

## FACTORS INFLUENCING VOICE MESSAGE SERVICE ACCEPTANCE AMONG MOBILE PHONE USERS IN NIGERIA

<sup>1</sup>Ogbunankwor, Chibueze E; <sup>1</sup>Nwaizugbo, Ireneus C and <sup>2</sup>Nwankwo, Chike H (Corresponding Author)

<sup>1</sup>Department of Marketing, Nnamdi Azikiwe University, Awka, Nigeria.

<sup>2</sup>Department of Statistics, Nnamdi Azikiwe University, Awka, Nigeria.

E-mail of Corresponding Author: [chikeezeoke@yahoo.com](mailto:chikeezeoke@yahoo.com)

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**ABSTRACT:** *The aim of this study is to empirically establish a framework of consumers' attitude and intention towards mobile advertising in Nigeria with particular focus on Voice Message Service (VMS). This study became necessary given that context specific studies conducted in the area of voice message service based mobile advertising since the advent of Global System for Mobile Communication (GSM) in Nigeria are lacking. The study replicated and extended a Chinese-based research model to a different context, namely Nigeria. We adapted constructs from the IDT, TAM, TRA, and by extension the TPB to under-pin the study's conceptual framework. The unit of analysis comprised active mobile phone users in Nigeria. Two-stage multiple regression analysis was used in the modeling. The result from a convenience sample of 2,509 respondents in six geopolitical zones of Nigeria show that the three key factors affecting consumers' attitude towards voice message service based mobile advertisements are compatibility, trialability and image. On the other hand, the study also revealed that the behavioral intentions of mobile phone users in Nigeria towards voice message service are as a result of attitude and perceived behavioral control. Interestingly, the voice message service based mobile advertising acceptance model was posited by the study. Overall, the study concludes that service providers and advertisers in Nigeria may need to revise their business models in line with these findings to reach out to their teeming VMS based mobile advertising consumers. A key recommendation is that the regulator in the telecom industry in Nigeria should mandate service providers to profile mobile phone users that subscribed to their network to be able to send them targeted VMS ads.*

**KEYWORDS:** Voice, Message, Trialability, Compatibility, Image, Advertising

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### INTRODUCTION

The Missing Link Report of 1985 set a remarkable target for telecommunications development across the globe (Ige, 2002). This target is that by the early part of the 21<sup>st</sup> century virtually the whole of mankind should be brought within easy reach of a telephone and all the benefits this can bring. In other words, the principal objective of this report was to curtail and bridge the continuously widening gap in telecommunications development between the industrialized and non-industrialized nations of the world. In consequence, mobile phone subscriptions globally have been increasing steadily in recent years. Statistics indicate that mobile phone coverage is now near-ubiquitous with an estimated 95% of the global population or some seven billion people living in areas covered by a basic 2G mobile-cellular network (International Telecommunications Union (ITU), 2016).

With these developments, the messaging service markets which include Short Message Service (SMS), Multimedia Message Service (MMS), and mobile e-mail, are growing rapidly (Hsu et al, 2007). Moreover, Meeker (2018) reports that messaging is expanding and this is an exciting time for voice controlled products. In comparison, SMS is text-based while MMS uses sound, pictures and video and in the words of Hsu et al. (2007), MMS has reshaped the landscape of mobile communication, making it more personal, more versatile, and more expressive than ever before.

Interestingly, Nigeria holds the position as the largest mobile market in Africa and the tenth largest mobile market in the world (Moronfolu, 2012). Moreover, subscriber statistics from the Nigerian Communications Commission (NCC) (2018) revealed that Nigeria has over 161 million active telephone lines with a teledensity of 115.57 percent. This presents a fantastic opportunity in terms of reach when promoting products and services. Nevertheless, with the advent of the GSM and Code-Division Multiple Access(CDMA), people can now be advertised to through sound, pictures and video otherwise known as voice message service, picture message service and video message service respectively using the mobile phone.

However, among the listed multimedia message services, voice message service appears to be the most frequently used for advertising in Nigeria. While the use of voice message service (VMS) to advertise continues to increase, there is not enough evidence of its acceptability on the part of the Nigerian mobile phone user. To draw a conclusion that voice message service (VMS) based mobile advertising has fully gained prominence in Nigeria, the factors affecting mobile phone user acceptance, attitude and intention in the system need to be validated. In this work, we replicate and extend a Chinese-based research model (Mao &Palvia, 2006) which is consistent with that of Karahanna et al (1999),in a different setting, namely Nigeria. This is because it would be erroneous to assume that IT acceptance theories predict equally well in other settings as the robustness of the model may vary across different contexts and thus needs to be empirically tested.

### **Statement of the Problem**

Studies using a similar model of IT acceptance have been carried out in other cultures like the US and China (Karahanna et al., 1999; Mao &Palvia, 2006). If we adopt these studies, there will be a problem because context variation is very significant in studies of this nature. From a theoretical perspective, testing a model based on existing innovation theories and empirical work from the USA or China in the Nigerian cultural setting could offer a substantially different view. For instance, the US has a high degree of individualism while Nigeria is a collectivist society (see Hofstede, 2018). On the other hand, Nigeria is a normative and indulgent society while China is a pragmatic and restrained society (Hofstede, 2018). Therefore, Nigeria's cultural status is the first problem that triggered this study. This is because culture has a significant impact on IT acceptance (Straub, 1994; Straub et al, 1997). More importantly, we expect differences in the effects of the determinants of acceptance and behavioral intention particularly in the context of VMS.

In academic circles, studies on consumers' acceptance of mobile advertising focused on either SMS (e.g.Suher&Ispir, 2009; Loya, 2013) or MMS (e.g. Hsu et al., 2007; Lee et al, 2007) or both (Wong & Tang, 2008; Hosseini et al., 2010; Saadeghvaziri&Hosseini, 2011). However, studies specifically on any of the three components of MMS based mobile advertising such as voice message service, picture message service or video message service are lacking. There is the need for further specific empirical investigation on any of the three components of MMS

based mobile advertising since its success depends on consumers' acceptance of this emerging phenomenon.

### **Objectives of the Study**

The aim of this study is to establish a framework of factors influencing voice message service acceptance and intentions among mobile phone users in Nigeria.

The specific objectives are

- To determine the extent to which Innovation Diffusion Theory (IDT) variables of compatibility, trialability, image, visibility, result demonstrability and voluntariness individually influence consumers' acceptance of voice message service based mobile advertising.
- To establish the extent to which Technology Acceptance Model (TAM) variables of perceived usefulness and perceived ease of use individually influence consumers' acceptance of voice message service based mobile advertising.
- To find out whether perceived ease of use of voice message service based mobile advertising has a significant effect on perceived usefulness of voice message service based mobile advertising.
- To examine the extent to which Theory of Reasoned Action (TRA) factors of attitude and subjective norm individually contribute to behavioral intention to consume shop or purchase after receiving voice message service based mobile advertising.
- To ascertain the level to which Theory of Planned Behaviour (TPB) variable of perceived behavioral control contribute to behavioral intention to consume, shop or purchase after receiving voice message service based mobile advertising

### **Scope of the Study**

The present study is domiciled within the domain of consumer behavior. In terms of geographical scope, the study covers the six geopolitical zones in Nigeria. The major entity that is being analyzed in this study is active mobile phone users

### **Significance of the Study**

To begin with, in spite of the increasing importance of voice message service as marketing and advertising medium, there is relatively dearth of academic research and empirical support for it in the Nigerian context. At the same time, this study will add to the stock of existing knowledge and provide a base for further studies in this area of mobile advertising.

## **REVIEW OF RELATED LITERATURE**

### **Theoretical Framework**

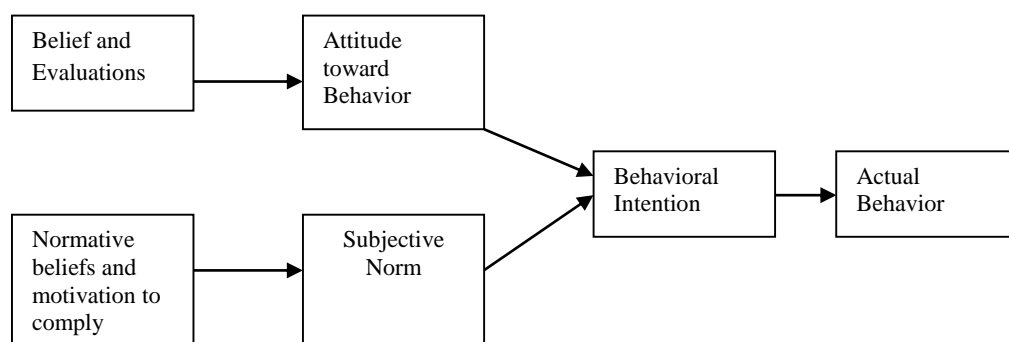
Consumer attitudes towards mobile advertising review is examined from theories of information technology acceptance: the first is the innovation diffusion theory (Rogers, 1962); the second is the theory of reasoned action (Fishbein & Ajzen, 1975); the third is the theory of planned behavior (Ajzen, 1985); and the fourth is the technology acceptance model (Davis,

1989). This study adapted some of the theories from Mao and Palvia's (2006) IT acceptance model with some extensions to offer us a more robust, more comprehensive and more complete understanding of the factors related to voice message service acceptance in Nigeria.

Rogers (1962) proposed the diffusion of innovation as a theory that seeks to explain how, why, and at what rate new ideas and technology spread through cultures. Moreover, Rogers (1983) proposed that adoption behavior is influenced by beliefs associated with five factors of innovation. These characteristics of innovation that influence an individual's decision to adopt or reject an innovation according to Rogers (1983) include relative advantage, compatibility, complexity or simplicity, trialability and observability. Also, considering the diffusion of new end-user IT, Moore and Benbasat (1991) proposed some extended constructs such as image, visibility, result demonstrability, and voluntariness of use. Image emerged as a separate factor from relative advantage and was seen as social approval. Visibility and result demonstrability were developed from observability. Voluntariness of use was a new construct beyond Roger's (1983) classification ( Hsu et al., 2007).

However, TAM and IDT are extremely similar in some constructs and supplement one another (Wu & Wang, 2005). Relative advantage is similar to perceived usefulness whereas complexity is similar to perceived ease of use. Therefore, it is better not to repeat similar constructs in the model in order to have a compact but well integrated model. In consequence, compatibility, trialability, image, visibility, result demonstrability and voluntariness are IDT variables contained in the integrated model of voice message service based mobile advertising adapted in this study. Furthermore, the study adapted the IDT constructs because apart from perceived usefulness and perceived ease of use, they are rarely included as behavioral beliefs in IT acceptance studies although they constitute some important concepts and thus worth additional research efforts.

The theory of reasoned action, TRA, (Figure 1) was proposed by Fishbein and Ajzen (1975). Three major constructs of the TRAAre Behavioral Intention, Attitude, and Subjective Norm. TRA suggests that a person's behavioral intention depends on the person's attitude about the behavior and subjective norm (Fishbein&Ajzen , 1975).

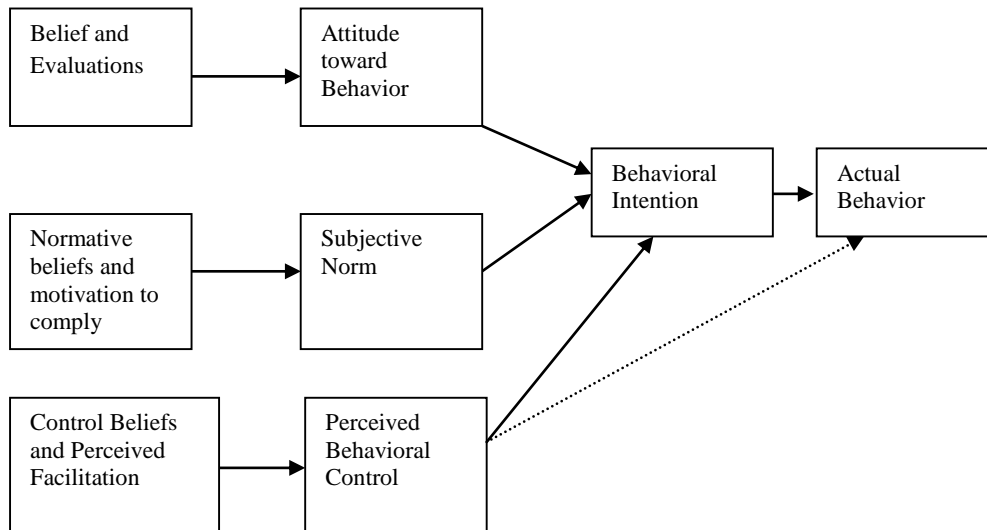


**Fig 1: The Theory of Reasoned Action (Fishbein and Ajzen, 1975)**

However, attitude, subjective norm and behavioral intention are TRA variables contained in the integrated model in the present study. Unfortunately, TRA's subjective norms construct has received inadequate attention from IT acceptance researchers (Mao &Palvia, 2006). It is

reasonable to assume that subjective norms play an important role in shaping behaviors in a collective culture, such as Nigeria. Therefore, it is adapted in our study.

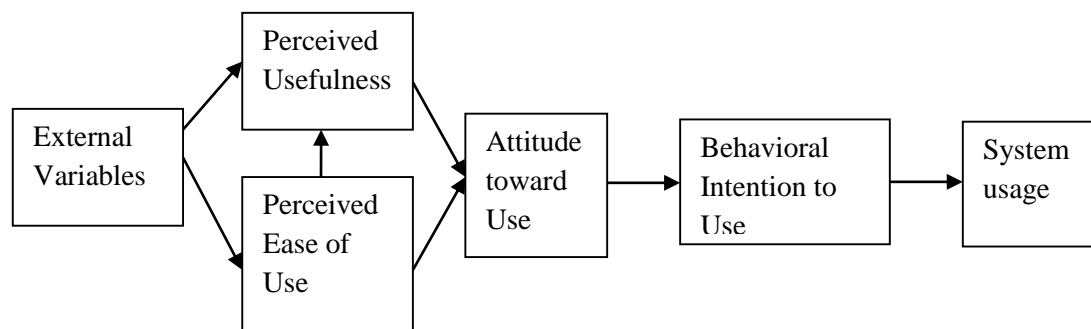
The theory of planned behavior (TPB) as shown in Figure 2 is a social psychology theory proposed by Ajzen (1985) to improve on the predictive power of the theory of reasoned action by including perceived behavioral control as one of the main independent constructs or factors. Therefore, the TPB states that attitude toward behavior, subjective norms, and perceived behavioral control, together shape an individual's behavioral intentions and behavior.



**Fig 2: The Theory of Planned Behavior (Ajzen, 1991)**

Perceived behavioral control variable added to attitude, subjective norm and behavioral intention together make up TPB constructs in the integrated model of voice message service based mobile advertising in this study. In this study, we develop a comprehensive model of TPB because TPB provides a very useful theoretical framework for understanding and predicting the acceptance of new information technology.

The technology acceptance model (TAM), arguably the most influential theory in the information systems field was proposed by Davis (1989) and Davis et al. (1989). TAM theorizes that an individual's behavioral intention to use information technology system is determined by two beliefs namely, perceived usefulness and perceived ease of use. Please refer to Figure 3. Similarly, Dishaw, Strong and Bandy (2002) confirmed the original TAM position that perceived ease of use also influences perceived usefulness.



**Fig 3: Technology acceptance model (Davis, 1989 as illustrated by Debili and Kumar, 2013)**

Researchers like Davis et al. (1989), Mathieson (1991), Adams, Nelson and Todd (1992) and Straub et al (1997) have tested the TAM in several studies on IT use. On the contrary, researchers like Wixom and Todd (2005) have also extended TAM in their studies. Moreover, Venkatesh and Davis (2000) provided a theoretical extension of the technology acceptance model called TAM2. However, in this study, perceived usefulness and perceived ease of use with the later influencing the former have been adopted as TAM constructs to develop the present research model. Unfortunately, while perceived usefulness and perceived ease of use are studied consistently in IT acceptance research, the link between perceived ease of use and perceived usefulness are rarely studied. Therefore, we develop a more comprehensive model of TAM and test it in the Nigerian context.

### **Hypotheses Development**

The literature suggests the following variables are relevant to consumer's attitudes towards mobile advertising: compatibility, trialability, image, visibility, result demonstrability, voluntariness, perceived usefulness, perceived ease of use, attitude toward usage, subjective norm, perceived behavioral control and behavioral intention. Accordingly, twelve factors were identified and reviewed in this research. The meanings of these important variables and the proposed hypotheses to be tested in the empirical study are explained below.

### **Compatibility**

Compatibility is the degree to which the innovation fits with the potential adopters existing values, previous experiences and current needs (Rogers, 1983; Moore & Benbasat, 1991). It is an IDT construct. The influence of compatibility on attitude has shown inconsistent result in other previous studies conducted in information technology (IT) context. To begin with, the studies by Ntemana and Olatokun (2012), and Yatigamma et al (2014) reveal that compatibility does not significantly influence attitude. In contrast, the studies by Mao and Palvia (2006), Dash et al (2014) and Ma et al (2015) have proved that compatibility has a significant direct effect on attitude. Thus, the first hypothesis is stated as follows:

**H<sub>1</sub>: H<sub>01</sub>:** Compatibility does not have a significant direct effect on attitude.

**H<sub>A1</sub>:** Compatibility has a significant direct effect on attitude

### **Trialability**

Trialability is the degree to which an innovation may be experimented with on a limited basis before making an adoption (or rejection) decision (Agarwal & Prasad, 1997; Tan & Teo, 2000). Moreover, apart from other studies like Nor and Pearson (2007), and Dash et al. (2014), numerous studies have proved that trialability does not have a significant effect on attitude in IT context (e.g., Karahanna et al., 1999; Mao & Palvia, 2006; Olatokun & Igbinedion, 2009; Ntemana & Olatokun, 2012; Yatigamma et al., 2014). Accordingly, the second hypothesis is stated as follows:

**H<sub>2</sub>: H<sub>02</sub>:** Trialability does not have a significant effect on attitude.

**H<sub>A2</sub>:** Trialability has a significant effect on attitude.

## Image

Image in IDT parlance is the degree to which use of an innovation is perceived to enhance one's image or status in one's social system (Moore & Benbasat, 1991). It emerged as a separate factor from relative advantage and was seen as social approval (see Moore & Benbasat, 1991). Nevertheless, attitude was significantly influenced by image in mobile marketing context (Ismail & Razak, 2011). This result confirms that of Karahanna et al.'s (1999) where image had impact on attitude. In contrast, in Mao and Palvia's (2006) study, image had no impact on attitude. Therefore, the third hypothesis is stated as follows:

**H<sub>3</sub>: H<sub>03</sub>:** Image is not a significant predictor of attitude.

**H<sub>A3</sub>:** Image is a significant predictor of attitude.

## Visibility

Visibility is the degree to which adopters see the innovation as being visible in the adoption context (Moore & Benbasat, 1991). Visibility and result demonstrability were developed from Roger's (1983) observability classification by Moore & Benbasat (1991). Several studies have confirmed visibility to have a significant effect on attitude in IT context (e.g., Mao & Palvia, 2006; Puschel & Mazzon, 2010). Moreover, Karahanna et al. (1999) showed a different finding. In consequence, the proposed fourth hypothesis is as follows:

**H<sub>4</sub>: H<sub>04</sub>:** Visibility does not have a significant direct effect on attitude.

**H<sub>A4</sub>:** Visibility has a significant direct effect on attitude.

## Result Demonstrability

Result demonstrability is the degree to which the results of using an innovation are perceived to be tangible (Moore & Benbasat, 1991). As has been said previously, result demonstrability and visibility were developed from Roger's (1983) earlier classification by Moore & Benbasat (1991). Moreover, the effect of result demonstrability on attitude in IT contexts has shown inconsistent result in prior studies. The study by Mao and Palvia (2006) reveals that result demonstrability is a significant predictor of attitude. Conversely, the studies by Agarwal and Prasad (1997) and Karahanna et al (1999) have proved that result demonstrability is not a significant predictor of attitude. As a result, the following is the fifth hypothesis:

**H<sub>5</sub>: H<sub>05</sub>:** Resultdemonstrability is not a significant predictor of attitude.

**H<sub>A5</sub>:** Resultdemonstrability is a significant predictor of attitude.

## Voluntariness of Use

Voluntariness of use is the degree to which the use of the innovation is perceived as being of free will. It is a new construct developed by Moore and Benbasat (1991) which was beyond Roger's (1983) classification. The findings of Agarwal and Prasad (1997) show that perceived voluntariness plays a significant role in acceptance behavior in IT contexts. Therefore, the proposed sixth hypothesis is stated as follows:

**H<sub>6</sub>: H<sub>06</sub>:** Voluntariness does not have a significant direct effect on attitude.

**H<sub>A6</sub>:** Voluntariness has a significant direct effect on attitude.

### Perceived Usefulness

Perceived usefulness has varying definitions depending on the context. Moreover, taking a cue from Knutsen et al (2005), in this study's context, perceived usefulness or relative advantage is defined as the degree to which voice message service based mobile advertisements provide benefits to individuals or is better than its alternatives such as broadcast ads, print ads, outdoor ads, SMS advertisements, other MMS variants ads like video message service ads, photo message service ads, email ads, etc in every day situation. Numerous studies have confirmed the relationship between perceived usefulness and attitude in information technology context (Mao &Palvia, 2006; Lu et al, 2009; Mukherjee, 2016). Specifically, in mobile advertising context, previous studies have confirmed that perceived usefulness has a direct significant influence on attitude (Hosseini et al., 2010; Ismail &Razak, 2011; Mansour, 2012). Thus, the proposed seventh hypothesis is stated as follows:

**H<sub>7</sub>: H<sub>07</sub>:** Perceived usefulness does not have a significant influence on attitude.

**H<sub>A7</sub>:** Perceived usefulness has a significant influence on attitude.

### Perceived Ease of Use

Taking a cue from Davis (1989) and Knutsen et al. (2005), in this study, perceived ease of use refers to the degree to which individuals associate freedom of difficulty with the use of voice message service based mobile advertisements. In voice message service based mobile advertisements; it includes easy access to customer services, accessibility on mobile phones with the most basic features, crisp sound, minimal drop calls, high quality of service and adequate consumer rights protection. Prior researches in information technology context have recognized the effect of perceived ease of use on attitude (Shin et al, 2009; Mukherjee, 2016). On the other hand, in mobile advertising context, prior researches found perceived ease of use not to have significant influence on attitude (Hosseini et al, 2010; Ismail &Razak, 2011) as obtained in other IT contexts (e.g. Karahanna et al., 1999; Mao &Palvia, 2006). Also, the original TAM posits that perceived ease of use has a direct effect on perceived usefulness (Davis, 1989). Thus; the eighth and ninth hypotheses are stated as follows:

**H<sub>8</sub>:H<sub>08</sub>:** Perceived ease of use does not have a significant influence on attitude.

**H<sub>A8</sub>:** Perceived ease of use has a significant influence on attitude.

**H<sub>9</sub>: H<sub>09</sub>:** Perceived ease of use does not have a significant direct effect on perceived usefulness.



**H<sub>A9</sub>:** Perceived ease of use has a significant direct effect on perceived usefulness.

### **Attitude**

Attitude refers to an individual's positive or negative evaluation about performing a particular behavior (Ismail & Razak, 2011). An individual having more positive attitude towards a behavior is likely to develop an intention to carry out that behavior (Ajzen, 1991). In the present study, consumers' attitude towards voice message service based mobile advertising refers to the individuals' positive evaluation towards intention to receive voice message service based mobile advertising services. Nevertheless, several studies in different contexts have confirmed that attitude has significant direct influence on behavioral intention (Mao & Palvia, 2006; Ham et al, 2015; Nguyen, 2017; Sood et al, 2017). This significant direct influence of attitude on behavioral intention has been proven in mobile advertising contexts (Ismail & Razak, 2011; Mansour, 2012; Martinez-Ruiz et al, 2016). Thus, the tenth hypothesis is stated as follows:

**H<sub>10</sub>: H<sub>O10</sub>:** Attitude does not have a significant direct influence on behavioral intention.

**H<sub>A10</sub>:** Attitude has a significant direct influence on behavioral intention.

### **Subjective Norm**

Subjective norm (SN) reflects perceptions that significant referents desire the individual to perform a behavior (Ajzen 1985, 1991). In mobile advertising context, subjective norm refers to the perceived pressure from the people who consumers think are important to them (Ismail & Razak, 2011). Some studies have confirmed subjective norm not to have significant influence on behavioral intention in IT context (Shih & Fang, 2004; George, 2004; Hsu et al, 2006) and even other contexts (e.g. Nguyen, 2017). In contrast, several studies have confirmed a significant positive relationship between subjective norm and behavioral intention in IT context (Mao & Palvia, 2006; Ismail & Rasak, 2011, Mansour, 2012; Ham et al. 2015). In consequence, the eleventh hypothesis is proposed:

**H<sub>11</sub>: H<sub>O11</sub>:** Subjective norm does not have a significant influence on behavioral intention.

**H<sub>A11</sub>:** Subjective norm has a significant influence on behavioral intention.

### **Perceived Behavioral Control**

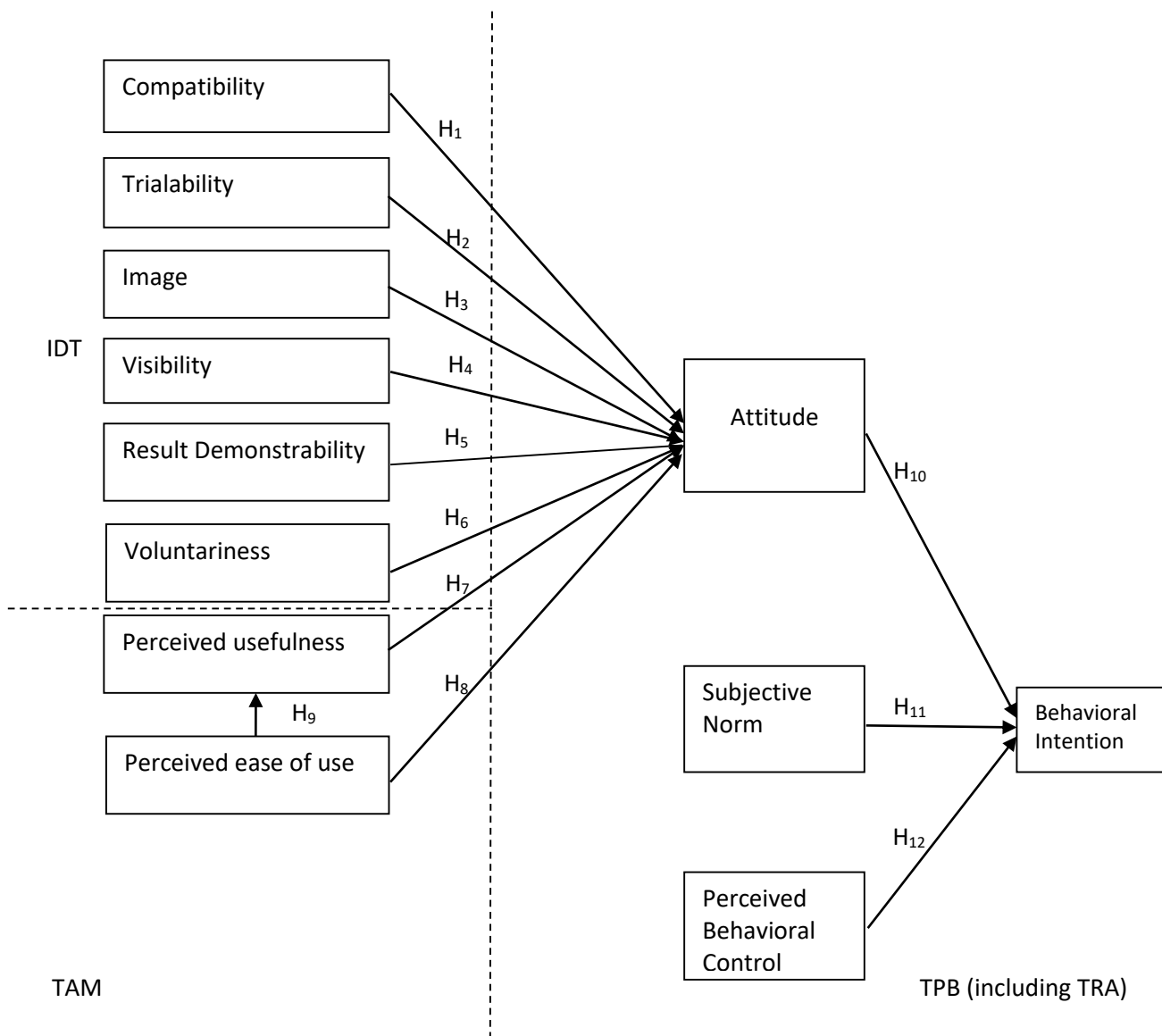
Perceived behavioral control (PBC) reflects perceptions of internal and external constraints on behavior, or alternatively, reflects beliefs regarding access to the resources and opportunities needed to perform a behavior (Ajzen 1985, 1991). Nevertheless, studies have confirmed perceived behavioral control to have a significant influence on behavioral intention (Taylor & Todd, 1995; Ham et al., 2015). On the other hand, Smith (2015) found no statistically significant relationship between perceived behavioral control and intention. Therefore, the proposed twelfth hypothesis is stated as follows:

**H<sub>12</sub>: H<sub>O12</sub>:** Perceived behavioral control does not have a significant influence on behavioral intention.

**H<sub>A12</sub>:** Perceived behavioral control has a significant influence on behavioral intention.

### **Conceptual Model**

The research model is formulated based on the foregoing discussion and hypotheses (Figure 4 below). The model is consistent with that of Mao and Palvia (2006) with the exception of a few links. These include the link between voluntariness and attitude, as per IDT, the link between perceived ease of use and perceived usefulness, as per TAM and the link between perceived behavioral control and behavioral intention, as per TPB. It includes aspects of IDT (compatibility, trialability, image, visibility, result demonstrability and voluntariness) and the key determinants for the TAM (perceived usefulness and perceived ease of use). It is supported by other constructs from the TRA (behavioral intention, attitude and subjective norm) and by extension the TPB (by including perceived behavioral control). Thus, this model is the most suitable for helping us confirm whether these factors are at work in Nigeria.



**Fig4: Conceptual model of voice message service based mobile advertising acceptance.**

## METHODOLOGY

## Research Design

Descriptive research design was adopted in this study and cross-sectional survey which is the predominant method of executing this type of research design is also adopted.

## Population of the Study

The population of this study comprises active mobile phone users in Nigeria. Active voice subscriptions per state as at March, 2016 as published by National Bureau of Statistics (2016) is 148, 745,464. Moreover, this figure is as a result of many users carrying multiple phones. Similarly, it is common for individuals to have more than one SIM card and handsets with multiple SIMs are becoming increasingly popular across Africa (Moronfolu, 2012). Therefore, the population of this study should comprise the active mobile phone users which includes multiple phone users/multiple SIM users and as such is tantamount to double/multiple counting. Thus, the population falls between what is known and what is not known.

## Sample Size Determination

The sample size was determined using the means value method where

$$n = \frac{\sigma^2 Z_{\frac{\alpha}{2}}^2}{e^2} \quad (\text{Horim\& Levy, 1981})$$

where

n = sample size

$\sigma^2$  = variance

$Z_{\frac{\alpha}{2}}$  = the ordinate from the standard normal distribution table corresponding to an  $\alpha$  level of significance, and

e = tolerance limit.

Because the population falls between what is known and what is not known, then for a significance level ( $\alpha$ ) of 5%, and a tolerance limit (e) of 10% and an estimated variance ( $\sigma^2$ ) of 6.53, the sample size required for this study is calculated as

$$n = \frac{(6.53)(1.96)^2}{0.1^2} = 2,508.6 \approx 2,509 \text{ respondents.}$$

## Sampling Procedure

Cluster sampling was used to generate six clusters represented by the six geo-political regions in Nigeria and Abuja Federal Capital Territory namely, South-east, South-south, South-west, North-east, North-central including Abuja FCT, and North-west. Going by the preliminary 2006 census figures, we then employed proportionate stratified sampling technique (Agbonifoh&Yomere, 1999; Hair et al, 2000) to arrive at 293; 376; 495; 339; 364 and 642 respondents which are judgmentally represented by six towns namely, Awka (South-east), Port Harcourt (South-south), Ikeja (South-west), Bauchi (North-east), Makurdi (North-central including Abuja) and Kano (North-west). The six towns were judgmentally sampled for the study because they are the administrative capital of the states that have the highest population

in each of the clusters. On the other hand, the samples for the study were selected based on the mobile phone users the researcher has easy access to and the ones that are conveniently located.

### Research Instrument

The survey instrument employed in this study to elicit responses from the respondents is the questionnaire. Similarly, the questionnaire had four major parts. The first part comprised the introductory letter, instructions for completing the questionnaire and the respondent's demographic data. The second, third and fourth parts of the questionnaire contain the core subject-matter sections and were developed based on the proposed research model (see Figure 4). The items used to operationalize the constructs of each investigated variable were adapted from relevant previous studies to suit voice message service based mobile advertising context and ensure content validity. Table 1 summarizes the informing literature for the variables.

**Table 1: Research Variables and Sources**

Variable	Source
Compatibility	Hsu et al. (2007)
Trialability	Hsu et al (2007)
Image	Hsu et al. (2007)
Visibility	Hsu et al. (2007)
Result Demonstrability	Hsu et al. (2007)
Voluntariness	Hsu et al. (2007)
Perceived Usefulness	Bauer et al. (2005)
Perceived Ease of Use	Wu and Wang (2005)
Attitude	Taylor and Todd (1995) as reported by Xu (2006)
Subjective Norm	Shimp and Kavas (1984) as reported by Bauer et al. (2005)
Perceived Behavioral Control	Taylor and Todd (1995)
Behavioral Intention	Taylor and Todd (1995) as reported by Xu (2006).

In addition, each variable and their various items were measured by using a five-points Likert scale with end points ranging from “strongly disagree” (1) to “strongly agree” (5).

### Reliability of Measuring Instrument

Reliability test was carried out on the research instrument designed with a five point Likert scale mostly to measure the variables identified in the study. These tests were administered to 30 respondents using test-retest method (Heise, 1969). In other words, 30 copies of the questionnaire were distributed to the 30 respondents and after a period of one month, the same copies of the questionnaire were once again distributed to the same 30 respondents. The test-retest reliability coefficient of the measuring instrument was determined using correlation analysis by correlating the first set of scores (R1) with the second set of scores (R2) for all the dependent and independent variables in the study. The test-retest reliability coefficient for the whole set of items in this study was 0.93 indicating highly reliable measurement scale. This is well above the 0.70 threshold value for acceptable test-retest reliability result suggested by Terwee et al. (2007) in the health domain. Also, the correlation is significant at the 0.01 level of significance. This means that the instrument can be reliably used in this research.

### Validity of Measuring Instrument

Two steps were taken to ensure that the instrument used in this research is valid. First, the researchers ensured that the items in each variable reflect and represent the various constructs in voice message service based mobile advertising. Second, Pearson correlation coefficients were computed to measure convergent validity (Fornell&Larcker, 1981) by correlating the first set of scores with the second set of scores for each of the constructs in the study (see Table 2). A stricter minimum requirement for measures of marketing constructs is 0.6 (Churchill, 1979; Peter, 1979), while some scholars recommend a liberal minimum requirement of 0.5 (e.g., Fornell&Larcker, 1981; Hair et al., 2010). Interestingly, all the Pearson correlation coefficients are considered acceptable because they are not below the benchmark recommended by both schools of thought. Therefore, all factors in the measurement model have adequate convergent validity. Moreover, all analyses were carried out using SPSS.

**Table 2: Variables and Pearson Correlation Coefficients Extracted from Measuring Convergent Validity**

Construct	Pearson correlation coefficient (r)
Compatibility	0.72
Trialability	0.60
Image	0.66
Visibility	0.79
Result Demonstrability	0.85
Voluntariness	0.70
Perceived Usefulness	0.70
Perceived Ease of use	0.75
Attitude	0.90
Subjective Norm	0.76
Perceived Behavioral Control	0.84
Behavioral Intention	0.75

### Administration of the Instrument

To ensure the interpretation and explanation of difficult to understand areas in the questionnaire and also guarantee a high percentage response rate, the copies of the questionnaire were administered on face to face basis especially for illiterate respondents. Thus, for the illiterate, our team members translated the questionnaire from English to relevant local language (Igbo, Hausa-Fulani, Yoruba, Tiv or any other useful native language). On the other hand, to ensure that the distribution and collection processes were systematic and objective, the drop-off and pick-up method (Ibeh, 2004) was adopted in administering the questionnaire to more literate respondents.

### Model Development and Statistical Method of Data Analysis

Literature especially Davis (1989) gives an indication that perceived ease of use and perceived usefulness are related in such a way that perceived ease of use may actually be a causal

antecedent to perceived usefulness. His study thus makes it relevant that we check the relationship between perceived usefulness and perceived ease of use. In other words, there is need to test for co-linearity between perceived usefulness and perceived ease of use. Thus, this relationship was checked by the use of the correlation coefficient between perceived usefulness and perceived ease of use. Using the Pearson correlation coefficient ( $r$ ) between perceived usefulness and perceived ease of use, a correlation value  $r = 0.54$  was obtained with a sample size of 30 using first set of questionnaire.

Moreover, when subjected to a statistical significance test using  $t$  – test statistic, this correlation value was found to be significant (i.e.,  $\rho \neq 0$ ). To be more precise, there is a significant correlation between perceived usefulness and perceived ease of use. Since  $t$ -calculated which is 3.39 is greater than the critical value which is 2.05 at a significance level of 5%, the null hypothesis of no significant correlation was rejected. There is indeed a significant correlation between perceived ease of use and perceived usefulness.

Since perceived usefulness and perceived ease of use are significantly correlated, either of them could be used in place of the other in the proposed research model.

The choice in this research is perceived ease of use. This is predicated on the published paper by Davis (1989) which established that perceived ease of use has a direct effect on perceived usefulness. This adoption of perceived ease of use only will solve the potential problems associated with multicollinearity. As a result, hypothesis 7 which aims at studying the influence of perceived usefulness on attitude is no longer relevant in this study. Additionally, hypothesis 9 which aims at studying the effect of perceived ease of use on perceived usefulness is no longer appropriate in this study. That is to say, the initial 12–variable and 12-hypothesis proposed research model was refined and resulted in a research model with 11 variables and 10 hypotheses.

### **Analysis of Data**

The data will be analysed using a two-stage regression analysis. This is because the model encompasses two dependent variables (behavioral intention and attitude) each with linear relationships with other independent variables. Multiple regression analysis is a statistical technique which analyzes the linear relationship between a dependent variable and multiple independent variables by estimating coefficients for the equation for a straight line (Hair et al, 2000).

### **Instrument Administration and Collection**

The total number of copies of the questionnaire produced and distributed in the six geopolitical regions represented by six towns in accordance with the sample size was 2,509, which is 100%. Out of this figure, 2,347 copies were returned, representing a 93.5% response rate.

Out of the 2,347 returned copies of the questionnaire, 2,257 representing 96.2% were usable for the final analysis. Also, this 96.2% valid response rate compares favorably to the 78.6% and 95.8% valid response rate obtained in similar studies by Yang et al (2010) and Ismail and Razak (2011) respectively.

### **Demographic Characteristics of Sample**

With respect to gender distribution of the respondents, male respondents dominated the sample by 1,222, accounting for 54.1 percent. The age distribution of the respondents shows that those within the age range of 18-35 years were more by 1,036, accounting for 45.9%. Coming next were those within the age range of 36-47 years. They were 474 or 21 percent. A large number of the respondents, 1,270 or 56.3 percent, were single. Those married were 876 (38.8%). Accordingly, 764 (33.9%) of the respondents were Igbos, 662 (29.3%) were of the Hausa/Fulani tribe, 326 (14.5%) were Yorubas, 170 (7.5%) were of the Tiv tribe, and 335 (14.8%) represented other tribes. Certainly, 1,490 (66%) of the respondents were Christians, 714 (31.6%) were of the Islamic religion, 45 (2%) belonged to African Traditional Religion, and 8 (0.4%) represented other religions.

The occupational distribution of the respondents reveals that most of the respondents were students. Those in this cohort were 903 or 40 percent. Six hundred and forty-five (28.6%) respondents said they were civil servants. Five hundred and eighty-six (26%) said they were in business/trading. Seventy-nine (3.5%) said they were farmers, and 44 (1.9%) said they belonged to other occupations. The income distribution of the respondents shows that out of the 2,257 respondents, 878 (38.9%) earned below ₦18,000 per month. Four hundred and ninety-three (21.9%) respondents earned between ₦18,001 to ₦30,000. Four hundred and sixty-three (20.5%) earned between ₦45,001 and above; and 423 (18.7%) earned between ₦30,001 to ₦45,000.

The distribution of the respondents' educational qualifications shows that most of the respondents had acquired up to secondary school education. Eight hundred and forty-five (37.4%) of them made up this category. Seven hundred and eighty-two (34.7%) respondents acquired tertiary level education; 390 (17.3%), postgraduate level education; and 240 (10.6%) had either not acquired any formal education or had acquired primary level education.

The respondents also expressed views on what they mostly use their mobile phones for. A good majority of the respondents, 1,482 of them, representing 65.7 percent said they mostly use their mobile phones to receive and make voice calls. Another 355 (15.7%) said they mostly use their mobile devices for receiving and sending SMS; and 15 (5.1%) said they used theirs mostly for snapping, receiving and sending pictures. Similarly, 60 (2.7%) said they mostly use their phones for listening to music and watching video. Two hundred and eleven (9.3%) said they used their phones mostly for receiving internet services, and 33 (1.5%) said they mostly use their phones for playing games.

Statistics regarding how long respondents have received voice message service show that the number of respondents that have received VMS for 4-6 years (820 or 36.3%) was highest, followed by those that have received VMS for 1-3 years (749 or 33.2%) and those that have received for 7-9 years (330 or 14.6%) respectively. The numbers of times respondents receive voice message service per month vary. Evidently, 70.3% of the respondents receive VMS at least three times per month.

## **Hypotheses Testing**

The hypotheses were tested one after the other by employing regression analysis using the SPSS Version 16.0 software. Below is a summary table for results of analyses of variables towards attitude.

**Table 3** Results from Testing Influence of Independent Variables on Attitude.

Hypothesis	Variables Involved	Regression Equation	R <sup>2</sup> Value	ANOVA p-value	Remark
H <sub>1</sub>	Attitude Vs Compatibility	$X_1 = 0.407 + 0.518Z_1$	0.712	0.035	Sig. Relationship
H <sub>2</sub>	Attitude Vs Trialability	$X_1 = 0.405 + 0.488Z_2$	0.818	0.013	Sig. Relationship
H <sub>3</sub>	Attitude Vs Image	$X_1 = 0.429 + 0.504Z_3$	0.743	0.027	Sig. Relationship
H <sub>4</sub>	Attitude Vs Visibility	-	0.004	0.090	No Sig. Relationship
H <sub>5</sub>	Attitude Vs Result Demonstrability	-	0.096	0.549	No Sig. Relationship
H <sub>6</sub>	Attitude Vs Voluntariness	-	0.065	0.626	No Sig. Relationship
H <sub>7</sub>	Attitude Vs Perceived Usefulness	-	-	-	No longer Relevant
H <sub>8</sub>	Attitude Vs Perceived Ease of Use	-	0.080	0.586	No Sig. Relationship

The model relating behavioral intention (y) to attitude (X<sub>1</sub>), subjective norm (X<sub>2</sub>) and perceived behavioral control (X<sub>3</sub>) generated the model estimate as:

$$y = 0.566 + 1.256 X_1 - 0.297X_2 + 0.708X_3 \quad \text{--- (4.4)}$$

with R<sup>2</sup> value of 0.814 and an ANOVA p-value of 0.265.

From the foregoing, there appears a paradox. Here, a big R<sup>2</sup> value indicating a significant regression extracting 81.4% information about y from X<sub>1</sub>, X<sub>2</sub>, and X<sub>3</sub>. On the other hand, the ANOVA p-value obtained which is 0.265 (see Appendix H) indicates a not significant regression relationship for an  $\alpha$  (significance level) of 0.05.

Literature in regression analysis (Neter et al, 1996) pointed out that the major cause of this paradoxical situation is high correlation amongst two or more independent variables in the regression (multicollinearity).



To test the existence of multicollinearity, the correlation between the three independent variables,  $X_1$ ,  $X_2$ , and  $X_3$  were carried out with the results as shown in the matrix below.

$$\begin{matrix} & X_1 & X_2 & X_3 & & & & \\ X_1 & \left( \begin{matrix} 1.00 & 0.94(0.005) & 0.280(0.591) \\ 0.94(0.005) & 1.00 & 0.348(0.499) \\ 0.280(0.591) & 0.348(0.499) & 1.00 \end{matrix} \right) & & & & & & \\ X_2 & & & & & & & \\ X_3 & & & & & & & \end{matrix} \quad (1.0)$$

Having observed that there is a significant correlation between  $X_1$  (attitude) and  $X_2$  (subjective norm) ( $r = 0.944$  and  $p$ -value of  $0.005$ ), a remedial measure is to drop one of the two variables that are highly correlated from the regression model.

Since Attitude ( $X_1$ ) is considered more important in the subject matter of this research,  $X_2$ , which is subjective norm, would be dropped from the model. The new regression model is now

$$Y = \beta_0 + \beta_1 X_1 + \beta_3 X_3 + \varepsilon \quad (2.0)$$

Where  $\varepsilon$  is assumed normally distributed with mean 0 and constant variance.

Since  $X_1$  is not observable directly but could be estimated through  $Z_1$  (Compatibility),  $Z_2$  (trialability) and  $Z_3$  (image), the first stage of the regression model is to estimate  $X_1$ , thus

$$X_1 = \alpha_0 + \alpha_1 Z_1 + \alpha_2 Z_2 + \alpha_3 Z_3 + e \quad (3.0)$$

Where  $e$  is assumed normally distributed with mean 0 and constant variance.

Superimposing equation (3.0) into equation (2.0) yields

$$y = \beta_0 + \alpha_1 Z_1 + \alpha_2 Z_2 + \alpha_3 Z_3 + \beta_3 X_3 + \varepsilon \quad (4.0)$$

A least squares estimate of parameters of equation (4.0) gave equation (5.0) below

$$y = 0.127 - 0.832Z_1 + 1.029Z_2 + 0.258Z_3 + 0.313X_3 \quad (5.0)$$

The least squares output showed an  $R^2$  value of 1.00 and ANOVA  $p$ -value of 0.025. The coefficient estimates for the independent variables  $Z_1$ ,  $Z_2$ ,  $Z_3$  and  $X_3$  in 5.0 showed  $p$ -values of 0.032, 0.029, 0.075 and 0.053 respectively. All these indicate an excellent regression relationship between the dependent variable  $y$  (behavioral intention) and the independent variables  $Z_1$  (compatibility),  $Z_2$  (trialability),  $Z_3$  (image) and  $X_3$  (perceived behavioral control). These are tolerable within 10 percent significance hence the estimated regression equation is very reliable.

From the fore going the null hypotheses  $H_{010}$  and  $H_{011}$  below are clearly rejected on account of their small  $p$ -values (i.e.  $p$ -values less than 10 percent or 0.10) indicating that all the coefficients of equation 5.0 are significant in the model.

Equation 5.0 can now be applied in predicting behavioral intention at given values of  $Z_1$ ,  $Z_2$ ,  $Z_3$ , and  $X_3$  when converted to percentages.

**H<sub>10</sub>: H<sub>010</sub>:** Attitude does not have a significant direct influence on behavioral intention.

**H<sub>A10</sub>:** Attitude has a significant direct influence on behavioral intention.

It is clear from equation (5.0) that attitude ( $X_1$ ) which is made up of  $Z_1$ ,  $Z_2$  and  $Z_3$  has a significant effect on behavioral intention. In other words, its presence in the final model, estimate through  $Z_1$ ,  $Z_2$  and  $Z_3$  which are all significant, show that  $X_1$  (attitude) contributes

$$-0.832 + 1.029 + 0.258 = 0.455$$

This means that behavioral intention ( $y$ ) will increase by 0.455 (45.5%) for every unit increase in attitude if perceived behavioral control ( $X_3$ ) is held under control (ie held constant).

**H<sub>11</sub>: H<sub>o11</sub>:** Perceived behavioral control has no significant influence on behavioral intention.

**H<sub>A11</sub>:** Perceived behavioral control has a significant influence on behavioral intention.

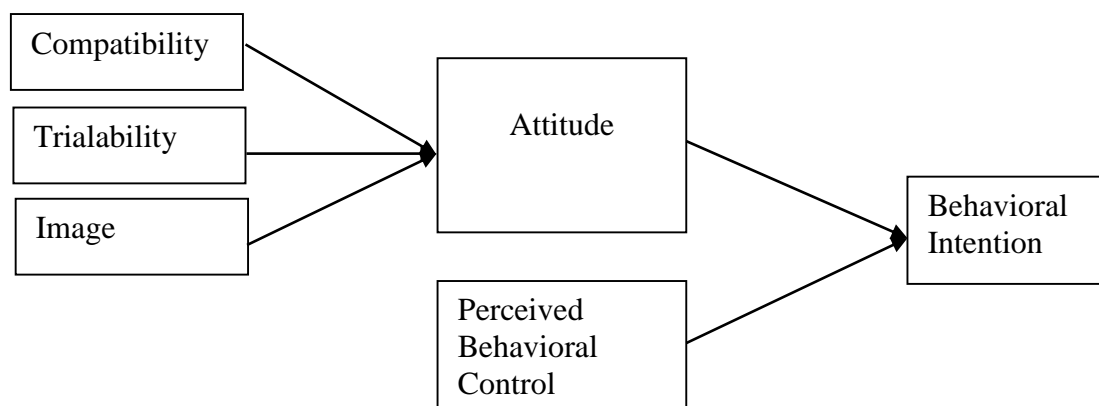
Similarly, behavioral intention ( $y$ ) will increase by 0.313 (31.3%) if  $X_3$  (perceived behavioural control) increases by 1% when attitude ( $X_1$ ) is held under control (ie held constant).

**Table 4: Results from Testing Influence of Attitude and Perceived Behavioral Control on Behavioral Intention**

Hypothesis	Variables Involved	Equation Coefficient	Remark
H <sub>10</sub>	Attitude Vs Behavioral Intention	0.455 (45.5%)	Significant Influence
H <sub>11</sub>	Perceived Behavioral Control Vs Behavioral Intention	0.313 (31.3%)	Significant influence

The results of the analyses, including the estimated parameters, their  $R^2$  values, ANOVA p-values and equation coefficients are shown in Tables 3 and table 4. From these tables three out of the seven hypothesized relationships (the relationship between attitude and compatibility, attitude and trialability, attitude and image) in the research model are statistically significant at  $\alpha = 0.05$ . The other four hypothesized relationships (the relationship between attitude and visibility, attitude and result demonstrability, attitude and voluntariness, attitude and perceived ease of use) in the research model are not statistically significant. In addition, both attitude and perceived behavioral control have significant effect on behavioral intention with equation coefficients of 0.455 and 0.313 respectively. Their regression equation shows an  $R^2$  value of 1.000 and ANOVA p-value of 0.025 (indicators of an excellent model).

The preceding results as shown in Table 3 and table 4 can be conceptualized into the following framework of consumers' acceptance and intentions towards VMS based mobile advertising in Nigeria and is thus captured in Figure 5 below:



**Fig 5:** Conceptualized Framework of Consumers Acceptance And Intentions Towards VMS Based Mobile Advertising In Nigeria.

The model depicted in Figure 5 above posits that three most important factors affecting consumers' attitude towards VMS based mobile advertisements in Nigeria are compatibility, trialability and image. The model also indicates that there are two key factors that influence behavioral intention towards VMS based advertising in Nigeria; they are; attitude towards VMS based mobile advertising and perceived behavioral control. Overall, Figure 5 provides answer to the main objective of this study; thus depicting the key factors affecting attitude towards VMS based mobile advertising, and by extension, revealing the crucial factors responsible for behavioral intention towards VMS based mobile advertising in Nigeria.

### **Discussion of Findings**

The present study supports prior studies conducted in different parts of the world as well as provides evidence of some contradictions. The discussion of the findings of this study is broken down into two broad classifications. First, the discussion of findings is focused on formation of attitude. Second, the discussion of findings dwelt on formation of behavioral intention. The key driver of all our discussion is the confirmation or non-confirmation of the applicability of IDT, TAM, and TPB as theoretical foundations to study mobile advertising acceptance among Nigerian phone users, particularly in the context of voice message services (VMS).

### **Formation of Attitude**

The important factors that influence attitude towards VMS based mobile advertising in Nigeria are: compatibility, trialability, and image. On the other hand, visibility, result demonstrability, voluntariness, and perceived ease of use did not impact attitude.

The effect of compatibility on attitude is significant among Nigerian mobile phone users in the context of VMS use. This finding corroborates the findings of previous studies in IT context such as Mao and Palvia(2006), Dash et al (2014) and Ma et al. (2015). Our finding contrasts those of Ntemana and Olatokun (2012) and Yatigamma et al. (2014) on the relationship between compatibility and attitude.

Trialability is a significant determinant of attitude. More importantly, it has the most significant influence on attitude. In existing studies conducted in other countries of the World like Nor and Pearson (2007) and Dash et al. (2014), the effect of trialability on attitude was significant. Nevertheless, a number of studies carried out in IT context (for example, Karahanna et al., 1999; Mao &Palvia, 2006; Mao &Palvia, 2006;Ntemana&Olatokun, 2012; Yatigamma et al. 2014) had shown that trialability did not influence attitude. The possible departure from the present study on trialability-attitude relationship could be that these studies were conducted in other IT contexts. However, the present study was conducted in the mobile advertising context.

Image is significant in our study in accordance with Ismail and Razak's (2011) study conducted in the mobile marketing context and Karahanna et al. (1999) study of windows technology but contrast that of Mao and Palvia (2006) that surveyed email users. This is because basically mobile phone ownership in Nigeria is still perceived as a status symbol. This is why many people carry multiple phones and many individuals carry handsets with multiple SIMs.

Visibility is not a significant determinant of attitude consistent with the results of Karahanna et al.'s (1999) study. This finding is inconsistent with the findings of Mao and Palvia (2006) and Puschel et al (2010). In consequence, our finding shows that among Nigerian mobile phone users, seeing others using VMS does not in any way reinforce a favorable attitude.

Result demonstrability does not influence attitude among Nigerian mobile phone users, particularly in the context of VMS use. This finding corroborates the findings in U.S. Studies (e.g, Agarwal & Prasad, 1997; Karahanna et al., 1999) but contrasts that of Mao and Palvia (2006) carried out in the Chinese context. Communicating the results of using VMS to Nigerian mobile phone users cannot trigger a favourable attitude towards VMS.

For Nigerian mobile phone users, it seems voluntariness is not important in the context of VMS. This contrasts the result of Agarwal and Prasad (1997) that voluntariness plays a significant role in acceptance behavior in IT context.

In our study, the mobile phone users' perceived ease of use of using VMS had no impact on attitude. This is consistent with the findings of prior researches conducted in mobile advertising context (Hosseini et al., 2010; Ismail &Razak, 2011) and other contexts (Straub et al, 1997; Karahanna et al., 1999; Mao &Palvia, 2006). Contrary to the present finding, Shin et al., (2009) and Mukherjee (2016) found the opposite, that perceived ease of use influences attitude in IT contexts. The significant relationship between perceived ease of use and perceived usefulness as unraveled by the present study sheds light on a number of policy and strategy direction in VMS use. The fact that mobile phone users find VMS easy to use, and provides benefits to them or is better than its alternatives like SMS, video messages service, photo message service, etc, it cannot reinforce a favorable attitude towards using VMS.

### **Formation of Behavioral Intention**

Our results support the belief that attitude has a direct influence on behavioral intention as professed by TRA. It also confirms TPB where perceived behavioral control influences behavioral intention. While both attitude and perceived behavioral control influence behavioral intention, attitude has more impact than perceived behavioral control.

Attitude is a significant determinant of behavioral intention. A plethora of scholarly works in different contexts have confirmed attitude to impact on behavioral intention (Davis et al., 1989; Taylor & Todd, 1995; Ham et al., 2015; Nguyen, 2017). Similarly, the present finding is consistent with the findings in mobile advertising contexts (Bauer et al., 2005; Hosseini et al., 2010; Ismail & Razak, 2011; Mansour, 2012; Martinez-Ruiz et al., 2016). Concomitantly, the present study's finding has its policy and strategy implications discussed in the next section.

Perceived behavioral control influences behavioral intention significantly among mobile phone users in Nigeria, particularly in the context of VMS use. The present study found support and is consistent with the findings of previous studies (e.g; Taylor & Todd, 1995; Ham et al., 2015). On the other hand, Smith (2015) found no statistically significant relationship to exist between perceived behavioral control and intention.

## CONCLUSIONS AND RECOMMENDATIONS

Technology is not a distraction but a fundamental business and social relations enabler. In consequence, VMS should not be seen as distracting but as a technology that can help service providers, brands and advertisers achieve their objectives. Overall, service providers and advertisers in Nigeria may need to revise their business models in line with the findings to reach out to their teeming VMS based mobile advertising consumers.

The recommendations of this study are as follows: First, service providers and marketers should definitely be advised against using impersonalized mass messages for communicating VMS advertising content. As a result, bulk VMS ads should be discouraged. Second, advertisers should target based on Average Revenue per User (ARPU) especially for high-end products to reach people of certain income brackets that spend a certain amount of airtime on the service provider's network. Third, the Nigerian Communications Commission (NCC) should mandate service providers to profile mobile phone users that subscribed to their network to be able to send them targeted ads.

## Limitations and Future Studies

The data for this study were collected from a convenience sample of mobile phone users in six towns in Nigeria. Future studies in the Nigerian context should obtain a completely random sample of mobile phone users in the country. This is because Nigerian consumers in the general population might be very different from consumers solely from the six towns. Second, the study is generalized to the six geopolitical regions in Nigeria. Therefore, it is recommended that future research is narrowed down to single city or region for specification issues. Further research needs to compare VMS acceptance among mobile phone users in different cities or regions in the country. Third, our study is restricted to a Nigerian sample only. Future research can be replicated in other countries to see what the result will look like.

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