concerned technology.

2) Perceived Usefulness (PU)

Perceived Usefulness is regarded as the degree to which a person believes that using a particular technology will be beneficial for him and will increase his/ her job performance [xxvii]. This characteristic may differ from one individual to another depending on their nature of work and understanding. Perceived Usefulness was found to have a positive relationship with BI when it offered any form of advantage to the user. Similarly if it didn't offer any form of advantage it affected BI negatively and in turn technology adoption rate [xxvi, xxvii, xxiv, xxv]. So, formulate hypotheses are as follows:

- **Ho1:** “No relationship exists between Perceived Usefulness and Behavioral Intention to use 3G/ 4G technology”.
- **H1:** “Perceived Usefulness has a positive direct effect on Behavioral Intention to use 3G/ 4G technology”.

3) Perceived Ease of Use (PEOU)

Perceived Ease of Use is regarded as the degree to which a person believes that using a particular system or technology will be free of effort [xxvii]. Any technology which helps an individual to achieve his target in a timely manner without much mental and physical effort is perceived to be easy to use. This characteristic of a technology may also differ from one

individual to another. A technology which is perceived to be more useful than another technology is more likely to achieve a better adoption rate [xxvii]. Perceived Ease of Use was found to have a positive relationship with BI when the user was able to use the technology without any difficulty or much mental and physical effort. Similarly if it offered any form of difficulty in usage then BI is affected negatively which in turn technology adoption rate [xxvi, xxvii, xxiv, xxv]. So, formulated hypotheses are as follows:

- **Ho2:** “No relationship exists between Perceived Ease of Use and Behavioral Intention to use 3G/ 4G technology”.
- **H2:** “Perceived Ease of Use has positive direct effect on Behavioral Intention to use 3G/ 4G technology”.

B. Research Design

1) Research Strategies and Choice

Survey strategy has been used for this research with deductive approach chosen as the theory already existed has been validated for local scenario. Research Choice is quantitative as it involve tabulation of data and different statistical tests performed on numerical data to extract useful results [xxviii]. Moreover, quantitative research comprises of specifying precisely both dependent and independent variables under study, making the interpretations and results more reliable [xxix].

2) Research Settings and Time Horizon

Research setting is non-contrived as natural setting is used. The data has been collected at a single point of time making the study cross-sectional [xxx]. This type of study is more useful when the research has to be finished in a limited time frame, making it convenient to identify and analyze the relationships between the various determinants involved [xxxi].

3) Population

The population considered for this research is educated youth of Pakistan. Due to budget and time constraints, population has been limited to educated youth in Rawalpindi, Islamabad and Wah considering abundant educational facilities and high literacy index.

4) Sampling Technique, Frame and Size

Probabilistic sampling is normally linked with survey based strategies to make deductions for population. Simple random type probabilistic sampling is used in this study to investigate the research hypotheses. The sample frame consists of students of Higher Educational Institutes of Pakistan in Rawalpindi, Islamabad and Wah. The Higher Educational Institutes have been selected through random number generator. A confidence level of 95% with 5% error margin, the minimum size of sample should be 384 to achieve reliable results [xxxi]. In order to achieve true results, the questionnaires were distributed among 700 students, among ten universities. Around 433 questionnaires were filled and

received back, from which 41 were ineligible. Therefore an overall response rate of 61.8 % was achieved.

5) *Questionnaire Development*

The questionnaire used for survey comprises of two main parts, with the opening section comprising five questions related to the demographic details of respondent while the second part containing fifteen questions measuring the respondent's acceptance level of 3G/ 4G technologies. The questionnaire for constructs PU and PEOU has been adopted from [xxvii, xxvi] and for BI from [xxxii, xxxiii]. A five point Likert scale used with (1) corresponding to "Strongly agree", (2) "Agree", (3) "Neutral", (4) "Disagree" and (5) to "Strongly Disagree".

6) *Validity and Reliability*

The questionnaire was verified by experts to validate language and comprehensiveness and then it was followed by a pilot study though reliability was ensured by calculating Cronbach alpha as in Table II.

TABLE II
CRONBACH ALPHA FOR PILOT TESTING

Constructs	Cronbach's Alpha	No. of items
Perceived Usefulness	0.833	6
Perceived Ease of Use	0.818	6
Behavioral Intentions	0.751	3

The items were considered highly reliable and consistent as the results of the pilot tests showed the reliability being greater than 0.8 except for Behavioral Intentions with 0.751 which is again adequately reliable and acceptable for further continuing the research. Therefore the questionnaire was further distributed to respondents to gain more results.

V. DATA ANALYSIS

In order to extract useful inferences, data analysis is necessary which is now much easier to perform with the help of latest software such as Statistical Package for the Social Sciences (SPSS).

1) *Descriptive Analysis-Basic TAM Dimensions*

The Table III relates to the descriptive statistics and these results demonstrate minimum and maximum value, the average value measured by mean, the dispersion in the series measured by standard deviation and the value of skewness to check whether the series are positively or negatively skewed within the range +1 to -1 to be considered as normal distribution. The values of kurtosis have also been mentioned, which depicts the peak of the curves, of the series of values used in the study. The primary descriptive statistics concerning basic TAM have been shown in Table III.

TABLE III
DESCRIPTIVE STATISTICS-BASIC TAM

	Min	Max	Mean	Std Dev.	Skewness	Kurtosis
PU	1	4	2.17	.718	.530	.199
PEOU	1	4	2.03	.646	.298	.197
BI	1	5	2.24	.747	.685	.842

2) *Inferential Analysis*

Inferential data analysis using various statistical techniques to test the hypothesis mainly comprises of two parts. The first part encompasses the assessment of association among the variable whether the relationship exists or not. The second part is more deliberate over the predictability of the dependent variable by the independent variables.

• *Correlation Analysis*

Statistical Correlation is the measure of association among different constructs, identifying whether the relationship is weak or strong and positive or negative. At this point in the research the null hypothesis will be accepted or rejected based upon the R values and sig levels.

Table IV illustrates the relationship between the variables. All the independent variables are showing moderate strength of positive relationships with the criterion variable i.e. BI and also showing moderate positive association amongst each other with $0.7 > r > 0.3$ and $sig < 0.05$ resulting in rejection of null hypotheses.

TABLE IV
CORRELATION ANALYSIS- TAM CONSTRUCTS

		PU	PEOU	BI
PU	Pearson Correlation			
	Sig. (2-tailed)			
PEOU	Pearson Correlation	.540**		
	Sig. (2-tailed)	.000		
BI	Pearson Correlation	.455**	.612**	
	Sig. (2-tailed)	.000	.000	

• *Regression Analysis*

Simple Linear Regression uses only one independent variable whereas Multiple Regression Analysis is a statistical technique that involves the prediction of an unknown value of dependent variable through two or more independent variables and analyzes the linear relationship between a dependent and two or more independent variable. It can also be used to infer cause and effect between independent and dependent variables.

In Table V, the model summary of the core constructs of TAM shows the value of R, known as the multiple correlation coefficient, which is the square

root of R Square and can be defined as the correlation between the predicted and observed values of the dependent variable, which is Behavioral Intentions in our case. The value of $R > 0.7$ which indicates a moderate positive association of the predictors with the criterion variable. Moreover the value of $R \text{ Square} = 0.396$ which is coefficient of determination indicates that almost 40% of the variance in Behavioral Intention measured outcome can be accounted for by the model used for this research. The adjusted R Square narrates the predictive loss in R square value if the same model is applied to other similar samples.

TABLE V
MODEL SUMMARY- CORE CONSTRUCTS OF TAM

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	.629 ^a	.396	.393	.59748
a. Predictors: (Constant), PU, PEOU				

In Table VI shows the $F = 127.915$ with $\text{sig} = 0.000$ which means that the model has sufficient explanatory power with regards to variance in Behavioral Intention explained and accounted for by the predictors i.e. Perceived Usefulness and Perceived Ease of Use in 3G/4G mobile telecommunication technology. At this point in the research, it is validated that the model is fit enough to proceed further with the results of regression analysis and conclude the hypothesis testing process.

TABLE VI
ANALYSIS OF VARIANCE

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	91.328	2	45.66	127.9	.000 ^b
	Residual	139.225	390	.357		
	Total	230.553	392			
a. Dependent Variable: BI						
b. Predictors: (Constant), PU, PEOU						

Table VII illustrates that Perceived Usefulness and Perceived Ease of Use are significant predictors of Behavioral Intention for using 3G/4G telecom tech by educated youth in Pakistan. It also verifies that multicollinearity does not exist among the predictors as **Tolerance > 0.1** or vice-versa Variance Inflation Factor (**VIF < 10**).

TABLE VII
COEFFICIENT ANALYSIS-TEST OF SIGNIFICANCE

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std Err	Beta		
1	(Constant)	.081	.116		.701	.484
	PU	.222	.059	.175	3.75	.000
	PEOU	.687	.062	.517	11.06	.000
a. Dependent Variable: BI						

• Summary of Inferential Analysis

TABLE IX
SUMMARY OF INFERENCE ANALYSIS

Hypotheses	Results
Ho1: No relationship exists between Perceived Usefulness and Behavioral Intention to use 3G/4G technology.	Not Supported
H1: Perceived Usefulness will have a positive direct effect on Behavioral Intention to use 3G/4G technology.	Supported
Ho2: No relationship exists between Perceived Ease of Use and Behavioral Intention to use 3G/4G technology.	Not Supported
H2: Perceived Ease of Use will have a positive direct effect on Behavioral Intention to use 3G/4G technology.	Supported

VI. RESULTS AND DISCUSSION

In order to investigate the users' intentions to adopt 3G/4G technology, this study was conducted using the basic TAM model to validate it considering scenario of Pakistan (Islamabad/ Rawapindi/Wah). This study encompassed to analyze the user acceptance of 3G/4G services among educated youth of Pakistan. According to the results achieved, Perceived Usefulness and Perceived Ease of Use have been found positively related to Behavioral intention to adopt 3G/4G technology. The results acquired from this study revealed R-square to be almost 40% which confirms validation of TAM as TAM describes a substantial part of variance in usage intentions typically about 40% [xxiv].

It can be deduced that the youth with greater level of perceived ease of use and perceived usefulness are more expected to rapidly and efficiently adopt 3G/4G technology. Thus youth are ready to accept and adopt 3G/4G technology as they believe that it is beneficial to them, convenient and easy to use. It has been found that PU and PEOU are significant predictors of BI and TAM is validated in the scenario of Pakistan considering 3G/4G technology usage among educated youth which is consistent with the findings of [xxxiv, xxxv, xxxvi, iii, xxxvii, xxxviii, xxxix, xxvi, xxxx] for

Basic TAM model consisting two core determinants i.e. PU, and PEOU has been used for this research which predicts BI to use 3G/ 4G technology among educated youth of Pakistan. TAM is a leading model for predicting usage intentions and no known research was found in Pakistan concerning validation of this basic model in 3G/ 4G user acceptance among educated youth. This model explained 40% of variance in usage intentions [xxiv]. This research focuses upon the users behavior intentions with regards to adoption of state of the art telecom technology i.e. 3G/ 4G mobile communication which is the backbone and founding platform for many other modern Communication and Information Technology based systems e.g. M-Learning, E-Government, online shopping/ banking, etc being researched currently for analyzing adoption/ diffusion trends not only in Pakistan but also other developing and technology savvy countries where these systems are considered to be new trends as compared to technologically and socially developed countries. As the user acceptance for 3G/ 4G technologies will increase, it will also pave way for the success of various other emerging technological systems in Pakistan e.g. electronic government (E-Government) and mobile learning (M-learning) being extensively studied to enhance its adoption and further diffusion but it cannot be accomplished without proper adoption of 3G/ 4G services as it is the main stay.

VII. CONCLUSIONS

This study was conducted to analyze the Behavioral intentions of educated youth to accept 3G/ 4G technology in Pakistan, based on the basic TAM model and the previous literature. According to the results, 40% of variance in Behavioral intention to adopt 3G/ 4G telecom services measured outcome can be accounted for by the model used for research and data collected resulting in validation of TAM model in Pakistani scenario. The core determinants which are perceived usefulness and perceived ease of use were found to be positively associated with the Behavioral intention to adopt 3G/ 4G technology. As 3G/ 4G services are still in initial phase and has been launched in Pakistan two years back, so mobile operators should devise efficient ways of its efficient adoption. This research paper focuses on the factors which affect the adoption of 3G/ 4G technology and it will prove to be very useful for the mobile operators, leading Pakistan to a successful nation.

VIII. RECOMMENDATIONS AND FUTURE WORK

Based on the statistical inferences and hypothesis testing carried out, the following recommendations can be made to promote successful employment of 3G/ 4G

among the educated youth of Pakistan. Media should play an important role by highlighting the advantages offered by 3G/ 4G technology and should create awareness among users' by conducting different seminars and workshops. As 3G/ 4G technology is the backbone for many other latest technologies such as m-learning, e-government etc. so the mobile operators should clear its usefulness to the users' so that they can also reap benefits from other technologies as well. Once the 3G/4G technology is implemented successfully, it is important for mobile operators to continuously monitor their quality of service, and evaluate their usability and performance to increase the efficiency of the applications introduced.

This research can also contribute to various other researches so many future work can be carried out based on this research. The scope of this study has been limited to universities in the twin universities of Rawalpindi and Islamabad and Wah. Therefore future researchers can include universities from different cities, other than the twin cities and Wah, to get more generalized results. The future research can include longitudinal study in which researchers will be able to identify changes and improvements in the behavior of the educated youth instead of assessing at a single instant of time. This basic TAM model can also be used for validation in other technology contexts and this research can be further expanded to include additional different types of variables which affects intention behavior. Additional research work can be carried out to by taking uneducated youth into account and users' of different age groups. The study can be extended to include the higher education institutes of other countries as well as the acceptance level of 3G/ 4G technology varies from culture to culture and country to country.

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