

# Factors Influencing the Success of Mobile Payment in Developing Countries: A Comparative Analysis of Nigeria and Kenya Mobile Payment Users\*

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## Abstract

**Purpose** - This empirical study, aims to identify the determinants of adoption and acceptance of mobile payment as to understand why it is successful in some countries in Sub-Saharan Africa but failing in others. A comparative study of a successful mobile payment service and a purported failed one was done as to have some insights to the factors affecting acceptance of the technology.

**Design/methodology/approach** - The strength of three notable theories: theory of diffusion of innovation (DOI), the extended unified theory of user acceptance of information technology (UTAUT2) and self-efficacy theory were use. The self-efficacy of government support inclusion as, a moderating variable in the form of infrastructure, securing transaction and price value revealed the relevance of government in the success of mobile payment service. By means of a field survey of 705 subjects in two separate regions of Africa (East and West), the data was collected and use to test the research model.

**Findings** - The study result shows the importance of the moderating factor of government support to the success of mobile payment of any nation. The result also shows the importance of the perception of relative advantage, compatibility, complexity, social influence as already revealed by other studies.

**Research implications or Originality** - Mobile payment success in some part of Sub-Saharan Africa is well known but also suggested to fail in some Sub-Saharan African countries. Buttressing the need for understanding of the factors affecting mobile payment acceptance. This article empirically examined the factors influencing the success of mobile payment, and we implicated that if the implementation of mobile payment is to be successful for mobile commerce in any nation, adoption, acceptance and use by its citizen is imperative.

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**Keywords:** Government Support, Mobile Payment, Successful and Unsuccessful Mobile Payment, Technology Adoption, Use Behavior.

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## I. Introduction

Mobile phone with its unique feature when used for mobile commerce (payment) has the advantage of bringing supply closer to the demand (Kemp, 2013). Mobile revenue growth is projected to be 68% every year (Arthur D Little, 2009). It has reached \$1.05 trillion in 2016 being, an increase of 2.2% on 2015 (GSMA, 2017); also suggested that the world population of mobile subscribers as at 2015 has reached 7.4 billion with the expectation that its services may exceed the world population (Telegeography, 2015; ITU and UNESCO, 2016). The widespread of mobile devices and its immediacy to users, has made it suitable for mobile payment; due to, its impacts on peoples lives more than other innovations like it in history (Donovan, 2011; Thakur and Srivastava, 2014). Mobile payment has not only eliminated the need for cash but also allow transaction to be done faster with convenience to the users (Slade, Williams and Dwivedi, 2013; Pham and Ho, 2015; Teo, Tan and Hew, 2015). Mobile payment conveys range of benefits such as, speed of transactions and convenience to both business and consumer (ISACA, 2011). Mobile payment gives cost effective coverage, widely spread than bank accounts in rural areas that has, no financial institutions due to its ease of use, low transaction cost and flexible subscription plans (Jack and Suri, 2011; Donovan, 2012). Mobile payment has been projected to reach \$670 billion in value in 2015 with user growing to 2.5 billion globally and three quarter of countries that use mobile payment frequently are in Africa (Simpson, 2014).

Mobile payments are said to be for bill payments, purchase payments or transfer of money between financial agents which is also used in the area of banking. Truthfully, mobile payments is mobile money, mobile transfer or mobile banking (Donner et al, 2008). Mobile payments, Mobile transfer, Mobile banking and Mobile finance all uses a set of application to enable people use their mobile devices to operate a stored value of money in their account in banks or in an account linked to their phones or devices. We can then assert that mobile banking, mobile money, and mobile payment are all models of mobile transactions and any of them could stand as a transactional application made with a mobile device. Mobile banking can be done using a banking account operated in a mobile device and likewise, mobile money can be used to make mobile payments while counting on the money stored on a digital wallet or directly to a merchant without using a banking system (Cernev, 2010). with this explanation, mobile payment as used in our research, is focused on mobile transactions (mobile banking, mobile money and mobile payment) as this includes payment processes linked to concepts of mobile transactions and mobile money.

Mobile payment is gaining acceptance with success in some Sub-Saharan Africa and other part of the world; from consumers, agents and merchants as, an alternative to using cash, check, credit cards and other payment systems ( Donovan, 2012; Mauree, V. Kohli, 2013; Aker, 2016). Mobile payment has been accepted in countries where formal banking usage by citizens is low (World Economic Forum, 2011; Slade, Williams and Dwivedi, 2013). Africa is said to be, a difficult location to understand in regards to mobile payment due to study gaps and was only known for mobile payment in 2007 due to the success of a single case M-PESA of Kenya (de Albuquerque, Diniz and Cernv, 2014). Kenyan M-PESA has active bank accounts, an increased from 2.5 million in 2007 to 15 million in 2011 while transaction exceed USD 375 million each month. Users are increasing daily and using the service for savings while sending and receiving money (International Telecommunication Union, 2013). Access to formal banking in Kenya has risen to 40% of adults through M-PESA as, compared to the formal

banking 22.6% of adult from 18.9% between 2006 and 2009. This has also, brought the introduction of other payment service as water and electricity bill payments which enhanced smaller transaction services (Aalberts et al., 2011; Simpson, 2014). The value of the transaction done through M-PESA was 4.36%, USD535 million of commercial bank deposit in Kenya (Donovan, 2012). M-PESA was adopted by 20 million subscribers, 57% of Kenyan adult; while, transacting USD 415 million monthly which, was about 17% of Kenyan GDP in 2009 (Radcliffe and Foundation, 2010; Burkson, 2014).

Mobile payment has taken off in Africa due to successful case of M-PESA of Kenya and, countries as Nigeria and Ghana, are just starting to get a headway in the mobile payment business (Burkson, 2014). Nigeria has an immense potential with citizens without bank account (Arthur D Little, 2009); but the acceptance or success of mobile payment has eluded Nigeria since it started; and, suggested to be a failed case because there is no significant growth (Evans, David S. and Pirchio, 2014).

Between 2009 and 2011, value of transaction by mobile rose from 1.27 to 20.5 billion naira (USD128,125 million), 1.2% of total of market share in e-payment in Nigeria (Agbaje, Opeyemi Ayanbadejo, Kehinde Ajiboye, Kalejaiye and Dada, 2013). The World Bank has suggested that, cost of remittance in Africa in 2011 was 6.87% of the transmitted sum, to send funds from the US to Mexico but, it cost 38.94% to send money from Ghana to Nigeria (Simpson, 2014). That global remittance in 2015 is \$581.6 billion and, \$431.6 billion of that amount is to developing countries. The World Bank proposed that average cost of sending \$200 is 7.6% and, the sub-Saharan Africa is the most expensive region of the world to send money to with average cost of 9.6%. Remittance through mobile payment is 2.7% which, is 50% cheaper than using global money transfer operators for remittance (GSMA, 2016, 2017). The direct cost of cash management for the Nigerian banks in 2012 was, USD 1.9billion. Family are mostly cash-based with reliance on jewelries, livestock, and cash as savings leading to sidelining them from formal economy (di Castri, 2013). The Global System for Mobile Telecommunications Association (GSMA, 2016), suggested Nigerian government is restrictive in terms of regulation of mobile payment services thereby, causing the lack of growth in mobile payment. The Kenyan and Philippines government suggest to have adopted an open regulatory approach for their mobile payment. They allow their mobile operators to work together with banks for the benefit of their citizens. Kenyan M-PESA was suggested to further develop its own regulation as to offer saving account to its customers in partnership with Equity Bank of Kenya (Mauree, V. Kohli, 2013; Simpson, 2014). M-PESA in collaboration with M-KESHO of Equity Bank of Kenya ensure that customers who register with M-PESA sign-up for M-KESHO account and the menu on the SIM application toolkit updated for account deposit and other financial services. M-PESA amasses USD 1.2 billion in deposit across 5 million account (Radcliffe and Foundation, 2010). Mobile payment transactions are 73% majorly, conducted through M-PESA and, 23% of users do their transactions at least once daily. M-PESA is proposed to have 18 million customers and 7 million of them are not having a bank account (di Castri, 2013). They allow users to pay bills, make ATM withdrawals, personal transfers, point-of-sale purchases and mobile phone top-up ; also serves as an application for insurance and banking (Flood, West and Wheadon, 2013).

The Mobile Network Operator (MNO)-centric models of mobile payment are popular for financial service in developing economy because, the infrastructures are not well developed. They are successful because of the enormous number of those reached without a bank account in the rural areas (Mauree, V. Kohli, 2013). The MNOs are more suited for mobile payment

because they have assets that they can leverage upon to offer service; skills and expertise central to their core business for mass marketing and managing a broad distribution infrastructure; they also cross-sell new service to already served customers (di Castri, 2013). Nigeria government has prohibited the MNOs to take any lead role in the mobile payment service and if they have to provide any service, they must work with banks (Evans and Pirchio, 2014). Remote payments and remittance are the most popular in developing countries while, domestic remittance is regularly done in Kenya from the urban to rural areas, M-PESA takes care of domestic remittance and, partners with Western Union to allow its customers to receive their international remittances (Flood, West and Wheadon, 2013). M-PESA is suggested to process greater transactions locally in Kenya than, Western Union transactions globally (Mauree, V. Kohli, 2013); while their services, are cheaper than alternative systems for domestic remittance (Donovan, 2012).

While the government of Nigeria is striving to enhance mobile payment for the poor and without bank account (unbanked) citizens of Nigeria, there is the advocacy to reduce the number of the unbanked Nigerians to 10 percent. Currently there are about 35 million (39 percent) of citizens living in rural areas without access to a pre-paid mobile phone. Mobile payment rollout is plague by low uptake and inactive users and, may be because of the lack of consideration of the real desires of the end-users. Buttressing, the need to comprehend the factors that affects mobile payment adoption and how the factors also, influence the services markets (Dahlberg, Guo and Ondrus, 2015; Srivastava and Shainesh, 2015). To make available, observed indications on the features of a successful and unsuccessful initiative within the region of Africa to researchers with a unified knowledge of mobile payment adoption (Dahlberg, Guo and Ondrus, 2015; Dennehy and Sammon, 2015). This study intends to advance the adoption and use of mobile payment systems because we, intend to do a comparative analysis of the adoption and acceptance of the mobile payment service from successful country initiative and an unsuccessful country initiative within Africa. To the knowledge of the authors, no study has examined a successful in comparison to an unsuccessful mobile payment initiative and suggested to be critical to mobile payment acceptance worldwide (Dahlberg, Guo and Ondrus, 2015; Dennehy and Sammon, 2015).

While using wellknown theories of adoption and acceptance of technology, our studies is more centered on the moderating aspect of Government support in terms of infrastructure, secure transaction and price value because we believe it will moderate the acceptance of mobile payment. Government support as a moderator has been posited to be more effective so long as it is indirectly provided such as regulation, reducing digital inequality, stimulating demand, provision of subsidies, financial incentives and facilitating diffusion of Technology (Di Pietro et al 2015). Government support when provided directly could lead to unfavourable competition that may involve government in production, marketing at the same time promotion of technology which may lead to failure of adoption or usage. Government support as a moderator indirectly influences behavioral intentions are proven to predict the decision to use technologies with positive relationship and effect on behavioral intension with adoption and use of technology. While cost of transaction of using any technology as mobile payment is said to be a problem because factors as perception of high financial cost is an important factor in mobile payment service. The reasonably priced value of M-PESA of Kenya was said to be a factor for success. Government support is posited to be very important in developing countries where private sectors role is lest prominent as to encourage innovation, adoption or intention to adopt information technology services (Perkins and Annan 2013). We believe

Government support as a moderator will better explain factors for adoption or usage of mobile payment. Values, are suggested, to be a psychological attribute of an individual and a population of a nation to which the individual belong and this may also affect their behavior (Fischer et al., 2010). Financial inclusion as explained by (Triki and Faye, 2013) refers to all processes that creates and makes recognized financial services available, accessible and affordable to all fragments of the inhabitants of a nation. There is a considerable gap in knowledge and geographical gap in literature of mobile payment schemes (Slade, Williams and Dwivedi, 2013; de Albuquerque, Diniz and Cernev, 2014) and the need to fill in that gap.

## II. Theoretical Background

The theory most widely used as framework to understanding individuals' adoption behavior in Information System (IS) are the Theory of Reason Action (TRA) and Theory of Plan Behavior (TPB) (Icek Ajzen, Robert L. Heilbroner, 1980; Ajzen, 1991). They are theoretical model that are familiar at the individual level explaining the association between user beliefs, attitude and intentions. (Davis, 1989) used the model of TRA and presented the Theory of Acceptance Model (TAM); most posited as a models used for studying individual intentions to adopt any technology, designed to predict Information Technology (IT) acceptance and use on job. Technology acceptance model TAM posited by Davis (Davis, 1989; Davis, Bagozzi and Warshaw, 1989) has been postulated to encourage the acceptance and use of technology in any organization but, suggested not to provide sufficient information necessary for the comprehension of user acceptance of new technology (Venkatesh, 2000). TAM was suggested to be limited in explaining some IT usage as it disregard the social context in which the technology is being adopted and, without the cognizance that there are barriers that are preventing individuals from using a system (Shin, 2009). TAM was also postulated to be too parsimonious and posited to ease the management of IS in the work place and, the need to expand it with the factors relevant to a specific technology under study (Venkatesh and Davis, 2000). (Venkatesh, Morris, Gordon B. Davis, et al., 2003) proposed the unified theory of acceptance and use of technology (UTAUT) as an extension of TAM; posited by reviewing eight user adoption literatures (Venkatesh, Morris, Gordon B Davis, et al., 2003) for better prediction of usage of IT. It was used to predict intentions to use technology in an organizational setting but, fail on individuals' context (Dwivedi, Y. K. Rana, N. P. Chen, H. Williams, 2011). The UTAUT was later extended to developed UTAUT2 in 2012 by (Venkatesh, Viswanath Thong, James Y.L. Xu, 2012).

Technology acceptance and use is centered on two main research streams: the theories on human behavior and the theories of diffusion of innovation (Dahlberg, Tomi Oorni, 2007); whereas, research have examined payment services mainly on the perceptions of technology diffusion and technology adoption. A postulation that reasoned behaviors comes before any consideration of action; which ends with a decision or an intention to act and, barriers can prevent an individual to act or complete the behavior even after the individual has decided to perform the action (Ajzen;I. and Fishbein; M., 1975). Control beliefs are suggested to be the beliefs that factors, that enable or hinder a behavior such as, knowledge, resources and opportunities for the performance of a behavior are present (Ajzen, 1991; Dahlberg, Tomi Oorni, 2007). The prediction of social factor of an individual behavior is termed, subjective norm which, indicates the perceived social pressure on an individual to use or perform the

behavior (Ajzen, 1991). The collective pressure in terms of the expectation of others, which, in the aspect of this study mobile payment service; as, to conform to the use of the technology. The attitude, subjective norm and perceived behavioral control cause the formation of behavioral intention and therefore increase the use of mobile payment services (Dahlberg, Tomi Oorni, 2007); suggesting the need for integration of theories starting with factors that are used in diffusion and then other relevant theories as it gives explanatory power which is also done in this study.

## 2.1. The Unified theory of acceptance and use of technology (UTAUT)

The Unified theory of acceptance and use of technology (UTAUT) first, postulated by (Venkatesh, Morris, Gordon B. Davis, et al., 2003). Three constructs of the Innovation Diffusion Theory (IDT) by (E. M. Rogers, 1995a) were replaced with two of the UTAUT which are: Relative advantage replaced with Performance expectancy; Compatibility and Complexity were replaced with Effort expectancy. The UTAUT emanated from Theory of Reason Action TRA through TAM. Where the favorable or unfavorable attitude concerning a behavior is the outcome of a collective behavioral beliefs. (Ajzen and Fishbein, 1980) revealed that perceived ease of use and perceived usefulness are the causes of one's behavioral intention to use any specific technology. Performance expectancy was renamed (Venkatesh, Morris, Gordon B. Davis, et al., 2003); it was formally perceived usefulness in TAM, effort expectancy renamed formally, perceived ease of use in TAM, social influence, facilitating conditions were used to predict intentions to use a technology in an organization. Perceived ease of use suggested when innovation is easier to use, it is considered to be more useful; other things being equal (Venkatesh, 2000).

There is the assertion that if UTAUT is modified appropriately, it will be well suited and may provide a very good base theoretically for the understanding of mobile payment (Shin, 2009). Furthermore UTAUT has been claimed to give greater predictive ability as to explain about 44% of the variance in behavioral intention and 35% of technology use (Venkatesh, Viswanath Thong, James Y.L. Xu, 2012). The UTAUT theory is confirmed to predict 70% of users' acceptance of information technology innovations (Shin, 2010). Applied by several scholars (Schaper and Pervan, 2007; Wu, Tao and Yang, 2007; Masrom and Hussein, 2008; Moran, Hawkes and El Gayar, 2010; Venkatesh and Zhang, 2010; Im, Hong and Kang, 2011; Yu, 2012; Chen and Chang, 2013). Social influence was established to have a resilient effects on intention and has noteworthy role in the acceptance of mobile payment services the opinion colleagues are important (Shin, 2009, 2010).

The UTAUT theory has higher percentage of determining technology innovation success and therefore used to ascertaining the likelihood of success in the implementation. According to (Shin, 2010), UTAUT will explain better, mobile payment service acceptance and usage behavior. (Venkatesh, Viswanath Thong, James Y.L. Xu, 2012) later extended UTAUT to developed UTAUT2 suggesting that, UTAUT have some limitations. It brought about the addition of three more constructs to the earlier four. One of three new constructs added was price value; that, users endure the costs concomitant with the service used; which is a critical factor in technology context; suggested, to have direct effects on both behavioral intention and use behavior (Venkatesh, Viswanath Thong, James Y.L. Xu, 2012). We included price value, infrastructure and secure transaction, as constructs in government support moderator and excluded facilitating conditions because we already have infrastructure as part of moderators. The

UTAUT, has been used in, e-government services (Alshehri, Drew and Alghamdi, 2013), Hybrid Library Services (Ogao, Patrick Ikoja-Odong and Wokadala, 2010). Mobile learning adoption (Thomas, Singh and Gaffar, 2013); Information Technology Across Cultures (Bandyopadhyay and Bandyopadhyay, 2010; Oliveira et al., 2016); E-Banking Services (Ghalandari, 2012), used as cultural moderator (Martins, Oliveira and Popovič, 2014; Baptista and Oliveira, 2015).

## 2.2. Diffusion of Innovations Theory (DOI)

Diffusion, is defined as the processes through which an innovation is transferred via certain channels over time and amidst members of a social system; while, innovation is defined as an idea, practice, or object which may be perceived to be new by an individual or other unit of adoption (E. M. Rogers, 1995; Rogers, 2002). According to (M. Rogers, 1995), diffusion of innovations theory, technology adoption is affected by five innovation characteristics which are: relative advantage, complexity, compatibility, trialability, and observability. The only constructs of the diffusion theory consistently acknowledged as key indicators of adoption are, suggested to be relative advantage, compatibility and complexity (Lee et al., 2003; Koenig-Lewis et al., 2015). Furthermore, while developing an instrument for IS adoption, perceived characteristics of innovation (PCI), (Moore and Benbasat, 1991) found that complexity and ease of use attributes are measures of the same type of innovation factors but, being measured in the opposite direction. (Venkatesh, Morris, Gordon B Davis, et al., 2003) posited that perceived ease of use and perceived useful used in Technology Acceptance Model (TAM) significantly overlap and can be used interchangeably with that of Innovation Diffusion Theory (DOI) constructs of relative advantage and complexity. Suggesting that prior studies have adopted only few of the attributes of the DOI theory (Koenig-Lewis et al., 2015). One of the reason why consumers adopt an innovation is because they see the relative advantage of the innovation and form positive attitude towards them but, they could also resist the innovation because of cost barriers (Antioco and Kleijnen, 2010a; Claudy, Garcia and O'Driscoll, 2014). Diffusion of Innovation (DOI) theory is use, to understand whether an individual or organization would adopt a new product, processes or policies perceived as new based, on either quantity or unit of adoption. New products are evaluated and, based on the evaluations, an individual forms positive or negative attitude concerning the innovation; buttressing the need for understanding why consumers will adopt innovations (E. M. Rogers, 1995b; Carlet, 2015). Managers and researchers should concentrate on factors that prevent and, consumers perceive them as a barrier from adopting innovations thus, leading them to rejecting the innovations (Fishbein M, 1975; Kleijnen, Lee and Wetzels, 2009; Antioco and Kleijnen, 2010).

The attribute of relative advantage is the level an innovation is perceive as superior to the product it is replacing and the barriers to it could be risk; that is, value and usage barriers while using. Whereas, compatibility which suggest the level, an innovation is similar or consistent with the existing values or past experience of prospective adopters. Complexity suggests the level at which the consumer perceives the innovation as difficult while trying to understand it before using; and, barriers due to uncertainty leads to resisting of the product (Claudy, Garcia and O'Driscoll, 2014). (Mallat, 2007) reveal, relative advantage and compatibility as the significant influencers of the behavior of mobile payment users. While in another study (Mallat et al., 2009) found that ease of use and compatibility are predictors of adoption intentions and relative advantage has no significant impact on adoption intentions. Complexity of an innovation is suggested to be the perception of how relatively difficult it is for an individual

to understand and use an innovation. The rate of failure with new products or services is suggested to be due to the neglect of the factors that are central to the rejection of innovations by consumers thus attention should be given to what will hinder consumers from adopting innovation (Garcia, R Bardhi, F Friedrich, 2007; Antioco and Kleijnen, 2010; Claudy, Garcia and O'Driscoll, 2014; Carlet, 2015).

Failure of a product is postulated to be the outcome of a consumer cognitive process involving information search and processing; while the resistance of the innovation could be due to complexity which relates to cost barriers or price (Antioco and Kleijnen, 2010; Chatzidakis and Lee, 2013; Claudy, Garcia and O'Driscoll, 2014; Merhi, 2015). Individuals always look for support for their decisions; may lead to rejection when they are not satisfied with the performance of the innovation due to lack of perceived relative advantage (Sahin, 2006).

Prior studies have used diffusion of innovations theory to study: telecommunication services (Lim, Choi and Park, 2003), environmental innovations (Sia et al., 2004). Mobile payments using focus groups and, mobile ticketing services adoption (Mallat, 2007; Chen, 2008; Mallat et al., 2009; Kapoor et al., 2015). Mobile banking services adoption (Koenig-Lewis, Palmer and Moll, 2010), mobile data services (Gerpott, 2011a, 2011b), innovation diffusion of IT-based innovations (Kapoor et al., 2015), corporate websites (Zollet and Back, 2015); podcast (Merhi, 2015), green infrastructure (Carlet, 2015) and behavioral research (Claudy, Garcia and O'Driscoll, 2014). This shows the importance and the suitability of the diffusion of innovations theory for the perspective of our study.

### 2.3. Self-Efficacy

Self-efficacy as defined by (Bandura, 1977, 1994) is an individual's appraisal of their capability to accomplish a behavior. Further, suggest that the experience based on performance accomplishment will produce greater and resilient efficacy expectation. (Davis, Bagozzi and Warshaw, 1989), suggest self-efficacy as an essential factor that highlights intrinsic motivation. Indirectly influences behavioral intentions and proven to predict the decision to use technologies (Hill, Smith and Mann, 1987; Davis, Bagozzi and Warshaw, 1989; Ellen, Bearden and Sharma, 1991; Bandura, 1994; Dabholkar and Bagozzi, 2002). Consumers, with high sense of self-efficacy, have assurance of their capability to use technology. They will not bother on the ease of use of the technology as those with less confidence in their capabilities (Ellen, Bearden and Sharma, 1991; Dabholkar and Bagozzi, 2002). Direct experience with technology has the strongest influence but because of the resistance to change to a new way of doing things; it discourages direct experience with a technology. Thus the essential of self-efficacy through emotional arousal, verbal persuasion, personal experience and vicarious experience (Bandura, 1977). Verbal persuasion aids to increase the individual's assessment of self-efficacy and enhance their beliefs that they have what it takes to perform the task (Bandura, 1982; Hawkins, 1992; Luthans, 1998). Support through environmental factors serving as change-promoting agent, which in this study government support, is suggested to influence outcome expectations as it is an essential antecedent to usage behavior (Ellen, Bearden and Sharma, 1991; Lent, Brown, 1994; Compeau, Higgins and Huff, 1995). Complexity of innovations is mostly the factor preventing their diffusion (Hill, Smith and Mann, 1987). When consumers resist to changing, it is not the technology or product they are resisting but the changes cause by the technology (Ellen, Bearden and Sharma, 1991). This is because to adopt the new technology, it requires some changes in both the procedure and approach in the performance of the task, which



can be a problem for the new adopter and thus the preference to maintain status quo.

Whereas, technological innovation requires knowledge of the individual's needs and goals, awareness of ways of reaching the goals, but most importantly the willingness and ability to take risk and access the skills necessary as to use the innovation (Ellen, Bearden and Sharma, 1991). Consumers always consider both the perceived benefits of the new technological innovation over the existing methods and the perceived risks or cost involved in changing. The perception of people that they have the requisite skills and perceived capability to implement the change and successfully perform the behavior or task is termed self-efficacy (Ellen, Bearden and Sharma, 1991). It is a subjective evaluation of competence or ability to perform a task or behavior; based on the interactions of the individuals and getting a feedback from their environment (through government support) and, may not reflect the actual competence or capability of the individuals (Bandura, 1977). According to (Dabholkar and Bagozzi, 2002), prior consumer studies have concentrated mostly on the direct effects of external factors but, will be more important as, we have done in this study if, the moderating effects of external factors; consumer traits as self-efficacy or situational influence are investigated.

### III. Research Model Development

#### 3.1. Relative Advantage

Relative advantage is postulated as the degree to which an innovation provides benefits that surpasses those innovations that came before it and, it may combine factors such as economic profits, suitability and satisfaction (Rogers, 1983). That, it does not matter if an innovation has an unlimited objective advantage but, what matters is if users perceives the innovation as advantageous (Gefen, 2002b; Rogers, 2002). Relative advantage is posited to be the key attributes contributing to mobile technologies and services adoption or acceptance (Arvidsson, 2014); as, services are provided anytime and anywhere with the provision of access to financial assets (Mallat, 2007; Kim, Shin and Lee, 2009; Mallat et al., 2009; Lu et al., 2011). It increases customer's intention to use mobile payment services and, is one of the main factors that positively influence the adoption of new innovations (Lu et al., 2011; Yang et al., 2012). Cost and social status motivation characteristics of innovations are all suggested to be features of relative advantage (Sahin, 2006; Yang et al., 2012). Relative advantage of information technology usage increases as the perception of complexity, which indicates the ease of use of the technology decreases. Suggesting that, there is an easy understating of how the technology works; because, the attitude of individuals toward IT usage tends to become more positive due to its positive relationship with attitude (Taylor, Shirley Todd, 1995). We therefore argue that the perception of relative advantage of mobile payment will enhance and have positive impact concerning the use of mobile payment.

**H1:** Relative advantage mobile payment will positively influence the behavioral intention to use mobile payment.

#### 3.2. Compatibility

Compatibility is posited as the degree to which an innovation comes to an agreement with a potential adopters' prevailing values, erstwhile experiences and present needs (Rogers, 1983).

Explored broadly by prior research, (Venkatesh, Morris, Gordon B. Davis, et al., 2003; He et al., 2006; Sun, Bhattacharjee and Ma, 2009; Crespo, De Los Salmones Sánchez and Del Bosque, 2013; Faqih, 2016). Compatibility is not only important and relevant to intentional and adoption process of individuals on e-payment, but it also affect the perception of usefulness and intention to adopt it (Lee, Hsieh and Hsu, 2011). Compatibility is posited as the extent a new service is in agreement with users' beliefs, habits or lifestyle, previous experiences and values leading to faster adoption (Chen, Gillenson and Sherrell, 2002; Wu and Wang, 2005; Mallat et al., 2009; Koenig-Lewis, Palmer and Moll, 2010; Lu et al., 2011). Compatibility is an important determinant of adoption in mobile payment environment as it is in agreement with the needs of potential adopters (Mallat et al., 2009; Lu et al., 2011; Arvidsson, 2014; Di Pietro et al., 2015). Compatibility is posited to have direct impact on adoption or intention to use a technology and mobile payment services (Mallat et al., 2006; Schierz, Schilke and Wirtz, 2010; Yang et al., 2012). Hence we hypothesize that users' perception of compatibility of mobile payment will have positive impact on their intention to use mobile payment.

**H2:** Compatibility of mobile payment service will positively influence the continuance use of mobile payment

### 3.3. Complexity

Complexity has been posited to be the degree to which an innovation is perceived to be difficult to understand, to learn or use (Rogers, 1983, 2002). Complexity is suggested to be referred to as perceived ease of use in TAM (Koenig-Lewis, Palmer and Moll, 2010) and is a vital variable that positively influence intention of early and late adopters of mobile payment because, it relates to the simplicity the adopter can get when, they start the use of mobile payment (Arvidsson, 2014). Perceived ease of use in TAM was considered to significantly overlap and can be used interchangeably with that of the Innovation Diffusion Theory (DOI) constructs of complexity (Di Pietro et al., 2015; Koenig-Lewis et al., 2015).

Complexity is suggested to be a barrier and an obstacle to the adoption of mobile payment and any innovation due to complicated procedures because, they need to be simpler and faster (Sahin, 2006; Mallat, 2007; Kim, Mirusmonov and Lee, 2010; Arvidsson, 2014). Complexity is suggested to be negatively related to Attitude and negatively correlated with the rate of adoption (Taylor and Todd, 1995; Sahin, 2006). The ease of use of mobile commerce which indicates the lack of complexity is the significant factor that enhance the adoption of mobile commerce (Wu and Wang, 2005). The level of ease of use or less complex that characterize the Indian Rail Catering Service and Tourism Corporation in its operation is suggested to have influence on users (Kapoor et al., 2015). One of the benefits of mobile payment service are posited to be flexibility and the lack of complexity leading to positive attitude and, consumers and merchants will be able to conduct payments at any time and from anywhere (Arvidsson, 2014; Zhou, 2014). We therefore argue that when mobile payment is less complex it will influence positively on the intention to use mobile payment.

**H3:** Low complexity of mobile payment will positively influence the behavioral intention to use mobile payment.

### 3.4. Social Influence

Social influence is posited as the magnitude to which a person perceives others family and friends, that are important believed that, they should use a new system; in our case mobile

payment service or the use of any new innovation (Ajzen;I. and Fishbein; M., 1975; Venkatesh, Morris, Gordon B. Davis, et al., 2003). Posited as Individual's discernment of people who are important to them think that they should or shouldn't perform the behavior in question (Ajzen;I. and Fishbein; M., 1975). Social influence has been emphasized as the views and roles of family, friends and relations (Teo et al., 2012; Koenig-Lewis et al., 2015). Furthermore, suggested to be an important motivation for adopting new technologies since, information and encouragement by customers will creates awareness and, can also influence intention for the service (Koenig-Lewis et al., 2015; Alalwan, Dwivedi and Rana, 2017). It has been shown that social influence affect individuals' behaviors in adoption of mobile Internet (Kim, Chan and Gupta, 2007), mobile phone services (Lee, Murphy and Swilley, 2009), adopt and intention to use mobile payment services (Yang et al., 2012; Koenig-Lewis et al., 2015). Social influence is posited to positively affect adoption and intention to use mobile banking (Amin et al., 2008; Yu, 2012; Alalwan et al., 2016; Alalwan, Dwivedi and Rana, 2017). Mobile Learning attitude (Nassuora, 2013), E-Banking Services (Ghalandari, 2012). Technology adoption in developing countries cultures (Venkatesh, Morris, Gordon B. Davis, et al., 2003; Jaradat and Faqih, 2014; Faqih and Jaradat, 2015; Faqih, 2016; Alalwan, Dwivedi and Rana, 2017). We hypothesized that social influence and others' opinion can enhance and have positive impact towards intention to use mobile payment.

**H4:** Social influence will positively influence the behavioral intention to use mobile payment.

### 3.5. Behavioral Intention

Behavioral intention as defined by (Ajzen;I. and Fishbein; M., 1975), is the intention to perform numerous behaviors. Consumers with high tendency to adopt a new technology will not only become adopters, but also recommend the technology to others (Lancelot Miltgen, Popovič and Oliveira, 2013; Leong et al., 2013; Oliveira et al., 2016). It has been postulated that behavioral intention has significant influence on the usage of technology (Venkatesh and Zhang, 2010; Yu, 2012); and, consumer behavior can be anticipated and influenced by their intentions (Yu, 2012). As, the aim of mobile payment operators and merchants is to influence the adoption of the service, this invariably means usage and not intention, Behavioral intention has been suggested to be a strong predictor of behavior (Ajzen;I. and Fishbein; M., 1975) and also posited to correlate with behavior (Al-Maghrabi and Dennis, 2011; Venkatesh, Viswanath Thong, James Y L Xu, 2012). Prior studies of mobile payment have found behavioral intention to have a significant influence on the usage behavior (Oliveira et al., 2016). (Venkatesh, Morris, Gordon B. Davis, et al., 2003) in conclusion suggested that behavioral intention significantly has an influence on technology use; suggesting that the influence of behavioral intention on use behavior has been reliably present in initial tests and cross-validation in the process of the development of the UTAUT model. We therefore argue that behavioral intention will have a positive influence on mobile payment use.

**H5:** Behavioral intention will have positive influence on use behavior of mobile payment.

### 3.6. Moderating Role of Government Support in Terms of Price value, Infrastructure, Secure Transaction.

Government is a system that plans organize controls and supervises people for all to have a conducive environment and a sense of belonging (Olusola Babatunde, Opaole and

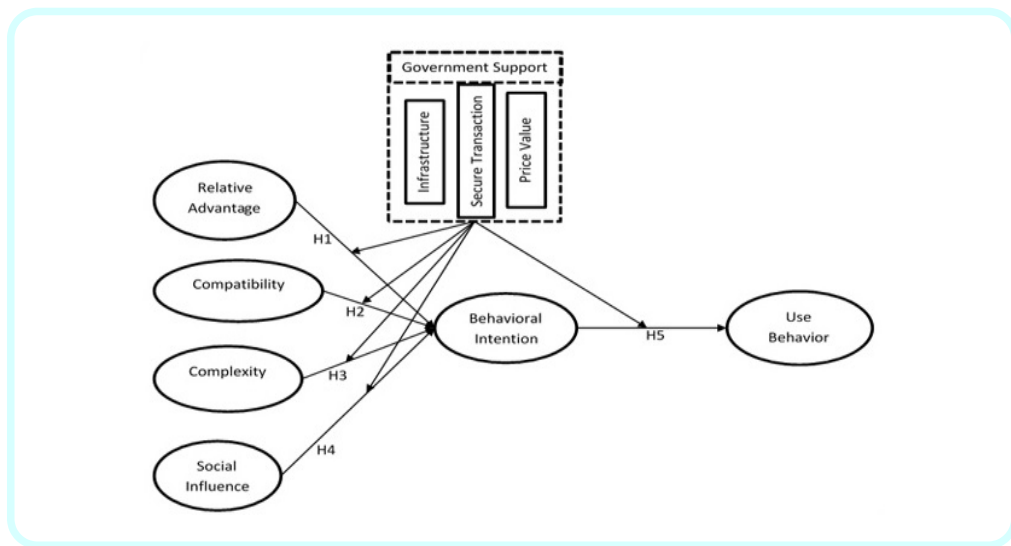
Emmanuel Akinsiku, 2012). Government is enhanced through well-focused application of Information and Communication Technologies (ICT) to enhance increases in productivity, management, effectiveness and the quality of services offered to the populace (Gichoya, 2005). The behavior and interest of the users of mobile payment is affected by the abnormality of the creation and enforcement of government regulations (Yang et al., 2015). Government institutions are important as, they can facilitate diffusion of ICT innovation, reduce digital inequality and develop through small-scale steps to have effect in faster technology diffusion (Pavitt and Walker, 1976; Gichoya, 2005; Hsieh, Rai, 2008). Government regulations is a factor that can encourage or discourage the adoption of innovations (Lin, C. Y. Ho, 2009). Government support is relevant where, only few people have use the service as they may not be able to appreciate the technology compatibility or be confident to use it (Brown et al., 2003). The governments of the United State, Denmark and South Korea offered reduced cost of computers to households, stimulated demand through education and training. The government of the three countries provided subsidies for private educational centers to train their citizens (Lee, Heejin O'Keefe, Robert M. Yun, 2003; Choudrie and Lee, 2004; Wallsten, 2005; Lau, Kim and Atkin, 2005; Falch, 2007; Picot and Wernick, 2007; Cambini and Jiang, 2009; Horrigan, 2009, 2010; Vicente and Gil-de-Bernabé, 2010; Hauge and Prieger, 2010; Abbasi et al., 2011; Sim et al., 2011).

Government has an important role of promoting financial inclusion and can regulate for the provision of interoperability (Mauree, V. Kohli, 2013). Government as the largest payer in a country have been suggested to be suited for efficiencies offered by mobile payment solutions because it pays millions on a monthly basis on welfare, salaries and pensions; doing that through the mobile payment with a proper regulation will help to secure trust in the mobile payment schemes (Heyer and Mas, 2009). In trying to encourage acceptability of mobile payment, government of some countries as Afghanistan, Tanzania, India and Haiti have started using mobile payment for payments of salaries, pensions, tax and delivering social welfare aid payments to their citizens (Mauree, V. Kohli, 2013). Cost or price have significant impact on consumers' use of technology as they bear the monetary cost of the use. Quality of product or service not only depend on cost or price, but is also a determinant of perceived benefit and monetary cost for using the technology (Venkatesh, Viswanath Thong, James Y.L. Xu, 2012). Price value as a context of mobile payment has not been tested (Slade et al., 2015) and, this study is using price value as part of a moderator in government support. The quality of any product or service is often related with monetary cost as to decide the perceived value of the product or service (Wang, Liao and Yang, 2013). The cost of transaction of using mobile banking is a problem and indicating a high perceived financial cost and , important factor in mobile payment service (Cruz et al., 2010; Huili and Chunfang, 2011; Yu, 2012; Di Pietro et al., 2015). Mobile payment service fees have been suggested to be significantly more than fees charged by traditional services (Must and Ludewig, 2010). Price value is a factor for success of M-PESA of Kenya due to affordability (Heyer and Mas, 2009); and mobile payment is posited to be relatively cheap, reliable and secure hence, the reason for its success in Sub-Saharan Africa (Mauree, V. Kohli, 2013). Government has direct effect on behavioral intention to accept and use of a technology; and, is significant in the adoption of internet and its diffusion (Macharia and Nyakwende, 2009). (Alam and Noor, 2009) revealed that government support has a strong and significantly positive relationship with ICT adoption, Singapore government play an important role in the promotion of internet adoption (Teo, Thompson S. H. , Tan, M. and Buk, 1997). Government support revealed to be positively associated with intention

to use online banking in Vietnam (Chong et al., 2010). It is one of the significant motivators of electronic commerce in Brunei Darussalam (Looi, 2005). Therefore, we argue that the moderating role of government support of mobile payment in terms of price, secure transaction and infrastructure for mobile payment service will positively inspire consumers to use mobile payment service for their transactions.

**H6:** Government support in terms of infrastructure, secure transaction and price value will significantly moderate the behavioral intention and use behavior of mobile payment users.

**Fig. 1.** Research Model



### 3.7. Measurement Models Assessment and Data Collection

The data collected from Kenya and Nigeria aims at those using mobile payment to do their transactions, have mobile banking applications on their phones to conduct transactions. Considering also, whether they use feature (regular) phone or smart-phones to conduct their transactions.

We used questionnaires based in English and structured in a way to bring out and process our research model. The research model includes nine factors, general information, and demographics measure with multiple items adopted from extant research for content validity. We adopted the items and scales for the DOI constructs from (Moore and Benbasat, 1991), UTAUT2 constructs from (Venkatesh, Morris, Gordon B. Davis, et al., 2003; Venkatesh, Viswanath Thong, James Y L Xu, 2012). The government support construct is from (Goh, 1995; Teo, Thompson S. H. , Tan, M. and Buk, 1997; Tan and Teo, 2000; Chong et al., 2010); the use behavior construct from (Martins, Oliveira and Popovič, 2014). We reverse the code of each item and, each item used measured with a seven-point Likert scale ranging from 'Completely

**Table 1.** Demographics of the Samples

Measure	Range	Kenya: ( N = 373)		Nigeria: ( N = 332)	
		Frequency	Percentage	Frequency	Percentage
Gender	Male	168	45.0	216	65.1
	Female	205	55.0	116	34.9
Age	19 or younger	11	2.9	45	13.6
	20 to 29	63	16.8	117	35.2
	30 to 39	161	43.0	113	34.0
	40 to 49	80	21.4	39	11.7
	50 to 59	52	13.9	16	4.8
	60 or older	6	2.0	2	0.6
Education	Primary School	2	0.5	0	0.0
	Secondary School	58	15.5	22	6.6
	OND/HND	50	13.4	138	41.6
	Bachelor's Degree	190	51.1	126	38.0
	Master's Degree	57	15.2	34	10.2
	Doctorate Degree	10	2.7	1	0.3
	Other	6	1.6	11	3.3
Occupation	Student	45	12.0	88	26.5
	Corporate worker	108	28.9	150	45.2
	Government worker	106	28.3	54	16.3
	Self employed	100	26.7	27	8.1
	Pensioner	6	1.6	2	0.6
	Other	8	2.4	11	3.3
Type of Phone used	Feature phone	100	26.8	101	30.4
	Smartphone	273	73.2	231	69.6
Frequency of use	Always	75	20.1	28	8.4
	Most of the time	114	30.5	75	22.6
	Often	102	27.3	63	19.0
	Sometimes	66	17.8	106	31.9
	Rarely	16	4.3	60	18.1
	Never	0	0.0	0	0.0

True' (1) to 'Completely False' (7), (Appendix A). The item for the use behavior was coded from (1) always to (6) never.

(Table 1) shows the Demographic Group Samples from Kenya and Nigeria.

A pilot test conducted online using google forms with 54 mobile payment users and at a university in South Korea. Respondents were workers, undergraduate and graduate student users of Facebook. Based on the pilot sample, we examined the internal consistency, reliability, and validity of our measurement model. Based on our preliminary result we found evidence that our measurement scales were reliable and valid and so we proceeded to collecting a full-scale sample using both online by google form and field survey simultaneously.

A total of 373 Kenyans and 332 Nigerians completed the survey questionnaires. Table 1 provides the demographics of the study participants. Overall, it shows that the Nigerian participants that are male were more with (65.1%) while it was the Kenyan female that were more with (55.0 %). The age group of between 20 and 29 (35.2%) participated more for Nigeria and that of range 30 to 39, (43%) for Kenya. On educational level, the Kenyan participants with Bachelor's degree were more with (51.1%) participants and that of Ordinary National

Diploma/Higher Diploma (OND/HND) (41.6%) were more for Nigerian participants. 73.2% of the participants from Kenya used smartphones and 69.6% of Nigerians; participants with frequency of usage of 'Most of the time' are higher; (30.5%) for Kenya and 'Sometime' are higher (31.9%) for Nigeria.

### 3.8. Data Analysis and Result

To ensure construct validity empirically, there is the need for convergent and discriminant validity and we therefore calculated convergent and discriminant validity following (Zhang et al., 2009). We used partial least squares 3.0 (PLS) for the analysis of our data. PLS is a structural equation modeling (SEM) technique and, according to (Wong, 2013; Sarstedt et al., 2014) has a user friendly interface. It uses component base estimation which maximized the variance that is explained in the dependent variable (Chin, 1998), with advanced reporting features also proven to be robust, appropriate for studying complex models that have many constructs (Chin, 1998; Henseler, Ringle and Sinkovics, 2009). We tested our measurement model reliability by conducting a confirmatory factor analysis (CFA) first with combined dataset and then with data from each country separately as shown in Table 2.

As posited, convergent validity is satisfactory if composite reliability (CR) value are higher than 0.7 and average variance extracted (AVE) value are higher than 0.5 (Fornell and Larcker, 1981; Henseler, Ringle and Sinkovics, 2009; Zhang et al., 2009). There was no cross loading of items in the study as shown in Appendix B for the combine construct model and the results supported the convergent validity of the indicators. As to ensure that there is discriminant validity, it is suggested that the square root of the AVE for each construct measured to be greater than the correlation between the constructs (Fornell and Larcker, 1981b; Zhang et al., 2009) as shown in Table 3. The average variance extracted (AVE) values of our combined construct model ranged from 0.616 to 0.733, which indicated and confirmed the convergent validity of our survey instrument. The internal consistency of the model which indicates reliably of the model was assessed by the convergent validity; done by reviewing the factor loading with composite reliability and Cronbach's alpha greater than 0.7 (Nunnally, 1978; Straub, 1989). The composite reliability of the construct ranges from 0.848 to 892 for (combine), 0.852 to 901 for (Nigeria) and 0.839 to 846 for Kenya. To ensure discriminant validity, it is postulated that the square root of AVE for each of the construct should be greater than the correlation between constructs and that it should be lower than the loading of each indicator (Fornell and Larcker, 1981b; Chin, 1998; Hair, Joseph F., 2009; Zhang et al., 2009). As shown in Table 4 it also shows that the result of our study measurement model is reliable and internally consistent.

To measure discriminant validity of the proposed model, we also conduct two more tests, which are cross loading and Heterotrait-Monotrait Ratio (HTMT). From the result, a further examination of Appendix B, and Table 4, shows that the result of the proposed model meets the described criteria. Additionally, we note that, the cross-loadings derived in the procedure indicates that it is higher than the exploratory factor analysis (Gefen, 2005).

It is expected that the indicator outer loadings, should be greater than all its loadings on other constructs which is the cross-loading (Hair et al., 2014); intended loadings should be greater than 0.7 and cross-loading should be under 0.4 (Garson, 2016). From Table 4, it shows that the correlations among constructs is not larger than 0.85 as required by the rule of thumb for assessing discriminant validity (Hultén, 2007; Kline, 2011). In this present research therefore, it is evident that the research model has a good fit and discriminant validity is established.

**Table 2.** Mean, Standard Deviation, and Loading of Measurement Model for Each Country and Combine.

Construct	Mean	SD	Kenya			Nigeria			Combine				
			Loading	t-Statistics	Mean	SD	Loading	t-Statistics	Mean	SD	Loading	t-Statistics	
Relative Advantage (RA)	RA1	1.477	0.749	0.768	30.818	1.747	1.104	0.823	26.478	1.604	0.943	0.808	39.349
	RA2	1.710	0.883	0.847	49.879	1.765	1.009	0.816	24.096	1.736	0.945	0.823	40.097
	RA3	1.954	0.935	0.772	26.163	2.130	1.310	0.797	25.854	2.037	1.131	0.788	34.166
Compatibility (CT)	CT1	1.979	0.785	0.780	27.090	2.840	1.404	0.765	21.563	2.384	1.200	0.809	35.554
	CT2	1.906	0.818	0.751	22.710	2.623	1.427	0.807	24.285	2.244	1.200	0.828	35.904
	CT3	1.879	0.841	0.859	48.706	2.605	1.458	0.859	56.796	2.221	1.227	0.882	80.205
Complexity (CP)	CP1	1.842	0.937	0.754	22.761	2.042	1.314	0.777	15.268	1.936	1.135	0.762	24.005
	CP2	1.756	0.807	0.790	23.548	2.018	1.172	0.825	22.392	1.879	1.004	0.804	32.228
	CP3	1.850	0.965	0.850	49.215	2.087	1.173	0.880	36.985	1.962	1.075	0.856	58.881
Social Influence (SI)	SI1	2.051	1.061	0.750	15.582	2.702	1.431	0.904	58.091	2.357	1.290	0.864	51.524
	SI2	2.035	1.186	0.845	31.622	2.934	1.525	0.867	34.882	2.458	1.429	0.872	57.317
	SI3	1.855	1.025	0.810	27.037	2.506	1.405	0.829	23.214	1.162	1.261	0.831	39.214
Behavioral Intention (BI)	BI1	1.855	0.854	0.768	28.779	2.139	1.288	0.795	29.527	1.989	1.078	0.786	41.156
	BI2	1.933	0.948	0.817	45.784	2.461	1.213	0.754	20.448	2.182	1.113	0.792	37.441
	BI3	1.887	0.884	0.738	25.038	2.337	1.252	0.824	32.669	2.099	1.196	0.805	42.407
Use Behavior (UB)	UB4	2.110	0.991	0.717	16.680	2.322	1.376	0.783	22.136	2.210	1.193	0.754	25.849
	UB	2.558	1.125	NA	NA	3.286	1.234	NA	NA	2.901	1.233	NA	NA

NA, not applicable.



**Table 3.** Composite Reliability, Cronbach's Alpha and Average Variance Extracted (AVE).

Latent Variable	Kenya			Nigeria			Combine		
	CR	AVE	$\alpha$	CR	AVE	$\alpha$	CR	AVE	$\alpha$
Behavioral Intention	0.846	0.579	0.757	0.868	0.623	0.798	0.865	0.616	0.792
Compatibility	0.840	0.637	0.716	0.868	0.686	0.774	0.878	0.706	0.793
Complexity	0.841	0.638	0.717	0.852	0.658	0.740	0.849	0.653	0.735
Relative Advantage	0.839	0.634	0.711	0.853	0.659	0.743	0.848	0.650	0.731
Social Influence	0.844	0.645	0.728	0.901	0.752	0.835	0.892	0.733	0.817
Use Behavior	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA, not applicable.

**Table 4.** Latent Variable Correlation and Square Root of AVE (in bold diagonal)

Latent Variable Correlation Kenya and Nigeria (Combine)						
	BI	CT	CP	RA	SI	UB
BI	<b>0.785</b>					
CT	0.546	<b>0.840</b>				
CP	0.546	0.429	<b>0.808</b>			
RA	0.528	0.525	0.557	<b>0.806</b>		
SI	0.459	0.499	0.370	0.406	<b>0.856</b>	
UB	0.470	0.423	0.363	0.377	0.319	<b>NA</b>
Latent Variable Correlation Kenya						
	BI	CT	CP	RA	SI	UB
BI	<b>0.761</b>					
CT	0.502	<b>0.798</b>				
CP	0.593	0.493	<b>0.799</b>			
RA	0.607	0.533	0.577	<b>0.797</b>		
SI	0.507	0.429	0.526	0.473	<b>0.803</b>	
UB	0.452	0.401	0.369	0.387	0.368	<b>NA</b>
Latent Variable Correlation Nigeria						
	BI	CT	CP	RA	SI	UB
BI	<b>0.789</b>					
CT	0.630	<b>0.828</b>				
CP	0.506	0.380	<b>0.811</b>			
RA	0.477	0.536	0.535	<b>0.812</b>		
SI	0.384	0.439	0.246	0.355	<b>0.867</b>	
UB	0.434	0.344	0.330	0.353	0.169	<b>NA</b>

Note: The diagonal elements in bold in the table are the square root of the average variance extracted (AVE). NA, not applicable. RA, Relative Advantage; CT, Compatibility; CP, Complexity; SI, Social Influence; BI, Behavioral Intention; UB, Use Behavior.

The result of the measurement model indicated that our model has good indicator reliability, construct reliability, convergence validity and discriminant validity; also indicated that the constructs are distinct statistically and used to test the structural model of our study.

### 3.9. Structural Model and Hypothesis Testing

The constructs and hypothesis were analyzed and examine based on standardized paths while estimated path significance level were done with bootstrap resampling method (Henseler, Ringle and Sinkovics, 2009), routine with 500 interactions of the bootstrapping technique using SmartPLS 3.0. Bootstrapping analysis using 5000 samples was done as suggested to be the preferred method to test significance (Henseler, Ringle and Sinkovics, 2009; Henseler and Fassott, 2010). The R2 values which measure the variance in each of our constructs predictive accuracy shows that the model rate of R2 of 0.415 of variation in behavioral intention, 0.188 in use behavior for Nigeria; R2 of 0.494 of variation in behavioral intention and 0.204 in use behavior for Kenya; while the combine rate of R2 of 0.458 of variation in behavioral intention and 0.221 in use behavior. Scholars have various views on the ranges of the levels indicating the degree of prediction and good model fit. While (Wold, 1985; Chin, 1998) indicate a good model fit rate of R2 of 0.67, 0.33, and 0.19 as 'substantial,' 'moderate,' and 'weak,' respectively; (Henseler, Ringle and Sinkovics, 2009; Sarstedt et al., 2014). That rate depends on the particular model and research discipline but generally posited that R2 value of 0.75, 0.50, and 0.25 considered as 'substantial,' 'moderate,' and 'weak,' respectively. We therefore consider our proposed models to be significant predictors of adoption, acceptance and subsequent usage of mobile payment.

The constructs and hypothesis path relationships were analyze based on the examination of their standardized paths and path significance level; estimated by bootstrapping as earlier stated and the results are summarize in Table 5.

**Table 5. Statistical Comparison of Paths for Country and Combine Specific Results.**

Path Relationships	Kenya n = 373		Nigeria n = 332		Combine n = 705	
	Path Coefficient	T-value	Path Coefficient	T-value	Path Coefficient	T-value
RA → BI	0.303***	5.767	0.107	1.549	0.172***	3.654
CT → BI	0.141***	3.113	0.296***	4.764	0.256***	5.744
CP → BI	0.261***	4.390	0.301***	4.857	0.282***	6.393
SI → BI	0.166**	2.440	0.142**	2.378	0.157***	3.444
BI → UB	0.452***	11.334	0.434***	11.089	0.470***	16.493

Notes: Significance at (\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ )

RA, Relative Advantage; CT, Compatibility; CP, Complexity; SI, Social Influence; BI, Behavioral Intention; UB, Use Behavior.

It shows the comparison of the country specific and combine model path coefficients, which revealed differences in some feature. From the result, it clearly revealed that, relative advantage was significant in explaining behavioral intention at ( $p < 0.01$ ) for the Kenyan and Combine model but, it was not significant for the Nigerian model. Overall result indicated that Compatibility and Complexity were significant in explaining behavioral intention at ( $p < 0.01$ ) for all the models while, Social influence was significant at ( $p < 0.01$ ) for the combine mode but was significant at ( $p < 0.05$ ) for the two countries model separately. Behavioral Intention was significant in explaining use behavior at ( $p < 0.01$ ) for all the models.

From the result as shown on Table 5, it reveals that in respect of the two countries and the combine structural model relations, we can therefore reject the null hypothesis that the path coefficients are equal across two countries. We further conducted a t-test to compare the two countries as shown in Table 6. From the T-test, there is every indication that there is a significant difference in terms of each factor of the study.

**Table 6.** Descriptive Statistics and T-test.

Variable	Kenya: n = 373			Nigeria: n = 332			T-test	
	Mean	SD	SE	Mean	SD	SE	Difference	t - value
BI	1.946	0.701	0.036	2.315	1.009	0.055	-0.368***	5.678
CT	1.921	0.652	0.034	2.690	1.188	0.065	-0.768***	10.797
CP	1.816	0.724	0.037	2.049	0.991	0.054	-0.233***	3.952
RA	1.714	0.684	0.035	1.880	0.927	0.051	-0.166**	2.730
SI	1.980	0.881	0.046	2.714	1.262	0.069	-0.733***	9.022
UB	2.558	1.126	0.058	3.286	1.236	0.068	-0.729***	8.187

Notes: Significance at (\*\*\*) $p < 0.001$ ; (\*\*) $p < 0.01$ ; (\*) $p < 0.05$   
 SD, Standard deviation; SE, Standard Error; RA, Relative Advantage; CT, Compatibility; CP, Complexity; SI, Social Influence; BI, Behavioral Intention; UB, Use Behavior.

It is suggested that for comparing multiple groups with pair wise T-test, we have to assume that our data is not too non-normal, the sub-model has acceptable goodness of fit and there should be measurement invariance (Chin, 2000). To compare our results between the moderators, we calculated the T-statistics as to evaluate the difference in path coefficients based on the proposal by (Chin, Marcolin and Newsted, 2003; Eberl, 2010; Sarstedt, Henseler and Ringle, 2011) and, that of the difference between the two nations as posited by (Keil and Tan, 2000) parametric approach that is considered to be liberal. The result is as shown in Table 7 and Table 8.

**Table 7.** Hypothesis Comparison Between Kenya and Nigeria.

Path Relationships	Nigeria vs Kenya	
	Diff.	t-Parametric
Relative Advantage → Behavioral Intention	0.196**	2.215
Compatibility → Behavioral Intention	0.156**	2.061
Complexity → Behavioral Intention	0.039	0.460
Social Influence → Behavioral Intention	0.024	0.259
Behavioral Intention → Use Behavior	0.017	0.302

Note: (\*\*\*) $p < 0.01$ ; (\*\*) $p < 0.05$ ; (\*) $p < 0.10$

The result as shown on Table 7, shows difference in the two comparisons' path coefficient estimates with a significant relationship in two paths (Relative advantage with behavioral intention significant ( $p < 0.05$ ) and, Compatibility with behavioral intention significant ( $p < 0.05$ ).

**Table 8.** Comparison of Structural Relationships on Moderators.

Path Relationship	Kenya					
	Infrastructure		Secure Transaction		Price Value	
	Path Coefficient	T-value	Path Coefficient	T-value	Path Coefficient	T-value
RA → BI	0.005	0.995	0.045	0.101	0.019	0.264
CT → BI	0.039	0.776	0.031	0.554	0.036	0.615
CP → BI	0.132	2.340**	0.059	1.111	0.043	0.656
SI →BI	0.015	0.305	-0.003	0.048	-0.075	1.235
BI → UB	-0.000	0.006	0.010	0.149	-0.123	2.422**
Path Relationship	Nigeria					
	Infrastructure		Secure Transaction		Price Value	
	Path Coefficient	T-value	Path Coefficient	T-value	Path Coefficient	T-value
RA → BI	0.020	0.293	0.007	0.085	0.117	1.860*
CT → BI	0.058	1.274	-0.110	1.815*	-0.054	0.998
CP → BI	0.005	0.085	0.051	0.695	0.005	0.094
SI →BI	0.035	0.532	0.074	1.103	0.043	0.855
BI → UB	0.054	1.021	-0.048	1.050	-0.029	0.794
Path Relationship	Combine					
	Infrastructure		Secure Transaction		Price Value	
	Path Coefficient	T-value	Path Coefficient	T-value	Path Coefficient	T-value
RA → BI	-0.028	0.606	-0.007	0.133	0.089	1.727*
CT → BI	-0.024	0.712	-0.055	1.175	-0.010	0.232
CP → BI	0.035	0.805	0.040	0.775	0.003	0.061
SI →BI	0.035	0.774	0.054	1.155	0.029	0.768
BI → UB	-0.060	1.740*	-0.054	1.685*	-0.038	1.709*

Note: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$

RA, Relative Advantage; CT, Compatibility; CP, Complexity; SI, Social Influence; BI, Behavioral Intention; UB, Use Behavior.

Findings from the comparison of the moderators on the two countries (see Table 8), revealed that, for Kenya, government support in terms of infrastructure will moderate the relationship between Compatibility and Behavioral intention at ( $p < 0.05$ ) and in terms of Price value will negatively moderate the relationship between Behavioral intention and Use behavior at ( $p < 0.05$ ). Whereas, for Nigeria, findings show that government support in terms of securing transaction will negative moderate the relationship between Compatibility and Behavioral intention at ( $p < 0.10$ ) while in terms of Price value will moderate the relationship between Relative advantage and Behavioral intention at ( $p < 0.10$ ). For the combine model, the findings, revealed that government support in terms of Price value will moderate the relationship between Relative advantage and Behavioral intention at ( $p < 0.10$ ) but, will negatively moderate the relationship between Behavioral intention and Use behavior in terms of all the three government support; infrastructure, Securing transaction and Price value.

## IV. Discussion and Implications of the research

The theoretical model integrated two unique theories which are the theory of diffusion of innovation (E. M. Rogers, 1995a) and the extended unified theory of acceptance and use of technology (UTAUT2) of (Venkatesh, Viswanath Thong, James Y L Xu, 2012) as to explain why mobile payment is adopted, accepted and successful in some developing nations but is failing in others.

### 4.1. Hypothesis Findings

Overall, the result shows that all five hypotheses supported as shown on table 9. From our Nigerian dataset (H1) was not supported.

**Table 9.** Assessment of Structural Equation Model

Hypothesis	Supported
H1: Relative advantage mobile payment will positively affect behavioral Intention of mobile payment.	Yes
H2: Compatibility mobile payment will positively affect behavioral Intention of mobile payment.	Yes
H3: Complexity of mobile payment will have impact on behavioral Intention of mobile payment.	Yes
H4: Social influence will positively affect the behavioral Intention of mobile payment.	Yes
H5: Behavioral intention will have positive impact on use behavior of mobile payment.	Yes

With respect to the combine (multi-group parametric) dataset, we observed that there is difference in relationships between the two nations: a) the relationship between relative advantage and behavioral intention of mobile payment was significant ( $p < 0.05$ ). In addition, b) Compatibility and Behavioral intention was significant ( $p < 0.05$ ).

### 4.2. Supported Findings

The research model was able to validate the three relationships of DOI with behavioral intention, which are namely relative advantage, compatibility and complexity. It was also able to validate all the relationship of UTAUT2 with behavioral intention and use behavior. The only relationship not supported was that of Relative advantage and Behavioral intention (H1) for Nigeria. Compatibility (H2), Complexity (H3), Social Influence (H4) and Behavioral intention (H5) all supported by Kenya and Nigeria. Relative advantage (H1) which explained the degree to which an innovation perceived to be better than the product or idea it is trying to replace because it provides more advantage or benefits to its users found not to be significant for Nigeria. Relative advantage will not be significant or advantageous due to resistance factor, which could be due to functional, or usage barriers. Suggesting that new product or ideas are rejected due to barriers users encounter while trying to adopt an innovation and so prefer to remain with the product they are used to as, they know how efficacious existing product

are in solving their problems (Kshetri, 2007; Claudy, Garcia and O'Driscoll, 2014). However, from the result, it shows that, government support in terms Price value will positively moderate the relationship between Relative advantage and Behavioral intention. It goes to say that Nigerians do not perceive mobile payment as advantageous to them. They see only the barriers that prevents them from benefiting with the innovation and, that is why relative advantage was insignificant to them; while as, Kenyans see the relative advantage of mobile payment and adopted it quickly (Gefen, 2002a; Rogers, 2002; Kim, Shin and Lee, 2009; Lu et al., 2011; Yang et al., 2012). In order to change these perspective, government need to finds ways to reduce the price or fees paid for doing transaction with mobile payment. Government should look at the obstacles that are preventing the mobile payment service to work and allow users to decide what they need and, the price they can pay (Björn Wellenius, 2000). Nigeria should borrow a leave from the government of Denmark, United States or Korea on how they offer direct subsidies to their citizens for the adoption of ICT (Frieden, 2005; Falch, 2007; LaRose et al., 2007; Picot and Wernick, 2007; Bouras, Giannaka and Tsiatsos, 2009; Abbasi et al., 2011; Sim et al., 2011). Price value, posited as cost, is the major concern in the initial stage of adoption and it will eventually have less influence on users' behavior, One of the features of relative advantage of innovations that the users has is, suggested to be price value (Sahin, 2006; Yang et al., 2012).

Findings from government support as moderator revealed the need for government support in terms of infrastructure for the Kenyan citizens as, to increase the sense of compatibility for users also motivate intention. However, while the government is trying to increase the infrastructure as to increase the sense of compatibility it should also make sure that the price or cost of transactions do not change (Björn Wellenius, 2000). If there is going to be any price change, it should be decreasing and dictated by the users; because it is indicative that the moderation of price will negatively affect intention of the Kenyan citizens. For Nigeria, it is revealed that government support in terms of securing transaction will negatively affect the sense of compatibility for the users and invariably adoption. Therefore, the government of Nigeria, while trying to ensure that transactions are secured, they should also ensure that, the systems or technologies are compatible with what the users are used to through promotions and adverts for users to have the knowledge of the changes. If technologies are compatible what users know, it will negative affect their intention to adopt the mobile payment system. Overall, the findings for the two countries in terms of government support revealed that, in terms of price value government can moderate the intention to use mobile payment by making sure that the cost or fees are not too high for the citizens as to encourage users to adopt the use of mobile payment. However, government should note that, while there is high intention to use mobile payment service or technology, there should be caution in terms of trying to moderate usage through infrastructure, securing transaction and price value. Government should only come in to encourage the citizens to adopt mobile payment services; however, when the citizens adopt the technology and are using it for their transaction, government should draw back and allow the operator or service providers to innovate to increase the usage of the service or technology if not it will negatively affect usage (Björn Wellenius, 2000).

### 4.3. Implication of the Research for Theory

The present study, proposes an integrated model of the innovation characteristic of Diffusion of Innovation (DOI) theory, UTAUT2 with Self-efficacy and as postulated, the integrated per-

spective brings out more understanding and explanatory power (Jackson, Yi and Park, 2013; Cruz, Y., Boughzala, I., & Assar, 2014). The innovation factor brought out its influencing role on behavioral intention that leads to adoption and the UTAUT2 factors role on acceptance cannot be over emphasized on acceptance of information technology (Venkatesh, Viswanath Thong, James Y L Xu, 2012). Even though this is not the first study to integrate the three theoretical models, postulated as best to provide better and complete prediction and moderation for adoption of new information technology (Koenig-Lewis, Palmer and Moll, 2010), acceptance (Venkatesh, Viswanath Thong, James Y L Xu, 2012) and the self-efficacy (Bandura, 1977, 1982). The present study being exploratory, based on the fact that it is the first to make a comparative analysis of successful mobile payment service and so called unsuccessful one; as suggested by (de Albuquerque, Diniz and Cernev, 2014; Dahlberg, Guo and Ondrus, 2015; Dennehy and Sammon, 2015), we had to use the best theories for better understanding of the phenomenon. The results of the present study have implication for researchers and practitioners as the findings could advance our understanding of the factors that prevent or consist as a barrier for user's adoption, acceptance and use of mobile payment leading, to failure of the service.

The finding shows that the perception of relative advantage is very importance as it demonstrates how advantageous new product or ideas are and, if wrongly perceived can lead to resistance and functional or usage barriers; causing preference to remain with old products or services. Furthermore, it shows the importance of pricing in the delivery of mobile payment service as it could also serve as a barrier for intention and use of mobile payment service. The need for government support as to influence intention is also reveal. Government need to at least, at the initial stage of adoption of the new innovation, encourage both the private sectors and regulators in the formulation of good policies and provision of infrastructures that will not constitute a barrier as, to ensure the adoption and use of the new innovation.

#### 4.4 Implication for Practice

Practitioners should understand the main factors influencing user adoption, acceptance and use of mobile payment services. The barriers and exactness that is revealed by such constructs as Relative advantage, Complexity, Compatibility, Social influence and moderation by government support in terms infrastructure, securing transaction and price value; suggest, their need by nations and mobile payment operators in both the develop and developing countries. They should try and advance and align their practicalities with the real customers' need by adapting strategies as to be able to design and develop their services with educational and technology based content that will enable them to leverage the benefit of adoption and acceptance of the mobile payment service.

### V. Conclusions

This study provides interesting instrument in expanding general knowledge but with cautious approach for it generalizability based on the findings. It has supported some findings in regards to constructs of previous studies, but it has also raised some concerns about other previous results. Limitations is recognize as; there are several of them requiring further research and examination. While we conduct the research to analyze the two nations Nigeria and Kenya,

we did not include the cultural context of the two nations into our consideration. It is suggested that, cultural characteristics also have influence on the interpretation of the features of any information technology that can be adopted by users; since, the technology that fits users with a kind of cultural preferences may not fit other users who, have different preference (Hillier, 2003; Lee et al., 2007). In addition, while this study focused on behavioral intention and use of mobile payment, future studies can focus on consumers' continuance usage of mobile payment. Because mobile payment is a telecommunication network dependent service, future study could also look payment intention and use. Lastly, there are legislations, policies that are being introduced as to encourage spread, and acceptance for financial inclusion but this could form a barrier and thus the suggestion for future study to consider the impact of policies and regulations on mobile payment services in developing countries.

For institutions, this study has added to literature the understanding of why we have a successful mobile payment services in some countries and failing in some. The study suggests that adoption, acceptance and, the moderation by government support are probably the first dimensions that we should look into if we want to reduce the gap in knowledge of mobile payment. There is the need for developing countries to educate consumers on the advantage of the service via government support in terms of infrastructure, policies and regulations. Private sectors participation should also be encouraged as creating alternatives for the success of mobile payment as done by Kenyan government. The result supports the proposed model and provides key insights into the role of Diffusion of Innovation (DOI) theory, UTAUT2 and self-efficacy in, mobile payment adoption and acceptance. The role of government in the formulation of good policies, securing transaction and provision of infrastructures for the enhancement of the use of mobile payment in Nigeria and developing countries in general.

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**Appendix A: Measurement Items**

Construct	Items	Measurement Questions
Relative Advantage	RA1a	Mobile payment service provides quicker access to the transactions that I need to make.
	RA2a	Mobile payment service provides greater flexibility for my transactions.
	RA3a	Mobile payment service helps me complete all my financial transactions on time.
Compatibility	CT1a	Mobile payment service is compatible with all of my financial transactions needs
	CT2a	Mobile payment service fits well with the type of financial transactions that I perform
	CT3a	Mobile payment service fits well with my lifestyle
Complexity	CP1a	Learning to use mobile payment is easy for me
	CP2a	How easy to operate mobile payment service is important to me
	CP3a	I find it easy for me to be skillful at using mobile payment service
Social Influence	SI1a	People who are important to me think that I should use the mobile payment service
	SI2a	People who influence my behavior think that I should use mobile

		payment service
	SI3a	The managers of the mobile payment service have been helpful in the use of the mobile payment service
Price Value	PV1a	I pay a reasonable fee when I use the mobile payment services
	PV2a	The cost of making a financial transaction with mobile payment service is reasonable
	PV3a	At the current fee that I pay when I use mobile payment service, I can say that it provides a good value for the transaction.
	BI1a	I intend to continue using mobile payment service for my transactions
Behavioral Intention	BI2a	I will always try to use the mobile payment service in my daily transactions
	BI3a	I plan to continue to use mobile payment service regularly
	BI4a	I like doing transactions with mobile payment service
Government Support (Infrastructure)	GSPT1a	There is good government promotion of mobile payment service in the country
	GSPT2a	There is good government regulation of mobile payment service in the country
Government Support (Securing transaction)	GSPT3a	Government is active in ensuring secure transactions when using mobile payment service
	GSPT4a	Government is active in reducing risk in transactions when using mobile payment service
Use Behavior	UBb	I use Mobile Payment to send and receive money

b Frequency range from "Always" to "never"  
a Scale: 1 = Completely True / 7 = Completely False

**Appendix B: Heterotrait-Monotrait Ratio (HTMT)**

Heterotrait-Monotrait Ratio (HTMT) Kenya and Nigeria (Combine)						
Construct	BI	CT	CP	RA	SI	UB
BI						
CT	0.676					
CP	0.714	0.556				
RA	0.694	0.684	0.763			
SI	0.569	0.613	0.473	0.526		
UB	0.527	0.470	0.423	0.440	0.353	
Heterotrait-Monotrait Ratio (HTMT) Kenya						
	BI	CT	CP	RA	SI	UB
BI						
CT	0.672					
CP	0.794	0.678				
RA	0.820	0.740	0.807			
SI	0.666	0.584	0.715	0.645		
UB	0.518	0.473	0.425	0.458	0.425	
Heterotrait-Monotrait Ratio (HTMT) Nigeria						
	BI	CT	CP	RA	SI	UB
BI						
CT	0.654					
CP	0.653	0.496				
RA	0.613	0.695	0.726			
SI	0.468	0.534	0.311	0.457		
UB	0.484	0.379	0.385	0.406	0.186	