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Factors influencing mobile banking continuous use in Sub-Sahara Africa: A study of mobile banking users in Nigeria

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Abstract

The ubiquitous diffusion of information and communications technology is fundamentally impacting several sectors. In the financial services sub-sector, the convenience and speed with which mobile banking (m-banking) applications offer users have made it one of the most popular applications in use. However, the growth trajectory of the application is questionably different as it has continually seen a decline in the Nigerian market. The aim of this study is therefore to examine the factors influencing m-banking continuous use in an emerging market context by using a hybrid of unified theory of acceptance and use of technology (UTAUT2), uses and gratification and privacy theories. Survey data were collected from 245 m-banking users in Nigeria. Using structural equation modelling for analysis, the study found that enabling environment is a critical determinant of continuous use. Contrary to some extant studies, we found that the role of social influence is a critical determinant of continuous use, just as embedding hedonic features engenders interactivity. Recommendations are offered.

Introduction

Digital technologies are altering consumers' purchase journey in various ways (Powers et al., 2012). Some decades ago, a purchase decision that could take a consumer weeks and months

because of information gathering on available competing products and services, prices and locations are currently made within minutes because of the quantum of information available to the consumer through digital technology. While other digital technologies offer different benefits to the user, mobile technologies have attracted unprecedented attention in recent times (Kauffman & Techatassanasoontorn, 2005). The rapid diffusion of mobile technology is predicated on the fact that while mobile devices provide consumers with unlimited access to information, mobile apps also provide consumers with tailor-made information such as gaming, news, banking, sports, commerce, and tourism (Shaikh and Karjaluoto, 2015). While there is uniformity in the high adoption rate of mobile devices in both the developed and emerging markets, different studies however found a wide gap on consumer adoption of mobile technologies in business transactions. For instance, while nine-in-ten Nigerians and South Africans own mobile phones (PewResearchCentre, 2017), around half, that is, 48% use it on social media such as Facebook while others are for making and receiving calls.

In Nigeria, for instance, the rapid diffusion of mobile devices such as smartphones and tablets accentuates the impacts it has made in other sectors such as the news media and banks which has led to a corresponding adoption by consumers in order to access these services. Specifically, all the 23 licensed money deposit banks own robust m-banking platforms which have provided a more convenient way through which customers conduct their banking transactions. Accordingly, as reported by the United Nations Conference on Trade and Development (UNCTAD, 2007), Nigeria is the leading country in Africa in terms of m-banking adoption. Additionally, a study after some few years (Bankole, Bankole and Brown, 2011), corroborated the UNCTAD report and argued that Nigerians' use of m-banking applications varied in different forms such as balance enquiry, statement request, and money transfer, indicating that there was a frenzied rate of adoption as soon as it was introduced in the Nigerian market. However, that rate of adoption could not be sustained as many consumers dumped the platform due to technical and regulatory challenges. For instance, a financial crisis in December 2016 saw purchases for Christmas celebrations got to a fever pitch as the rush for cash withdrawals could not be handled by the banks. Automatic teller machines (ATMs) also ran out of money, thereby casting a pale shadow on a festive season that is the most celebrated in the entire country. As a result, the multiplier effect of this economic quagmire was felt across the country. Besides the pain and hunger suffered by families, businesses such as fast food restaurants, retailers, transportation companies and

others were largely short of the expected number of customers because of the unavailability of cash. The above scenario paints a glaring picture of m-banking continuous usage behavior.

Accordingly, Shaikh and Karjaluoto (2015, p.131), define m-banking as "a product or service offered by a bank or a microfinance institute (bank-led model) or MNO (non-bank-led model) for conducting financial and non-financial transactions using a mobile device, namely a mobile phone, smartphone, or tablet." The emergence of m-banking is attributed to the availability of information and communication technology tools that enabled consumers' interaction with digital devices. Thus, just like tourism, e-tailing, education, transportation and so on, it became essential to develop mobile applications that harmonizes the different banking transactions to give the customer convenience in his/her relationship with the bank. Different studies have examined the antecedents of m-banking adoption in different contexts. Thus, Lin (2011) argues that two critical factors were responsible for m-banking adoption. Extant studies have validated positive relationships between facilitating conditions and continuous usage of document management system (Bhattacherjee, Perols and Sanford, 2008); social influence and continuous usage of SmartIDs and Government website (Venkatesh et al., 2011); hedonic features and continuous usage of Habbo, a virtual networking site (MäntymäKi and Salo, 2011). Interestingly, m-banking continuous use has been studied in different contexts particularly in the developed and technologically advanced economies (Lee and Chung, 2009; Shaikh and Karjaluoto, 2016). The reason for the preponderance of studies in such economies is that technological adoption by both individuals and corporate entities naturally follow a seamless paradigm by virtue of the technological ecosystem prevalent in such climes. However, there are empirical evidence to support that early adopters of technological innovation are not restricted to geographical boundaries but largely predicated on personal innovativeness of individuals irrespective of the prevalent socio-economic and technological profundities, and such innovation-prone consumers are more likely to adopt new technological innovations than laggards in the developed and technologically advanced economies (Akinci, Aksoy and Atilgan, 2004; De Mooij and Hofstede, 2011; Smith and Urpelainen, 2014), therefore making our study very suitable in the Nigerian context. Accordingly, our study aims to explore the factors influencing continuous usage of m-banking in Nigeria. Specifically, our study's three-fold objectives include:

- to examine the antecedents of m-banking continuous usage in a developing economy;

- to examine to what extent the hedonic features embedded on m-banking platforms influence continuous usage;
- to evaluate the differences in customer demographics in m-banking continuous usage.

Our study makes two key contributions to literature a.) it extends the m-banking continuous use literature by integrating the UTAUT and uses and gratification models, and b.) test this model in an emerging market context in Africa, thus, providing new insights to underlying factors to technology use.

Figure 1 introduces the framework of this study and fuses the technology acceptance model, gratification model, and trust to explain the m-banking continuous use. Facilitating condition, social influence, privacy, affective motivation, and tension directly predict m-banking app continuous use. The model also examines the moderating role of user's age and user's level of education on social influence, facilitating conditions and tension free constructs respectively.

[Insert Figure 1 about here]

Theoretical background and literature review

The Unified theory of acceptance and use of technology (UTAUT) was proposed and validated in order to provide a unified theoretical basis from which to facilitate research on information system (IS) and information technology (IT) adoption and diffusion (Venkatesh et al., 2003). A more complete and practical set of factors is obtained from these authors as a unified view of user adoption by combining eight competing theoretical models, the authors derived an overarching set of four constructs that have an immediate influence on acceptance and usage behaviour of technology. The theory postulates that four core constructs, performance expectancy, effort expectancy, social influence and facilitating conditions are direct determinants of IS/IT behavioural intention and ultimately behaviour (Venkatesh et al., 2003). The theory also assumes that the effect of core constructs is moderated by gender, age, experience, and voluntariness of use (Venkatesh et al., 2003).

The theory was developed through the review and integration of eight dominant theories and models, which are the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behaviour (TPB), a combined

Theory of Planned Behaviour/Technology Acceptance Model (C-TPB-TAM), the Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT) and the Social Cognitive Theory (SCT). These theories and models have been successfully utilised as fundamental antecedents to different branches of information science and innovation adoption such as mobile apps, electronic shopping, mobile commerce, m-banking and electronic financial services adoption. The motivation to define and validate the UTAUT was based on the argument that many of the constructs of existing theories are similar in nature, making it logical to map and incorporate them to create a unified theoretical basis (Venkatesh et al., 2003). UTAUT is still a relatively new model and has not been as widely used as TAM and IDT; it has gradually drawn researchers' attention and has been recently applied to exploring the users' acceptance of m-banking especially in Africa (Cudjoe, Anim & Nyanyofio, 2015). Interestingly, while the original UTAUT conceptualization was tested in an organisational context, an extension of it, UTAUT2, was used in the consumer context (Venkatesh, Thong and Xu, 2012). In the UTAUT2, voluntariness was dropped while hedonic motivation, experience and habit, and price value were included.

The key risks to the mobile device include: Malware, malicious applications, privacy violations relative to application collection and distribution of data, wireless carrier infrastructure, payments infrastructure/ecosystem, SMS vulnerabilities, hardware and operating system vulnerabilities, complex supply chain and new entrants into the mobile ecosystem and lack of maturity of fraud tools and controls (Pegueros, 2012). The perception of risk among individuals has been proved in technology adoption literature as an important element in acquiring new technology or services (Martins, Oliveira & Popovi, 2013). A recent study conducted by Farzianpour et al. (2014) found that users' perception of risk is a crucial driver to determine innovative/information technology acceptance. But consumers' performance risk perception, security risk perception, time loss risk perception, privacy risk perception and innovation adoption affect adoption of m-banking services. However, Martins, Oliveira, and Popovi (2013); Abadi, Kabiry and Forghani, (2013) found that risk to strongly predicts behavioural intention to adopt Internet/m-banking.

Moreover, the uses and gratification theory seeks to answer the question of why and how do individuals differ in their motivations (Joo and Sang, 2013). According to Joo and Sang, the theory argues that individuals are motivated to gratify felt desires. Originally stemming from the media discipline, the importance of the theory has drawn scholarly attention to the

underlying gratifications individuals derive from technological adoption. Accordingly, the theory has been used in use of social media, e-shopping and intentions to adopt m-banking (Whiting and Williams, 2013; Amin et al., 2012; Kang, Lee and Lee, 2012). M-banking, enabled through the use of mobile devices such as smartphones, tablets and personal digital assistants (PDAs), is used for basic banking operations like funds transfer, account balances, bills payment and account history (Lin, 2011; Tam and Oliveira, 2017).

Accordingly, customers who have more positive perceived relative advantage and those who find it easy to use were more favourable to its adoption. Additionally, among young people, compatibility, trust, credibility and ease of use were major influencers of its adoption among Germans (Koenig-Lewis, Palmer, & Moll 2010). As a matter of fact, Crabbe et al. (2009) found that age, educational level and occupation influenced its adoption in a socially cohesive culture like Ghana. In order to understand the resistant factors, Laukkanen & Kiviniemi (2010) posit that bank customers' slow adoption of m-banking is as a result of lack of sufficient information. To reduce information deficit, they suggested that banks and regulatory authorities should utilize all media channels both new and traditional media to espouse the benefits of m-banking. The successful adoption of m-banking by customer, according to Shaikh, Karjaluoto & Chinje (2015), is a vital strategy for customer retention. With the increased level of m-banking adoption in many economies including some developing countries, scholars have deemed it pertinent to examine factors that can lead to sustained use of the platform (Laukkanen, 2017). Specifically, Chen (2012) argued that post adoption relationship quality is fundamental to sustain continuous usage. As a matter of fact, it is critical for service providers to continuously provide support services and other enabling conditions so as to sustain the usage.

Facilitating conditions

Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh et al., 2003). The definition captures concepts embodied by three constructs: perceived behavioural control (TPB/DTPB, C-TAM-TPB), facilitating condition (MPCU) and compatibility (IDT). These constructs play a role in aspects of the technological and organizational environment that are designed to remove barriers to use. Taylor and Todd (1995) acknowledged the theoretical overlap by modelling facilitating conditions as a core

component of perceived behavioural control in TPB/DTPB. Facilitating conditions do have a direct influence on usage beyond that explained by behavioural intentions alone, thus, when moderated by experience and age, facilitating conditions will have a significant influence on usage behaviour (Deng et al. 2011). As argued by Bhattacherjee, Perols and Sanford (2008), initial adopters of a piece of technology will likely discontinue its use if the external factors are detrimental to its continuous use. Additionally, Venkatesh et al. (2011) posit that users will seek external assistance when confronted with difficulties and are prone to discontinue its use if the assistance does not come. Similarly, in a study of mobile banking users in Ghana, Crabbe, Standing, Standing and Karjaluoto (2009) found that educational level and gender significantly influences individuals' perception of facilitating conditions and intention to adopt m-banking, which also corroborates an earlier study by Haghirian and Madlberger (2005) in which education enhances consumers' interactivity and positive attitude towards mobile advertising. We thus argue that:

H1 *The facilitating conditions for m-banking app will positively influence the m-banking continuous use.*

H2 *The higher the education status, the stronger will be the link between FC and m-banking app continuous use.*

Social Influence

Venkatesh et al. (2003) stated that social influence is the degree to which an individual feels that it is important for others to believe he or she should use the new system. Three constructs are related to social influence: subjective norms (rational action theory, planned behavior theory, decomposed planned behavior theory and technology acceptance model 2), social factors (PC utilization model) and image (innovation diffusion theory). While they have different labels each of these constructs contains the explicit or implicit notion that the individual's behaviour is influenced by the way in which they believe others will view them as a result of having used the technology. The constructs are also said to behave similarly though not in voluntary context. However, each becomes significant when use is mandated (Venkatesh et al., 2003). Venkatesh and Davis (2000) suggested that such effects could be attributed to compliance in mandatory contexts that causes social influences to have a direct

effect on intention, in contrast, social influence in voluntary contexts operates by influencing perceptions about the technology.

In mandatory settings, social influence appears to be important only in the early stages of individual experience with the technology, with its role becoming less significant as the user gains experience with the technology (Venkatesh & Davis, 2000). Social influence has an impact on individual behaviour through compliance, internalization and identification mechanisms (Venkatesh & Davis, 2000). The view of compliance is consistent with results in information technology, information science technology acceptance literature indicating that reliance on others' opinion is significant only in mandatory settings particularly in the early stages of experience, when an individual opinion are relatively ill-informed (Venkatesh & Davis, 2000). This pressure weakens over time as increasing experience provides a more influential basis for individual intention to use the system. Several studies found that social influence plays a significant role in behavioural intention to adopt information technology (Chang, 2013; Cheng et al., 2011; Martins, Oliveira & Popovi, 2013). In examining factors influencing the continuous use of mobile commerce (m-commerce), Lu (2014) posit that social influence is very critical at the initial stage of adoption, however, its effects wane as the user gains more experience with the platform thus, corroborating Venkatesh et al. (2011), who did not find a positive relationship between social influence and continuous usage. Additionally, in a study of m-banking usage in Taipei, Yu (2012) found that age significantly moderated the relationship between effort expectancy and intention, with adults being mostly affected while younger respondents were more influenced by facilitating conditions. We thus argue that social influence is likely going to be critical factor with age playing a dominant role in m-banking continuous usage especially in a socially cohesive culture like Nigeria. Thus,

H3: *Social influence of m-banking users will positively influence m-banking app continuous use.*
H4: *The higher the age, the stronger will be the link between social influence and m-banking app continuous use.*

Privacy

Privacy is the security that the consumer's personal information are saved and not transferred to third parties (Li and Yeh, 2010). Privacy policy should constantly be updated to increase trust and confidence amongst the customer to accept and use the mobile services (Kaitawarn, 2015). According to Li and Yeh (2010), trust and privacy play a vital role in providing satisfaction and expected outcomes for mobile commerce users. User trust and privacy as well as security are important to ensure that users have their confidence in m-banking services (Gu, Lee & Suh, 2009; Li & Yeh, 2010). In addition to the original determinants, trust, convenience, privacy and cost are also shown to affect behavioural intention (Min, Ji & Qu, 2008). Customers' intention to use an innovation or mobile device can be influenced by security and privacy (Luarn & Lin 2005). Accordingly, Cranor, Reagle and Ackerman (2014) found that 81% of users are concerned about privacy when they are online. Mobile technology provides a great commercial potential for location based applications and services. The capability may provide information services such as advertising and navigation based on the user's location, it also poses potential privacy problems since the service providers will know the exact location of the user and might even know the user's travel pattern. As a result, consumers are concerned about their privacy protection (Wayne, 2005). Bhattacherjee (2001) suggested that service providers should permit a user to choose how his or her personal information is used. In an examination of the factors influencing continuance intention of mobile shoppers in China, Gao, Waechter and Bai (2015) found that privacy and security significantly influence trust, flow and satisfaction to continue mobile shopping. A conflicting finding however in an m-banking context in India was reported where risk associated with privacy concerns was not found to be a significant determinant of satisfaction but continuance intention (Kumar, Rejikumar and Ravindran, 2012). Thus, we hypothesise that:

H5: *Privacy concern of m-banking app use will negatively influence m-banking continuous use.*

Affective motivation

Affective motivation, similarly referred to as hedonic motivation is defined as the fun or pleasure derived from using a technology, and it has been shown to play an important role in determining technology acceptance and usage (Brown & Venkatesh, 2005). It has been conceptualized as perceived enjoyment found to influence technology acceptance and use

measuring m-banking as fun, enjoyable and very entertaining (Venkatesh, Thong & Xu, 2012). These motivational aspects can be described as adventure, socializing, taking pleasure, having an idea, exchange of values and roles (Arnold & Reynolds, 2003). Hedonic consumption is based on hedonism, which is a philosophy acknowledging pleasure in the content and meaning of life. Although hedonism is related to excess, unplanned and pleasure, it is necessary for businesses to know about factors motivating consumers towards hedonic behaviour. Knowledge about these factors will be of competitive advantage for businesses in the long run, as it makes it possible to understand many aspects of consumer behaviour. Empirically, affective motivation has been found to be an important determinant of technology acceptance and use in consumer context (Brown & Venkatesh 2005; Childers et al. 2001). Yang (2010) found that hedonic performance expectancy, social influence and facilitating conditions are critical determinants of US consumers' intentions to use mobile shopping services. In the m-banking context, Baptista and Oliveira (2015) found a positive relationship between affective motivation and behavioural intention on m-banking. Hedonism as a motivation for online games and mobile shopping continuance intension are well established in literature (Yang, 2010; Brown & Venkatesh 2005; Childers et al. 2001; Gao and Bai, 2014), its application in m-banking continuous use is relatively scarce. Thus, we are arguing that embedding hedonic features in m-banking apps will increase affective interest and continuous use. Accordingly,

H6: *Embedding affective features in m-banking apps will positively influence continuous use.*

Tension-free

Different people use the media for different reasons. The core postulation of the tension-free component of the uses and gratification theory is that besides the utilitarian reasons, the use of media is to escape tension such as listening to favourite music or watching favourite video clips in order to keep a relaxed mood (Reychav and Wu, 2014). Embedding features in mobile applications that foster users' interactivity and enjoyment will increase their cognitive and affective commitment to use the application (Kang, Mun and Johnson, 2015). Reychav and Wu (2014) posit that interactivity in digital multimedia offers sociability, benefits and involvement and enjoyment. Interestingly, tension-free has been applied in the use of mobile tablet for road safety training (Reychav and Wu, 2014), retail apps (Kang, Mun and Johnson, 2015), and mobile games (Sjöblom et al. 2017). Empirically, Reychav and Wu (2014) found

that embedding enjoyment content on road safety training application enhanced learning as perceived interactivity was a critical antecedent to users' affective involvement to use mobile retail apps. Additionally, Lu and Su (2009) found that those who exhibit less anxiety on mobile shopping site show more favourable disposition to using it. Finally, evidence abounds that educational level significantly influences patients' anxiety level with respect to the use of mobile devices (Rosen et al., 2013). Accordingly, we argue that embedding voice features, pleasant tones and background music will enhance users' interactivity and enjoyment of m-banking application just as educational level affects users' anxiety. Thus,

H7: *Tension free feature of m-banking app will positively influence m-banking continuous use.*

H8: *The higher the education status, the stronger will be the link between tension free and m-banking app continuous use.*

Continuous use

M-banking has been confirmed to be beneficial and plays vital role in customer satisfaction therefore retention and sustainable usage of the banking services by customers is necessary (Shaikh, Karjaluoto and Chinje, 2015). There are several important factors which are required to be identified and designed in analysing continuance usage intention. The adoption of m-banking can be analysed in two stages: Initial m-banking adoption and post m-banking adoption (Kang, Lee & Lee, 2012). In the initial adoption process, an individual forms the attitude toward m-banking and further decides if to adopt it or not. The post-adoption process explains an individual who has already adopted m-banking and forms the attitudes toward continuing using it or not. The available evidence within marketing literature suggests that similar to other service industries, lack of understating on determinants of customer retention can be costly to banks which have made considerable amount of investments to provide m-banking services (Mittal & Lassar, 1998; Nazir & Shah, 2014). Retaining existing customers and making them loyal to the service providers is one the most important ways of attaining long-term profitability. Also, attracting new customers costs up to five times more than the cost of retaining an existing customer (Bansal, Irving & Tailor, 2004; Mittal & Lassar, 1998). Regularly, it is important to banks and agencies providing m-banking services to implement effective and efficient strategies to retain existing users of their m-banking services to be able

to enjoy the long-term benefits of having loyal and customers. Evolving from pre-adoption to post-adoption stage, Bhattacherjee (2001) modelled IS continuance model specifically to understand the reasons an individual continues IS usage and contend that critical factors that underpin continuous use are satisfaction, perceived usefulness and confirmation. The framework explains that individuals continue intention is primarily determined by users' satisfaction with their prior IS use. Users' satisfaction is driven by users' perceived usefulness and confirmation of expectations following actual use.

Research Design and Methodology

Questionnaire development

To have an in-depth understanding of the factors responsible for m-banking app in an emerging market, the study adopts questions from previous studies and used 7-point Likert Scales (strongly disagree to strongly agree) in order to have a valid and reliable instrument for the study. The questions related to facilitating conditions and social influence were adapted from Venkatesh, Morris, Davis and Davis (2003). Items for affective and tension free were adapted from Ha et al. (2015). Items from privacy and security were adapted from Flavián and Guinalíu (2006) while continuous use items were adapted from Venkatesh and Goyal (2010). To add demographic and interaction effect insights, the study added questions on gender, occupation, income, education and age (see table 1 for details).

Sample and Data Collection

Using a convenience sampling method, 300 questionnaires were administered to banking customers in the Western part of Nigeria that have used m-banking app either to check their account balance, pay bills or performed intra and inter-banking money transfers. The study retrieved 250 from the respondents which account for 83% response rate as 50 questionnaires were not returned. On further evaluation, 5 responses were poorly filled, had missing values or had unengaged responses, thus, leaving 245 which were finally used for the data analysis. The study utilised non-probability convenience sampling technique because of the inconsistency of population records of the Western region of Nigeria. The participants (n=245) consists 159 males (65%), 86 females (35%). The occupation of the respondents varies, 12 respondents belonged to the armed forces (5%), 40 are teaching professionals

(16%), 22 technicians and associate professionals (9%), 19 clerical support workers (8%), 58 are service and sales workers (24%), 7 skilled agricultural workers (3%), 6 craft and related trades workers (2%), 4 plant and machine operators (2%), 66 students and researchers (27%) while 11 belong to other occupations (4%) with additional demographic details as contained in Table 1. The data were analysed with SPSS 24 version and SmartPLS 2.0 (Ringle, Wende, & Becker, 2014) for reliability analysis and variance based structural equation modelling. The option of SmartPLS statistics software for this study is due to its easy user's interface and its exploratory characteristics and its ability to handle complex models. Previous studies have established the usefulness of SmartPLS for data analysis (Almahamid, Amjad, and Mousa, 2016; Hair, Ringle and Starstedt, 2011, Henseler, Ringle, and Sinkovics, 2009). The study also added the interaction terms to the model to have an expanded understanding of the variables relationship.

[Insert Table 1 about here]

Measurement Model Assessment

The study combines the theory of trust, technology acceptance and gratification to form a model of m-banking app continuous use in an emerging market. The study tested the new model for reliability, convergent validity and discriminant validity (see table 3 for details). The factors loaded within the range of (0.54 – 0.93). The Composite Reliability (CR) of the variables are greater than the rule of thumb of 0.7 (0.88 – 0.94) (Hair et al., 2011). The Variance Extracted (AVE) values were above the threshold of 0.5 (0.63 – 0.81) (Hair et al. 2011, Bagozzi and Yi 1988). Table 3 depicts the discriminant validity (Hair et al. 2011, Fornell and Larcker 1981). In the data collection phase, common method bias from the self-reported data was minimized by keeping the respondents' identities confidential and by randomizing the items in the questionnaire."

[Insert Table 2 about here]

Structural Model Assessment with Moderation Effects

Table 4 shows the path coefficients. The results show that facilitating conditions have the strongest effect on continuous usage ($\beta = .43$, $p < 0.01$), followed by the effects of social

influence (β = .29, $p <$ 0.01) and privacy concerns (β = -.26, $p <$ 0.01). Affective motivation (β = 0.17, $p <$ 0.05) and tension free (β = .15, p < 0.05) feature of m-banking app also positively influence continuous usage, albeit their effects are weak. These findings provide support for the hypotheses H1, H3, H5, H6, and H7.

[Insert Table 3 about here]

[Insert Figure 2 about here]

The R^2 is recommended as a viable means of assessing model's predictive accuracy with thresholds of 0.75, 0.50, and 0.25 as being substantial, moderate and weak sequentially (Leppäniemi, Jayawardhena, Karjaluoto, and Harness, 2017; Hair et al. 2011; Henseler et al. 2009). The overall variance of the model explains (R^2=73%) which is near substantial.

The moderation results show that the higher the education, the stronger are the links between facilitating conditions and continuous usage (moderating effect: β = .13, p < 0.01) and between tension free and continuous usage (β = .16, $p <$ 0.01). Thus, the results provide support H2 and H8. Finally, we find that the moderating effect of age on the relationship between social influence and m-banking continuous use is close to significant (β = .11, $p <$ 0.10), providing partial support for H4.

[Insert Table 4 about here]

Discussion

In our study, we built a model which comprised the UTAUT2, uses and gratification and privacy theories, and sought to determine if embedding hedonic features in m-banking apps will influence continuous use. We tested eight hypotheses comprising three moderation tests. All the hypotheses received support from the data. The model explained 73% of continuous usage of m-banking app. The findings are mostly in line with other studies.

Theoretical contributions

This research contributes to the literature on m-banking in several ways. Firstly, the effect of facilitating conditions on m-banking continuous use was confirmed (Zhou, 2011; Venkatesh et al., 2011). This result shows that users' ability to acquire knowledge and availability of structural assurances such as the required technology will decrease their risk perception and enhance continuous use. Interestingly, the International Telecommunication Union (ITU, 2017) reports that Nigeria is the leading country in Africa with mobile cellular subscription currently above 154 million in addition to being the country with the highest internet subscription rate, therefore, a fertile ground has already been laid for mobile internet-enabled business transactions. Moreover, the result of the moderation test (*H2*) indicates that education positively moderates the relationship between facilitating conditions and continuous use. This implies that educated people will have more knowledge and innovative inclinations to operate m-banking applications than those without similar level of education. Service providers can provide a level playing ground by increasing promotional activities geared towards training users and bank customers on how to use these applications.

Secondly, the effect of social influence on continuous use also shows a strong and significant relationship, indicating that the variable is a critical determinant of m-banking app continuous use, thus, *H3*, is accepted. This result is contrary to Venkatesh et al. (2011) and Lu (2014) who did not find support for a direct positive relationship between social influence and continuous use, but however added that the effect of social influence on continuance intention decreases as the user gains experience and knowledge in the use of the technology. Our moderation result (*H4*) also shows that age positively moderated the relationship between social influence and continuous use, thus, consistent with Zhou (2011), implying that the older the users are the stronger becomes the link between social influence and continuous use. This result also shades some light about the social acceptance of the aged in a collectivistic culture, implying that the older a family member becomes, the greater becomes his need of the members of the social system (Xiao, Shen and Paterson, 2013).

Third, *H5* was accepted which shows a negative effect of privacy concern on continuous use. This implies that the higher the privacy concerns of the m-banking customers, the lower the continuous use. Cyber fraud is one of the technological dilemmas plaguing ICT-driven business transactions in Nigerians. Users' private information is important and negates the principle of fair dealing and is perceived as a betrayal of trust when third party is given access to such information without the express approval of the user. Accordingly, as agued by

Salo and Karjaluoto, (2007), suppliers should make it apparently clear in such a way that users will be able to indicate which type of information they are willing to share while registering for the service. Fifth, the positive effects of the two uses and gratification variables (affective motivation, H6, and tension-free, H7) on continuous usage were both confirmed. These findings are consistent with extant studies (Zhou, 2012; Zhou, 2013), underpinning the role of affective features in m-banking. Hedonic features increase interactivity and users' affective interests are likely to increase when providers embed features that promote fun, enjoyment and pleasure thus provide positive and relaxed feelings. Additionally, our results (*H8*) also show that education positively moderated the relationship between tension-free and continuous use. This implies that the higher the level of education the higher the likelihood of the user to derive pleasure as a result of personal innovativeness with the platform. From a theoretical standpoint, first, the integration and the successful confirmation of the UTAUT2, uses and gratification and privacy theories proves novel and extends the m-banking literature in this regard. Previous studies, as argued earlier, have dominantly considered the extrinsic factors as major drivers of m-banking continuous use, with few exceptions which have looked at individual-specific factors.

Ordinarily, financial-related issues are fundamentally driven by utilitarian motives, however, Kang, Lee and Lee (2012) contend that enjoyment is a critical factor for m-banking continuance intention. Apparently, in an environment laced with stressors and tension-inducing socio-economic forces, avoidance-oriented mechanism is primarily escapism (Beasley, Thompson and Davidson, 2003), which underscores desire for gratification and their effect on continuous use. To the best of our knowledge, this is one of the earliest studies that considers the effect of embedding hedonic features in m-banking app and how it influences continuous use especially in an emerging market in Africa. Second, our study's underscoring of the overarching importance of facilitating conditions as having the strongest influence on continuous use is explicit. In an emerging market context, these facilitating conditions can be summed into governmental, supplier and individual factors (Glavee-Geo, Shaikh and Karjaluoto, 2017). Governments must provide the right regulatory policy for the sustained use of technological innovations. This implies that weak regulatory framework which hampers competitiveness among service providers will undermine continuous use. As an aspect of facilitating conditions, the creation of awareness and educative programmes on the benefits of m-banking in addition to efficient customer-centered services are germane for sustained use of m-banking. Additionally, individual's intrinsic factors also play a role. This

is underscored by the result which showed that education positively moderates the relationship between facilitating conditions and continuous use. Education imbues a user with the right skills, experience and exposure. Thus, educated people are likely to show higher levels of personal innovativeness with m-banking app than others (Lu, 2014).

Third, our study challenges previous findings that did not support direct positive effect of social influence on continuance intention (Venkatesh et al. 2011; Lu, 2014), with not only a positive but with a significant relationship. In a collectivist culture such as Africa, reference groups such as family members, friends, colleagues and professional group members wield enormous influence on one another through word-of-mouth. Consequently, a user can continue or discontinue technology use through peer influence. This is further enunciated by age positively moderating the relationship between social influence and continuous use.

Managerial Implications

Our study also generates insights directly applicable for managers in the financial service sector responsible for m-banking services development. First, creating enabling environment is very critical for the sustained use of m-banking. From a developing country context, erratic power supply, lack of policy framework to drive mobile telecommunication and internet penetration are inimical to sustained use of m-banking. Governments should come up with policies to promote power supply. Power is a critical requirement for sustainable use of electronics such as mobile phones. Smartphones come with many applications that easily drain battery and so requires charging at intervals; therefore, policies that promote stable power supply is a necessity. M-banking thrives on internet platforms, accordingly, governments should come up with policies aimed at affordable and reliable internet access. Furthermore, service providers should constantly update the users with updates on the m-banking application. In some cases, personalised education could reduce user's complexity with the platform, for example in cases where "a bank customer, for example, perceives m-banking to be difficult to use he/she needs careful one-to-one customer education from the bank personnel. Therefore, personal communication is needed" (Laukkanen and Kiviniemi, 2010, p.384).

Moreover, Africa, nay, Nigeria is a socially cohesive society, implying that interpersonal relationship is a rubric that mediates all societal exchanges and intercommunication.

Consequently, word-of-mouth especially from the elderly and those in reputation fundamentally influences behavioural intensions. First, educative programmes should be floated that espouses the benefits of m-banking, targeted at policy makers, politicians, community chiefs and title holders, church pastors and Moslem imams; such would easily be accepted by their followers. Second, service providers should harness the power of social media by floating virtual community forums to engender discussions around m-banking applications and its benefits and the sustenance of the cashless policy of the federal government. Such forums have been found to be a great platform for the advancement of company programmes, policies and brand (Gao and Bai, 2014). Finally, service providers should build additional features into the m-banking apps to engender interactivity. Currently, a particular Nigerian bank is blazing the trail by having additional features such as booking for cinema ticket, payment of school fees, visa fees, mobile and internet top-up, flight and utility bills etc. Users are likely to be fond of a mobile banking app that serves as a one-stop platform for most of their payment needs. In doing that, pleasing tones such as welcome messages and information that uniquely identifies with the user's lifestyles such as birthday greetings, Christmas and special festivities will engender affective interest and interactivity. Not also forgetting that in all these, advanced security features that protect the user's private information should be the topmost priority.

Limitations, recommendations for future research and conclusion

Our study has three major limitations: the sample, the data and the variables. In terms of the sample, the generalizability of our findings is called to question as our respondents constituted of m-banking users who voluntarily accepted to respond to our questionnaires, thus, are not representative of the population especially as they were picked from a single region in Nigeria. However, some studies have argued that since specific and selective samples were used, findings from such studies could still offer insights for managers (Parra-Lopez et al. 2011). Secondly, although the survey was carefully designed and administrated, special attention was paid to reduce the potential common method bias, our data is cross-sectional, collected at one point in time. Thus, there are validity concerns of the causal inferences that can only be ruled out with a longitudinal study. Accordingly, the highly unpredictable dynamics of the Nigerian banking environment requires that a longitudinal study would be appropriate for future research. Finally, this study is particularly centered within the Nigerian m-banking context. A comparative study that incorporates other

emerging markets with m-banking use such as South Africa will likely offer some important insights. Consequently, future studies should seek to incorporate also other constructs in the model such as user satisfaction as a critical determinant of continuous intention in addition to conducting a cross-cultural study within the African emerging markets.

In conclusion, in spite of the above limitations, this study has identified the antecedents of mobile banking services continuous usage in a developing market context. The study has found that facilitating conditions, social influence and users' privacy concerns are critical antecedents underlying mobile banking continuous usage. This implies that with the right infrastructure and awareness, positive word of mouth and increased security features, mobile banking usage will be increased and sustained. Similarly, embedding hedonic features on mobile banking platforms influences continuous usage to a large extent. Finally, educational attainment and age are critical demographic factors service providers must take into account in their quest to ensure mobile banking continuous use in a developing market context.

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Figure 1. Research conceptual framework

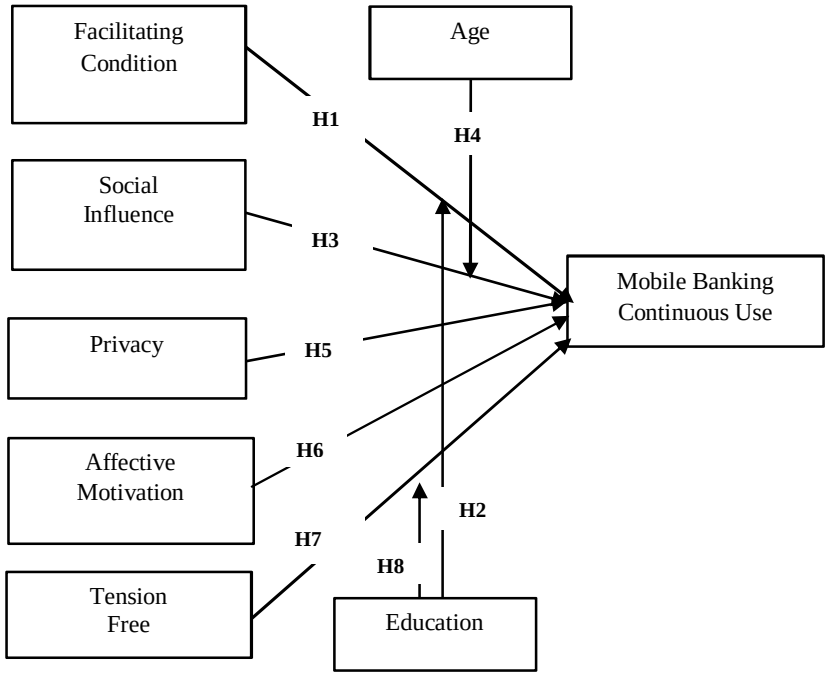

Fig. 2. Conceptual framework and Tested hypotheses

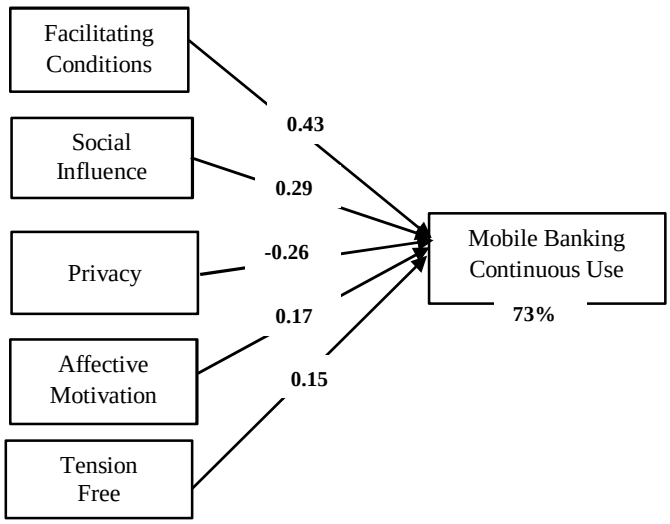

Table 1. Demographic information of m-banking app users

Demography Variable	Demography Classification	Frequency	Percentage%
Gender	Male	159	65
	Female	86	35
Occupation	Armed Forces	12	5
	Teaching Professionals	40	16
	Technicians and Associate	22	9
	Professionals	19	8
	Clerical Support Works	58	24
	Service and Sales Workers	7	3
	Skilled Agricultural	6	2
	Workers	4	2
	Craft and Related Trades	66	27
	Workers	11	4
	Plant and Machine		
	Operators		
	Students/Researchers		
	Others		
*Income	Less than ₦100000	127	52%
	₦100000-₦200000	70	29%
	₦200001-₦300000	21	9%
	₦300001-₦400000	12	5%
	₦400001-₦500000	6	2%
	₦500001-₦600000	5	2%
	₦600001 or more	4	2%
Education	High School/Diploma	115	47
	Bachelor Degree	79	32
	Master's Degree	39	16
	PhD	7	3
	No Formal Education	5	2
Age	15 – 24	120	49

25 - 34	68	28
35 - 44	36	15
45 - 54	19	8
55 – 64	2	1

* One Dollar is an equivalent of 360 Nigerian Naira

Table 2. Items Loadings and Descriptive Statistics

	Loading	Mean (SD)
Facilitating Condition		
I have the resources necessary to use the mobile banking app	0.822	5.51 (1.41)
I have the knowledge necessary to use the mobile banking app	0.851	5.60 (1.35)
The mobile banking app is not compatible with other apps I use	0.737	5.07 (1.70)
A specific person (or group) is available for assistance with mobile banking app difficulties	0.790	5.27 (1.43)
Social Influence		
People who influence my behavior think that I should use the mobile banking app	0.840	5.35 (1.50)
People who are important to me think that I should use the mobile banking app	0.886	5.38 (1.40)
The senior management of the Bank has been helpful in the use of the mobile app	0.884	5.34 (1.44)
In general, the organization has supported the use of mobile banking app	0.842	5.49 (1.40)
Privacy[a]		
I think this banking mobile app shows concern for the privacy of its users	0.863	2.51 (1.21)
I feel safe when I send personal information to this banking mobile app	0.882	2.57 (1.28)
I think that this banking mobile app will not provide my personal information to other companies without my consent	0.884	2.50 (1.25)
I think this banking mobile app abides by personal data protection laws	0.855	2.42 (1.28)
Affective[a]		
Mobile Banking app help me to derive fun and pleasure	0.906	2.84

		(1.53)
Mobile Banking app stimulate my mind	0.912	2.86
		(1.54)
Mobile Banking app makes me feel excited	0.884	2.71
		(1.45)
I think Mobile Banking app is cool	0.801	2.45
		(1.33)
Tension Free		
Mobile Banking app help me to have some enjoyable time	0.914	5.22
		(1.50)
Mobile Banking app help me to have some relaxing time	0.898	5.18
		(1.61)
Mobile Banking app help me to have some entertainment	0.934	5.18
		(1.55)
Mobile Banking app multimedia features is very interesting	0.845	5.16
		(1.57)
Continuous Use		
I want to continue using the mobile banking app rather than discontinue	0.832	5.63
		(1.30)
I plan to continue using the mobile banking app	0.901	5.63
		(1.36)
I don’t intend to continue using the mobile banking app in future	0.539	4.90
		(1.99)
Chances are high that I will continue using the mobile banking app in future	0.857	5.78
		(1.36)

Notes: SD: Standard Deviation; reverse-coded[a].

Table 3. Square Root of AVE (bold) on Diagonal and Construct Correlations

Construct	**CR**	**AVE**	1	2	3	4	5	6
FC (1)	0.88	0.65	**0.8**					
SI (2)	0.92	0.75	0.7949	**0.86**				
PR (3)	0.93	0.76	- 0.6357	- 0.5613	**0.87**			
AM (4)	0.93	0.77	- 0.6332	- 0.6247	0.6356	**0.88**		
TF (5)	0.94	0.81	0.6036	0.6058	- 0.5514	- 0.8044	**0.9**	
CU (6)	0.87	0.63	0.8062	0.7596	- 0.6673	- 0.5709	0.5918	**0.79**

Notes: AVE: Average Variance Extracted; CR: Composite Reliability

FC: Facilitating Condition; SI: Social Influence; PR: Privacy; AM: Affective Motivation; TF: Tension Free; CU: Continuous Usage of M-banking App.

Table 4. Standardized path coefficients and corresponding hypothesis results for the study

Hypotheses	Path Coefficient	Beta	TDEV	T-Test	Result
H1	FC -> MBCU	0.43***	0.0619	6.877	Accepted
H2	FC*Edu -> MBCU	0.13**	0.0434	2.895	Accepted
H3	SI -> MBCU	0.29***	0.0644	4.381	Accepted
H4	SI*Age -> MBCU	0.11*	0.0566	1.953	Partially Accepted
H5	PR -> MBCU	-0.26***	0.0559	4.542	Accepted
H6	AM -> MBCU	0.17*	0.0773	2.082	Accepted
H7	TF -> MBCU	0.15*	0.0734	2.000	Accepted
H8	TF*Edu -> MBCU	0.16*	0.0792	1.993	Accepted
MBCU			R^2 0.729		

***p<0.001; **p<0.01; *p<0.05; *the significance levels are two-tailed.*