

Do risk and fun matter in the adoption of mobile commerce in Nigeria? A PLS-SEM approach

Maruf Gbadebo Salimon^a, Sany Sanuri Mohd Mokhtar^{a*}, Maha Mohamed Yusr^a,
Rushami Zien Bin Yusoff^b, Olanrewaju Kareem^c and J.A. Bamgbade^d

^a*School of Business Management, Universiti Utara Malaysia, Malaysia*

^b*School of Technology Management and Logistics, Universiti Utara Malaysia, Malaysia*

^c*School of Business Innovation and Techopreneurship, Universiti Malaysia, Perlis, Malaysia*

^d*Faculty of Engineering, Computing and Science, Swinburne University of Technology Sarawak Campus, Malaysia*

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ABSTRACT

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The objective of this research is to determine the factors that can effectively predict the adoption of mobile commerce in Nigeria. In doing this, 192 questionnaires were analyzed using Smart PLS-SEM. While majority of previous studies revealed negative relationship between perceived risk and system usage, the result of this study however indicated a positive relationship with mobile commerce adoption especially with the incorporation of perceived fun that tends to make mobile commerce platforms to be enjoyable. The study provides further insights into how perceived risk and fun can be used to increase the rate of adoption of mobile commerce by coming up with policies that can be used to improve the platform while marketability of mobile commerce can be enhanced.

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1. Introduction

The adoption of mobile commerce is on the increase especially in the developed and emerging nations. Recent statistics states that across European nations, every household transacts or buys something on the mobile commerce platforms (Holzer & Ondrus, 2011). McKinsey Company (2013) indicates that across six national leading market of United State, United Kingdom, Brazil, India, Hong Kong and China, nearly two-third of the respondents of the global survey admitted that they purchased mobile contents and applications while over fifty percent of this group believed that within the next three to five years, mobile payments will be available at all outlets of all merchants. It has equally been projected that monetary transactions through mobile commerce platforms will reach \$1.3 trillion dollars in year 2016 (Nassuora, 2013). The major reason behind this magnitude of usage is the seamless growth and access to mobile phones and other similar apps, and less cost of internet access that is accompanied with high-speed data (Yadav et al., 2016). Other benefits such as ability to perform transactions on the go, personalization, enjoyment and fun are some of other factors that attract both actual and potential users (Srivastava 2014; Yadav, et al., 2016).

* Corresponding author.

E-mail address: sany@uum.edu.my (S.S.M. Mokhta)

In spite of the benefits of mobile commerce, evidence has however shown that the rate of its usage is astronomically low in developing countries generally (Lim et al., 2108; Rahman & Sloan, 2015). Further evidences have equally indicate that the rate of adoption in developing countries is not keeping the same pace with developed nations (Agarwal, 2016; KPMG, 2013; Salimon et al., 2017a; Yadav et al, 2016). Yadav et al. (2016) opine that the rate of mobile commerce usage in India is very low while Agarwal (2016) initially raised a voice on the likely premature death of mobile commerce. In Nigeria, KPMG (2013) established that mobile commerce is a goldmine for mobile commerce practitioners but its rate of growth is inhibited by the refusal of majority of the population to accept the platform. This inertia towards mobile commerce usage has continued to pose major challenges for practitioners, marketers, policy makers and other investors. Evidently, a number of reasons are counted for the lack of the usage. For instance, perceived risk has been identified as one of the major factors that cause apprehension and made a lot of users to either reduce the rate of usage or to totally abandon information system (IS) platform generally (Kesharwani & Radhakrishna, 2013). The risk does not only cause apprehension as colossal amount of about 195 billion naira has been lost cumulatively to e-fraudsters in Nigeria as in 2013 (Uzor, 2014) and it has largely reduced the associated benefits of mobile commerce. Recent report by NeFF (2016) also indicates that the rate of electronic fraud in Nigeria is on the rise reaching about 82% with about 2.9 billion Naira lost to cybercrime in 2016 alone. It has equally been opine that mobile commerce platforms are utility oriented (Ashraf et al., 2017; Dai & Pavia, 2008) and do not comply with the fun seeking desire of large majority of users. Recent evidences have revealed that an IS/IT platform that is fun-configured is capable of increasing the rate of usage of such platform (Baptist & Oliveira, 2017; Rodrigues et al., 2016), little attention has however been paid to this by the previous researchers. These inherent weaknesses make the mobile commerce platforms not to compete favorably with other IS/IT platforms that comply with such configuration and thereby inhibiting the rate of its growth. It is therefore exigent to comprehend how fun and risk may affect adoption usage of mobile commerce with the objective of helping the practitioners who have invested largely in this platform.

In view of the challenges faced by mobile commerce in developing countries generally, and in Nigeria in particular, the studies that guide practitioners, designers and marketers of mobile commerce are very limited (Kalinic & Marinkovic, 2015). Most mobile commerce and related IT/IS studies emanate from developed countries (Salimon et al., 2017b), while a few others from developing countries are very parochial in their conceptualizations (Awa et al., 2015). Aside, several of the previous studies have only considered consumers' intention to adopt or not adopt mobile commerce (Chong 2013), thereby leaving a large gap for adoption behavior studies in the domain of mobile commerce (Sun & Chi, 2018). Evidence has also shown that the previous studies are fragmented by context, while their results are inconsistent (Pentina et al., 2018) and which necessitate further research. Pousttchi et al. (2015) recently challenged mobile commerce academic researchers to rise up to the task of making significant contributions to understanding one of the important phenomena of our time as strong theoretical foundation to engender mobile commerce growth is lacking. This paper is an attempt to answer that clarion call.

This paper is presented in the following structure. First, a literature review on the factors that determine adoption of mobile commerce is presented. Second, the article presents the methodology of the study. Lastly, the findings and discussion are presented while, theoretical and managerial implications are followed.

2. Literature Review

2.1 Mobile commerce adoption

Mobile commerce refers to the emerging arena within which commercial transactions are performed by employing portable mobile and other devices that are connected through wireless networks (Cho et al., 2007; Yadav et al., 2016). This is in line with Vrechopoulos et al. (2003) where the authors assert that

mobile commerce is providing service and product through mobile network and device, which is an extended concept of electronic commerce based on Internet Technology. Adoption of this technology is however regarded as its acceptance to make use of the platform in transacting different businesses (Rogers, 1983). Many theories have been used to predict information system (IS) based service, but few of the previous studies have considered cognitive evaluation theory of motivation (Deci, 1971) to predict mobile commerce adoption. The Cognitive Evaluation Theory segregates motivations into intrinsic and extrinsic subsystems. Extrinsic phase is regarded as the execution of a particular activity in order to accomplish certain objective (e.g., rewards) while intrinsic phase refers to the performance of certain task for no desired reinforcement beyond the process of executing the activity per se (Kim et al., 2007). Recent experience has however shown that most of IS based studies only considered extrinsic perspectives while little attention has been paid to intrinsic motivation (Lowry et al., 2012; Ndubisi & Sinti, 2006) based on the arguments that mobile commerce is utility oriented technology and to the disadvantage of practitioners.

2.2 Perceived Fun

Perceived fun otherwise known as hedonic outcome is a key determinant of adoption and is derived from the motivation theory (Ndubisi & Sinti, 2006). The hedonic outcome is regarded as the pleasure and satisfaction that are derived from a specific task (Vallerand, 1997). According to Chtourou and Souiden (2010) perceived fun refers to the performance of an activity for no visible benefits beyond the process of executing the task per se. In line with *the* arguments of Igbaria et al. (1995), a site might be useful but still be frustrating if it does not satisfy fun curiosity of the users. This therefore points to the importance of intrinsic values against utilitarian values as previous studies from different fields of electronic banking (et al., 2004), mobile sites (Zhou, 2013), online banking (Amin et al., 2012; Suki, 2010), and so forth have confirmed positive influence of perceived fun. However, a number of other studies reported contrary findings (e.g. Joo et al., 2017; Ndubisi & Sinti, 2006). Based on this, the following hypothesis is presented:

H₁: Perceived fun is related to mobile commerce adoption.

2.3 Perceived Risk

One of the major factors that inhibits adoption of IS based service is perceived risk. Risk can be in different forms but there seems to be a lot of controversies among scholars about what constitutes a risk. While some scholars viewed risk from perspective of security concerns, and which may lead to involuntary disclosure of private information and financial loss (Yousafzai et al., 2009), a number of others believe that risk can be ubiquitous in nature since it goes beyond the control of an individual (Ong & Lin, 2015). For this study, perceived risk is regarded as those events that cause negative feelings of anxiety, discomfort and uncertainty (Dowling & Staelin, 1994; Featherman, 2001) thereby dissuading users of mobile commerce from using the platform. This is in line with the position of Yüksel, and Yüksel, (2007) that the perceived risk can have a negative influence on the degree of pleasure that may be derived from online shopping. The perception about the presence of security, on the other hand, can however be a motivator rather inhibitor (Jahangir, & Begum, 2008). Studies across different fields such as online banking (Ong & Lin, 2015), social networking (Almadhoun et al., 2014; Ernst, 2015), online shopping (Dai et al., 2014), and others have confirmed negative influence of perceived security risk on adoption of online services while some other few studies reported positive relationship (Jahangir & Begum, 2008; Salimon et al., 2017a,b). Based on this, the following hypothesis is presented.

H₂: Perceived risk is related to mobile commerce intention

Based on the above discussions, the following conceptual framework is presented.

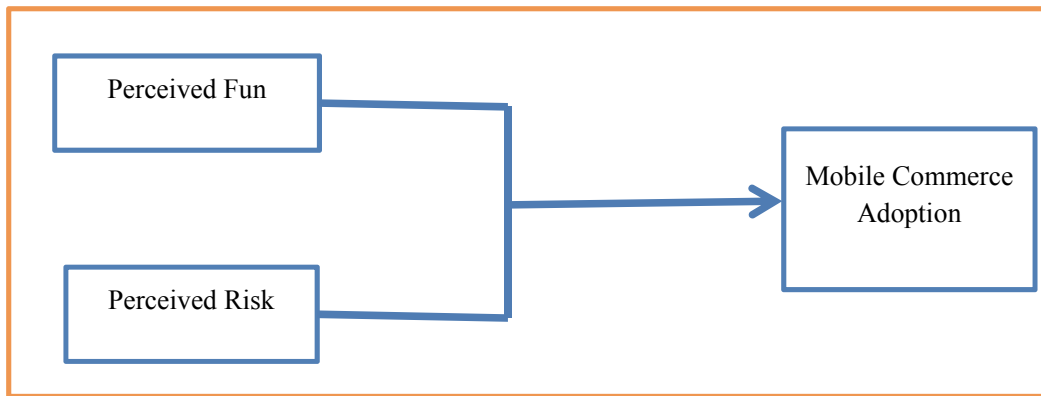


Fig. 1. Conceptual Framework

2.4 Methodology

The model of this research has 3 variables. We measure each variable with several items that are adapted from the previous studies since their reliability and validity have been established. The researchers used five Likert measurement scale to measure all the items. The scale ranges from (1) which stands for strongly disagree to (5) for strongly agree. Mobile commerce adoption items were adapted from (Chong et al., 2012; Chong, 2013), Perceived risk items from (Flavian & Guinaliu, 2006), while perceived fun items were taken from Moon and Kim (2001).

2.5 Data Collection

We collected our data through convenient sampling from various university campuses in Nigeria using 230 structured questionnaires. Only 192 questionnaires were valid for the final analysis. Among the respondents, 67.4 percent were male while 32.6 percent were female. The large percentage of the respondents was young postgraduate students as it assumed that these set of respondents are risk takers and innovators (Yadav et al., 2016) and enjoy using technology.

2.6 Statistical Analysis Results

We employed Partial Least Square (PLS-SEM) to draw the model of the study for its ability. PLS-SEM has been proved to be capable of handling complex-large and simple model while it treats un-normal data with subtleness (Bamgbade et al., 2015; Chin, 1998; Hair, et al., 2014). PLS-SEM is equally regarded as an emerging contemporary business research tool that is variance based as it maximizes the explained variance of the dependent variable (Hair et al., 2014). PLS-SEM does not intend to confirm theories like covariance-based approach (CB-SEM) but "...the model extracts fresh knowledge from the data, thereby putting flesh on the theoretical bones" (Hair et al., 2014). In using the PLS-SEM therefore, we estimated both measurement and structural models for the study.

2.7 Measurement Model

In estimating the measurement model, the researchers are required to assess content validity, convergent validity and discriminant validity (Hair, et al., 2013). For this study, all of these meet and surpass the required criteria as established by various scholars and as depicted in Fig. 1 and Table 1.

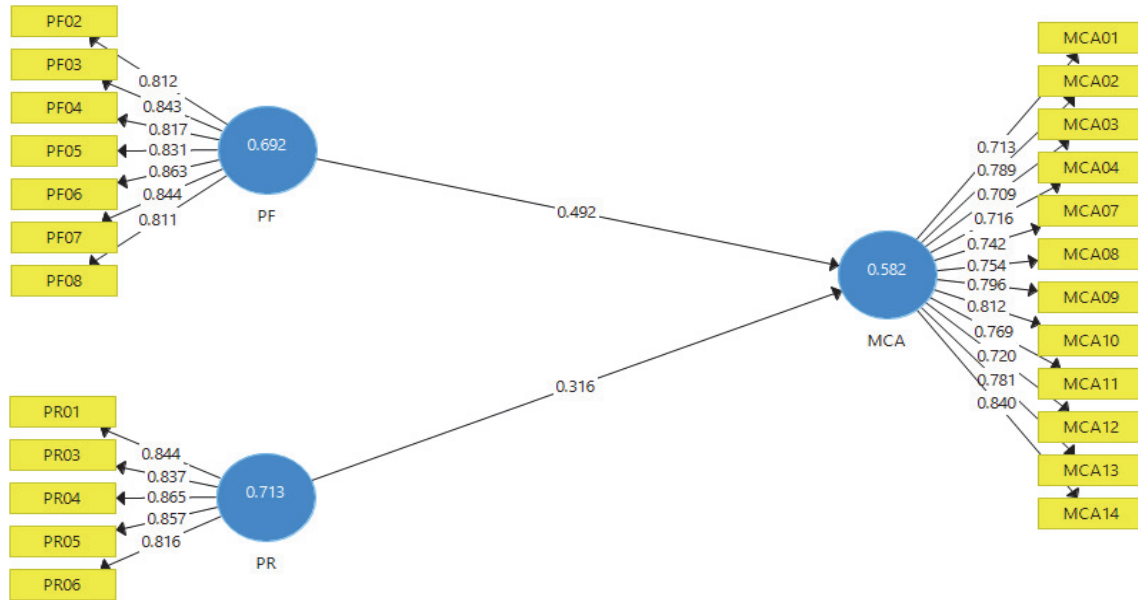


Fig. 2. Measurement model

Table 1
Loadings, Average Variance Extracted and Composite Reliability

Constructs	Items	Loading	AVE	Rho_A	CR	R2					
MC Adoption	MCA01	0.713	0.582	0.936	0.943	0.53					
	MCA02	0.789									
	MCA03	0.709									
	MCA04	0.716									
	MCA07	0.742									
	MCA08	0.754									
	MCA09	0.796									
	MCA10	0.812									
	MCA11	0.769									
	MCA12	0.720									
	MCA13	0.781									
	MCA14	0.840									
	Perceived Fun	PF02					0.812	0.692	0.932	0.940	
		PF03					0.843				
PF04		0.817									
PF05		0.831									
PF06		0.863									
PF07		0.844									
PF08		0.811									
Perceived Risk		PR01	0.844	0.713	0.90	0.925					
	PR03	0.837									
	PR04	0.865									
	PR05	0.857									
	PR06	0.816									

Table 1 shows that all the item loadings are above 0.50, the AVEs are above 0.50 while the composite reliability was met and surpassed the threshold of 0.60 as suggested by past literatures (Hair et al, 2018). The Rho_A equally indicates that all the items are reliable. The discriminant validity based on Fornell and Larcker (1981) (Table 2), Heterotrait-Monotrait Ratio (HTMT) (Table 3) and as well as crossloadings (Table 4) are also in line with recommendations of previous scholars (Hair et al., 2013; Henseler et al., 2009).

Table 2

Discriminant validity (Fornell-Larcker)

Construct	MCA	PF	PR
MCA	0.763		
PF	0.683	0.832	
PR	0.614	0.605	0.844

Table 3

Heterotrait-Monotrait Ratio (HTMT)

Construct	MCA	PF	PR
MCA			
PF	0.722		
PR	0.666	0.660	

Table 4

Crossloadings

Items	MCA	PF	PR
MCA01	0.713	0.559	0.419
MCA02	0.789	0.545	0.507
MCA03	0.709	0.427	0.462
MCA04	0.716	0.456	0.451
MCA07	0.742	0.568	0.438
MCA08	0.754	0.516	0.485
MCA09	0.796	0.595	0.522
MCA10	0.812	0.560	0.501
MCA11	0.769	0.493	0.469
MCA12	0.720	0.445	0.441
MCA13	0.781	0.493	0.401
MCA14	0.840	0.559	0.508
PF02	0.496	0.812	0.472
PF03	0.485	0.843	0.491
PF04	0.547	0.817	0.478
PF05	0.579	0.831	0.513
PF06	0.593	0.863	0.535
PF07	0.690	0.844	0.532
PF08	0.541	0.811	0.489
PR01	0.502	0.554	0.844
PR03	0.497	0.513	0.837
PR04	0.483	0.470	0.865
PR05	0.544	0.545	0.857
PR06	0.555	0.469	0.816

2.8 Importance Performance Matrix

As part of the effort to achieve the objective of this study, the importance-performance matrix analysis (IPMA) (Hair et al., 2014) was performed by using mobile commerce adoption as the outcome variable. Fig. 3 depicts the performance level of each exogenous variable (i.e., perceived fun and perceived risk) along with their importance on the mobile commerce variable so that the mobile commerce service providers can easily make decisions from the graphical representation. The total effect which draws on the

path coefficients (on a scale from zero to -0.50 on the horizontal axis), shows the importance of the independent variables, while the mean value of their scores (on a scale from zero to 100 on vertical axis) shows their performance (see Fig. 3). Based on Fig. 3, it becomes exigent that priority should be laid by the mobile commerce providers on perceived fun to engender increase in the rate of mobile commerce adoption as it shows highest impact. Therefore, mobile commerce practitioners should focus and lay emphasis on perceived fun, by strongly embedding this into mobile commerce platforms to ensure increase in the rate of patronage.

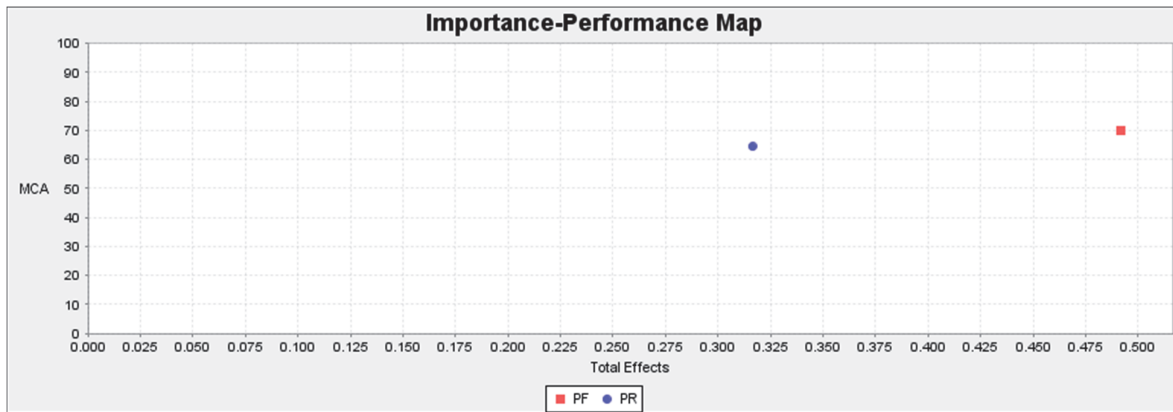


Fig. 3. Importance Performance Matrix.

2.9 The Structural Model (Inner Model) and Hypotheses Testing

In order to order to estimate the inner model of the study, an algorithm and bootstrapping of SmartPLS were further performed. The essence of running these is to determine the level of significance of the hypotheses while other parameters are equally measured. As can be seen from Fig. 2, the t-statistics of the perceived fun and the perceived security risk are above 1.96 and which signifies the results.

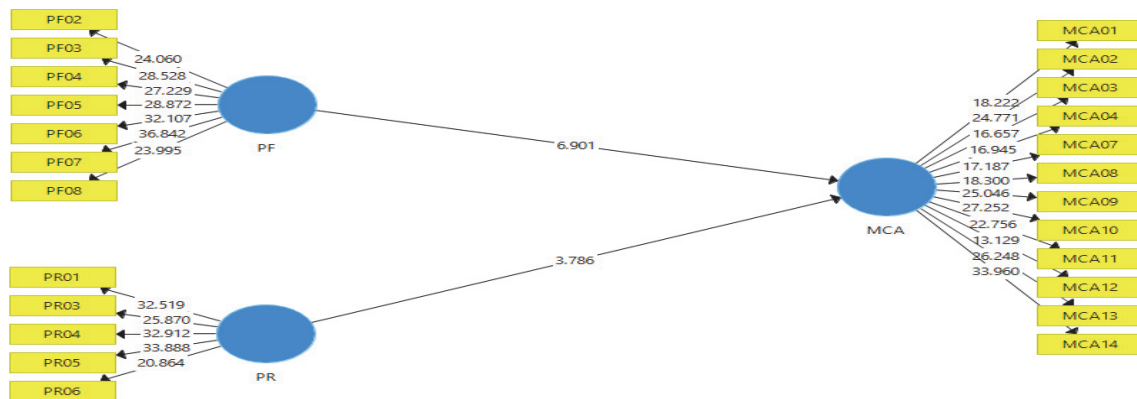


Fig. 4. Structural Model

2.10 Predictive relevance and effect size of the model

The researchers employed R² and cross-validated redundancy to assess the predictive relevance of the research model. The R² also known as coefficient determinant is used to ascertain the level of variance in the dependable construct that the independent construct explains. Based on the R² of 0.53% as shown in Table 1, the two independent variables adequately predict the variance of the endogenous variable

thereby surpasses the minimum threshold suggested by Cohen (1988). The effect size shows the contribution of each variable in the variance as perceived fun contributes 0.492, while perceived risk contributes 0.316. This implies that two constructs have large effect size. According to Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 indicate small, medium and large effects of the exogenous latent variable, respectively (Hair et al., 2014).

As part of prerequisite of establishing theoretical soundness of the study model, the researchers also assessed Q^2 using cross-validated redundancy of the model. The value obtained from blind folding exercise as indicated in Table 5 shows that the Q^2 is above zero

Table 5

Predictive relevance of the model

	SSO	SSE	Q^2
MCA	2,088.000	1,496.110	0.283

3. Research Findings

The two hypotheses of this study are supported. Perceived fun has positive and significant relationship with mobile commerce adoption ($\beta=0.492$, $t=6.901$, $p<0.000$). Perceived risk also has a positive and significant relationship with mobile commerce adoption ($\beta=0.316$, $t=3.784$, $p<0.000$). These findings are depicted in Table 6 below.

Table 6

Result of Hypothesis testing

Hypotheses	Relationship	β	Standard Error	T-Statistics	P-Values
H1	PF \rightarrow MCA	0.492	0.071	6.901	0.000***
H2	PR \rightarrow MCA	0.316	0.084	3.786	0.000***

*** = $P<0.01$

4. Discussions and Conclusions

The primary objective of this research was to assess the influence of perceived risk and perceived fun on mobile commerce adoption. The findings reveal that the two hypotheses were supported. Hypothesis H1, which estimated a relationship between perceived fun and mobile commerce adoption, is supported. Previous studies have reported similar findings (Pikkarainen et al., 2004; Salimon et al., 2017a,b). The result suggests that fun which is distinct from extrinsic value can be used to increase the rate of mobile commerce adoption. As noted by a number of previous studies, perceived fun has become an important stimulus that can make adopters of IS based service such as mobile commerce to be cognitively attached to the platform. This can be achieved through underground music, animation, cartoons etc.

Hypothesis H2 that estimated a relationship between perceived risk and mobile commerce adoption was supported (Ernst, 2015; Salimon et al., 2017a,b). This therefore confirms that when customers perceived fewer risks or feel that the platform is incorporated with high risk protection mechanisms they would be motivated to adopt mobile commerce. However, they would be discouraged if they feel threatened as a result of perception of insecurity (Deb & Lomo-David, 2014).

4.1 Theoretical Implication

Perceived risk and perceived fun are the two important variables of this study. While majority of studies have used these variables in different contents, the uniqueness of this study is that the two variables are being considered from mobile commerce perspectives which most of the previous studies have largely

ignored. This therefore indicates that the framework of this study will continue to be a point of reference for coming researchers who may be interested in researching mobile commerce adoption.

4.2 Practical Implication

A lot of practical implications can be drawn from this study as the results of the study would continue to guide mobile commerce service providers, designers, marketers, and policy makers. The study reveals some important factors that can be used to significantly increase the rate of adoption. For instance, perceived fun positively and significantly predicts mobile commerce adoption. This therefore suggests that mobile commerce platform designers and providers should lay emphasis on both utilitarian and intrinsic aspects of mobile commerce. This coincides with the arguments of previous researches that emphasize that intrinsic value in the contemporary time has become a goldmine that should be explored by IS based service providers as this will help to stem the rate of frustration that may be associated with the usage of those platforms. This is in line with the argument of Lowry et al., (2012) where the authors argued that perceived fun based system is now a driving force of IS globally as IS service providers are making billion yearly in sales revenues against utilitarian motivation system. This is also in line with the arguments of Zhou (2013) which indicate that when users find that using mobile sites are enjoyable and fun, they feel satisfied and continue their usage. The usage of mobile commerce in this study revolves round content delivery, transactions and location based services (Chong, 2013) and which can be enhanced by incorporating animation, games and music on mobile commerce sites.

Considering the practical implication of perceived risk on the adoption of mobile commerce, it is very important for mobile commerce providers and designers to come up with platforms that are deemed secured and protected. For instance, experience has revealed that a lot of users of mobile commerce have reduced or totally jettisoned mobile commerce platform due to security risk and apprehension on the likelihood of losing money and other valuable information. It is therefore important for providers to incorporate those features that would make the platforms to be highly secured. This will ensure that the good attributes that would make users to enjoy high quality of interactions would also assist them to enjoy the full benefits of adoption.

4.3 Limitation and further research

This study in line with the past researches has some limitations which must be considered when interpreting its result. First, the researcher conducted this study in Nigeria; a developing country and among active users of mobile commerce. This poses a limitation due to the peculiarity of the context as the level of technology usage is still evolving in Nigeria. Therefore, it is highly recommended that future researchers should conduct similar studies in other developing countries with the objectives of testing the veracity of the results of this study. The second limitation is that the study was conducted among users of mobile commerce. In this instance, we recommend coming researchers to conduct comparative studies among users and non-users with the purpose of exploring further into other factors that make the intending users to be willing to use this platform while actual users either continue or discontinue the usage. Notably too, the research model only explain 53.0 per cent of the total variance of mobile commerce adoption indicating that there are other factors that can explain possible variance in the construct. Future studies can therefore consider measuring the diffusion of mobile commerce usage activities over time, and equally investigate the influence demographic factors at various stages of consumer diffusion of m-commerce activities as well include perceived cost, perceived value and consumer attitude (Chong, 2013; Sikdar et al. 2015).

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