The Impact of Moderating Factors on Behavioral Intention Towards Internet: a Transnational Perspective

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Abstract—**Moderating factors are interacting terms used when the relationship between a dependent and independent variable is weak, inconsistent or nonexistent. They form an integral part of both the Unified Theory of Acceptance and Use of Technology (UTAUT) and its extended version (UTAUT2). In this paper, we examine the direct impact of six moderating factors (age, gender, experience, complexity and education) on behavioral intention towards Internet which influence Internet use. The first three factors are used in both UTAUT frameworks to study technology use. Survey research methodology was employed in which data was collected from 368 respondents in Nigeria and The Gambia. Our findings suggest that only experience and complexity influence behavioral intention towards Internet in both countries. The impacts of age, gender, income and education however, vary significantly between these two countries. For instance, the respondents' support of gender, income and education more strongly influences their behavior towards Internet in The Gambia than in Nigeria, while that of age is weaker. On the contrary, respondents' support of age is stronger in Nigeria whereas that of gender, income and education are relatively weak compared to The Gambia. These statistics suggest that socio-demographic variables like age, gender, income and education influence behavioral intention towards Internet. However, the extent to which this is true varies significantly across national boundaries.**

Keywords-behavioral intention; Internet use; moderating factors; Nigeria; The Gambia

I. INTRODUCTION

The Internet is one of the most important innovations that transformed today's ICT domain. It is significantly changing the costs and modes of communication within Africa and between Africans and the rest of the world [21]. The Internet is a technology required to support information processing which is needed to execute applications and deliver services [30][36]. Among the prominent applications of the Internet are the *Es* and *Ms* which are used in Africa in areas such as health, education, governance and journalism [27]. The term Es refers collectively to a set of applications that enable people to use electronic devices like computers and 3G phones to access, store or transfer information such as eCommerce, eBanking, eHealth, etc. The Ms perform similar functions overcoming mobility such as m-banking, m-payment, m-transfer and m-finance [16]. Research shows that Sub-Saharan Africa has the highest known ratio of mobile users of any region in the world [19]. However, studies have shown that this boom in the mobile voice industry does not translate to corresponding Internet use [6]. Other researchers like [51] focus their study on the impact of the Internet. One important factor for the success of information technology is users' acceptance and use of technology [1]. Therefore, it is imperative to investigate the factors that determine individuals' behavior towards a technology like the Internet.

The unified theory of acceptance and use of technology (UTAUT) [44] and its extended version UTAUT2 [45] are widely used to study technology use. A moderating variable is an interacting term used when the relationship between independent and dependent variable is surprisingly weak, inconsistent or nonexistent [2]. They are extensively used in both UTAUT frameworks mainly to moderate the relationship between core determinants (e.g., performance expectancy, effort expectancies, social influence, etc.) and behavioral intention. Still the application of the UTAUT theory has produced contradictory findings in terms of the relationship between social influence and behavioral intention. For instance, Abubakar & Ahmed [3] found a significant relationship between these two UTAUT constructs. Their findings were supported by other researchers [18][50]. However, the study by Birch & Irvine [10] reveals no significant relationship between social influence and behavioral intention in technology adoption. Their findings were substantiated by other researchers [48]. These

contradictory findings are due to the fact that contextual similarity between different studies does not necessarily produce consistent findings [2]. For instance, Foon & Fah [18] focuses on the relationship between the four core UTAUT determinants (performance expectancy, effort expectancy, social influence and facilitating conditions) and behavioral intention. However, [10] utilizes both the aforementioned core determinants as well as three moderating factors.

In this paper, we took a novel approach by neglecting the effect of UTAUT core determinants on behavioral intention as in previous studies [10][3][4][50]. Instead, we examine the direct impact of six moderating factors on behavioral intention towards Internet. The rest of this paper is organized as follows: *Section 2* explains the theoretical background and *Section 3* describes our research methodology. *Section 4* entails the data analysis and our results are presented in *Section 5*. *Section 6* concludes the paper, states its limitations and provides the direction of future research.

II. THEORETICAL BACKGROUND

There are essentially three schools of thought in technology adoption: adoption, diffusion and domestication [34]. This taxonomy has been used by a number of other researchers [14][15][23][28][41]. These researchers argue that the diffusion school broadly describes the pattern by which technologies are typically adopted by a group of people over time. The adoption school focuses on the decision to adopt a particular technology and tries to explain the factors that influence the decision plan on an individual level. The domestication school typically tries to understand how information and communication technologies are domesticated. This paper is based on the adoption school. The unified theory of acceptance and use of technology (UTAUT) is our adapted theoretical framework. We chose this theory because of its explanatory power since it integrates eight other models while accounting for their limitations. The integrated models are the technology acceptance model (TAM), the diffusion of innovation theory (DOI), the theory of planned behavior (TPB), the theory of reasoned action (TRA), the motivational model, Combined-TAM-TPB, PC utilization and the social cognitive theory [2]. According to Wu and other researchers [48], the explanatory power of UTAUT for technology-using behavior is about seventy percent making it more effective than any of the previously used models. This model has been applied and adapted to a number of studies that are similar to ours [8][11][13][26][45][49]. There are opportunities for future research to strengthen the unified theory of acceptance and use of technology in understanding technology acceptance and use [44]. They stress the need to identify and test additional model boundary conditions in order to contribute to an even richer comprehension of technology adoption and usage behavior [43]. This assertion has led to the extension of UTAUT to UTAUT2 [45] in which

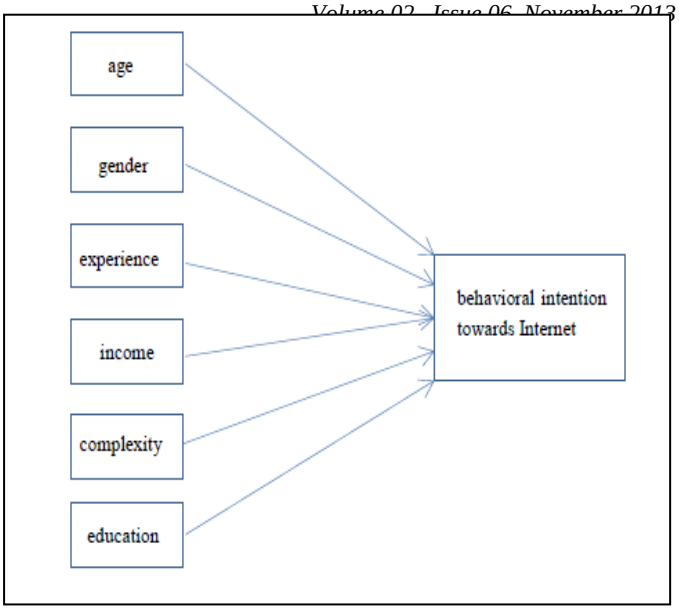

Figure 1. Research framework

three more core determinants are added, namely, hedonic motivation, price value and habit.

This paper utilizes three moderating factors of the unified theory of acceptance and use of technology: age, gender and experience. We added three more potential factors, namely, income, complexity and education. The use of these additional factors is based on their importance in general ICT diffusion and adoption as evidence in previous research. For instance, [37] underscores the significance of complexity in technology diffusion while [36] echoes similar sentiment about education. The impact of income in technology ICT diffusion and adoption has been revealed by other studies [7][31]. A recent study has also shown the importance of all the six variables in ICT diffusion and adoption in developing countries [42]. We develop a research framework based on these factors and investigate their respective impact on behavioral intention towards Internet.

III. RESEARCH METHODOLOGY

Research is defined as an accepted investigation to find answers to a problem [5]. This research employs survey methodology. According to [35], it has a precise procedures which, when followed closely, yield valid and easily interpretable data. Kraemer [29] highlights that survey research has three distinct characteristics. Firstly, the phenomenon to be studied should involve examining the relationship among variables. Secondly, the data are collected from people. Finally, survey research should use a selected portion of the population. The scope of survey is determined by the independent and dependent variables a researcher considers. Other researchers suggest that survey research also required to have a predicate model that depicts the expected relationship among variables [22]. In this paper, we strive as much as possible to adhere to the guidelines stipulated by [22] for the design and implementation of survey research.

A. Case selection

The case countries for this research are Nigeria and The Gambia. Both countries are situated in Sub-Saharan Africa. It is important to mention that no sampling approach was used in choosing these countries. Instead, we adopted the deliberate and theoretical sampling plan used in the Warwick study [17]. The sampling approach included one case country (Nigeria) which demonstrated clear success in terms of telecommunication and infrastructural development and another case country (The Gambia) with a minimal success in the same context. Another key factor that was used in selecting the aforementioned case countries in this research is one of the authors' conscious living experiences in both countries; he spent approximately six years in Nigeria and 20 in The Gambia. Additionally, he has extensive knowledge of these countries' respective cultures, politics, economics, education and a range of other issues which are relevant to and were extremely supportive of this research.

B. Survey administration and sample size

This paper comprises of two separate surveys which were conducted within four months of each other. The data were collected from university environments in the respective countries. The survey in The Gambia was conducted from September 19th to November 12th, 2012 at the University of The Gambia. In order to seek the consent of our potential respondents and also minimize the number of unreturned questionnaires, we first visited individual classes from the selected faculties and enlightened the participants about the research. During that period, those who were interested in participating in the research were asked to write their names under the administrative region they came from in The Gambia.

This approach helped us to have participants from every region of the country. Since the number of potential respondents who were willing to participate in the research exceeded our target of 200, we employed a simple random sampling method. This enabled us to select our research respondents in an unbiased manner from all administrative regions of the country within the selected faculties. We could not sample from the entire university population due to our time constraint. Each potential respondent was then given a questionnaire to complete within a week. The sampled faculties were Information and Communication Technology, Law, Business Administration and Arts & Sciences.

The survey in Nigeria was conducted from April 1st to April 30th, 2013. We applied the same sampling approach as we did in The Gambia. However, minor variations exist in terms of the target population and survey administration. The shorter duration in Nigeria was mainly possible because of the lessons we learned in The Gambia.

The variation in the target population is based on the fact that it was not feasible to select our potential respondents from

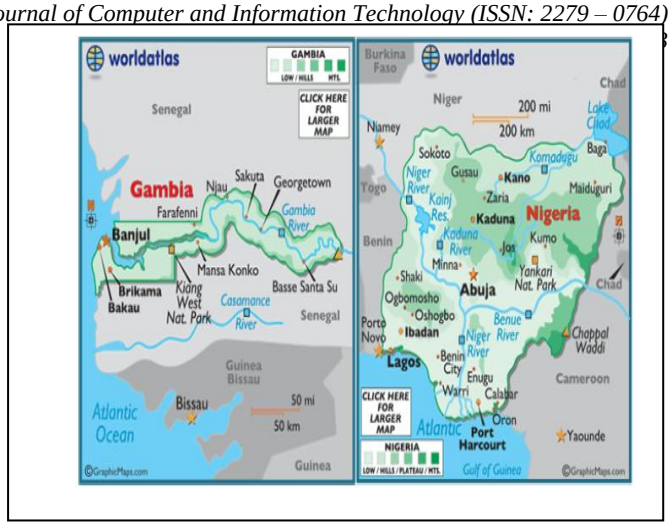

Figure 2. Map of The Gambia and Nigeria

every administrative region in Nigeria as we did in The Gambia. This constraint was due to the size of the country and the political instability present in some regions at the time of our survey. Instead, we limited the scope of the survey to the University of Ibadan in Oyo State.

It is imperative to highlight that the sampling approach we use in both surveys has been employed by other researchers [11][25][46][39][40]. We endeavor to maintain both reliability and validity through appropriate use of case study protocol [38].

C. Questionnaire

We administered 400 questionnaires between the two surveys. In The Gambia, 200 questionnaires were administered to students at the University of The Gambia. Out of this total, we received 179 valid responses corresponding to about a 90 percent return rate. This includes 65 respondents who claimed to be females, 110 males and three who did not indicate their gender. In Nigeria, we also administered 200 questionnaires from which we received 184 valid responses. This corresponds to about a 92 percent return rate. Among the valid respondents, 85 claimed to be females, 89 males and 10 who did not indicate their gender. The age distribution of our research respondents is between 20 to 60 years. In order to achieve the aims of this paper, we focused on a number of hypotheses:

- *H1: Young people have a more positive view of the potential benefits of Internet use than the elderly.*
- *H2: Gender plays an important role in the way an individual perceives the usefulness of the Internet.*
- *H3: Prior Internet experience determines an individual's attitude toward its potential benefits.*
- *H4: An individual's income determines his/her behavior towards Internet usage.*
- *H5: The simpler the Internet is to use, the faster individuals would want to learn how to use it.*
- *H6: Education has a direct impact on one's behavior towards the Internet.*

These hypotheses correspond to age, gender, experience, income, complexity and education, respectively.

D. Data analysis

A number of data analysis techniques can be used for quantitative data. They include descriptive statistics and correlation analysis [38]. This paper utilizes the former to present our results in a form that is easy to understand. We then categorized our responses from these tables into three regions (see TABLES III, IV & V) for further analyzes.

(1) *region of positive certainty:* this region represents responses corresponding to the strongly agree (1) and agree (2) scales.

(2) *region of uncertainty:* this region represents responses corresponding to somewhat agree (3), not applicable (4) and somewhat disagree (5) scales.

(3) *region of negative certainty:* this region represents responses corresponding to disagree (6) and strongly disagree (7) scales.

We first determined the frequency count for each hypothesis and the total number of valid respondents for each of the two studies. The frequency count (FC) of the responses was determined for each region.

TABLE I. RESPONDENTS' SUPPORT OF HYPOTHESES (HYPO)

Study 1: The Gambia								
Hypo	response based on seven-point likert scale frequency count (FC)							total resp.
	1	*2*	*3*	*4*	*5*	*6*	*7*	
H1	20	40	51	8	7	33	18	177
H2	85	43	27	5	4	9	5	179
H3	55	59	44	6	3	7	2	176
H4	104	46	18	6	2	1	2	179
H5	84	49	25	1	6	7	5	177
H6	79	45	13	10	8	6	17	178

1= STRONGLY AGREE; 2= AGREE; 3= SOMEWHAT AGREE; 4= NOT APPLICABLE; 5= SOMEWHAT DISAGREE; 6= DISAGREE; 7= STRONGLY DISAGREE

TABLE II. RESPONDENTS' SUPPORT OF HYPOTHESES (HYPO)

Study 2: Nigeria								
Hypo	response based on seven-point likert scale frequency count (FC)							total resp.
	1	*2*	*3*	*4*	*5*	*6*	*7*	
H1	90	66	19	1	5	0	3	184
H2	16	28	30	16	10	40	41	181
H3	54	68	38	3	10	6	1	180
H4	10	30	25	44	24	35	10	178
H5	79	63	18	3	6	8	5	182
H6	27	56	40	12	11	21	14	*181*

1= STRONGLY AGREE; 2= AGREE; 3= SOMEWHAT AGREE; 4= NOT APPLICABLE; 5= SOMEWHAT DISAGREE; 6= DISAGREE; 7= STRONGLY DISAGREE

TABLE III. POSITIVE REGION OF CERTAINTY

Hypo	The Gambia		Nigeria	
	FC	% FC	FC	% FC
H1: age	60	**33**	156	**85**
H2: gender	128	**72**	44	**24**
H3: experience	114	**65**	122	**68**
H4: income	150	**84**	40	**22**
H5: complexity	133	**75**	142	**78**
H6: education	124	**67**	83	**46**

TABLE IV. REGION OF UNCERTAINTY

Hypo	The Gambia		Nigeria	
	FC	% FC	FC	% FC
H1: age	60	**33**	156	**85**
H2: gender	128	**72**	44	**24**
H3: experience	114	**65**	122	**68**
H4: income	150	**84**	40	**22**
H5: complexity	133	**75**	142	**78**
H6: education	124	**67**	83	**46**

TABLE V. NEGATIVE REGION OF CERTAINTY

Hypo	The Gambia		Nigeria	
	FC	% FC	FC	% FC
H1: age	51	**29**	3	**2**
H2: gender	14	**8**	81	**45**
H3: experience	9	**5**	7	**4**
H4: income	3	**2**	45	**25**
H5: complexity	12	**7**	13	**7**
H6: education	23	**13**	35	**19**

The percentage responses for each region of both countries were calculated from TABLES III, IV & V. in order to provide description pictures.

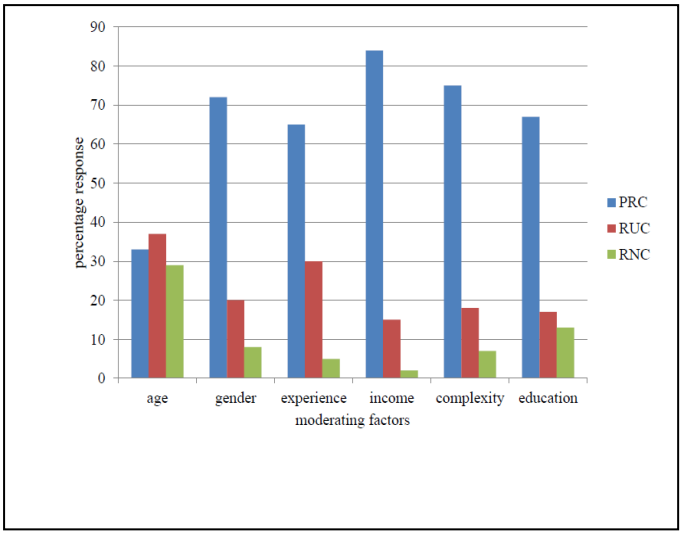

Figure 3. Responses from The Gambia

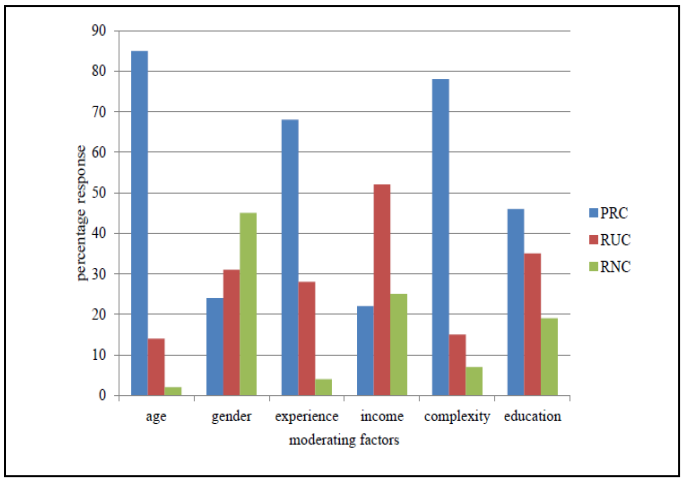

Figure 4. Responses from Nigeria

IV. RESEARCH FINDINGS

Moderating factors are traditionally used in the literature to study the relationship between UTAUT core determinants and behavioral intention. This paper examines their direct impact on behavioral intention towards Internet from university students in Nigeria and The Gambia. Our main findings are broadly summarized as follows:

- The percentage of respondents' support for the impact of experience and complexity on behavioral intention towards Internet is strong in both countries. In particular, the support for experience in Nigeria and The Gambia is 68 and 65 percent, respectively. The support for complexity is 75 and 78 percent, respectively.
- The percentage impact of age on behavioral intention towards Internet is stronger in Nigeria than in The Gambia. About 85 percent of the respondents in Nigeria support this impact while only 33 percent support it in The Gambia.
- The impacts of gender, income, education on behavioral intention towards the Internet are all stronger in The Gambia than in Nigeria. The respondents' support of these three factors in The Gambia is 72, 84 and 67 percent, respectively. Respondents' support of them in Nigeria is 24, 22 and 46 percent, respectively.
- Fifty-two (52) percent of the respondents in Nigeria are uncertain about the impact of income on behavioral intention towards Internet.
- Almost half of the respondents in Nigeria (45 percent) do not support the impact of gender on behavioral intention towards the Internet.

The aforementioned findings of this paper demonstrate a huge divergence in behavioral intention towards Internet.

V. CONCLUSION

Moderating factors are interacting terms used when the relationship between a dependent and independent variable is weak, inconsistent or nonexistent. They form an integral part of both the Unified Theory of Acceptance and Use of Technology (UTAUT) and its extended version (UTAUT2). We can conclude from the findings of this paper that the impact of moderating factors on behavioral intention towards the Internet can be directly examined. In previous research [44][45][10], these factors are used to moderate the relationship between dependent and independent variables. The complexity associated with the use of the Internet influences behavioral intention towards it. This confirms the impact of perceived ease of use of a technology on user behavior [37]. It is quite surprising that 52 percent of our respondents in Nigeria are uncertain about the impact of income on behavioral intention towards Internet. One possible explanation for this specific result could relate to the study by [9] which demonstrates that the effect of income on Internet activity has greater impact on countries with lower Internet usage rate than countries with higher one. Our findings suggest the impact of all six independent variables on behavioral intention towards Internet. However, the respondents' support for each one varies significantly across country boundaries. This is particularly true for the impact of age, gender, income and education on behavioral intention towards Internet in both countries. The diverging responses for these independent variables might depend on the difference of some cultural dimensions between Nigeria and The Gambia. This could be explored in future research in order to provide a deeper understanding of behavioral intention towards the Internet. There are two main limitations of this paper. Firstly, the research participants are drawn from only university students. Secondly, the survey focuses on four randomly selected faculties at each university.

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