FACTORS INFLUENCING INTENTION TO ADOPT NEAR FIELD COMMUNICATION (NFC) PROXIMITY PAYMENT TECHNOLOGY AMONG BANK CUSTOMERS IN LAGOS, NIGERIA

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FACTORS INFLUENCING INTENTION TO ADOPT NEAR FIELD COMMUNICATION (NFC) PROXIMITY PAYMENT TECHNOLOGY AMONG BANK CUSTOMERS IN LAGOS, NIGERIA

by

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LIST OF ABBREVIATIONS

AJEMS	African Journal of Economic and Management Studies
AVE	Average variance extracted
ATM	Automated Teller Machine
BI	Behavioural Intention
B2B	Business to Business
B2C	Business to Consumer
CFA	Confirmatory Factor Analysis
CIIT	Customer Innovativeness in Information Technology
CMB	Common Method Bias
CR	Composite Reliability
CTMP	Consumer Trust in Mobile Payment
C2C	Consumer to Consumer
DOI	Diffusion of Innovation
EFA	Exploratory Factor Analysis
E-Business	Electronic Business
E-Commerce	Electronic Commerce
IEEE	Institute of Electrical and Electronics Engineers
GFI	Goodness-of-Fit Index
GSM	Global System for Mobile
GSMA	Global System for Mobile Communications Association
ICT	Information Communication Technology
IFI	Incremental fit index
IJEM	International Journal of Emerging Markets
IP	Internet Protocol
ISI	Institute for Scientific Information

ISS	Information system success
IT	Information technology
JAB	Journal of African Business
KMO	Kaiser-Meyer-Olkin
MNO	Mobile Network Operators
M-Banking	Mobile Banking
M-Business	Mobile Business
M-Commerce	Mobile Commerce
MP	Mobile Payments
M-POS	Mobile point of sale
MRA	Multiple regression analysis
M-Wallet	Mobile Wallet
NFC	Near Field Communication
NFCPP	Near Field Communication Proximity Payment
NIP	National Instant Payment
OLS	Ordinary Least Squares
PBC	Perceived Behavioral Control
PDA	Personal Digital Assistant
PEOU	Perceived Ease of Use
PFR	Perceived Financial Risk
PIIT	Personal Innovativeness in IT
PIN	Personal identification number
PLS	Partial least squares
POS	Point of Sale
PS	Perceived Security
PSC	Perceived Smartphone Cost
PT	Perceived Trust

PTC	Perceived Transaction Convenient
PU	Perceived Usefulness
QR	Quick Response
RFID	Radio Frequency Identification
RMSEA	Root Mean Square Error of Approximation
SEM	Structural Equation Modeling
SET	Secure Electronic Transaction
SMS	Short Message Service
SI	Social Influence
SPSS	Statistical Package for the Social Sciences
TA	Technology Awareness
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UAC	User Absorptive Capacity
USD	United States Dollar
USSD	Unstructured Supplementary Service Data
UTAUT	Unified Theory of Acceptance and Use of Technology
WAP	Wireless Application Protocol
WWW	World Wide Web

LIST OF APPENDICES

FAKTOR-FAKTOR YANG MEMPENGARUHI NIAT UNTUK MENGGUNAKAN TEKNOLOGI PEMBAYARAN MUDAH ALIH PROXIMITI *NEAR FIELD COMMUNICATION* (NFC) DI KALANGAN PELANGGAN BANK DI LAGOS, NIGERIA

ABSTRAK

Tanpa mengambil kira peningkatan jumlah pemilik telefon bimbit yang berterusan, penggunaan pembayaran mudah alih orang di Nigeria sangat rendah jika dibandingkan dengan bahagian lain dari negara-negara membangun. Kajian ini bertujuan untuk menghubungkan faktor keselamatan, yang berkaitan dengan sistem, dan faktor perbezaan individu ke dalam asas Model Penerimaan Teknologi (TAM) untuk menyelidiki penggunaan pembayaran mudah alih, terutama pembayaran jarak dekat Komunikasi Lapangan (NFC), di kalangan pelanggan bank Nigeria. Kajian ini menggunakan borang soal selidik swaguna untuk mengumpulkan data di kalangan pelanggan bank di Lagos, Nigeria. Ia kemudian menggunakan Pemodelan Persamaan Struktur Kuasa Dua Terkecil Persegi (PLS-SEM) untuk menguji model hipotesis. Hasil kajian menunjukkan bahawa walaupun kesedaran, keselamatan, dan kegunaan teknologi mempunyai kesan relatif yang kuat sebagai peramal niat yang lebih tinggi dalam kajian ini, risiko kewangan, kepercayaan, dan kemudahan penggunaan memberi kesan relatif yang lebih rendah terhadap niat penggunaan teknologi pembayaran jarak dekat NFC. Kajian ini juga secara empirik mengesahkan kesan penyederhanaan kedua-dua inovasi pelanggan dan kapasiti daya serap pengguna terhadap hubungan antara gagasan ETAM dan teknologi pembayaran jarak dekat NFC. Oleh itu, kajian ini mengesyorkan bahawa pembuat keputusan bank, pembuat dasar kerajaan Nigeria, dan syarikat telekomunikasi, perlu mengetahui dan

memahami anteseden yang mempengaruhi niat tingkah laku yang disarankan oleh

ETAM.

FACTORS INFLUENCING INTENTION TO ADOPT NEAR FIELD COMMUNICATION (NFC) PROXIMITY PAYMENT TECHNOLOGY AMONG BANK CUSTOMERS IN LAGOS, NIGERIA

ABSTRACT

Regardless of the persistent increase in the number of mobile phone owners, peoples' use of mobile payment in Nigeria is very low compared to other parts of developing countries. This study aims to link security-related, system-related, and individual difference factors into the fundamental Technology Acceptance Model (TAM) to investigate mobile payment adoption, particularly Near Field Communication (NFC) proximity payment, among Nigerian bank customers. The study utilized a self-administered questionnaire to collect the data among the bank customers in Lagos state Nigeria. It then utilized Partial Least Square Structural Equation Modeling (PLS-SEM) to test the hypothesized model. However, the results of the study show that while the technology awareness, security, and usefulness have relatively stronger effects being higher predictors of intentions in the study, the financial risk, trust, and ease of use have relatively lower impacts on the NFC proximity payment technology adoption intention. Equally, the study empirically confirmed the moderating effects of both customer innovativeness and user absorptive capacity on the relationships between the ETAM constructs and the NFC proximity payment technology. Therefore, this study recommends that bank decision-makers, Nigerian government policymakers, and telecommunication companies, need to know and understand the antecedents affecting behavioral intention suggested by the ETAM.

CHAPTER 1

INTRODUCTION

1.0   Background of the Study

The rapid evolution of mobile technologies and the increasing diffusion of smartphones among the world's population have given significant opportunities for innovative companies to create new payment solutions and offer value-added services in the business of sales to their customers (Liébana-Cabanillas, Ramos de Luna et al. 2017, Pham and Ho 2015). Currently, both basic and smartphones are used in a variety of payments, such as payments for digital contents; ringtones, music, news, logos, games; transport tickets and fares, parking fees, and other retail purchases (Slade, Dwivedi et al. 2015). When compared with fixed-line personal computers and telephones, mobile phones are closer to the user. They support the storing of personal information and facilitate its use as a payment instrument (Jaradat, Riad et al. 2018).

Furthermore, the rapid adoption of mobile phones in society and their role in the development of personal and professional activities has been one of the most important technological events in recent decades (Liébana-Cabanillas et al. 2019, Ramos-de-Luna, Montoro-Ríos et al. 2016). According to the GSMA (2018) report, "The Mobile Economy", the number of unique users of mobile services in 2017 exceeded five billion people globally, which represents a penetration rate of 66%, with extreme values in geographical areas such as Europe (85%), North America (84%) and Sub-Saharan Africa (44%).

According to (Ooi and Tan 2016), mobile phones are becoming a primary platform for access to information and a primary area for mobile applications.

Considering this trend, most technology firms are focusing their efforts on increasing the number of available mobile services, including mobile payments (Liébana-Cabanillas, Muñoz-Leiva et al. 2018). Mobile payment is simply described as a financial transaction where at least one transaction partner uses a mobile communication device (Uwamariya and Loebbecke 2020). As one of the types of electronic payment systems, mobile payment has started to gain notable popularity in recent years due to the increase in advancements and popularity of mobile devices (Esfahani and Ozturk 2019).

From the African context, Kenya has been described as the epicentre of mobile payment across Sub Saharan Africa. The country counts thirty-one million mobile payment subscribers only ten years after having introduced mobile payment in the year 2007. Safaricom's M-Pesa alone serves 24 million customers (Safaricom, 2016). This makes Kenya the number four globally in mobile payment services after Singapore, Canada, and the United States and the number one in East Africa (Akamanzi, Deutscher et al. 2016). Despite its huge potential, mobile payment is yet to reach high-scale adoption because the issues and obstacles relating to mobile payment are yet to be understood for different user sections in different country contexts (de Albuquerque, Diniz et al. 2016; Dahlberg, Guo et al. 2015).

In Nigeria, for example, a West African country geographically located precisely opposite Kenya in Africa, the trend is different a very low adoption of the technology was reported (Bankole, 2015). Aside the growing penetration of smartphones and other devices that can be used for mobile payment and the launch of several mobile payment services in Nigeria, the level of acceptance of the technology is not encouraging (Bankole, 2015; Hamza & Shah, 2014). According to GSMA, (2018) report the smartphone penetration rate in Nigeria as at September

2018 was 43% which was projected to hit 55% by the year 2025. According to Uwamariya and Loebbecke (2019), mobile payment has become a major force for creating an inclusive cashless economy. This mobile payment is of two categories; remote mobile payment and proximity mobile payment.

However, the Nigerian payments system has undergone remarkable changes over the years in terms of the number of instruments, and extent of operations these changes have been caused by new policies and other revolutions in the environments (Nwatu and Ezeh 2017). In 2006, the Federal government of Nigeria initiated a new payment system strategy 2020, which is part of the overall financial sector strategy (FSS) 2020, the aims of which are to make the Nigeria payments system effective, efficient, technology-driven and in line with emerging global trends (Okeke & Okpala, 2014). The central bank of Nigeria (CBN) also came up with its cashless policy the aim of which is to limit the amount of cash in circulation and to encourage people to key into the new payments system (Ogbeide, 2019; Osakwe & Okeke 2016). According to numerous reports (e.g., see Osakwe & Okeke, 2016; CBN, 2013; Egbuta, 2013), mobile payment is one of the tools that has been marked for the effective implementation of the cashless policy; hence mobile payment is critical for the success of the policy.

Notwithstanding, the success recorded so far in the execution of the cashless policy of the federal government of Nigeria, it is seen that to support consumer utilization of the e-payment stage particularly mobile payment has been taxing (Ejiobih, Oni et al. 2019, Ogbeide 2019). This is about data obtained from CBN released e-payment statistics for the first quarter, 2019 (CBN, 2019) which indicates that despite the introduction of cashless economy with its attendant benefits the data as depicted in Table 1.1 suggest low penetration of mobile payment compared to NIP,

ATM, POS and WEB among the Nigerian customers. But the success of this new payment technology (mobile payment) for products and services depends on customer adoption and usage of the technology from Table 1.1. Central Bank of Nigeria (CBN, 2019), reports that NIP has 70.34% of the market for e-payments in value terms; and 44.30% in terms of volume when ATM has 6.95% of the market for e-payments in value terms; and 38.62% in terms of volume while POS accounts for 2.86% of the market in value terms and 10.26% in terms of volume by first quarter of 2019; Web accounts for 3.88% in volume and 0.03% in value terms, and Mobile payment accounts for 0.56% and 0.45% of the e-payments market in volume and value terms respectively. The reasons as given by CBN for the low adoption of mobile payment include; security and trust issues, connectivity and network challenges, inadequate enlightenment (Bayero 2015).

Table 1.1   Volume of transactions for selected e-payments platform (1st quarter, 2019)

Channel	Value	Volume	Percentage (%)
NIP	1.55833E+13	232816102	44.3
ATM	1.53927E+12	202959732	38.62
POS	6.33806E+11	53941390	10.26
WEB	7644819814	20382111	3.88
Mobile payment	1.0069E+11	2928797	0.56

Source: (NBS, 2018; CBN, 2019)

However, each of the traditional m-payment technology has several limitations which make payment during checkout an annoyance. The usability of the devices such as small screen to display information and limited keyboard makes mobile devices difficult and unsuitable for payment adoption (Ramos-de-Luna, Montoro-Ríos et al. 2016). The internet connection which enables the mobile payment solutions to work may not be hundred percent stable (Dahlberg, Guo et al.

2015). The payment solution is also complicated due to the multiple steps that are required during the payment process (Tan, Ooi et al. 2014). Another shortcoming of this technology is the limitations of messages in SMS; with messages being limited within 140-160 characters, which makes it difficult to create an effective message within such short word limit (Liébana-Cabanillas, Muñoz-Leiva et al. 2018) — remembering the pin and the required codes to perform such banking transactions correctly during authentication (Anyanwu, Ubi & Ananwude, 2016). As such, consumers require more effort and time in learning to use the applications, which makes the popularity undesirable. A truly mobile solution should be able to link the internet world and the real world of physical objects (Ooi & Tan 2016; Teh, Ahmed et al. 2014).

Therefore, the emergence of NFC proximity payment overcomes all the limitation of traditional mobile payment solutions. NFC proximity payment provides simple communication setup, ease of use, flexibility and requires only a little power consumption (Museli & Jafari Navimipour 2018; Monteiro, Ooi & Tan 2016; Rodrigues et al. 2014). Near Field Communication (NFC) is a standardised technology that enables bidirectional wireless proximity (about 10 centimetres) communication between electronic devices (Museli & Navimipour 2018; Madureira 2017). In broad terminology, NFC works using short-range wireless technology between two devices of 10 cm or less. By waving the NFC-enabled smartphone over a sales terminal, the checkout process can be completed faster using minimum effort. This is because the signature is not required during the payment process (Liébana-Cabanillas, Marinkovic et al. 2018; Ooi & Tan 2016; Leong, Hew et al. 2013).

Additionally, the current NFC proximity payment technology with benefits that will overcome the limitation of traditional mobile payment solutions is predicted

as a vital catalyst to the existing m-payment solutions and will potentially change consumers' lifestyles and transform the mobile payment industry (Liébana-Cabanillas, Marinkovic et al. 2018). NFC proximity payment is even considered as the fourth wave of income for mobile operators after data, voice and text plan. While there are tremendous benefits in adopting NFC proximity payment as an alternative mobile payment solution, the adoption rate is far from high-scale adoption (Kujala, Mugge et al. 2017; Dahlberg, Guo et al. 2015).

Through proximity mobile payment, the user's payment account information is encrypted and saved on the phone, which is later used to conduct financial information transaction through a transportable platform (Cobanoglu, Yang et al. 2015). The most well-known form of proximity mobile payment is Near Field Communication (NFC)-based mobile payment systems (Liu, Kauffman et al. 2015). The NFC proximity payment technology brings several advantages to its users being personal and interactive, offering the capability of communicating directly with the retailer in addition to its flexibility for customers to access at any time and any location. Thus, it becomes a great challenge for the bank marketing manager to attract more customers, improve their relationships and then encourage loyalty, since customer's demand is the driving force behind the adoption of mobile financial services (Joshi, Gupta et al. 2019).

Furthermore, five Nigerian banks (Access Bank, First Bank, Sky Bank, United Bank of Africa, and Zenith Bank) have invested significant resources in developing NFC proximity payment instruments (Segun-Amao, 2015, May 11). It is important, to understand consumers' reactions to and willingness to engage with this innovative payment method. Similarly, identifying drivers of NFC proximity payment acceptance by Nigerian bank customers is a key retailing issue.

Yet, existing mobile payment adoption studies have predominantly utilized Davis' (1989) Technology Acceptance Model (TAM), which has been criticized for having a deterministic approach without much consideration for users' characteristics (Slade, Dwivedi et al. 2015). To the researchers´ best knowledge, few studies have focused on the impact of individual difference factors, security-related factors, and system-related factors on mobile payment adoption by the bank customers. Consequently, this study extends TAM and reflects on the influence of individual difference factor (technology awareness), security-related factors (perceived security, perceived trust, perceived financial risk, perceived smartphone cost), and system-related factors (perceived ease of use, perceived usefulness, perceived transaction convenient) on the acceptance of NFC proximity payment technology in the Nigerian context.

1.1   Information Communication Technology in Nigerian Banking Sector

Before the introduction of ICT and the consequent proliferation of financial innovation products into the banking sector, the general operation was cumbersome, and banks' performance was bad. Staff and customers spend endless hours in the banking halls to affect a simple transaction. Therefore, the growth of the sector was stunted (Awoyemi & Awoyemi, 2017). The use of ICT to enhance service delivery in the Nigerian banking system has now reached a remarkable level. For example, ICT backed financial innovation products, services and devices are available everywhere 24/7 (Ikpefan, Enobong, Osuma, Evbuomwan & Ndigwe, 2018).

Consequently, the adoption of relevant technologies facilitates the enhancement and modernization of the payment systems, allows greater mobility and flexibility in the capital and finance movement as well as data transfer flows. Besides, financial

innovations increased the pace of economic transactions and enhance business practice. In other words, financial innovation aids prompt decisions and actions which influence increased operational efficiency, performance, and productivity (Ahmed & Azam 2016).

However, the financial innovation in Nigerian banks started in 1982 with Societe Generale Bank (a foreign, French bank) that installed an Automated Teller Machine (ATM). Soon the credit and debit cards followed in 1985 (Awoyemi & Awoyemi, 2017). What we now have in all Nigerian banks is the proliferation of financial innovation products and services. Banks have acquired and imbibe technology culture for competition and relevance in the global financial market.

The Federal Government of Nigeria in consortium with the CBN in support of these innovative ideas rolled out its Electronic Banking policy guidelines in 2003 and Cashless policy followed in 2011. It is to control financial fiscal policies and supporting financial deepening and inclusion. Billions of Naira had been invested in technological hard and software programs by the government, banks, and the private sector to aid and bring financial innovation to customers' doorstep (Osakwe & Okeke, 2016). Accordingly, banks must settle on critical enhancements choices that address customer concerns, to encourage consumer financial innovation adoption in Nigeria. Now that almost all the 20 banks in Nigeria today offer banking services based on financial technology innovation platforms, there is need to figure out what variables impact the technology acceptance in Nigeria. Accordingly, it will fit for commercial establishments to increase awareness of the main factors influencing customers' behaviour.

1.2 Near Field Communication Proximity Payment and its Significances

Madureira (2017), described Near Field Communication (NFC) as a standardized innovation that empowers bidirectional remote proximity (around 10 cm) communication between electronic devices. NFC proximity payment systems enable customers to use their smartphones for over-the-counter payments instead of cash or magnetic strip cards (Gerpott & Meinert 2017).

Moreover, NFC is a correspondence innovation dependent on Radio Frequency Identification (RFID) innovation, and it warrants contactless correspondence of up to about 10cm between two NFC-empowered gadgets (Muchinguri, 2016; Roland 2015). The operational distance under passive mode is 10 cm, while the active mode is 20 cm (Coskun, Ozdenizci & Ok, 2013). Consequently, the NFC innovation empowers the exchange to be conducted by holding a mobile phone within the scope of the NFC reader, as in Figure 1.1 (Tan, Ooi, et al. 2014).

Source: Allied Market Research (2018)

Figure 1.1   Payment transaction with NFC enabled mobile phone

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However, NFC-based mobile payments have several significances. First, providing e-payment convenience for customers (Mertaniemi, Escobedo-Lucea, et al. 2016). For multiple banks' customers, NFC ensures the convergence of multiple bank accounts on a single platform. its use on devices equipped with contactless features, makes payments and pays for transport around the world (Liébana-Cabanillas, Molinillo, et al. 2019). Additionally, NFC based mobile payment can lead to economic growth, since it depends on open standards and users are not obliged to pay licensing fees (Liébana-Cabanillas, Ramos de Luna, et al. 2017). NFC is important in contributing to the national economic growth, provided more customers adopt it. Thus, increasing the revenue generated from the telecommunication sector (Morosan & DeFranco 2016). Despite its technological and economic benefits highlighted above, the adoption of NFC proximity payment is at its early stage.

1.3   Problem Statement

Some of the problems of the traditional physical payment systems include experience of long queue at banks while making deposit or withdrawal, making a distressing and extremely long-distance journey in order to settle payment for goods and services, and paying utility bills, system and transaction errors (Ajiboye, Kalejaiye, et al. 2013). Thus, this profoundly lower customer's view of the nature of administration offered and consequently diminished the customers' support and financial, technological innovation adoption (Omotayo & Adebayo, 2015).

Still, the needed knowledge and skills to handle and manage the low rate of adoption of mobile payment technology in Nigeria are lacking (Bankole, Osei-Bryson, & Brown, 2015). Yet, existing mobile payment acceptance studies have broadly utilized TAM, which has been castigated for having a deterministic

methodology deprived of much thought for clients' attributes (Slade, Dwivedi, et al. 2015). To the researchers' best ability, few studies focused on the impact of individual difference factors, security-related factors, and system-related factors on mobile payment adoption among the bank customers. Furthermore, as TAM does not include economic, demographic, and other external variables, it might not predict customers' attitudes and behavioral intentions toward NFC proximity payment service effectively (Davis 1989).

However, several models and theories for depicting client technology adoption behavior have been developed, but they are not without some limitations (Lee, Kim, et al. 2019). The basic limitation is regarding the model explanatory power (R^2). Most of the existing studies address less than 60% of the R^2, particularly those utilizing field studies with proficient clients, the current study is one of such studies. The study of Khalilzadeh et al., (2017) is one of the very few studies that produce a good explanatory power (R^2), but conducted in North American, a western country context.

Equally, a number of models and theories developed, on technology adoption behavior have inconsistent connections among factors. Fortunately, whenever previous studies yielded inconsistent findings, Baron and Kenny (1986) suggested the presentation of moderating factors (Memon, Cheah, Ramayah, Ting, Chuah & Cham, 2019). Similarly, Agarwal and Prasad (1998) explicitly condemned the nonappearance of moderating factors in the TAM model and called for more research to investigate moderating factors.

Even though previous studies have explored customer innovativeness as a central element in users' acceptance studies, however, its moderating role has not been explored in the NFC proximity payment context, and specifically in the

relationship between system-related factors, security-related factors, individual difference factors, and users' intention. Several researchers have found a significant relationship between customer innovativeness and behavioral intention (Lwoga & Lwoga, 2017; Yang, Lu et al., 2012).

Additionally, the study examined the moderating role of absorptive capacity on the correlation among (system-related, security-related and individual difference) factors and users' behavioral intention in the context of NFC proximity payment technology in Nigeria. Several researchers have found a significant relationship between user absorptive capacity and behavioral intention (Hernandez-Perlines, 2018; Mayeh, Ramayah & Popa, 2016; Pham & Ho, 2015).

Moreover, the preliminary part of this study already depicted the importance of technology knowledge in mobile payments. Appendix 5 of the preliminary shows that 80%, 90%, and 10% of the interviewees have prior and internalization capacity knowledge of SMS, mobile banking, and mobile web application payments respectively to influence their knowledge utilization, which agree with Lee, Park, Chung, and Blakeney (2012: 1593), who stated that "if individuals have prior knowledge of the Internet and mobile applications, they can more easily understand mobile financial services technology and likely feel more confident in using it". Several authors observed that users with previous experiences in online purchasing are more likely to buy products online (Liébana-Cabanillas et al. 2016; Campo & Breugelmans 2015).

Notwithstanding, from the preliminary study conducted in this research, focusing on the responses provided by the interviewees in replies to the questions asked during the interviews, the problem of NFC proximity payment technology low adoption was confirmed in the Nigerian context. This can be seen evidently, from the

various responses to interview question two (2) "What kind of mobile payment application do you use regularly?" where the responses showed that NFC proximity payment has the lowermost score of only 5%; in contrast to 90%; 80% and 10% for mobile banking, short message services and Web application respectively, as depicted and explained in detail in Appendix 5 of this study.

Correspondingly, for the influential factors, the interviewees mentioned several factors in which most of the factors appeared to be consistent with the literature, except for few factors, such as; bank queue length, network stability, service quality, and cashless policy. Thus, the factors are organized into system-related, security-related and individual difference factors (Lwoga & Lwoga 2017; Khalilzadeh et al. 2017; Pham & Ho 2015).

Although, several empirical researches on factors influencing customers' intention to adopt NFC proximity payment technology including those obtained from the preliminary study presented, have been carried out in behavioral attributes (Khalilzadeh et al. 2017; Tan, Ooi, et al. 2014). The results revealed mixed findings, where some revealed a positive relationship (Liébana-Cabanillas, Molinillo & Ruiz-Montañez, 2019; Khalilzadeh et al., 2017; Sam et al., 2016), and others revealed a negative relationship (Moroni et al. 2015; Teo et al., 2015; Pham & Ho, 2015).

Equally, most such researches were conducted in the developed (western) countries, and very little has been done in the developing economies (Humbani & Wiese, 2018). While (Mpazanje, Sewchurran, et al. 2013) and (Harry, Sewchurran et al. 2014) noted that there is under-representation of research on NFC adoption in the African context, numerous studies have argued that the limitation in the research on online and mobile payment technology is due to neglect of country aspect factors

influencing such technology adoption (Humbani & Wiese 2018; De Kerviler, Demoulin et al. 2016).

Therefore, given the critics, this study extends TAM by incorporating country-specific factors, to predict the behavior of Nigerian bank customers. Security related factors, system related factors, and individual difference factors were incorporated into the framework. This may improve the explanatory power of TAM by tackling some of its limitations highlighted by the previous studies. Equally, the study examined the role of customer innovativeness and user absorptive capacity as moderators, on the relationship between (system-related, security-related, and individual difference) factors and users' behavioral intention in the context of NFC proximity payment technology in Nigeria.

1.4   Research Objectives

The main objective of the research is to explore the factors influencing intention to adopt near field communication proximity payment technology among bank customers in Lagos, Nigeria. The specific objectives include:

i. To examine the impact of system-related; security-related and individual difference factors on the Nigerian bank customers' intention to adopt NFC proximity payment technology.

ii. To test the moderating effect of customer innovativeness on the impacts of system-related; security-related and individual difference factors on the Nigerian bank customers' intention to adopt NFC proximity payment technology.

iii. To test the moderating effect of user absorptive capacity on the impacts of system-related; security-related and individual difference factors on

the Nigerian bank customers' intention to adopt NFC proximity payment technology.

iv. To determine the predictive relevance of the extended Technology Acceptance Model (ETAM).

1.5 Research Questions

The following are the research questions of the study:

i. What are the impacts of system-related; security-related and individual difference factors on the Nigerian bank customers' intention to adopt NFC proximity payment technology?

ii. Does customer innovativeness moderate the relationship between system related; security-related, individual difference factors and the Nigerian bank customers' intention to adopt NFC proximity payment technology?

iii. Does user absorptive capacity moderate the relationship between system related; security-related, individual difference factors and the Nigerian bank customers' intention to adopt NFC proximity payment technology?

iv. What is the predictive relevance of the extended Technology Acceptance Model (ETAM)?

1.6 Research Scope

The study covers only the customers from the five (5) out of twenty (20) recapitalized deposit money banks licensed by the Central Bank of Nigeria. This is because the NFC proximity payment technology is only available in Nigeria at Access Bank, First Bank, Skye Bank, United Bank of Africa, and Zenith Bank. Therefore, the commercial banks in Nigeria that their customers formed the units of

analysis of this thesis study include Access Bank, United Bank of Africa, Zenith Bank, Skye Bank, and First Bank. The study utilized primary data (survey data collected using questionnaires). The area of concentration is Lagos state, Nigeria.

1.7   Significance of the Research

This study contributed to the theoretical body of knowledge about the factors influencing the Nigerian bank's customers' behavioral intention to adopt NFC proximity payment technology.

1.7.1   Theoretical Perspective

The main theoretical contributions of this study can be summarised as follows: In the theoretical perspective, this study contributed by extending the original TAM theory by integrating four security-related factors (perceived security (PS), perceived trust (PT), perceived financial risk (PFR) and perceived smartphone cost (PSC)); one system-related factor (perceived transaction convenient (PTC)) and one individual difference factor (technology awareness (TA)) to the original TAM model. The extended theory was then empirically tested within the context of NFC proximity payment technology in Nigeria among bank customers.

The study equally makes a contribution by testing the moderation effects of two individual difference factors namely; customer innovativeness and user absorptive capacity, on the relationship between the main predictors (individual difference, system, and security-related factors) and Nigerian bank customers' intention to adopt NFC proximity payment technology within the extended TAM model. The study contributed again by integrating and linking ten different factors, namely; PEOU, PU, PTC, PS, PT, PFR, PSC, TA, CIIT and UAC to the original

TAM theory. Thus, the research framework provided a complimentary foundation in information system literature.

Academically, the study advanced the understanding of the impact of UAC and CIIT on users' perceptions of NFC mobile payment on (PEOU, PU, PTC, PS, PT, PFR, PSC and TA). Moreover, the proposed theoretical model advanced the understanding of the antecedents of behavioral intention in NFC proximity payment by exploring factors not included in TAM, UTAUT, and their variants. Researchers always need to consider not only the technical characteristics but also security and individual-related factors when studying innovation diffusion and technology adoption.

1.7.2 Practical Perspective

The main practical contributions are as follows:

Innovativeness is the factor that needed to be considered, since in the early stage of new information technology (e.g., NFC proximity payment); people have little knowledge from internal perception and external environment. CIIT has been reported to play a vital role in the adoption of new technology such that both scholars and manufacturers have regarded it as the most vital constructs to information system adoption success. Innovative individuals always look for stimulation, uniqueness, novelty, and are not easily influenced by others' opinions.

This means that innovative consumers are willing to try new services or explore new functions of existing services, without well-established references. Innovative consumers are the best choice for new service/product trials since they will not be easily discouraged by the risk and complexity associated with a new service/product. They often share their usage experience with others, influence their

friends in choosing a new service/product, and could help vendors attract more consumers to the service/product. Therefore, if NFC proximity payment vendors can identify and satisfy the needs of innovative consumers, they will be able to more accurately predict acceptability of their new services/products and save time and cost in marketing. Thus, the study chooses to test the moderating effect of CIIT to recommend ways for the improvement of customers' satisfaction and NFC proximity payment technology adoption.

Due to the security issues raised by the interviewees in the preliminary stage of this study, some security-related factors were included in the framework of the study as revealed from the interview. By so doing the study helps achieve the Central Bank of Nigeria (CBN) 's objective of expanding, deepening and modernizing the payment system in Nigeria and also stimulate the CBN in ensuring that Nigeria ranks among the top 20 economies of the world in line with the nation's vision 2020 aspirations if the study recommendations were implemented effectively.

From the absorptive capacity perspective, which appeared very uncommon in the IS literature, especially at an individual level. Customers' prior mobile payment experience plays an important role in moderating how customers derive their intention to use, from their evaluations of the NFC proximity payment. Different levels of mobile payment experience produce different relationships between technology acceptance perceptions and intentions towards NFC proximity payment adoption. Thus, while the ability of customers to internalize and exploit NFC proximity payment can build up their confidence; customers' background knowledge of NFC proximity payment is a more important means of boosting customers' confidence. Therefore, it seems reasonable to consider the absorptive capacity as the moderating variable, on the relationships developed in the model.

1.8   Definitions of Terms

The key terms utilized in this study are defined as follows:

1. Mobile payment: is defined as the capability of a mobile phone user to initiate, authorize, and complete a financial transaction, in which money or funds are transferred over the mobile network or via the wireless communication technologies to the receiver through the use of a mobile device (Slade, Williams, et al. 2014).

2. Near Field Communication (NFC): is an established innovation that empowers bidirectional wireless proximity (around 10 cm) correspondence between electronic devices (Madureira 2017).

3. Behavioral intention: This is determined by Attitude, which is represented as "a person's certain or pessimistic emotions about performing the target behavior" (Fishbein & Ajzen 1975).

4. Technology adoption: Adoption is a user's willingness or choice to subscribe and use mobile phones to perform money related exchanges (Rogers 1995). An individual makes plans to turn into a habitual user of a technology (NFC proximity payment). Kamble, Gunasekaran, and Arha, (2019) have characterized technology adoption as the phase of choosing an innovation for use by an individual or an organization.

5. Perceived ease of use: This is defined as the degree to which a person believes that using specific information technology will be free of effort (Dutot, 2015).

6. Perceived usefulness: This is how much an individual accepts that utilizing information innovation will improve his/her performance (professional, personal) (Dutot, 2015).

7. Transaction convenience: The degree to which individuals find NFC proximity payment technology convenient during the time spent making payment and accept

that they can utilize it to achieve their payment whenever and wherever convenient for them (Ozturk, Bilgihan, et al. 2016).

8. Technology awareness: Technology awareness is the customers' insight on the presence, highlights, costs, advantage, and simplicity or difficulty of utilizing mobile payment in their transactions (Rogers, 1995).

9. Perceived Trust: Trust is an important element influencing consumer behavior in uncertain environments such as electronic commerce (Pham & Ho, 2015).

10. Perceived Security: Security represents a state in which users will feel secure if a payment service is offered not only in a specific area and is also compatible with all environmental conditions (Lee, Lee & Park, 2015).

11. Smartphone cost: This is the cost of acquiring, maintaining and upgrading mobile phones as well as the transactional fees to use the services and other hidden transaction charges which may further exaggerate the costs (Tan et al. 2014).

12. Perceived financial risk: Perceived financial risk is the expectation of losses related to purchasing (Tan et al. 2014).

13. Customer innovativeness: Innovative individuals are communicative, curious, dynamic, venturesome, and information seekers (Kim et al., 2010).

14. User absorptive capacity: User absorptive capacity refers to the ability of an organizational member to value, assimilates, and apply new knowledge. Therefore, the ability of a person to recognize the value of NFC proximity payment, assimilate it, and apply it to make a payment is critical to his or her intention to adopt the NFC proximity payment technology (Pham & Ho, 2015; Park et al. 2007).

1.9   Organization of the Thesis

This study is organized into six chapters. Chapter 1 presents a brief background of the Study, highlighting and discussing subsections as information communication technology in Nigerian Banking; near field communication proximity payment and its significances; as well as the problem statement. The chapter proceeds with specifying the objectives of the study, questions that guide the study and then defines the scope of the study. The significance of the study including both theoretical and Practical Perspectives were also presented. The Chapter then expounds on the context of key themes that are connected to the study. The key themes are discussed by providing operationalized definitions of the constructs, it then concludes with a brief description of the chapters that constitute the whole study.

Chapter 2 also starts with a brief introduction, then followed by important subsections as technology adoption and adoption theories. The Technology Acceptance Model (TAM) as well as its extended version, was discussed as the choosing theory for the study. It also presented and discussed the related factors for the research, including an Overview of ETAM research used in studies explaining mobile payment. The chapter then conducted and introduces meta-analysis of individual mobile payment adoption, before it provides an overview of ETAM research used in studies explaining NFC proximity payment. It also presented the moderating effects of both customer innovativeness and user absorptive capacity and then discussed the behavioral intention as well as the existing literature gaps on NFC proximity payment adoption. The chapter then continues with a description of the proposed conceptual model and research hypotheses, and then concluded by providing the chapter summary.

Chapter 3 presents in detail the methodology used throughout the study. It presents the preliminary study, after the introduction. The chapter then discusses the research design, research philosophy, and the population of the study. It also presents and explained sampling technique; sampling procedure; as well as the sample size determination approach. The chapter then highlighted the method used for data collection, the survey instrument together with the survey item selection and construction. It then proceeds with the discussion on assessing validity and reliability of the study instrument, as well as the pilot and pretesting the survey instrument. The data collection and responses; the response bias; and demographic variables distribution were all highlighted and explained in the chapter.

Equally, the statistical techniques; the data Coding; analysis of outliers; the test of normality and multicollinearity; the PLS bootstrapping; as well as the common method variance and the descriptive statistical analysis were all presented and explained in this chapter. The chapter also provides the assessment of measurement model, under which the indicator reliability; internal consistency reliability; convergent validity; and discriminant validity (Fornell-Larcker and HTMT) were well discussed. It further provides discussions on the assessment of structural model, under which the hypothesis testing; the assessment of coefficient of determination ($R2$); the effect size ($f2$) and the predictive relevance ($Q2$) of the Models were well explained. The chapter concluded by presenting the study unit of analysis together with the chapter summary.

Chapter 4 presents the results of data preparation and screening, after a brief introduction of the chapter. It then followed by providing the analysis of missing values; analysis of outliers; test of normality and multicollinearity; the common method variance; as well as the descriptive statistical analysis. The chapter also

provides and presents all the results of the assessment of both measurement and structural models. It then provides and depicts the figures of the moderating effects of both customer innovativeness and user absorptive capacity, together with their predictive relevance and effect sizes. The chapter finally ends up summarizing the entire sections discussed in the chapter.

This chapter reviews the major findings and provides combined discussions of the perceived factors which influence technology acceptance, revealed in the survey findings discussed in chapter four, along with the literature reviewed (chapter two) in the current research. The chapter starts by giving its overview that was followed by the summary of the research hypotheses and model, based on the survey findings. It then provides discussion on the findings, for both direct and moderating effects, as well as the predictive relevance of the ETAM. The chapter equally concludes by providing the chapter summary at the end.

Chapter 6 is the final chapter of this study, that presents the conclusion of the whole study. The chapter discussed and analyzed the research objectives, research contribution to knowledge, as well as the theoretical and practical contributions. It finally provided the recommendations together with the limitations and the future research.

CHAPTER 2

LITERATURE REVIEW

2.0   Introduction

The previous chapter has discussed about the research background, problem statement, research questions, objectives, scope as well as the significance of this study. The main purpose of Chapter 2 is to provide a review of the scholarly literature on the topic under study. Therefore, this chapter discussed the theory that will be applied as well as the interrelationships between the constructs of the study, by reviewing the past studies on the adoption of mobile payments especially the NFC proximity payments. The chapter reviews and critically analyses the extant literature in order to explore various aspects of customers' mobile payment adoption behaviour as well as to build the foundations for developing a theoretical framework and proposing a research model for NFC proximity payments adoption in a developing country context (Nigeria). A review of previous MP adoption in the current study context (Nigeria) was also included in the chapter. The chapter included a discussion of key findings presented in previous studies, as well as research gaps existing in the previous studies of identifying the consumers' perception of the mobile payments. This is to provide a context for the study and to communicate the state of the research in the field. The chapter concludes by discussing the proposed framework variables and related hypotheses, and then the presentation of the proposed model.

2.1 Technology adoption

Adoption and use of new technologies have always remained a hot topic for researchers; consequently, in the past three decades, various theoretical models have been introduced and tested. New technology adoption is the first time use of products or services (Rad, Nilashi, et al. 2018). Nowadays, understanding the reason for accepting or rejecting any new technology by users has become one of the most important areas in the information technology field (Chege, Wang & Suntu, 2019). Studying individuals' adoption, acceptance, and use of information technologies (IT) and information systems (IS), as a part of software engineering field from computer sciences, has been recognized since the 1970s, because it is a prerequisite for technology's utilization and realization (Momani & Jamous 2017). For organizations, it means to continue to increase their investment in IT (Amendola, Calabrese & Caputo, 2018). Davis, Bagozzi, and Warshaw (1989) defined the technology adoption as the implementation of the software and hardware technology in an organization to increase productivity, competitive advantage, improve processing speed, and make information readily available.

Innovation acceptance theories and models aim to convey the concept of how users may comprehend and accept the new innovation and how they may utilize it. For any new innovation, numerous factors can influence people's decision-making processes about how and when they will utilize it (Fishbein & Ajzen, 1975). These factors have been examined and analyzed in different research (Venkatesh, Morris, et al. 2003; Triandis 1979). Research on the adoption of innovation has attempted to measure the components which impact the adoption behavior of end-users (Rad, Nilashi, et al. 2018; Gangwar, Date et al. 2014). Researchers have indicated a constant interest in finding the most significant components that impact consumers to