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An Evaluation Of Behavioral Intention To Use 3G Wireless Network Technology Among The Students Of Abubakar Tafawa Balewa University, Bauchi

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Abstract: ***The study evaluate the factors that play vital role in influencing the behavioral intention of students to use Third Generation (3G) wireless mobile technology. The research further analyze the important factors of 3G network perception and intention using the Technology Acceptance Model (TAM2) as the guiding principles with the following constructs; Perceived Ease of Use (PEOU), Perceived Usefulness (PU) and Social Influence (SI). Based on these factors, the behavioral intention to use 3G network technology services among students of developing country like Nigeria was evaluated. Stratified random sampling was used across three (3) selected departments namely Information Technology, Computer Science and Electrical and Electronics Engineering which have 459 students, 360 students and 535 students respectively to arrive at 1,354 as the total number of students in these three departments. The study made use of 309 sample size out of the students' population from the university in the study area. Therefore, incorporating social influence construct into technology intention research. The research concluded that Perceived Ease of Use and Perceived Usefulness have positive correlation with the Behavioral Intention of students to use 3G network technology services. However, Social Influence was not found to be associated or has no positive influence on the behavioral intention of students to use 3G technology services.***

Keywords: 3G Wireless Network, Behavioral Intention, Social Influence, Technology

I. INTRODUCTION

Mobile phones have been around for several decades in some form or another, although the first cellular phone call was placed in 1973 in the USA, it was Japan that introduced the first cellular network in 1979 (Gautam & Sinha, 2009). The first internationally roaming cellular network standard was NMT (Nordic Mobile Telecoms), introduced in 1981 which was initially used in Scandinavia and adopted in some countries in central and southern Europe, known as the first generation of mobile cellular telecommunications systems (Ahonen, Kasper & Melkko, 2007).

Mobile telecommunication system continuously progresses with the advancement of 3G wireless network technology services and the users' demands towards transmission speed and application services. The acceleration of the demand for high speed data services and the spreading of mobile communication have also increased the demand for high speed mobile services. Understanding the behavioral adoption requirements is important to both researchers and industry players. Researches on 3G Technology Services acceptance and adoption provide worthy information on 3G mobile Internet development and implementation. Therefore,

it is thus imperative to understand the interplay of factors involved in the use of 3G network technology.

Mobile Telecommunications System [UMTS] (Korhonen, 2008). UMTS, the so called third generation (3G) wireless network has become widespread more and more around the globe owing to the various applications it brings to the mobile phones. It offers higher bandwidth, packet-based transmission of text, voice, video, and multimedia needed to support data-intensive applications (Lim & Siau, 2005). What 3G wireless technology brought to the mobile technologies over these previous developments can be listed as customized infotainment, multimedia message service mobile intranet/extranet access, mobile internet access, location-based services, simple voice and rich voice services.

The high infusion of Information & Communication technologies (ICTs) and web based technologies are pertinent trends of the internet economy and require the use of 3G wireless technology service with mobile devices and wireless capability. The need for robust planning and research into the future of emerging information technology creates a problem. Advances in wireless technology have increased the number of people using mobile devices and accelerated the rapid development of mobile services conducted with these devices (Wang, Lin & Luarn, 2006).

Given the difference between rapid growth rates in the adoption of mobile technologies and associated services in developed countries and the relatively slow growth rates in developing countries such as Nigeria, is the first reason that makes the research worthwhile to conduct. The second reason is that 3G wireless technology adoption and acceptance have been at the forefront of several research projects in different geographical and social context (Nysveen, Pedersen & Thorbjørnsen, 2005; Agarwal, Wang, Xu & Poo, 2007; Liao, Tsou & Huang, 2007; Lu, Liu, Yu, & Wang, 2008; López-Nicolás, Molina-Castillo & Bouwman, 2008; Rao Hill and Troshani, 2010; Sun, Cao & You, 2010). However, the use and the adoption intentions of the Nigerian users have not been evaluated especially among students. Different cultures approach innovation in different ways; therefore there is a need for further exploration across cultures, markets, and stages of use (Urban, 2006).

Based on the literature reviewed there is inadequate study conducted on the intention to use 3G wireless mobile technology service using students as respondents especially from the perspective of a developing country like Nigeria. Accordingly, this study aims at bridging the gap by conducting the study from the point of view of Nigeria using the students of Abubakar Tafawa Balewa University, Bauchi as the respondents.

II. LITERATURE REVIEW

Several theoretical models have been proposed to explain the users' intention to use information technology, such as: the Theory of Reasoned Action (Fishbein & Ajzen, 1975), the Theory of Planned Behavior (Ajzen, 1991), the Technology Acceptance Model (Davis, 1989), the Innovation Diffusion Theory (Rogers, 1983), and the Unified Theory Acceptance and Use of Technology (UTAUT) (Venkates et al., 2003) which are developed gradually and built up on each other (Sendecka, 2006). These models employ 'intention to use' and 'actual use' as the main dependent variables (Venkatesh et al., 2003). Intention to use information technology as a predictor of behavior, such as use and adoption, has been well established in the literature (Ajzen, 1991, Taylor and Todd, 1995, Legris et al., 2003, Nysveen et al., 2005, Wang et al., 2006, Kuo and Yen, 2009, Chong, Darmawan, Ooi, & Lin, 2010).

Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) is widely validated intention model that has been proven successful in predicting and explaining behavior across a wide variety of domains (Davis, Bagozzi & Warshaw, 1989). However, due to its limitation on volitional control, Ajzen (1985) extended it by including another construct called perceived behavioral control, which predicts behavioral intentions and behavior. This extended model proposed by Ajzen (1985) is called Theory of Planned Behavior (TPB) (Chang, 1998).

Innovation Diffusion Theory (IDT) is also a theory associated with research on technology innovation, proposed by Roger (1983). IDT tries to explain the innovation decision process, the determining factors of rate of adoption, and different categories of adopters (Chen et al., 2002). Based on a review of user acceptance literature, Venkatesh et al. (2003) discuss eight prominent models formulate, such as: TRA, TPB, TAM, IDT, the motivational model, a model combining the TAM and TPB, the model of PC utilization, and the social cognitive theory, and develop a unified model that integrates elements across the eight models so called the Unified Theory Acceptance and Use of Technology (UTAUT).

A. PERCEIVED EASE OF USE (PEOU)

Perceived ease of use is an individual's assessment to the extent to which interaction with a specific information system or technology is free of mental effort (Davis, 1989). It is one of the major behavioral beliefs influencing user intention to technology acceptance in both the original and the revised TAM models. According to changing of mobile technology from time-to-time, it is necessary to study about consumers' perceived ease of use that will impact for intention to use newest mobile devices. In mobile phone context, perceived ease of use, as key determining factor that influenced toward behavioral intention to use the mobile service through mobile application (Vatanparast, 2010; De Silva, Ratnadiwakara & Zainudeen, 2011), to adopt advanced mobile phone services. Islam, Low and Hasan (2013), as a mediating factor to adopt to mobile phone applications and tools (Milena & Ziolkowski, 2010), as an antecedent of electronic customer relationship management performance in mobile phone services industry (Wahab, Al-Momani & Noor, 2010) and played as a key role in user attitudes toward mobile adoption (Abad, Diaz & Vigo, 2010). These researchers confirmed that perceived ease of use was responsible in determining the consumers' intention to use of 3G mobile service and perceived ease of use was most important factor to increase consumer's behavioral intention to use 3G mobile value-added services. Therefore, it is assumed that:

H_1: There is a significant relationship between perceived ease of use and behavioral intention to use 3G Technology Services

B. PERCEIVED USEFULNESS (PU)

Perceived usefulness, first explored by technology acceptance model by (Davis, 1989) is found to be a critical factor in adoption of technology, with the name 'relative advantage' in the Diffusion of Innovations Theory by Rogers (1995). Reviewing the literature, both perceived usefulness and relative advantage have been analyzed as a crucial construct affecting the acceptance of the innovations. Moreover, from the review of the existing literature is derived that perceived usefulness has a significant positive effect on user attitude (Chong et al., 2010). Hence it is postulated that:

H2. There is a significant relationship between perceived usefulness and behavioral intention to use 3G Technology Services

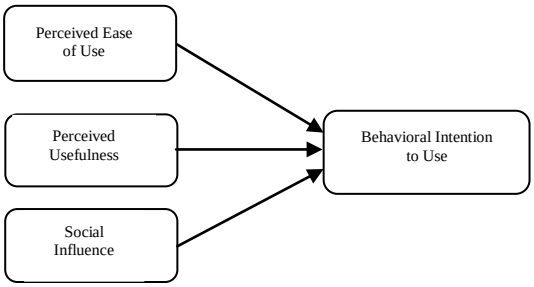
C. SOCIAL INFLUENCE

According to Venkatesh, Morris, Davis, Davis, Delone, Mclean, Jarvis, Mackenzie, Podsakoff and Chin (2003) 'social influence' is defined as the degree to which an individual perceives that important others believe he or she should use the new system. Wu, Tao, and Yang (2007) found that social influence has a significant influence on the behavioral intention to use 3G mobile phones. Hong and Tam (2006) based on the consumer behavior literature, claim that, when usage of an innovation is seen as a form of public consumption, such usage is significantly influenced by friends and colleagues. In a survey of young people, Carroll, Howard, Peck and Murphy (2002) found that those who do not use mobile technology (e.g. SMS, chatting, and e-mail) appear to struggle to maintain their social links. Hence, social influence is seen as an important factor that affects behavioral intention.

H3: There is a significant relationship between social influence and behavioral intention to use 3G Technology Services.

D. RESEARCH FRAMEWORK

The services of TAM2 was employed for the purpose of this research. However, only three of its constructs namely: Perceived ease of use (PEOU), Perceived usefulness (PU) and Social influence (SI) were used. The construct of Social Influence (SI) is chosen because of its importance in influencing the Behavioral Intention (BI) of users to adopt technology. The conceptual framework is shown in the figure below



(Adopted and modified, Davies 1989 & Rogers, 1983).

Figure 1: Conceptual Framework for 3G Technology Use

III. METHODOLOGY

This section describes the methodology used in conducting the research. It starts with the presentation of the research population, sampling design, research instrument, the data collection procedure and a description of how the data will be analyzed.

A. RESEARCH DESIGN

The study involves 3G Technology service therefore, a correlational field study (survey) design is used and a questionnaire was employed in order to collect data and gain a deeper knowledge on the factors that play role in the behavioral intention to use 3G Technology services among the students of Abubakar Tafawa Balewa University, Bauchi State Nigeria. Questionnaire was administered to students of Information Technology, Computer Science and Electrical and Electronics Engineering. The research study is geographically limited to Bauchi state Nigeria, and involves students in higher institution of the Abubakar Tarawa Balewa University, Bauchi as the target population.

B. INSTRUMENT DEVELOPMENT

The first part of the questionnaire involves nominal scale items which covers demographic information consisting of gender, age department and use of 3G technology services. The second part of the questionnaire includes adapted items with five-point Likert scales, ranging from (1) "strongly disagree" to (5) "strongly agree", used to operationalize the constructs included in the investigated research model; perceived ease of use, perceived usefulness, social influence, and behavioral intention to use which were all obtained Venkatesh & Davis (2000). The instrument has already been validated by Venkatesh & Davis (2000). The services of Statistical Software for Social Sciences (SPSS) was used in analyzing the data.

IV. DATA ANALYSIS

The results in table 1 shows that male respondents have the highest number of participation of 163 (74.8%) over female respondents which is 55 (25.3%). With regards to age, 24-29 years of age were the highest with 105 respondents (48.2%) followed by 18-23 years of age group with 99 respondents (45.4%) then 30-35 age group with 11 respondents (5.0%) followed by 36-41 age group with 2 respondents (0.9%) and lastly >42 age group with 1 respondent (0.5%). With regards to the departments, 37.6% of the respondents are from Information Technology, 33.5% of the respondents are from Electrical and Electronics Engineering and lastly, 28.9% of the respondents are from Computer Science. In terms of respondents who use 3G

enabled mobile phones, 186 (85.3%) of the respondents said "Yes" while 32 (14.7) respondents said "No".

Construct	Frequency	Percentage
Gender		
Male	163	74.8
Female	55	25.2
Age Group		
18 -23	99	45.4
24-29	105	48.2
30-35	11	5.0
36-41	2	0.9
>42	1	0.5
Department		
Info. Tech. (Management Sciences)	82	37.6
Computer Science (Mathematical Sciences)	63	28.9
Electrical & Electronics Engineering	73	33.5
Do you use a 3G enabled mobile phone?		
Yes	186	85.3
No	32	14.7

Source: (Field Survey, 2016)

Table 4.1: Demographic Profile of the Respondents

The reliability of the measurement instrument was tested and the results of the Cronbach's Alpha values ranged from 0.710 to 0.810 as shown in table 2 below, this is an indication that there is a high level of internal consistency in the questionnaire items since the minimum recommended Cronbach's alpha value by Nunnally is 0.7 (Nunally, 1978). The validity of the instrument was also measured through Exploratory Factor Analysis (EFA). The individual items under PEOU, PU, SI and BI were explored with EFA through Principal Component Analysis with Varimax rotation to extract the underlying factors of behavioral intention to use 3G mobile services and the results were reported in table 4.2. The results of the factor analysis show that most of the items correlated on at least 0.5, with Kaiser-Meyer-Olkin's Measure of sample adequacies of 0.609, 0.593, 0.662 for PEOU, PU, SI and BI respectively.

Items	Communalities	Component Matrix	
PEOU 1: Learning to use 3G mobile technology is very Simple.	0.610	0.781	
PEOU 2: It is easy to be familiar with the use of 3G mobile technology services.	0.601	0.775	
PEOU 3: My Interaction with 3G mobile Technology services are understandable and Clear.	0.587	0.766	**0.766**
Cronbach's Alpha			
PU 1: Using 3G mobile technology services can increase the efficiency of my wider learning process.	0.538	0.662	
PU 2: 3G mobile technology services can provide better internet surfing.	0.558	0.747	
PU 3: 3G mobile technology services can increase my degree of mobility.	0.540	0.663	
PU 4: Using 3G technology service increased my academic productivity.	0.574	0.611	
Cronbach's Alpha			**0.795**
SI 1: People who are important to me would recommend using 3G technology service.	0.514	0.717	
SI 2: Social media (e.g., LinkedIn, twitter, whatsapp, facebook) are promoting 3G Technology.	0.503	0.635	
SI 3: 3G mobile Technology service will enable me improve my social status in school.	0.565	0.752	
SI 4: My course mates think that I must use 3G technology service.	0.570	0.608	**0.810**
Cronbach's Alpha			
BI 1: Now i am willing to perform online school registration with a 3G mobile Technology.	0.583	0.695	
BI 2: Given the opportunity, I will use 3G Technology services for my academic needs.	0.625	0.791	
BI 3:I am likely to use 3G technology services in the near future .	0.537	0.691	
BI 4:I intend to use 3G Technology services when the service becomes widely available within the school.	0.591	0.700	
Cronbach's Alpha			**0.710**

Table 4.2: Reliability and Validity Analysis of factors influencing adoption of 3G mobile services

A correlation was computed in order to examine the bivariate relationships among the variables PEOU, PU, SI and BI. The results of the correlation coefficients among the variables revealed that the highest correlation is 0.496 as depicted in table 4.3. As recommended by Field (2005), the value of the correlation coefficient should be less than 0.8 in order to avoid multicollinearity. Therefore, multicollinearity problem does not exist in this research.

		BI	PEOU	PU	SI
Pearson Correlation	**BI**	1.000	.378	.439	.327
	PEOU	.378	1.000	.496	.414
	PU	.439	.496	1.000	.423
	SI	.327	.414	.423	1.000
Sig. (1-tailed)	**BI**	.	.000	.000	.000
	PEOU	.000	.	.000	.000
	PU	.000	.000	.	.000
	SI	.000	.000	.000	.

N	BI	218	218	218	218
	PEOU	218	218	218	218
	PU	218	218	218	218
	SI	218	218	218	218

***. Correlation is significant at the 0.01 level (1-tai led).*

Table 4.3: Correlations

Multiple regression analysis was used in obtaining the significant predictors and the findings were also used to test the hypotheses.

With regard to the coefficient of determination, R^2 indicated 0.539, which means that 53.9 percent of the changes in behavioral intention (BI) to use 3G technology services can be predicted by the combination of the three independent variables, while the F-statistics for this research was significant at the one percent level (Sig F < 0.1) indicating the fitness of the model as shown in table 4.4

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df 1	df 2	Sig. F Change
1	.489[a]	.539	.529	.61113	.539	22.441	3	214	.000

Table 4.4: Model Summary

Similarly, the results of the ANOVA table also show a significant value, meaning that one or more of the variable(s) significantly predict the behavioral intention to use 3G wireless technology services. As shown on table 4.5

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	25.144	3	8.381	22.441	.000[b]
	Residual	79.926	214	.373		
	Total	105.069	217			

Table 4.5: ANOVAa

- ✓ Dependent Variable: BI
- ✓ Predictors: (Constant), SI, PEOU, PU

The individual model variables presented in table 4.6 shows a significant and positive regression model between PEOU and BI to adopt 3G mobile services, in which PEOU (p < .05). The result of the model demonstrates that PEOU has a positive impact on behavioural intention to adopt 3G mobile services in such a way that the regression equation predicted almost (β = 0.179) 17.9% contribution to the behavioural intention to use 3G technology services. The regression analysis result indicates that PEOU significantly influences the behavioural intention to adopt 3G mobile services.

Therefore, H1*: There is a significant relationship between perceived ease of use and behavioral intention to use 3G Technology Services among students* is accepted. While alternative hypothesis, HO*: There is no significant relationship between perceived ease of use and behavioral intention to use 3G Technology Services among students* is rejected.

The individual model variables presented in table 4.6 shows a significant and positive regression model between PU and behavioral intention to use 3G mobile services in which PU (p < .05). The result of the model demonstrates that PU has a positive impact on behavioral intention to use 3G technology services in such a way that the regression equation predicted almost (β = 0.296) 29.6% contribution to the behavioral intention to use 3G technology services. The regression analysis result indicates that PU significantly influences the behavioral intention to use 3G technology services.

Therefore, H2*: There is a significant relationship between perceived usefulness and behavioral intention to use 3G Technology Services among students* is accepted. However, HO*: There is no significant relationship between perceived usefulness and behavioral intention to use 3G Technology Services among students* is rejected.

However, the individual model variables presented in table 4.6 shows an insignificant regression model between SI and behavioral intention to use 3G technology services, in which SI (p > .05). The result of the model demonstrates that SI has an insignificant impact on behavioral intention to use 3G technology services in such a way that the regression equation predicted almost (β = 0.128) 06.9% insignificant contribution to the behavioural intention to use 3G technology services. The regression analysis result indicates that SI insignificantly relate to behavioural intention to use 3G technology services, indicating that SI has no significant influence to reduce the use of 3G technology services.

Therefore, H3*: There is a significant relationship between social influence and behavioral intention to use 3G Technology Services among students* is rejected. Accordingly, HO*: There is no significant relationship between social influence and behavioral intention to use 3G Technology Services among students* is accepted.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	*B*			Tolerance	VIF
(Constant)	1.783	0.294		6.067	0.000		
PEOU	0.173	0.096	0.179	2.511	0.013	0.912	1.096
PU	0.305	0.074	0.296	4.148	0.000	0.912	1.096
SI	0.119	0.063	0.128	1.874	0.062	0.827	1.209
R^2	0.53.9						
Adj. R^2	0.529						
Sig. *F*	0.000						
F-Value	22.441						

Table 4.6: Regression Analysis Results for the Constructs

The findings show that the independent variables will account for 53.9% changes in the behavioral intention to use 3G technology services. Similarly, it has been found that PU contributes substantially to the behavioral intention to use 3G technology services with (β = 0.296), followed by PEOU (β =0.*179*) and SI (β = 0 .128) with (F = 22.441).

V. RESULTS AND DISCUSSION

The findings of the study revealed that male students have high participation rate of 163(74.8%), while females make the remaining 55 (25.2%). The results also show that of the 218 students who participated in this study, 82(37.6%) of them are of Information Technology option, 63(28.9%) are from Computer Science option, while 73(33.5%) are from Electrical Electronic Engineering of the ATBU.

In terms of factors that influence the behavioral intention to use 3G mobile technology services, the results revealed that two factors were identified. For perceive ease of use (PEOU), the results of this study discovered that PEOU has positive and significant influence on the behavioral intention of students to

use 3G technology services. The finding is similar to some studies (Ayodele et al., 2013; Jeong& Yoon, 2013). Therefore, as proven by this study PEOU has significant influence on the decision of students to use 3G technology services.

Similarly, perceive usefulness (PU) was also found to be significantly associated with the behavioral intention to use 3G technology services. The finding is in line with other related studies in the area like (Venkatesh & Morris, 2000; Ayodele et al., 2013). Meaning that, students tend to have the behavioural intention to use 3G technology services provided it is usefulness. However, as obtained from the finding of this study social influence (SI) was not found to have a significant relationship with the dependent variable (BI). The result contradicts the finding of (Puschel et al., 2010). Although there is a social pressure in utilizing a given technology, some students are not liable to be subjected to the influence of other people on their decision to use a new system (Du et al., 2010). This implies that family members, peers as well as the media (electronic and print) might not really influence the students to use the 3G technology services as shown by the findings of this study.

A. CONCLUSION

In conclusion, the main objective of this study is to investigate the factors influencing the use of 3G wireless network technology services. The results show that PEOU and PU are the factors that have significant effect in predicting the use of 3G wireless network technology services among students. PU is the most influential factor in the use of 3G wireless technology services, followed by PEOU. However, this study concluded that SI has no significant effect on the behavioral intention to use 3G wireless technology. Generally, findings of this study should provide a great management insight and information to all the stakeholders. Finally, the set objectives of this research have been achieved.

B. RECOMMENDATION

This study provided some recommendations. From the managerial point of view, findings from this study suggest that the regulatory authority, operators of mobile network and others who provide supporting services should concentrate on strategizing towards PEOU and PU. The providers of the service should pay much attention on PEOU by making sure that the way consumers interact with the 3G technology services has been made very easy so as to attract more usage. They should also intensify its awareness campaign programme to promote the idea and reveal the usefulness of the 3G services to the consumers

Despite the fact that social influence was not found to be significant in influencing the behavioral intention of students to use the 3G technology services, it is recommended that more awareness campaign through the social media be used. The study pointed out the important variables that must be integrated in any policy formulation that deals with use of 3G technology services. Therefore, the policy makers as well as the service providers should make relevant adjustments regarding that in accordance with these findings in order to attract more usage.

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