

## Factors Influencing the Adoption of Smart Phones by University Students – A Cross-border Approach

**S. Tunmibi**

School of Computer Science, Mathematics and Information Technology,  
Houdegbe North American University,  
Republic of Benin  
padebola@gmail.com

**A. Aregbesola**

Centre for Learning Resources,  
Landmark University,  
Omu-Aran,  
Nigeria.  
aregbesola.ayooluwa@lmu.edu.ng

**E.O. Asani**

Computer Science Department,  
Landmark University,  
Omu-aran,  
Nigeria.  
asani.emmanuel@lmu.edu.ng

### ABSTRACT

This study explains the factors influencing the adoption of smart phones by undergraduate students in Nigeria and Republic of Benin. Questionnaire was used as the data collection instrument, and the design was guided by Rogers' diffusion theory of innovations. Most of the sampled students agreed that factors such as relative advantage of smart phones, complexity of the phone, trial before buying the phone, observation before buying the phone, and compatibility of smart phone with their lifestyle influence their adoption of smart phones. The study also shows that internet browsing has a major influence on the adoption of smart phones.

**Keywords:** Smart phones, adoption, diffusion theory of innovations.

---

### African Journal of Computing & ICT Reference Format:

S. Tunmibi, A. Aregbesola & E.O. Asani (2015). Factors Influencing the Adoption of Smart Phones by University Students – A Cross-border Approach. Afr J. of Comp & ICTs. Vol 8, No. 1. Pp1-16.

### I. INTRODUCTION

Almost half the population of the earth now uses mobile communications. A billion mobile subscribers were added in the last 4 years to leave the total standing at 3.2 billion. Given the strong growth trajectory and pace of innovation, we are confident that the next few years will see continued growth with a further 700 million subscriber expected to be added by 2017 and the 4 billion mark to be passed in 2018 (GSMA, 2013a). By the middle of 2013, there were 253 million unique mobile subscribers (and 502 million active SIM connections) in the Sub-Saharan Africa (SSA) region, 95% of whom were on prepaid tariffs. The unique mobile subscriber base has grown by 18% per annum over the last five years, making SSA by some distance the fastest growing region globally. Despite the astonishing progress of the mobile industry in Sub-Saharan Africa in recent years, the biggest impact of mobile in Africa is yet to come.

Roughly two thirds of the populations are still without a mobile subscription, leaving much room for growth; while the region is on the cusp of an explosion of mobile data as 3G and 4G deployments gain scale and advanced capabilities appear on increasingly affordable handsets. Mobile already contributes over 6% of Sub-Saharan Africa's GDP, higher than any other comparable region globally, and this is forecast to rise to over 8% of regional GDP by 2020 (GSMA, 2013b). According to Oketola (2013), 25 percent of Nigeria's over 105 million mobile telephone subscribers use smart phones. While citing the report of global market research firm, TNS, he revealed that Nigeria was the second biggest smart phone market in Africa, closely following South Africa.

In a study carried out on students' adoption of mobile phone at University of Ibadan (Nigeria), Nwagwu and Odetunmbi (2011), observed that respondents in their study are mainly young people below 25. These observations motivated the researchers to carry out this study on students, using Univeristy of Ilorin and Landmark University from Nigeria, as well as Houdegbe North American University from Republic of Benin, as case study.

## 2. LITERATURE REVIEW

Rogers (2003) defines the diffusion of innovations as “the process in which an innovation is communicated through certain channels over time among the members of a social system”. Among the three variables identified by the model, the nature of an innovation is considered to be the most powerful predictor because it explains 49–87% of the variance in technology adoption. The nature of an innovation has two variables: innovation attributes and technology clustering. Rogers' Diffusion of Innovation theory was first described in 1962 and characterizes people based on their likelihood to adopt technology and categorizes organizations based on their stage of adoption of a new technology. The perceived attributes of an innovation include its relative advantage, complexity, compatibility, observability, and trialability.

Several studies confirm the perceived attributes of a technology to be a significant predictor for its adoption (Chang et al., 2006; Daupagne and Driscoll, 2010; Jung et al., 2012; Lee, 2013; Rogers, 2003). For example, Daupagne and Driscoll (2010) found that perceived relative advantage, compatibility, trialability, and observability were significant predictors of the adoption of high-definition television in the U.S. Jung et al., (2012) found that three perceived attributes – relative advantage, compatibility, and trialability – were positively correlated with the intention to use e-books in South Korea. Li's study (2013b) demonstrated that perceived ease of use was a significant predictor of a user's intention to adopt terrestrial digital television in Taiwan.

Technology clustering as described by Rogers (2003) is the compatibility between a technology's functions and a user's needs. Past studies have found that people adopt technologies because the functions fulfilled their needs. Individual's ownership of different types of technologies allows researchers to predict technology adoption because individuals are likely to adopt functionally similar technologies due to the compatibility of the technologies' functions with the consumers' needs (Daupagne and Driscoll, 2010; Jung et al., 2012; Lin, 2009, Lin, 2010, Rogers, 1995 and Rogers, 2003).

Atkin (1995) classified all communication technologies as entertainment, information, or interpersonal technologies. Based on the concept of technology clustering, he predicted that people were more likely to adopt technologies within similar functional categories. Lin (2010) examined the adoption of satellite radio in the U.S. and found that the ownership of fluid digital media technologies was positively correlated with the respondents' adoption evaluation, which consequently positively affected their intention to adopt. Jung et al. (2012) found that the degree of digital media ownership was a significant predictor for the adoption of e-books in South Korea. Daupagne and Driscoll's study (2010) found that the owners of HDTV possessed significantly more communication technologies than non-owners. Lin (2009) found that compared to non-adopters, online radio adopters in the U.S. owned a significantly higher number of digital media devices including iPods, cellular phones, and satellite radio technologies.

## 3. RESEARCH METHODOLOGY

This study was carried out, using accidental sampling method. A total of 200 undergraduate students were sampled, using questionnaire, from both schools. Undergraduate students were chosen as the target sample in the study because the likelihood of them using smart phone is high as well as considering a strategy to facilitate easy access to the respondents.

This study used a questionnaire-based survey method, as many similar studies conducted earlier have also used this method for data collection such as (Chang et al., 2006; Daupagne and Driscoll, 2010; Jung et al., 2012; Lee, 2013). The questionnaire design was guided by Rogers' diffusion theory. For face validity, the questionnaire was circulated to faculty members in Centre for Learning Resources, Landmark University for their comment and observations. Their observations were considered in designing the final copy of the questionnaire before they were administered to the students in February 2014.

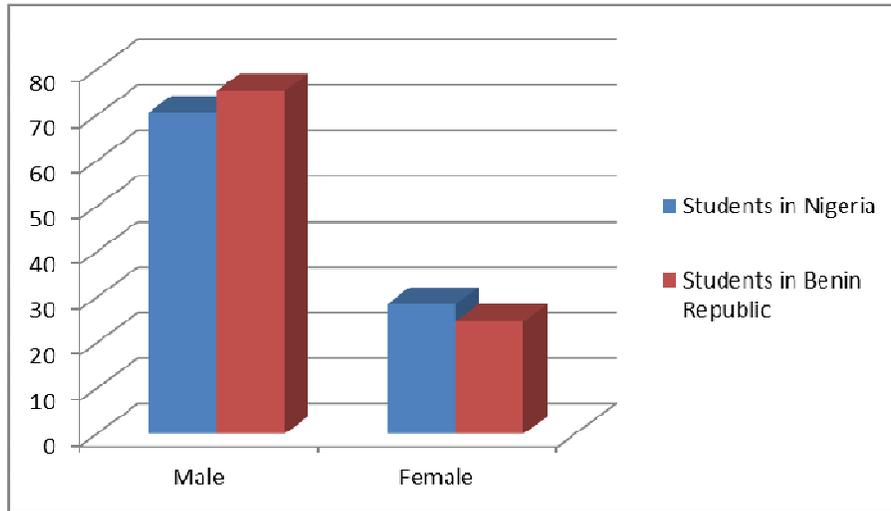
A total of 95 copies of the questionnaire were usable from those returned from Nigeria (University of Ilorin, Ilorin and Landmark University, Omu-Aran); and 85 copies of questionnaire were usable from those returned from Republic of Benin (Houdegbe North American University). Descriptive statistical method (use of frequency tables and charts) was adopted for analysis.

**4. RESULT**

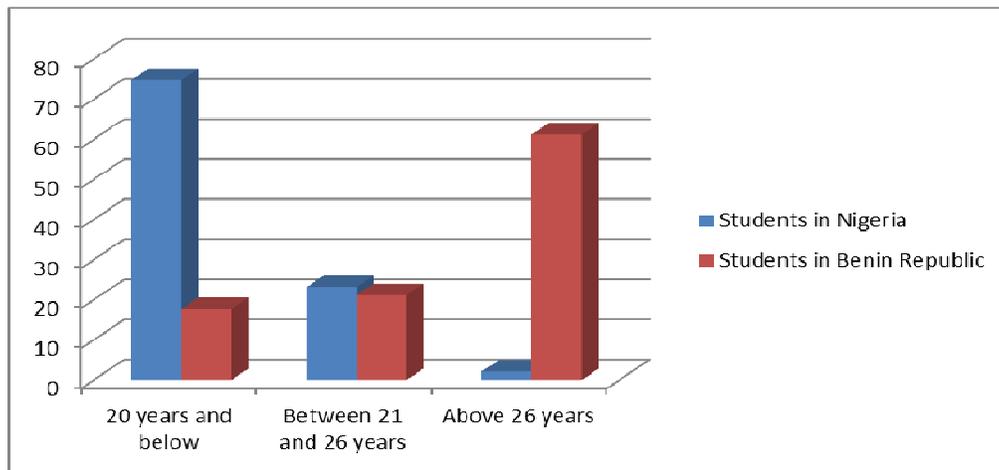
**Demographics**

The figures below represent the gender and age of respondents. The responses on gender show that sampled male students accounted for 70.5% and 75.3% for the school in Nigeria and Benin Republic, respectively. Female

respondents accounted for 28.5% and 24.7% for the school in Nigeria and Benin Republic, respectively. For age, majority of the sampled students (61.2%) are above 26 years in the school in Benin Republic, while majority (74.8%) are 20 years and below in the school in Nigeria.



**Figure 1: Gender of Respondents**



**Figure 2: Age of Respondents**

**Perceived Characteristics of Smart Phones**

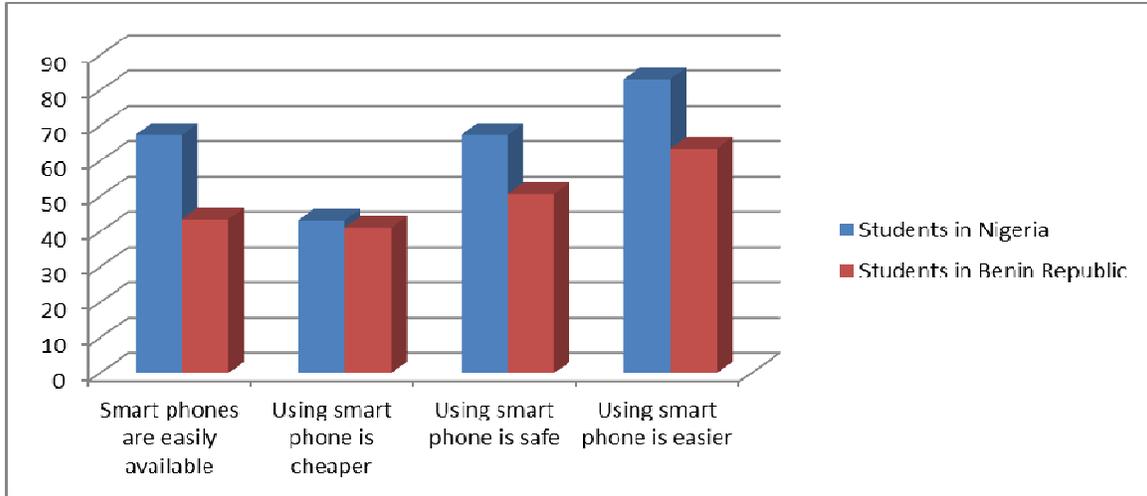
Before asking the questions under this section, respondents were asked if they have a smart phone. A total of 75.8% of the sampled students in the Nigerian school answered yes while all the sampled students (100%) from the school in Benin Republic answered yes.

Questions on perceived characteristics of mobile phone were divided, according to Roger’s theory, into relative advantage, complexity, trialability, observability and compatibility of smart phones.

**Relative Advantage of Smart Phones**

A higher percentage 55.3% and 54.1% of the sampled students, of the school in Benin Republic, respectively disagreed on smart phones are easily available and smart phone is cheap while majority 50.6% and 63.5%, respectively agreed that smart phone is safe and smart phone is easy to use.

Likewise, 50.5% of the sampled students in the Nigerian school disagreed on smart phone is cheap; but, majority 67.4%, 67.4% and 83.2% respectively agreed that smart phones are easily available, smart phone is safe, and smart phone is easy to use. Figure 3 shows a graphical representation of the results.

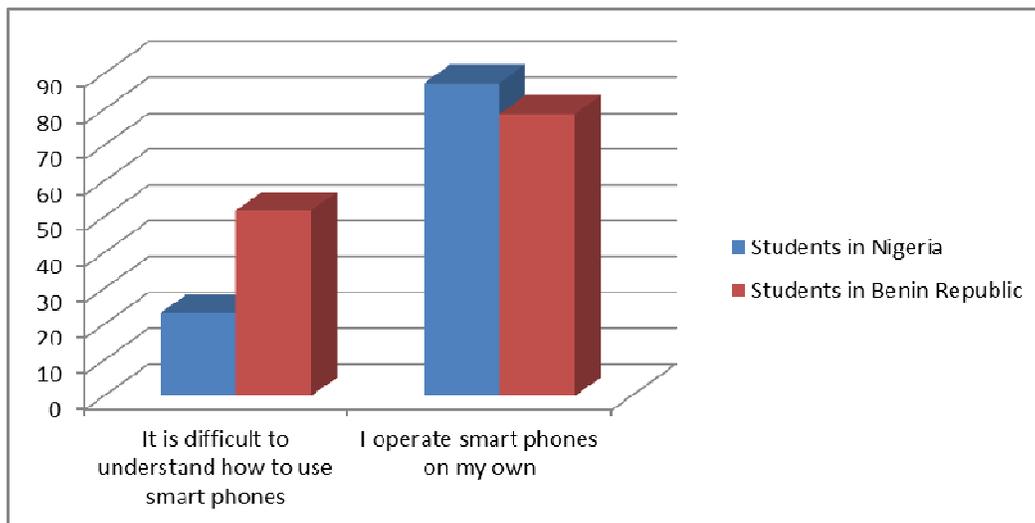


**Figure 3: Relative advantage of smart phones**

**Complexity of Smart Phones**

Most of the sampled students (69.5%) from Nigeria disagreed on it is difficult to understand how to use smart phones. This is unlike their counterpart from Republic of

Benin (51.8%) who agreed that it is difficult to understand how to use smart phones. Majority from both groups, 87.4% from Nigeria and 78.8% from Republic of Benin, agreed that they operate smart phones on their own.



**Figure 4: Complexity of smart phones**

**Trialability of Smart Phones**

Majority of the respondents from Nigeria (87.4% and 76.8%) agreed that it is easier to use smart phone after trying it out, and it is better to test smart phones before buying one, respectively.

This is similar to the responses from Republic of Benin, where 69.4% and 78.8%, respectively agreed on the two subjects. However, 64.2% of the Nigerian students disagreed on it took time to try before buying smart phone; while 65.9% of their counterpart from Republic of Benin agreed on the same subject.

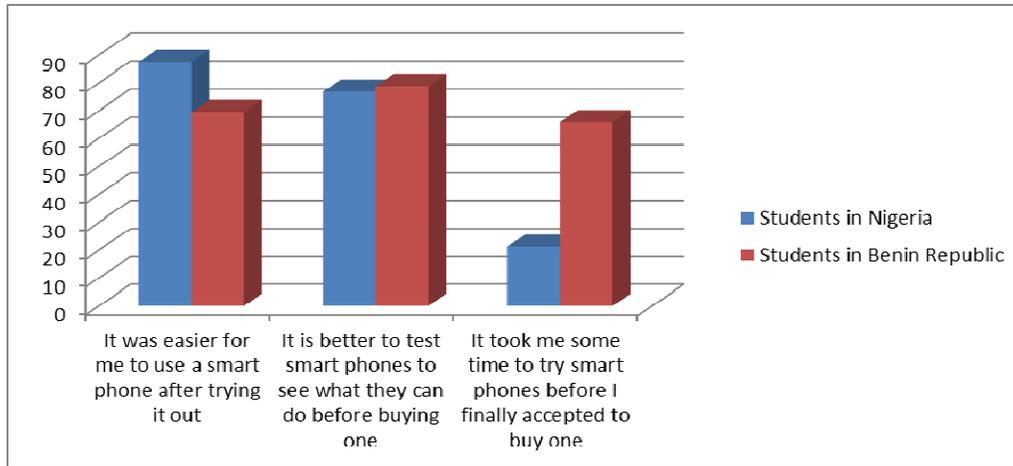


Figure 5: Trialability of smart phones

**Observability of Smart Phones**

Higher percentage (56.8% from Nigeria and 52.9% from Republic of Benin) disagreed on being influenced by others to buy a smart phone. Also, 74.7%, 89.5% and 90.5% respectively, from Nigeria; as well as 69.4%, 72.9% and

81.2% from Republic of Benin agreed that they were influenced by observed benefits of smart phones, they are satisfied with the result of using smart phones, and smart phones are worth their values.

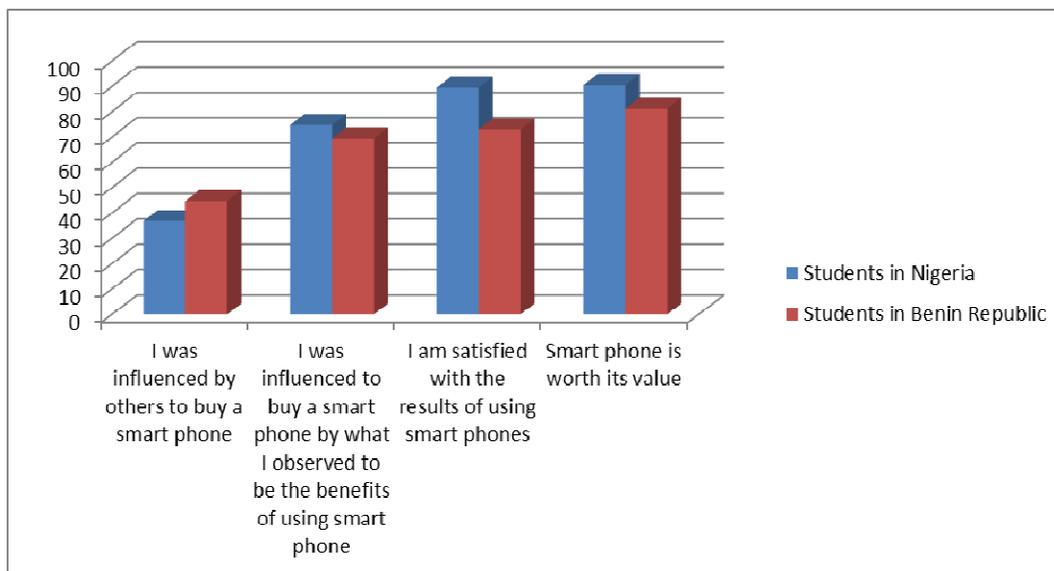
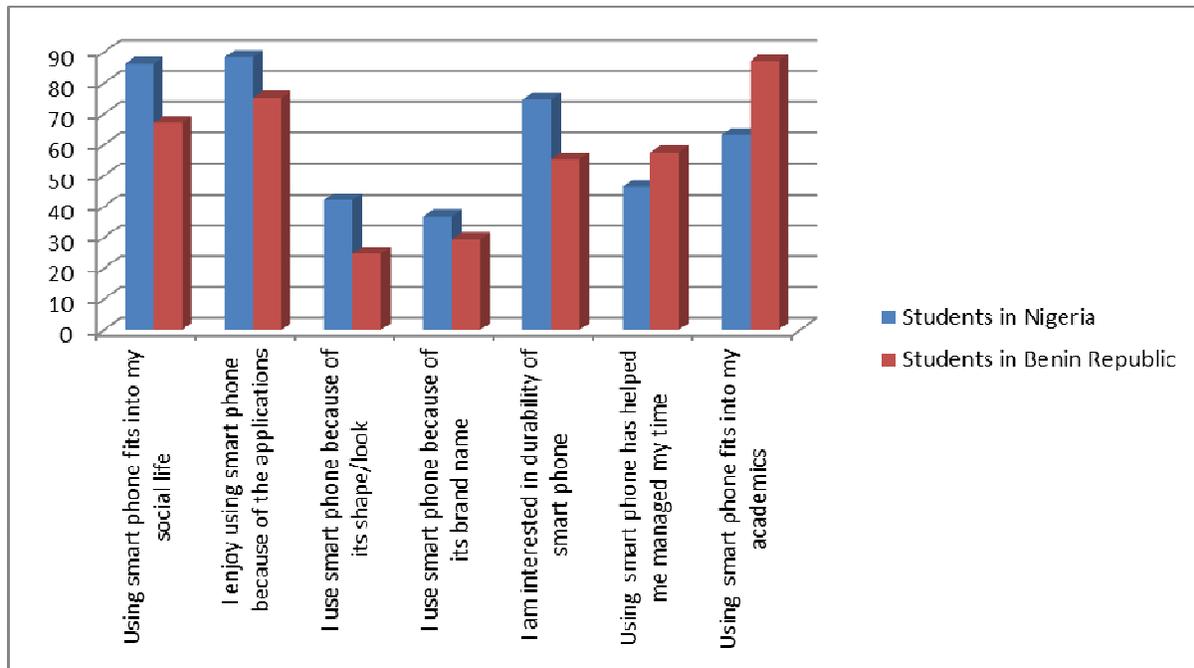


Figure 6: Observability of smart phones

**Compatibility of Smart Phones with Lifestyle**

Majority of the sampled students from Republic of Benin (67.1%, 75.3%, 55.3%, 57.6% and 87.1%) respectively agreed that using smart phone fits into their social life; they enjoy using smart phones because of the applications; they are interested in the durability of smart phones; using smart phones has helped to manage their time; and using smart phones fit into their academics. Nevertheless, 65.9% and 62.4% respectively disagreed that they used smart phones because of their shapes/look; and they use smart phones because of their brand names. These responses were similar to their Nigerian counterpart.

A higher percentage of the sampled students from Nigeria (86.3%, 88.4%, 74.7%, 46.3%, and 63.2%) respectively agreed that using smart phone fits into their social life; they enjoy using smart phones because of the applications; they are interested in the durability of smart phones; using smart phones has helped to manage their time; and using smart phones fit into their academics. However, 47.4% and 49.5% respectively disagreed that they used smart phones because of their shapes/look; and they use smart phones because of their brand names. It is important to state that 13.7%, 10.6%, and 13.7% respectively failed to choose between agree and disagree for using smart phone has helped to manage my time, I use smart phone because of its shape/look, and I use smart phone because of its brand name.



**Figure 7: Compatibility of smart phones with lifestyle**

**Communication Factors**

**Mass Media Influence**

The highest percentage of sampled students from Republic of Benin (80.0%) agreed that internet browsing influenced their adoption of smart phones. This was followed by 61.2%, 54.1% and 47.1 % who were influenced by listening to/watching television; newspaper report; and

listening to radio respectively. These were not all the same for their Nigerian counterpart. A total of 82.1% and 47.4%, from the sampled Nigerian students, agreed that internet browsing influenced their adoption of smart phones; and listening to/watching television influenced their adoption of smart phones. However, majority of 61.1% and 50.5% respectively disagreed that listening to radio; and newspaper report influenced their smart phones adoption.

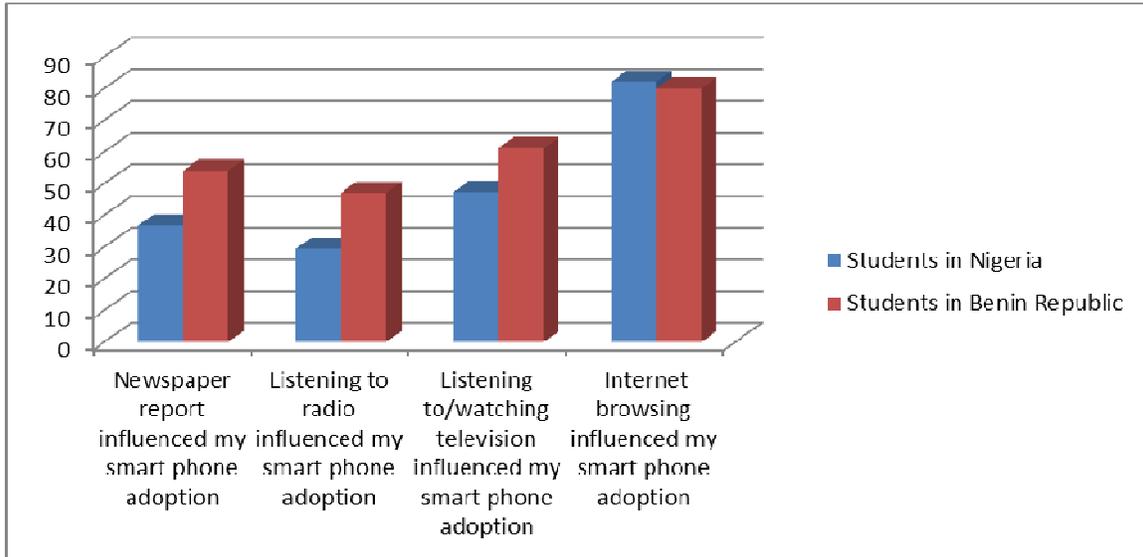


Figure 8: Mass media influence

***Influence Due to Relationships***

Most of the sampled students from Republic of Benin (87.1%, 83.5%, 71.8% and 58.8%) respectively agreed that interaction with friends, interaction with family members, interaction with community members, and interaction with people in the general population influenced their adoption

of smart phones. Similarly, 86.3%, 81.1%, 62.1% and 49.5% of their Nigerian counterpart respectively agreed that interaction with friends, interaction with family members, interaction with people in the general population, and interaction with community members influenced their adoption of smart phones.

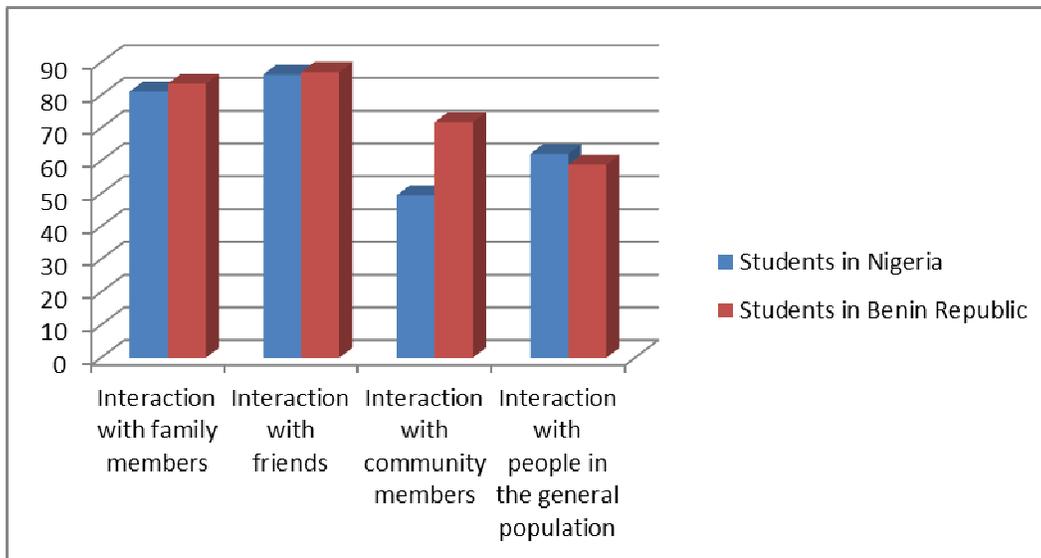


Figure 9: Influence based on relationships

#### 4. CONCLUSION

This study shows that about two-third of the total number of sampled students might have adopted smart phones because smart phones are easy to use, although their opinions vary on other relative advantages of smart phones. More than two-third of them also operate smart phones on their own. This indicates that smart phones may not be that complex. This study also show that most of the sampled students might have tried smart phones before buying one and were influenced by the observed benefits of using smart phone. Lastly on the perceived characteristics of smart phones, a good number of the sampled students noted that smart phones are compatible with their lifestyles.

The study shows further that internet browsing has a major influence on adoption of smart phones by students. The opinions of the students vary on listening to/watching television, newspaper report and listening to radio. In addition, interaction with family and friends were also observed to be another major influence for the adoption of smart phones by students. It is assumed that the difference in opinion between the two set of students might have been influenced by age, as students from Nigeria are younger than those from Republic of Benin.

#### REFERENCES

- [1] Atkin, D. J. (1995). Audio information services and the electronic media environment. *The Information Society*, 11, 75–83. <http://dx.doi.org/10.1080/01972243.1995.9960180>.
- [2] Chang, B. H., Lee, S. E., & Kim, B. S. (2006). Exploring factors affecting the adoption and continuance of online games among college students in South Korea: Integrating uses and gratification and diffusion of innovation approaches. *New Media & Society*, 8 (2), 295–319. <http://dx.doi.org/10.1177/1461444806059888>.
- [3] Daupagne, M., & Driscoll, P. D. (2010). Comparison between early high-definition television owners and non-owners. *Journal of Media Economics*, 23 (4), 216–230. <http://dx.doi.org/10.1080/08997764.2010.527226>.
- [4] GSMA (2013a). The Mobile Economy. GSMA resources: <http://gsma.com/newsroom/wp-content/uploads/2013/12/GSMA-Mobile-Economy-2013.pdf>
- [5] GSMA (2013b). Sub-Saharan Africa Mobile Economy. GSMA resources: [http://gsma.com/newsroom/wpcontent/uploads/2013/12/GSMA\\_ME\\_Sub\\_Saharan\\_Africa\\_Report\\_2013.pdf](http://gsma.com/newsroom/wpcontent/uploads/2013/12/GSMA_ME_Sub_Saharan_Africa_Report_2013.pdf)
- [6] Jung, J., Chan-Olmsted, S., Park, B., & Kim, Y. (2012). Factors affecting e-book reader awareness, interest, and intention to use. *New Media & Society*, 14(2), 204–224. <http://dx.doi.org/10.1177/1461444811410407>.
- [7] Lee, S. (2013). An integrated adoption model for e-books in a mobile environment: Evidence from South Korea. *Telematics and Informatics*, 30(2013), 165–176. <http://dx.doi.org/10.1016/j.tele.2012.01.006>.
- [8] Li, S. S. (2013). Digital television adoption: Comparing the adoption of digital terrestrial television with the adoption of digital cable in Taiwan. *Telematics and Informatics*. <http://dx.doi.org/10.1016/j.tele.2013.02.003>.
- [9] Lin, C. A. (2009). Exploring the online radio adoption decision-making process: Cognition, attitude, and technology fluidity. *Journalism & Mass Communication Quarterly*, 86 (4), 884–899. <http://dx.doi.org/10.1177/107769900908600410>.
- [10] Lin, C. A. (2010). Satellite adoption demand: Consumer beliefs, attitudes and intentions. *Journal of Broadcasting & Electronic Media*, 54(2), 265–281. <http://dx.doi.org/10.1080/08838151003737964>.
- [11] Nwagwu W. and Odetunmbi S. (2011). Factors influencing the adoption of mobile telephony by students at the university of Ibadan, Nigeria. *Asian Journal of University Education*, 7(2), pp. 109-142.
- [12] Oketola D. (2013). 25% of Nigerian mobile subscribers use smartphones –TNS. Punch newspaper. <http://www.punchng.com/business/technology/25-of-nigerian-mobile-subscribers-use-smartphones-tns/>
- [13] Rogers, E. M. (1995). Diffusion of innovations (5th ed.). New York: Free Press.
- [14] Rogers, E. M. (2003). Diffusion of innovations (6th ed.). New York: Free Press.