

Observed Demographic Differentials in User Perceived Satisfaction on the Usability of Mobile Banking Applications

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ABSTRACT

Mobile banking (m-banking) is a current technological innovation in mobile commerce. The growth of the mobile phone market opens an ever increasing opportunity for the expansion and penetration of the m-banking enterprise with its attendant business gains. However, the context of use of m-banking portends great challenges especially with respect to mobile usability. The peculiarity of the mobile phone (e.g. smallness of screen size, non-traditional input method etc) makes usability difficult and which in turn affects the users' perceived satisfaction of the m-banking interface, as usability and user satisfaction are associated. Usability is a central issue for mobile phone design, service and evaluation because users need to access various functionalities via limited user interfaces often while they are on the road (on the move). This usability issues in turn affect users' satisfaction of mobile banking applications. In this study, the perceived satisfaction of users of m-banking applications for three Nigerian banks were assessed and evaluated based on the demographics: age, gender, experience, and education. The study was necessitated due to the dearth of studies on the effects of demographic factors on m-banking usability and satisfaction. An online-based survey approach was used. The results indicate that these factors had significant effect on the perceived satisfaction of m-banking applications. There are significant demographic (age, gender, education, experience) differentials in the user perceived satisfaction on the usability of mobile banking application interfaces.

Keywords: M-banking, demographic differentials, perceived usability satisfaction.

I INTRODUCTION

Mobile banking (m-banking) is an aspect of mobile commerce and a natural evolution of electronic banking (Mohammadi, 2015). It is one of the recent mobile technological innovations that have added the element of mobility in bank service delivery to bank customers (Mohammadi, 2015). Although other banking channels like the automatic teller

machines (ATMs), Internet banking, and telephony together with the traditional banking channel provide effective delivery channels, they do not cater for bank users who are on the move. Therefore, m-banking offers users the opportunity to transact banking business anywhere and anytime while on the go (Shaikh & Karjaluoto, 2015). Within the context of m-banking, users can do banking transactions while on the move or while doing other tasks at the same time. This channel of banking has some advantages and challenges. It avails bank users and customers, timely banking facilities like bill payment, account management, money transfer, monitoring and finding ATM locations, and information inquiry, etc (Afshan & Sharif, 2016). M-banking has greater convenience for bank customers as it makes traveling to and queuing at bank branches or ATM locations unnecessary (Afshan & Sharif, 2016). It benefits users in terms of time optimization, instant connectivity, immediate information, great interactivity, convenience, and ubiquity (Malaquias & Hwang, 2016). These have the potential of increasing customer satisfaction. With m-banking, users conduct banking transactions anyplace and anytime and they connect to banking services easily and quickly with mobile devices. Banking services are offered interactively and immediately (Gu et al., 2009). For banks, m-banking channel enhances service quality, decreases service cost, and enhances operational efficiency, therefore, it is not only attractive to customers, but it is also attractive to banks as well (Shaikh & Karjaluoto, 2015; Afshan & Sharif, 2016).

M-banking has the potential of improving customers' quality of life and bringing efficiency to banks (Malaquias & Hwang, 2016). The improved service delivery and enhanced customer satisfaction brought about by m-banking helps in the retention of bank customers, attracting new ones and also enables the bank to maintain a competitive position in the market (Lee et al., 2015). In addition, this leads to increased market share, and profitability, reduced failure cost, price elasticity, lower business cost and cost of attracting new customers by the bank (Bayraktar et al., 2012). However, the context of m-banking implies that portable mobile devices like mobile phones, smart phones, tablets, and personal digital assistants (PDAs) are used as medium of transaction. Small portable (mobile) devices pose some

challenges and issues that can affect the usability and user satisfaction of m-banking users. Some of these issues and challenges are: mobile context, poor/limited connectivity, small screen size, limited processing capability, reduced display resolutions, high power consumption, limited input modalities (non-traditional input methods), and navigational difficulties, etc (Lee et al., 2015; Zhang & Adipat, 2005; Harrison et al., 2013). Also, the mobility of the m-banking user is a critical factor to the success or failure of the application (Harrison et al., 2013). These challenges can elicit users' emotional reaction and affect their task performance with respect to m-banking. As a result of these issues with mobile devices on which m-banking is anchored, many m-banking applications remain difficult to use. Mobile application usability is difficult because smart phones have small screens and the mechanism for input is tiny (Lee et al., 2015; Hoehle et al., 2016). Thus, it becomes necessary to assess the level of users' satisfaction in an m-banking usability context.

In this study a further attention is given to demographic factors such as age, experience, education, and gender to ascertain their effects on perceived satisfaction. Prior research posits that age, experience and education are factors influencing users' interaction with mobile banking in Nigeria (Agwu & Carter, 2014). Furthermore, Agwu and Carter (2014) stated that there is dearth of research in m-banking usability evaluation in Nigeria as existing research focused on Internet banking and mobile banking adoption rather than m-banking usability evaluation (Agwu & Carter, 2014). This study was necessitated due to the dearth of studies on the effects of demographic factors on m-banking usability and satisfaction.

A. M-Banking

M-banking is defined as "...an application of m-commerce that enables customers to access bank accounts through mobile devices to conduct transactions such as checking account status, transferring money, making payments, or selling stocks" (Shaikh & Karjaluoto, 2015; Alafeef et al., 2012). It is an innovative communicative channel that allows customers to interact with a bank through a portable device (Masrek et al., 2012; Akturan & Tezcan, 2012). Banks offer four points of access to mobile banking services, as follows: 1) mobile applications that are downloadable to smart phones, 2) web application that can be used on any smart phone or mobile phone with a web browser, 3) applications that are downloadable to a tablet, 4) short messaging service (SMS) for account information notification (Shaikh & Karjaluoto, 2015). Various terms are used to refer to mobile banking, such as, m-banking, cell phone banking,

branchless banking, m-payment, m-transfer, m-finance, and pocket banking (Shaikh & Karjaluoto, 2015). M-banking is an easy, simple, fast, and secure banking alternative (Ravendran, 2013). Juniper Research (2013) reports that by 2017, more than one billion users are expected to use m-banking globally. This projection represents 15% of the mobile subscription base. Mobile phone subscription is about 96% of the world population (Shaikh & Karjaluoto, 2015; International Telecommunication Union, 2011). In 2014 alone, more than 1.9 billion units of mobile devices were sold and smart phones account for more than 60% of mobile phone sales (Gartner Research, 2015). This statistics show the possibility of more mobile phone users being converted to mobile bank users in the near future. The increasing numbers of smart phones as well as the growing mobile web usage are very likely to drive users and consumers further towards m-banking option (Ravendran, 2013). However, the characteristics of mobile devices in terms of usability can impede the rate at which mobile phone users convert to m-banking users, but improvement in usability, especially satisfaction can influence and improve the conversion rate in the mobile context. This is true because satisfaction affects users' intention to use a system or application (Ravendran, 2013; Kargin et al., 2009).

B. M-Banking Usability and User Satisfaction

Usability, according to ISO 9241-11 standard (ISO, 1997), is "the level of effectiveness, efficiency, and user satisfaction when a given product is used to achieve a specific aim by a specific user in a specific usage situation". Effectiveness is defined by the standard as "accuracy and completeness with which users achieve their goals". Efficiency is "the resources expended in relation to the accuracy and completeness with which users achieve their goals" and user satisfaction is "freedom from discomfort and positive attitude towards the use of the product" (Ravendran, 2013). Usability is a software quality attribute and as ISO 13407 puts it, it is the extent to which a product can be used by the user to achieve specified goals (ISO, 1999). In IEEE standard (IEEE, 1990), usability is defined as the "ease with which a user can learn to operate, prepare input for, and interpret outputs of a system or component". According to ISO/IEC 9126-1 (Bevan, 2001), usability is "related with attributes of the product that make it understandable, learnable, easy to use, and attractive". Nielsen (1999) also described usability as ease of use and learning. Usability has two aspects, namely: perceived and performance usability. (For more on usability and user satisfaction, see Hussain et al., 2015; Hussain & Mkpojiogu, 2015a; 2015b; Hussain et al., 2016). Perceived usability (subjective usability) is the

usability of a system or application on the basis of users' perception or judgment (Reinecke & Beinstein, 2011). On the other hand, performance usability (actual or objective usability) is the usability of a system or application based on the performance of users on specific tasks in a real operational environment (Lew et al., 2010). Perceived usability of an interface is often more influential than that of performance usability (Ravendran, 2013; Phillips & Chapparo, 2009).

Banking efficiency, in particular, task efficiency, is central in the mobile context. In this context, users can fulfill their banking needs anytime and at any place through their mobile devices. M-banking beckons for a more efficient interaction. This need is echoed further by the challenges presented in the mobile context like smallness of screen size and the stronger focus on task completion in shorter time. It is needful to provide interface that is usable in the context of mobile banking that offers high productivity and performance. In like manner, mobile effectiveness is very crucial in m-banking applications. It is closely associated with the simplicity, ease of use and user friendliness of the interface of a mobile banking application. Complexity in m-banking interface is likely to hinder effectiveness, thus leading to poor usability (Ravendran, 2013; Yoon, 2010). Simplicity and interactivity (cognitive dimensions) are key antecedents of mobile phone usability. Simplicity is a major part of a highly usable interface. It makes a positive but indirect contribution to usability by influencing interactivity (Lee et al., 2015).

Satisfaction is a user's perception of the degree to which his/her expectations have been fulfilled (Ravendran, 2013; Yoon, 2010). It can also be defined as a mobile phone user's summary affective response (Lee et al., 2015). The more the user considers the usability experience with a mobile phone, the more the user is satisfied. There is a validated association between usability and satisfaction (Lee et al., 2015). Satisfied online banking users are more likely to purchase more products and services from their banks than unsatisfied users (Ravendran, 2013). This reaction is likely to be the same for m-banking users. Customer satisfaction is a significant determinant of m-banking loyalty. Satisfied customers return and buy more and they also tell others about their experiences. Strongly dissatisfied customers exit and leave while weakly satisfied customers may not leave but they complain (Bayraktar et al., 2012). Lee et al. (2015) posit that users' usability experience translates well into apps loyalty via satisfaction and trust. Customer dissatisfaction leads to negative word-of-mouth, disloyalty and distrust. A greater degree of satisfaction leads to a greater degree of

loyalty (Lee et al., 2015). Furthermore, visual design (design aesthetics, hedonic and visual appeal and attractiveness) of an application has the potential to spur emotional appeal and to ginger user satisfaction (Coursaris & van Osch, 2016). Efficiency and effectiveness of a system have effect on user satisfaction (Coursaris & van Osch, 2016). In addition, demographics such as age and experience have been determined from prior research as having impact on usability and user satisfaction (Kang & Yoon, 2008; Mayhorn et al., 2012; Page, 2014; Ghayas et al., 2013; Kurniawan, 2008).

In this paper, an assessment is made on the satisfaction of m-banking users based on their perceived usability of m-banking application interfaces using demographic characteristics as antecedents. The remaining part of this paper is organized as follows: section 2 deals with the methodology, section 3 presents the results and discussion, while section 4 concludes with the conclusion.

II METHODOLOGY

In this study, a survey approach was used to collect data and a sample of 150 online participants was selected purposely for the study. The selected participants were identified and recruited via Facebook and email. The participants are all mobile banking users in Nigeria. Three banks were selected for the study too. The selected participants are customers to one of the three banks and users of their respective mobile banking applications. The three banks include: GtBank, Skye Bank, and Diamond Bank. Online questionnaire was distributed to the selected respondents via Facebook and emails. The filled questionnaires were returned through the same channel. The study instrument was adapted from Abubakar et al. (2015).

The instrument was face validated. In addition, a construct validation was done and the instrument was psychometrically valid for the study as all items were loaded onto the construct "perceived satisfaction". The result of the factor analysis indicates that the variance of the principal component (construct, i.e. perceived satisfaction) that is explained by each item in the instrument ranged from 0.674 to 0.918. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.962 (very close to 1), indicating that the correlation matrix of the instrument's items is adequate for the factor analysis. The Bartlett's test of sphericity is: approx. $\chi^2(595) = 15557.52$, $p=0.000$ (i.e. $p < 0.01$); this shows that the correlation matrix of items in the instrument is not an identity matrix, implying that the instrument has good construct validity.

Furthermore, a reliability analysis was carried out and the resulting Cronbach alpha coefficient was 0.986, indicating that there is good internal consistency of all items in the instrument. Cronbach alpha coefficients that are 0.70 and above are regarded as good estimates of reliability and internal consistency of survey instrument (Nunnally, 1973). The instrument consists of 37 items; however, two items were eliminated from the analysis due to their poor item reliability. The items in the instrument were measured using a 9-point likert-type scale. The items covered the satisfaction of users in the following areas: mobile device compatibility, learning ability, interface structure and layout, task structure and presentation, privacy and reliability, and overall user impression. The two items eliminated were from overall impression. The data from the filled and returned questionnaires were analyzed using SPSS Version 17 package. A one way ANOVA analysis was computed to ascertain the differentials in the perceived satisfaction of the three banks' application interfaces as well as the differentials in the perceived satisfaction based on some demographics like age, educational qualification, experience, and gender.

III RESULTS AND DISCUSSION

This section presents the results of analysis and discussion. The differences in the perceived satisfaction of mobile banking applications with respect to the apps used, age, gender, education and experience were analyzed and evaluated.

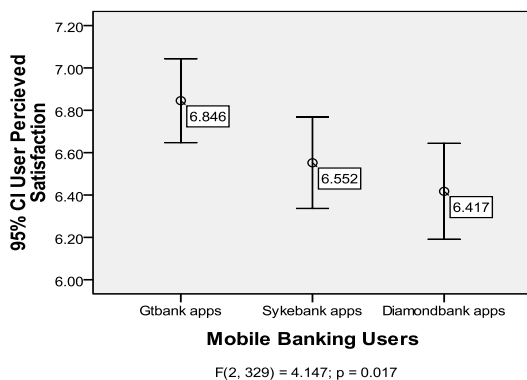


Figure 1. M-Banking Users' Perceived Satisfaction

The perceived satisfaction of m-banking users for the three banks is significantly different, $F(2, 329) = 4.147, p < 0.05$ (Figure 1). All users of the three bank apps are satisfied with their banks' m-banking application interface, however Gtbank users have the highest perceived satisfaction ($M=6.846, SD=1.28$), followed by Skye Bank users ($M=6.552, SD=1.05$). Diamond Bank users have the least perceived m-banking application satisfaction ($M=6.417, SD=0.98$). Further post hoc pair-wise comparison (using Bonferroni's type-1 error correction) reveals

that Gtbank and Diamond Bank pair are significantly different in their perceived user satisfaction ($p < 0.05$), all other pairs have the same level of perceived satisfaction. This result indicates the Diamond Bank m-banking apps user interface needs improvement to enhance users' perception of its usability and satisfaction.

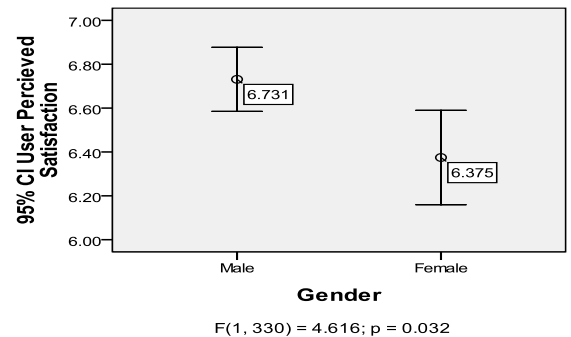


Figure 2. M-Banking Users' Perceived Satisfaction By Gender

The analysis reveals a significant gender differential in the perceived satisfaction of the m-banking applications, $F(1, 330) = 4.616, p < 0.05$ (Figure 2). The male users ($M=6.731, SD=1.22$) irrespective of their banks, have more perceived m-banking satisfaction than the females ($M=6.375, SD=0.83$). A further study is needed to ascertain why females are less satisfied than their male counterpart.

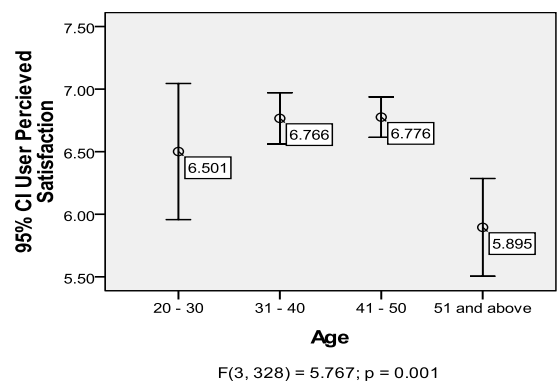


Figure 3. M-Banking Users' Perceived Satisfaction By Age

The one-way ANOVA shows an age-wise significant difference in m-banking perceived satisfaction, $F(3, 328) = 5.767, p < 0.01$ (Figure 3). There seems to be a quadratic trend in the level of users' perceived m-banking usability satisfaction as the users' satisfaction rises with age from age category 20-30 ($M=6.501, SD=1.29$) to age group 31-40 ($M=6.766, SD=1.30$) up to peak at age group 41-50 ($M=6.776, SD=0.89$) and fell afterwards at age group 51 and above ($M=5.895, SD=1.08$). However, irrespective of age, the users have certain levels of satisfaction, the older users (ages 51 and

above) have the least user satisfaction ($M=5.895$, $SD=1.08$). The middle aged users (ages 31-50) seem to be more enthusiastic and satisfied than all other age groupings (the younger, ages 20-30 and the elderly, ages 51 and above). Further post hoc analysis reveals that ages 51 and above and 31-40; ages 51 and above and 41-50 are those whose perceived satisfaction are significantly different, all other pairs have similar perceived usability satisfaction.

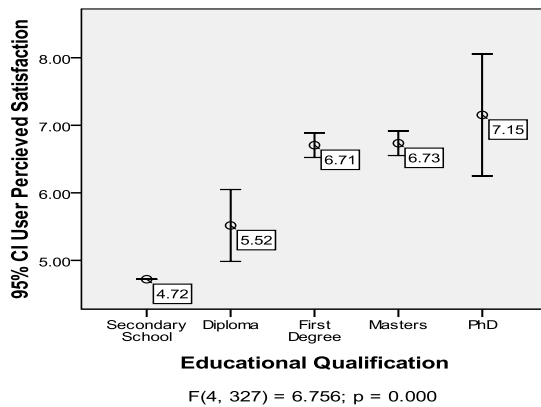


Figure 4. M-Banking Users' Perceived Satisfaction By Educational Qualification

As in the previous results, there is a significant difference in the m-banking users' perceived satisfaction based on their educational qualification, $F(4, 327) = 6.756$, $p < 0.01$ (Figure 4). Education has a strong influence the users' perceived satisfaction. There is an increasing trend in their average perception with higher educational qualification; secondary school ($M=4.73$, $SD=0.00$), diploma ($M=5.52$, $SD=0.84$), first degree ($M=6.71$, $SD=1.14$), masters ($M=6.73$, $SD=1.14$), and PhD ($M=7.15$, $SD=1.35$). The more the users are educated, the more they are satisfied with apps interfaces. However, there seems to be a near plateau experience for first degree and master's degree holders before a rise in the user satisfaction experience at PhD level. PhDs are the most satisfied with m-banking. A Bonferroni type-1 error correction pair-wise comparison indicate that the user satisfaction of secondary school and diploma users are significantly the same, in addition, the perceived satisfaction of graduates and post-graduates are also significantly similar after correcting for type-1 error.

The result indicates that there is a significant difference in the perceived satisfaction of m-banking users based on years of experience, $F(4, 327) = 5.618$, $p > 0.01$ (Figure 5). There is also a slight quadratic trend in the perceived satisfaction of m-banking users on the basis of experience with m-banking apps use. Users' satisfactions grow with experience (from 1-2 years [$M=6.114$, $SD=1.61$], to

3-4 years [$M=6.58$, $SD=1.04$], to 5-6 years [$M=6.912$, $SD=0.92$], to 7-8 years [$M=6.947$, $SD=0.92$], but after this peak experience, there is a decline at 9 and above years experience ($M=6.894$, $SD=1.25$). This shows there is diminishing return in perceived satisfaction with higher experience (at years 9 and above). Furthermore, there is some sort of plateau from 5-6 to 7-8 years of experience before the decline in perceived satisfaction. While correcting for type-1 error using Bonferroni's method, the following groupings of years of experience were found to have significant user satisfaction, 1-2 and 5-6, 1-2 and 7-8, 1-2 and 9 and above; all other pair-wise comparisons have significantly the same perceived m-banking application interface satisfaction.

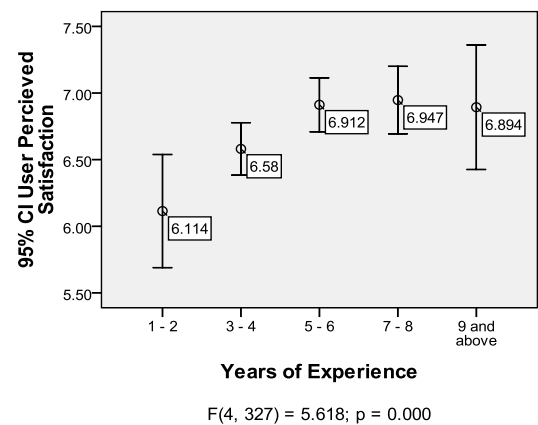


Figure 5. M-Banking Users' Perceived Satisfaction By Years Of Experience

IV CONCLUSIONS

Perceived satisfaction and usability on m-banking applications is interwoven as usable m-banking apps interfaces are satisfying interfaces and when users are satisfied with an interface, it is an indication of its usability. In this study, the user satisfaction of m-banking application users for three banks in Nigeria was assessed. 150 users using Gtbank, Skye Bank and Diamond Bank m-banking apps were conscripted into the study. Their perceived satisfaction based on the usability of the application interfaces was measured and evaluated. A one-way ANOVA was computed to determine the differences in the users perceived satisfaction on the basis of apps use and the social demographics such as age, gender, experience and educational qualification. The results reveal that there are significant differentials in the perceived satisfaction of mobile banking users based on the apps used, age, gender, experience and educational qualification. These factors had significant effect on the level of perceived user satisfaction of m-banking applications. These findings are helpful as it will assist in improving the m-banking apps interfaces of

the banks investigated so as to bridge the observed gaps and the perceived differences.

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