Determinants of Mobile Payment Use by Consumers in Kenya

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Abstract

Purpose: The purpose of this study was to investigate the drivers that influence the use of mobile payment services in Kenya.

Design/Methodology/Approach: The study developed a conceptual framework of the drivers that influenced the use of the mobile application. A descriptive survey design and systematic random technique was adopted as research design and data sampling methods while a questionnaire was used as data collection instrument. A research model was tested empirically using data collected from 680 mobile payment users situated in four towns located in Kenya. Multiple regression analyses were used to test the research hypothesis.

Findings: The study findings revealed that perceived ease of use (PEOU), perceived enjoyment (PE), perceived usefulness (PU) education level, perceived security (PS) and age influenced the use of mobile payment services in Kenya. The results also suggested that Social influence and gender did not influence the use of mobile payment services in Kenya while perceived usefulness was the strongest factor.

Research Limitations: The research limitation was related to the mobile commerce application that was targeted in this study. This study only focused on mobile payment services and therefore more applications need to be studied before generalization the results.

Practical implications: With a huge disparity in the use of mobile payment services globally, a study focusing in Kenya which is the global leader in the consumer readiness and use will help understand the drivers behind this success that may be replicated in other countries.

Originality: Majority of the studies have studied technology adoption as dichotomous. This study goes further to study technology adoption as a process by testing the factors that influence the usage of mobile payment services in Kenya. The study contributes to the body of knowledge by establishing the drivers that influence the usage of mobile payment services a critical stage in the adoption process.

Key Words: Mobile Payment, Consumer intention, intrinsic motivation, extrinsic motivation.

1. INTRODUCTION

The adoption and implementation of mobile commerce activities has not only changed the way organizations design and develop their products and services but also how these products and services are delivered and used by the consumers(Teoh, Chong, & Lin, 2014). It is self-evident from recent statistics that in the last twenty years or so, many people, educated and uneducated have adopted the available technology aggressively in Kenya(GSMA, 2015). The use of mobile money transfer has been rising since its inception in 2007 and in addition, money transfer from cell phones and wireless technology has accelerated to the highest level ever seen in the continent (GSMA, 2015). The number of mobile subscribers in Kenya has grown to an estimated figure of approximately 30 million with 99% of the internet access being via mobile phones (CAK, 2014). Moreover, it is estimated that money transfer subscribers is approximately 26m while the total money deposited via mobile phones grew to 1.5 trillion quarterly by mid of 2015.Though m-commerce is a relatively wide concept, Hwang (2009) stated that without the transaction of monetary value, m-commerce cannot be achieved hence existence of three ways in which the transaction of monetary value can be achieved.A review of recent statistics reveal that while Kenya is the global leader in consumer readiness and use of mobile payment services with 68% over all usage rate and 89% consumer readiness, the global average remain very low at 51% (Mobile Payments Readiness Index, 2015). With the reportssuch as Mobile Payments Readiness Index (2015)reveling that mobile phones should have established itself as a successful mode of payment globally by now but this has been hindered by absence of large consumer acceptance that has prevented the market from breaking even, several aspects of research such as the need to understand the drivers that influence successful use of mobile payment services emerge.This study therefore investigated the factors that influence the use of mobile payment services in by consumers in Kenya.

2. Theoretical Background

Existing literature reveals that there are many documented studies focusing on technology diffusion either at individual, organization or government perspective(Salwani, 2009). According to (Alam, 2009), majority of the studies are grounded on the following theoretical frameworks.An analysis of the prior studies indicates that these models differ in their focus and are designed to examine different aspects of technology adoption(Peixin & Wei, 2012).Theoretical literature based on the individual usage of technology reveal that Technology acceptance model (TAM), unified theory of acceptance and use of technology model (UTAUT), Theory of planned behavior (TPB) and Extended TAM by Venkatesh & Davis (2000) are some of the models that have widely been used in the previous studies (Chan & Chong, 2013; Issa & Mamoun, 2013; Njuguna, Ritho, & Olweny, 2012; Safeeni & Kamani, 2011; Teoh et al., 2014).

For the purpose of this study, theoretical foundation was based on the extended TAM developed by (Venkatesh 2003). The model included other variables such as social influence and demographic profile to improve on the original TAM model variables which included; perceive ease of use (PEOU) and perceived usefulness (PEOU). Chan & Chong (2013) argued that Technology acceptance model (TAM) as a model has its own limitations based on the fact that previous studies have clearly tested and shown without doubt that the two variables (PEOU) and (PU) will have a direct relationship on the intention to adopt any technology hence a need to extend the model.

3. Conceptual Model and Research Hypotheses

The conceptual framework in this study shows the relationship between independent variables (Perceived ease of use, Perceived usefulness, Perceived security, Social influence, age, gender and education level) and their influence on the dependent variable (use mobile payment system amongst Kenya's consumers).
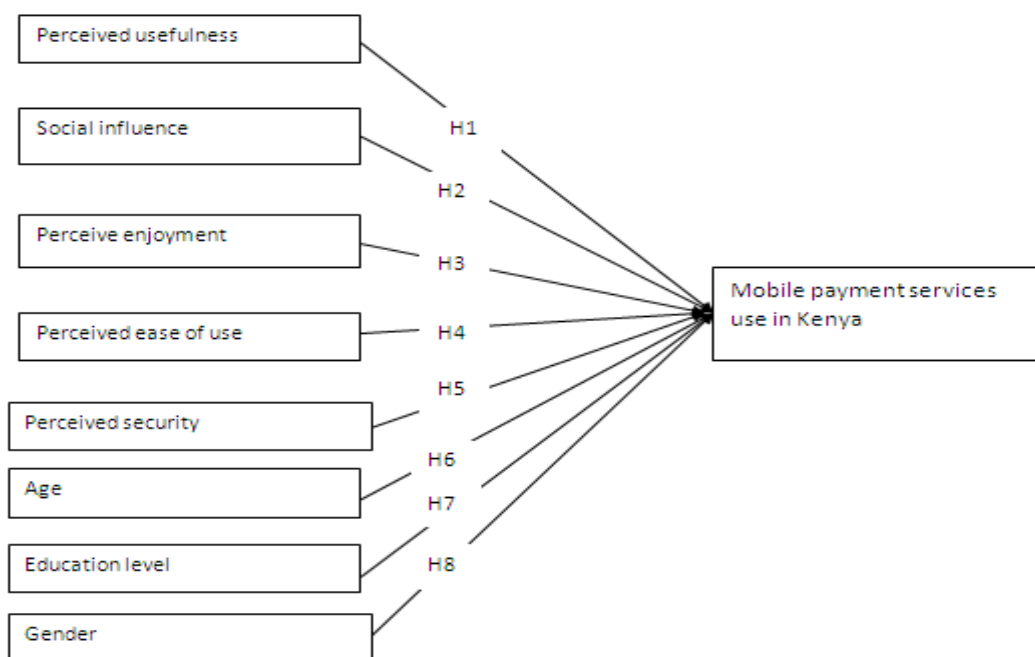
4. Hypothesis Development

Motivation Factors and Mobile Payment Use in Kenya.

Research in psychology has reported a correlation between motivation and behavior intention to engage in a certain activity and one such activity is the consumer intention to adopt or use information technology application such as m-commerce (Chan & Chong, 2013; Issa & Mamoun, 2013; Marumbwa & Munyaradzi, 2013). Deci & Ryan(1985), defined motivation as a state which influences peoples actions by factors that are either externally or internally driven while Chan & Chong(2013) revealed that these factors can either be extrinsic motivation or intrinsic motivation where consumers can either be extrinsically motivated or intrinsically motivated to carry out a given action such as accepting and using mobile innovations.

Extrinsic motivation refers to an activity performed due to the reinforcement value of the outcome while intrinsic motivation occurs when a person performs an activity without apparent reinforcement other than the process of performing the process (Teoh et al., 2014). Based on the previous studies extrinsic motivation factors include social

influence (SI) and perceived usefulness (PU) which have been found to have a positive influence on mobile commerce application use (Chan & Chong, 2013; Issa & Mamoun, 2013). The following hypotheses are formulated in this case:

H$_1$:_Perceived usefulness has significant influence on the use of Mobile payment services by consumers in Kenya._

H$_2$:_Social influence has significant influence on the of use Mobile payment services by consumers in Kenya._

According to Chan & Chong(2013) and Chin & Ahmad(2015) intrinsic motiavtion occurs when a person performs a given activity without any support rather than performing that activity. Perceived ease of use and perceived enjoyment are the most widely studied intrinsic motivation factors that influence the using of mobile technology and it is important to know whether users are influenced by how easy and enjoyable the technology is to use the mobile payment services in Kenya.In view of thi,s the following hypothesis are developed;

H$_3$:_Perceived ease of use has significant influence on the use of Mobile payment services by consumers in Kenya._

H$_4$:_Perceived enjoyment has significant influence on the of use Mobile payment services by consumers in Kenya._

Perceived Security and Mobile Payment Use

Previous studies have revealed that security contributes to the use of mobile commerce application and use. For instance, Chan & Chong (2013) revealed that perceived security influenced some mobile commerce activities such as transaction and location based services but did not influence entertainment and content delivery activities. Based on this finding the following hypothesis was formulated:

H$_5$:_Perceived Security has significant influence on the of use Mobile payment services by consumers in Kenya._

Demographic Variables and Mobile Payment Use

According to Chan & Chong(2013) one way of understanding how different users interact with the various m-commerce application is to segment the users based on their demographic profiles. Although demographic variables such as (age, gender, experience and education level) are some of the profiles widely tested in the previous studies, researchers such as Venkatesh (2003) used them as moderating variables of other variables such as perceived ease of use (PEOU) and perceived usefulness (PU) in the unified theory of acceptance and use of technology (UTAUT) and technology acceptance model (TAM) rather than testing them as direct relationship. Age is one of the demographic variables that has widely been examined in the computer adoption studies and previous study have indicated that technology use was biased to the younger users than the older ones (Teoh et al., 2014). The following hypotheses aretherefore formulated:

H$_6$: _Age significant influence the use of Mobile payment services by consumers in Kenya._

Gender and Mobile Payment Use in Kenya

Gender, a demographic variable has also elicited a lot of interest in the innovation adoption and use literature (Chong, 2014; Hamza & Shah, 2014; Venkatesh & Davis, 2000). Despite majority of the study including gender as a moderating variable in the study, the researchers have mostly found no significant influence especially in mobile technology (Issa & Mamoun, 2013; Venkatesh & Davis, 2000). However evidence from the previous studies especially in other technology adoption indicates that men are likely to adopt a new technology than their female counterpart and moreover, women who adopted it use it at a lower level than men. For instance (Laiw, 2002) in his study found out that positive perception towards use of web technologies and computer was higher in male students than female. The following hypothesis was formulated based on these mixed results:

H$_8$: _Gender significant influence the use of Mobile payment services by consumers in Kenya._

Education Level

Education level is also a demographic variable that has elicited less attention in the prior innovation studies. Among those that have focused on education level, some studies have tended to report contradictory results. For instance Issa & Mamoun(2013) included education level as a moderating variable in their study and found out that education level had no significant effect on behavioral intention to use m-commerce. A similar study carried out by Chan & Chong(2013) where education level was included and direct relationship was tested found out that education level influenced m-commerce activities such as transaction and location based but no influence on entertainment and content delivery. These contradicting led to the formulation of the following hypothesis:

H$_7$: _Education level significant influence the use of Mobile payment services by consumers in Kenya._

5. Research Methodology

The researcher adopted a descriptive survey research design and the targeted population of the study was consumers who frequented the customer care centers of the leading mobile operators in Kenya. The research design was chosen based on its definition and use in previous studies (Chan & Chong, 2013; Issa & Mamoun, 2013; Zhou, 2014) The operators were sampled because it accounted for approximately 77% of the mobile payment market share in Kenya (CAK, 2014). To avoid any bias in data correction, consumers were sampled from for major towns in Kenya namely Nairobi, Nakuru, Kisumu and Eldoret. These towns were selected based on the number of customer care centers that were available. A sample of 680 respondents was selected based on Krejcie & Morgan (1970) formula of calculating sample size and systematic random sampling was adopted as the sampling technique. This technique was adopted to avoid bias while selecting a sample for the study due to the large number of consumers who frequented the customer care centers. This data correction technique was also used in previous similar studies such as (Chan & Chong, 2013). The measurement

items were adopted from the previous studies (Chan & Chong, 2013; Hwang, 2009; Teoh et al., 2014; Zhou, 2014) while a structured questionnaire was used as an instrument for data collection.

Reliability and Validity Test

To test the reliability and validity of the data collection instrument, a pilot study was carried out where 60 questionnaires were distributed to consumers in three randomly selected customer care centers what were not included in the final study. The reliability test was supposed to test the internal consistency of the items in the questionnaire while the content validity test was carried out to determine whether the questions were clear and accurate and understandable. Table shows the Cronbach Alpha (α) of 0.8563 that was realized after the reliability test was carried out

Cronbach's Alpha	Alpha based on standardized items	Number of items
	0.8463	60

This test was used to test reliability of the constructs measurement in similar studies as evidenced by; (Chan & Chong, 2013; Teoh et al., 2014). According to Hair (1998) a cronbach (α) value of 0.7 is considered acceptable hence satisfying the requirement.

6. Analyses and Results

Descriptive statistics

Out of 680 questionnaires that were issued, 527 questionnaires forms were filled up and returned indicating a response rate of approximately 77%. This response rate was considered adequate based on Saunders & Lewis (2012) recommendations that a response rate of 60% was adequate. Forty three (23) questionnaires that were found to be incomplete were discarded and over all 484 questionnaires were dimmed fit for analyses. 48% of the respondents were male while 52% of the respondents were female. 90% of the respondents were below the age of 40 years, 9% between the age of 41 and 50 years and only 1% of the respondents were above the age of fifty. 31% of the respondents had attained a secondary qualification, 48% college education, 7% primary and 15% university education. 64% of the respondents were not married and 36% were married. Lastly, 78% of the respondents had an income range of 50000Ksh and below, 15% between 50,000 and 100,000 and only 7% had income of over 100,000.

Inferential Analyses

Kaiser- Meyer-Olkin measure of sample adequacy (KMO) was carried out to measure sample adequacy while Barlett test of Sphericity tested the null hypothesis that the correlation matrix is an identity matrix. The KMO test value was 0.827 which was well beyond 0.5. According to (Field, 2013) KMO test value that are well beyond 0.5 are recommended. This means that the patterns of correlations were compact and the factor analyses would yield reliable factors. Factor analyses were carried out and all the factors were found to have a value beyond 0.5.

Principal Component Analysis Test Statistics (Communalities)

Variables	Initial	Extraction
Perceived Ease of Use	1.000	.737
Perceived Enjoyment	1.000	.798
Social Influence	1.000	.661
Perceived Usefulness	1.000	.847
Mobile Payment Use	1.000	.659
Perceived Security	1.000	.754

Table above shows that all the variables had a factor analyses value of more than 0.5 which according to Hair (1995) is recommended if the researcher is to proceed to hypothesis testing.

To test the hypothesis proposed in the study, all the variables were selected and entered in SPSS in order to determine the correlation with the dependent variable. A summary of multiple regression analyses was carried out where the four variables being tested were entered into the SPSS as independent variable while the consumer behavior intention was entered as the dependent. This was done to test the influence of these four variables on the consumer behavior intention to use mobile payment services in Kenya.

Regression analyses Results
Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.682(a)	.465	.456	1.52315

The coefficient of determination R^2 and adjusted R^2 are 0.465 and 0.456 respectively meaning that 45.6% of the variation of consumer use of mobile payment services in Kenya was explained by the eight independent variables. R^2 value ranges from zero and one, the closer the value is to one, the better "fit" the model is.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	958.249	8	119.781	51.630	.000(a)
	Residual	1101.991	475	2.320		
	Total	2060.240	483			

The results of the significant test of regression model F value of 51.630 and sig f is 0.000 indicates that the model has a significant statistic and it indicates the "goodness" of fit of the model. According to (Field, 2013), for the model to have significant statistic meaning, the F change value should be greater than 10.

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.691	.682		3.944	.000***
	Perceived ease of use	.175	.031	.226	5.728	.000***
	Perceived usefulness	.320	.031	.395	10.376	.000***
	Perceived enjoyment	.108	.024	.191	4.522	.000***
	Perceived security	-.097	.026	-.128	-3.674	.000***
	Social influence	-.017	.014	-.043	-1.232	.219
	Gender	.139	.142	.034	.983	.326
	Age	.237	.073	.112	3.246	.001*
	Education level	.195	.073	.093	2.681	.008**

Sig * P= 0.01 significance ** P = 0.05 significance *** P = 0.001

The standard coefficients show that perceived ease of use has a standard coefficient of(0.226) and a significant value of (0.00); perceivedenjoyment β (0.191) and a significant value of (0.000); perceived usefulness β (0.395) and a significant value of (0.000); and social influence β (0.043) and a significance value of (0.219), gender had a β of (0.34) and a P-value of (0.326), age had a β of (0.112) and a P-value of (0.01) while education level had a β of (0.93) and a P-value of (0.08) and perceived security had a standard coefficient β of (-0.128) and a P-value of (0.000). This means that at a significance value of (0.05); perceived usefulness, perceived ease of use,perceived enjoyment, perceived security, age and education level wereall significant while social influence and gender werenot significant.

7. Results Explanation

ForDemographic factors, H_6, andH_7were found to be significant while $H_8$was insignificant. The study resultstherefore revealed that the age of the respondents had a strong influence on the use of mobile payment services in Kenya. This results resonate with previous studies results that reveled that age is a strong predictor in the use of mobile commerce applications such as mobile payment services (Chan & Chong, 2013; Teoh et al., 2014). $H_7$was also found to be significant revealing that education level influenced the use of mobile payment system in Kenya. This result is consistent with the previous studies findings which showed that education level of the respondent was an important factor in determining the use of mobile commerce transaction activities (Chan & Chong, 2013).$H_8$was found to be insignificant revealing that gender did not influence the use of mobile payment services in Kenya. The results from the study is consistent with Chan & Chong(2013) findings which revealed that gender did not influence the use of transaction based mobile application activities amongst Malaysian consumers.

The influence of perceived security $H_5$was also confirmed with the hypotheses having a significant influence on the consumers use mobile payment services in Kenya. This result is similar to previous studies findings which revealed that Perceived security was animportant driver in the use of mobile commerce transaction applications(Chan & Chong, 2013; Zhou, 2014).

The influence of H_1, $H_4$and $H_3$is also confirmed revealing that perceived ease of use (PEOU), perceived usefulness (PU) and Perceive enjoyment (PE) influence the use of mobile payment services in Kenya. For perceive usefulness (PU) and perceived ease of use (PEOU) (H_1 and H_4) these results are consistent with previous studies findings which indicated that perceived usefulness was the strongest predictor in the use of mobile commerce applications (Chan & Chong, 2013; Issa & Mamoun, 2013; Zhou, 2014). For perceived enjoyment (H_3), these results also resonate with previous studies findings which revealed that perceived enjoyment had a positive influence on the use of transaction based mobile commerce applications(Chan & Chong, 2013; Hwang, 2009).

Social influence (H_2) was found to be insignificant meaning that (SI) had no influence on the use of mobile payment services in Kenya. The results are consistent with Chan & Chong (2013) findings which revealed that social influence did not influence the use of transaction base mobile commerce applications. The results also contradicts Issa & Mamoun(2013) results that indicated that social influence was the strongest predictor of the use of mobile commerce applications in Saudi Arabia.

8. Discussion and Implications

Evidence from the previous studies indicates that limited studies have been undertaken on the drivers influencing use of mobile payment services particularly in a developing country context. A study focusing on Kenya the global leader in mobile money usage may serve to provide important information on the drivers of this success to other emerging markets and developed economies struggling to implement mobile innovations successfully.This study demonstrates a solid theoretical base of extended Technology acceptance model (TAM) as a useful framework for identifying the factors that influenceconsumer use of mobile payment in a developing country like Kenya. This results resonate with (Chan & Chong, 2013; Venkatesh & Davis, 2000)findings which revealed that Extended TAM was a strong and fit theoretical model for testing mobile commerce use. The study investigated the influence of perceived ease of use (PEOU), perceived usefulness (PU), perceived enjoyment (PE), Social influence (SI), gender, age and education level on the use of mobile payment services. First unlike the existing studies that focused on whether the user will or will not adopt mobile payment service; this study explored the influence of the adoption factors on consumer actual use of mobile payment services. As such mobile payment services providers will be able to understand the drivers that may lead to full utilization of the services after the adoption.

Significant effect of perceived usefulness, perceived ease of use and perceived enjoyment, education level and age on use of mobile payment services in Kenya is confirmed. This outcomes are similar to the previous studies findings; (Beng & Eze, 2010; Chan & Chong, 2013; Jayshree & Mohd, 2010; Mardikyan, Beşiroğlu, & Uzmaya, 2012; Omwansa, Lule, & Waema, 2015; Pousttchi & Wiedemann, 2014; Teoh et al., 2014) and (Arvidsson, 2014). The finding implications is that for consumer to continued using of mobile payment services in Kenya, will be determined by their perception of the services easy to use, usefulness and enjoyable to the user. The education level and age of the consumer will also determine the usage of these services. The implication about this is that mobile operators should continue rolling out the services targeting consumers with high level of education and also create awareness to those with lower level of education to increase their utilization.

Second, perceived security plays an important role in user engagement with mobile payment services in Kenya. It was interesting to find out that both perceived security had a strongand a negative influence on mobile payment use in Kenya indicating that the consumer perception that the services was not secure would have a negative influence on the use of these services. It is important to note that these findings resonate with Chan & Chong(2013) which revealed that perceived security influenced the use of transaction based mobile applications in Malaysia.The implication about this result to the mobile operators is that when designing mobile payment applications the designer should make sure that the

end product is secure and the firms should also roll out awareness campaigns to its consumers educating them on the security measures they have incorporated in the products to safeguard their transactions.

Third, this study revealed that social influences did not influence the use of mobile payment service. The implication of this finding is that social influences is not much of an issue in mobile payment use in Kenya probably because of low banking penetration in the country making this mode of payment a necessity to majority of the users. Moreover, existence of a single dominant mobile provider may also serve as a valid reason behind these results due to lack of large variety of trusted services in the market.

9. Conclusion

This study investigated the motivational factors that influence the use of mobile payment services in Kenya. The regression results show that six variables; perceived usefulness (PU), perceived ease of use (PEOU) and perceived enjoyment (PE), perceived security (PS), age and education level significantly influence consumer useof mobile payment services in Kenya. Interestingly, social influence and gender and had no significant influence on the consumer use of mobile payment services in Kenya. This study contributes to the body of knowledge by advancing the existing literature on the factors that influence the use of mobile payment services especially from Kenya a country regarded as the global leader in the use of mobile money services. The results give a leeway to those countries that are still struggling with the adoption and use of mobile payment applications to learn from success cases.

10. Limitations and Area of Further Studies

The researcher recommends the following areas of future studies. Firstly, the focus of this study was on the usage of mobile payment by the consumers in Kenya. Future studies should focus on other categories such as the government or business usage which were not included in the study.

Secondly, the study focused only on the mobile payment services available in Kenya. It would be interesting to observe the findings of a similar study if this model was replicated in other developing and developed countries.

Thirdly, the finding from the studied factors only explained 45% of the consumer intention to use mobile payment services. The remaining 55% may be explained by the factors that were not included in this study, future studies should include other variables that were not tested in this study.

Lastly, the study adopted a cross-sectional approach. As technology is dynamic, future researchers should consider studying diffusion of m-payment use across time or using longitudinal approach.

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