VIRTUAL AIRTIME PURCHASE IN NIGERIA: CONSUMER ATTITUDE, BEHAVIOUR AND CONTINUOUS USAGE

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Declaration

I, Okofu Sebastina Nkechi, hereby declare that this thesis is a personal research and has not been submitted in partial or full by me for any academic award in any institution.

All sources cited are acknowledged.

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March, 2021

Dedication

This thesis is dedicated to Almighty Trinity and The Blessed Virgin, Queen and Mother of My Lord, whose mercy, favour and faithfulness never fails. Lastly, this research is dedicated to the mystical family of Blessed memories of Augustine and Rose Okofu and children whose expression of love is unquestionable.

Certification

I hereby certify that this thesis was supervised under the guidelines and procedures of the University of the Witwatersrand.

…… Date …….

Prof. Thomas Anning Dorson

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Abstract

The Internet and mobile technologies have continued to transform the human, social and commercial engagements without the boundaries of space and time. These technologies are shaping every facet of human life, including socialisation, communication, and commerce. In Africa, the increase in mobile phone penetration is enhancing participation in the digital economy, with mobile commerce adoption being an important part. While there is growth in number by the players in the digital ecosystem in Africa, there are challenges with the adoption of such technologies. This thesis seeks to investigate the nuances of adoption of one such technology in the e-commerce space. This study, therefore, orients itself towards identifying factors slowing and/or promoting virtual airtime purchase, intention and continuous use. To achieve this, the study adopted an integrated theoretical approach using different aspects - the TAM, UTAUT, DOI and ECT. Quantitative data were collected from Delta State of Nigeria, using a sample of 390 participants to test the study's integrated model. A product indicator structural equation modelling using the partial least square approach (Smart-PLS 3) yielded some useful findings that help the study to make a significant contribution to literature and practice. The findings show that technological, social and contextual factors (at the personal level) are fundamental to promoting virtual airtime adoption of the mobile commerce technology. The findings also show a significant direct relationship between independent variable and dependent variables and also indicate usage satisfaction as a strong moderator for actual-continuous use relationship. The study is one of the first to have adopted an integrated framework to explain the end-to-end nuances of mobile commerce adoption in Africa's largest country and economy. The study makes a significant contribution to theory and empirical work in emerging African economies in terms of mobile commerce adoption. It also offers practical recommendations to aid policy at the governmental level and both strategic and operational recommendations for telecommunication and players in the mobile commerce ecosystem.

Keywords: virtual airtime, mobile commerce, technology adoption, consumer attitude, satisfaction, continuous use

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List of Abbreviations

AERA	American Educational Research Association
AMOS	Analysis of Moment Structure
ATM	Automated Teller Machine
AUS	Actual usage
AVE	Average Variance Extracted
BI	Behaviour Intention
BSc	Bachelor of Science
C-TAM-TPB	Model Combining the Technology Acceptance Model and Planned Behaviour
CA	Cronbach's Alpha
CAB	Consumer Affairs Bureau
CB-SEM	Covariance-Based Structure Equation
CDMA	Code Division Multiple Access
CFA	Confirmatory Factor Analysis
CF	Contextual Factors
CO	Compatibility
COP	Consumer Outreach Programme
CR	Composite Reliability
CTM	Consumer Township Meeting
CUS	Continuous usage
DC	Data Cost
D&MIS	Delone and McLean Information System
DELSU	Delta State University
DOI	Diffusion of Innovation
E-COMMERCE	Electronic Commerce
EDT	Expectation Disconfirmation Theory
E-ECM-IT	Extended Expectation-Confirmation Model in Information Technology
EL	Electricity
E-RECHARGE	Electronic Recharge
E-VOUCHER	Electronic Voucher

ECT	Expectation Confirmation Theory
ECU	Edwin Clark University
EE	Effort Expectancy
EFA	Exploratory Factor Analysis
FA	Family
FC	Facilitating Conditions
FUPRE	Federal University of Petroleum Resources Efurun
GDP	Gross Domestic Product
GSM	Global System for Mobile
GSMA	Global System for Mobile Association
HM	Hedonic Motivation
HND	Higher National Diploma
HTMT	Heterotrait- Monotrait
ICT	Information Communication Technology
IS	Information System
ISS	Information System Success
ITU	International Telecommunication Union
M-PAYMENT	Mobile Payment
M-RECHARGE	Mobile Recharge
MC	Mobile Commerce
MDA	Multivariate Data Analysis
MIM	Mobile Instant Messaging
MM	Motivation Model
MNO	Multinational Organisations
MPA	Mobile Phone Attitude
MPCU	Model of PC Utilization
MPH	Mobile Phone Habit
MTN	Mobile Telephone Network
NBS	National Bureau of Statistics
NC	Network Coverage
NC Act	Nigerian Communications Act

NCC	Nigerian Communications Commission
NFC	Near Field Communication
NITEL	Nigeria Telecommunication Ltd
NNA	Neural Network Analysis
OBD	Online Banking Division
OECD	Organisation for Economic Co-operation and Development
OND	Ordinary National Diploma
OTT	Over-The-Top
P-VALUE	Probability Value
PE	Peers
PEOU	Perceived Ease of Use
PERM	Perceived E-Readiness Model
PLS-SEM	Partial Least Square Structure Equation Modelling
POS	Point of Sale
PSE	Phone Self-Efficacy
PU	Perceived Usefulness
PUFRE	Federal University of Petroleum Resources Efurun
RMSE	Root Mean Square Error
SA	Satisfaction
SABI	State Accelerated Broadband Initiative
SCT	Social Cognitive Theory
SEM	Structure Equation Modelling
SF	Social Factors
SI	Social Influence
SME	Small and Medium-Sized Enterprises
SMP	Strategic Management Plan
SSA	Sub-Saharan Africa
T-VALUE	Table Value
TAM	Technology Acceptance Model
TCA	Telecommunication Consumer Parliament
TCT	Technology Continue Theory

TF	Technology Factors
TOE	Technology Organisation-Environment
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TRI	Technology Readiness Index
TTF	Task Technology Fit Model
TTT	Trust Transfer Theory
UAE	United Arab Emirate
UTAUT	Unified Theory of Acceptance and Use of Technology
V-RECHARGE	Virtual Recharge
VIF	Variance Inflation Factor
Voice over IP	Voice over Internet Protocol
WIN	Wire Nigeria Project
WITS	University of Witwatersrand
WOM	Word of Mouth

Chapter One: Background to the Study

1.1 Introduction

The advent of the Internet and mobile telecommunication and the subsequent diffusion of these innovations and adoption of similar technology have had a life-enhancing impact on the human race. These impacts include communication, transportation and mobility, commerce, governance, media, and education, to mention but a few. These technologies have also changed and will continue to change buyer-seller related issues such as value, consumption and consumer behaviour. Cascio and Montealegre (2016) observed that these technologies had transformed human, social and commercial activities without limits of space and time. This transformation is likely to become a continuous process as innovations within these technologies keep improving to deal with the numerous and ever-present societal and business challenges. One such transformation that has changed our lives is the development and adoption of mobile phone technology. Mobile technology has and continues to influence every facet of life: socialisation, communication, commerce, relationships, transportation, and the rest. One aspect of mobile technology is mobile commerce (MC) which has made payment transactions flexible for digital natives (Cao et al., 2015). This digital payment is facilitating the growth in the mobile telephony penetration rate globally. Pew Research (2017) confirmed this and stated that the number of people using mobile phones globally will continue in tandem with the increase in Internet connectivity via mobile devices. According to the Global System for Mobile Association (GSMA Report, 2019), 300 million new users joined the mobile Internet in 2018, resulting in 3.5 billion people globally connected.

The GSMA (2019) report further estimated that by 2025 there will be 600 million new Internet subscribers, mostly from China, Pakistan, India and Nigeria. Again, it is estimated that there will be 5.9 billion mobile users by 2025, equivalent to 71% of the global population (GSMA, 2018). By implication, the increasing number of Internet subscribers will result in more people opting for mobile services via their mobile phones. The 5.9 billion mobile phone users by 2025 will be motivated by the introduction of 4G in 2019 and 5G in the subsequent years. The 4G and in particular 5G technology, will be enhancing, maintaining and driving more consumers' involvement in the global digital economy (Wu et al., 2016; Alsharif et al., 2018), and minimising

operational cost (Andrey, 2019). The involvement in mobile phone penetration will be driving developing countries to participate in the digital economy, with mobile commerce adoption being an important part.

On the global GDP front, mobile technologies and services contributed a total value of $4.1 trillion, equivalent to 4.7% GDP globally (GSMA, 2020). This figure is estimated to approach $5 trillion, representing 4.9% of global GDP. Adamkiewicz of Marketing Tech News (2018) noted that 25% of global populations, which represent 1.6 billion people, use mobile devices for online activities. Besides, from the sub-Saharan Africa (SSA) perspective, Nigeria and Ethiopia are reported to have a fast growth rate in mobile phone markets which by 2025 is estimated will contribute 19% and 11% respectively to the GDP. This growth is due to the large population of digital youths becoming tomorrow's adults (GSMA, 2019). Also, GSMA 2019 reported that the sub-Saharan mobile ecosystem will increase to $150 billion in value - equivalent to 8% of regional GDP - by 2022, while by 2023, they will contribute $185 billion - equivalent to 9.1% GDP. Also, sub-Saharan Africa is witnessing an increase in adoption of mobile phone technology and mobile commerce services. According to Nabareseh et al. (2014), the sub-Saharan Africa region has experienced increased mobile phone usage.

In the view of Hedman and Henningsson (2015), mobile technology is changing the payment system because, the mobile payment system uses mobile devices as the tool for transactions. E-commerce, however, is marketing transactions of buying and selling that occur online (Khan, 2016), the exchange of information, ideas, knowledge, products, services via Internet sources (Kalu et al., 2017), or the marketing activities via digital medium using non-hard copy documentation. E-commerce offers advantages such as competitive strategies, convenience, improving firms' and consumers' relationships, building company image, as well as being time and cost-saving (Khan, 2016). However, mobile commerce encapsulates transactions performed via mobile devices. Accordingly, Kale and Mente (2018) referred to mobile commerce activities as transactions of buying, selling, and making payments using handheld technologies through the Internet.

Twinpine Consumer Survey (2016) observed that 63% of e-commerce is from the mobile phone: 66.9% buy items with the mobile phone, 36.4% pay bills with the mobile phone and 47.3% purchase airtime with the mobile phone. Twinpine (2016) submitted that Mobile commerce has

gradually become the new electronic commerce technology for contemporary digital consumers. The new digital purchase explains why mobile commerce activities happen mostly on palmtop and mobile phone terminals, characterised by ubiquity, convenience, localisation and personalisation (Du & Li, 2019). Also, mobile commerce has the advantages of convenience, accessibility, ubiquity, personalised services, localised services and instant services (Turban et al., 2015; Liébana-Cabanillas et al., 2017b). Observably, mobile commerce has become an extension of e-commerce in an online transaction through mobile phones and mobile apps (Cao et al., 2015; Du & Li, 2019). Again, mobile payment (m-payment), an aspect of mobile commerce, uses m-money or m-wallet, a payment method, to transfer funds and make purchases of goods and services in a virtual environment. Mobile payment thus works via wireless technology to facilitate electronic payment for goods and services (Ting et al., 2016), increase convenience, cost and time saving, and reduce transaction fees (Chen et al., 2019).

Hedman and Henningsson (2015) observed that while mobile technology and general e-commerce are driving business landscape and payment system globally, this may be low in adoption and usage in a developing country when compared to the developed countries (Jia et al., 2014; Pham & Ho, 2015). Poushter (2016) opined that developing nations are behind changes taking place in technology adoption. While mobile commerce is becoming the aspect of business transactions in more advanced economies, the same cannot be said about developing economies in Africa such as Nigeria. Despite the growth in Mobile Money and m-payments, there is still a substantial part of the population faced with challenges in adopting some form of mobile commerce. This study paid particular attention to virtual airtime purchase as a form of e-commerce/mobile commerce and the related issues regarding consumers' behaviour toward such service. This study, therefore, sought to understand the virtual airtime purchase behaviour, as a form of mobile commerce adoption, of the Nigerian telecommunication customers to determine subscribers' preferred airtime voucher activities. The study orientated itself towards identifying factors slowing or promoting virtual airtime purchase (a basic form of e-commerce/mobile commerce available to all mobile telecommunication subscribers), intention and continuous usage.

The justification for including e-commerce, mobile commerce and mobile payment in this study was that they are all Internet technologies and e-recharge is likely to be credited to a phone via any of these novel technologies. Despite the convenience and advantage of mobile commerce and

mobile payment awareness, research has shown that adoption is slow (Anouze & Alamro, 2019; Yeh, 2020).

1.2 Background to the Study

Nigeria is currently among the largest economy in Africa in both GDP and population terms. And like most developing economies, various policies and steps established by the federal government are to boost economic activities through the adoption of information communication technology (ICT). Also, the quest to improve the adoption of technology is equally driven by the four major network operators- MTN, Airtel, Globacom and Etisalat (renamed 9mobile). Besides, government commitments through the Nigerian Communication Commission (NCC) and industry players have enhanced mobile telecommunication and Internet penetration. Therefore, it is worth mentioning that Internet activities have gradually and steadily taken control of the communication sector by reducing and shifting lots of offline activities to online activities, with greater productivity and efficiency (Jain, 2016). The gradual Internet penetration is now facilitating e-commerce activities.

Thus, to enhance the mobile commerce trend in the country, the federal government of Nigeria introduced a "Cashless Policy" to promote a cash lite economy (Ezeamama et al., 2014). The aim is to reduce handling physical cash and drive electronic payments. This policy has increased the use of an Automated Teller Machine (ATM), Point of Sale (POS) technology in payment transactions and possibly prepaid airtime vouchers. Additionally, online shopping and social media marketing activities are developing and increasing digital transactions and e-commerce generally. Accordingly, Jumia (2017) noted that online engagement enhanced Internet connectivity and mobile penetration. The African Business Insight (2017) echoed that Nigerians now browse and pay for products via their mobile phones compared to the past when they browsed without making a purchase. With a population estimate of 206.1 million, Nigeria now has an estimated 61.2% Internet penetration rate compared to past years when much fewer the population had Internet access (Internet Stats World, 2020). There is, therefore, a critical mass to drive the country's effort to be a cash-lite economy.

The increase in Internet penetration is also fuelling online engagement through mobile apps and social media platforms. There is also a gradual uptake of e-commerce activities as the customers are beginning to opt for easy access and convenient shopping (Teo et al., 2015). Other strategies

motivating mobile commerce in Nigeria include the fact that there are instances where MTN does not charge data usage when their subscribers browse the Jumia website – an online shop (Jumia, 2017). On the other hand, studies have shown that network availability, cost and functionality of mobile phones do not bring about the adoption of mobile commerce (Wang et al., 2015).

Despite the no-fees charges and the convenience provided, telecommunication companies still spend a large amount of money printing recharge cards as virtual airtime recharge has not been fully adopted. The Vanguard Newspaper (2014) reported that Nigerians spend N447.8bn on recharge cards monthly. In 2015 this was N2.8 trillion, and in 2016 N3.3 trillion, but by February 2017, Nigerians spent N3.208trn on airtime (New Telegraph report, 2018). This amount has continued to rise such that by November 2018 it increased to N251.44bn and N767.23bn in just first quarter consumption for 2019 (Punch newspaper, 2019). However, despite Covid 19 global pandemic, N4.82tr was spent on recharge card in 2020 (ripplesnigeria.com 2020). Also, a household survey, conducted by the National Bureau of Statistics (NBS) (2019a), showed household expenditure on recharge card (airtime) for rural Nigeria at 81.4%, while the urban population reported 91.8%. The above statistics of NBS (2019) reinforce the low level of e-commerce/mobile commerce adoption in situations (as virtual airtime purchase) where adoption is likely and easily facilitated by network providers through digital payment systems. Therefore, it becomes necessary to understand the current challenges of e-commerce adoption and attendant issues in a developing environment like Nigeria.

1.3 Statement of the Research Problem

Mobile commerce has become an essential aspect of our lives, and the youths are more likely to be involved in digital engagements (Buzz Nigeria, 2019; Islam, 2017; Pew research, 2017). It is also shaping and enhancing communication and commerce globally. The necessity of mobile commerce activities has led to several studies conducted with regard to its adoption and usage satisfaction among businesses and customers (Chau et al., 2020). Despite the growing research in this area, Odoom and Kosiba (2020) claimed some lop-sidedness in developing economies. They further indicated that even within the developing economies' contexts, attention is more towards adoption than usage continuance. Fleischmann et al. (2016) confirmed this and stated the need for a comprehensive study on mobile commerce continuous use generally. The challenge is that while adoption and its determinants are critical to explaining how mobile commerce impacts individuals'

lives and economic activities, there is a lack of understanding in its usage continuance that can be detrimental. The reason is that usage continuance indicates satisfaction level and possible further development of mobile commerce technologies. The current study, therefore, considered it critical to investigate mobile commerce usage continuance and related issues.

Additionally, studies on mobile commerce in developing economies such as those in the African context tend to model their designs after the developed contexts. And while such attempts are commendable and offer some additional knowledge, they ignore the peculiar challenges of such contexts. Such contextual issues may help explain nuances in mobile commerce adoption in developing contexts. Research and scholars must, therefore, pay attention to contextual idiosyncrasies as studies such as Chau et al. (2020), Dongmo et al. (2020), Pandey and Chawla (2020), Maduku et al. (2016), and Boateng et al. (2016) have clearly shown that context explains adoption, determinants and usage continuance. In Nigerian contexts, there is an apparent lack of mobile commerce continuous usage adoption, despite the increasing penetration of mobile telecommunication and Internet services. For example, Osakwe and Okeke (2016) asserted that mobile money, one of the dominant e-commerce platforms across Africa, is not fully welcomed in Nigeria because it is new and its usefulness is not perceived.

While the advantages offered by e-commerce and mobile commerce are evident and far-reaching, the apparent lack of adoption in contexts such as Nigeria needs a more thorough investigation to tease out germane issues to help in policy formulation and implementation. Therefore, a thorough investigation is essential for two reasons: first, the Federal government's attempt to attain a cash-lite economy or society; and secondly, the life-enhancement opportunities mobile commerce offers both small and medium enterprises and customers. For a developing economy such as Nigeria to fully benefit from ICT for development (Ali & Odularu, 2020), mobile commerce and e-commerce generally are going to play critical roles in this regard (Myovella et al., 2020; Wijaya et al., 2020). E-commerce adoption is, therefore, a necessary tool for business growth.

A lack of deep understanding of adoption, challenges of adoption and usage continuance in a developing economy context such as Nigeria is a concern that needs urgent attention. While empirical studies are conducted and confirmed in the Nigerian context (Chiejina & Olamide, 2014; Ugonna et al., 2017), there are still some gaps on categorising adoption intention factors and the relationship between behavioural intention and actual behaviour. While attitude, which is

explained by behavioural intention, is a good measure of e-commerce adoption, understanding actual behaviour of those who have used or are using e-commerce in developing contexts helps strengthen the empirical relationship between adoption factors and adoption itself. A study that moves beyond intention to adopt, to an actual adoption, offers theoretical and practical implications for e-commerce research in developing economies.

Apart from the attitudinal factor, it is critical to explain mobile phone consumer behaviour competence (self-efficacy) in accepting the government's lite cash policy and financial inclusion. Besides the fact that mobile commerce has been adopted and is relatively new (Barry & Jan 2018), mobile phone use and Internet subscription is a fast-growing market (International Telecommunication Union (ITU), 2016) that needs to be determined. The modern-day consumer demand could explain why telecommunication industries are developing strategies to provide an enabling environment for digital consumers to promote individuals', organisations and nations innovation progress. There is, therefore, the need to investigate m-phone e-voucher users' acceptance as a determinant of technology efficacy in adoption. However, this may be lacking due to the dearth of technological infrastructure and consumers' incompetence in adapting to technology changes (Sabi et al., 2018).

Literature has shown that research on e-commerce and mobile commerce continuance in the developing economies' context is lagging when compared to the advanced economies (Humbani & Wiese, 2019). A crucial relationship that has not been considered thoroughly in this regard is the moderation effect on satisfaction in the relationship between actual adoption and continuance. Examining the moderating relationship of satisfaction on continuous usage will clarify e-commerce adoption in a developing economic context and enhancing livelihood.

Lastly, some e-commerce and mobile commerce platforms have been investigated, such as mobile banking, mobile payment and various aspects of mobile applications. While such platforms offer knowledge gaps into e-commerce adoption, they may not be as ubiquitous as other forms like the e-voucher. The current study has presented the virtual airtime aspect of mobile commerce readily available to every mobile user. The researcher argues that investigating the adoption of the e-voucher of mobile commerce allows for the inclusion of consumers who may not have access to the mobile application due to the sophistication of a few mobile applications. E-voucher service - a mobile commerce service from telecommunication providers - is considered crucial for both

consumers, operators and government. However, this service, despite its importance, has received low patronage in Nigeria. Therefore, this study considered it crucial to understand the current consumers' behaviour adoption of prepaid virtual airtime and continuance use. Besides, there is a lack of academic research on virtual airtime purchase in the Nigerian mobile phone sector.

1.4 Purpose of the Study

The purpose of the research study was to integrate the Technology Acceptance Model (TAM), the theory of Unified Theory of Acceptance and Use of Technology (UTAUT), Diffusion of Innovation (DOI) and the Expectation Confirmation Theory (ECT) to examine the technological, social and contextual factors driving attitudes, purchase and continuous use of prepaid virtual airtime among Nigerian consumers.

1.5 Research Objectives

The research objective was to examine the factors influencing the prepaid virtual airtime adoption and challenges of the mobile phone sector and consumers' attitude towards both its usage and continuous use. The empirical objectives for this study are discussed under technological, social and contextual factors as follows:

i. To determine the extent to which technology factors such as perceived usefulness, compatibility, phone self-efficacy, phone habit and phone attitude influences the behaviour intention to adopt virtual airtime purchase.
ii. To examine the influence of social factors such as family and peers on behaviour intention to adopt virtual airtime purchase.
iii. To investigate the extent to which contextual factors such as Internet coverage, electricity and data cost determines behaviour intention to adopt virtual airtime purchase.
iv. To determine whether behaviour intention to adopt virtual airtime influences actual usage.
v. To examine the influence of actual usage on virtual airtime's continuous behaviour usage.
vi. To evaluate the moderating effect of the customer satisfaction between actual use and continuous usage of virtual airtime purchase.

1.6 Research Questions

Several research questions asked were to help achieve the stated objectives above. The study therefore asked:

i. What factors influence the virtual airtime purchase attitude, and continuous usage of mobile phone customers?
ii. Do perceived usefulness, compatibility, phone self-efficacy, phone habits, and phone attitudes influence virtual airtime purchase?
iii. Does the influence of family and peers' determine virtual airtime purchase?
iv. Do Internet coverage, electricity supply, and data cost influence the virtual purchase of airtime?
v. Does the behaviour intention to adopt virtual airtime influence actual usage?
vi. Does the actual usage of virtual airtime influence continuous usage?
vii. Does satisfaction moderate actual usage and continuous virtual airtime usage?

1.7 Significance of the Study

The rapid penetration of digital services in developed countries has without doubt increased digital divide with the developing countries however this trend is changing. The introduction of mobile commerce has created an access to developing countries engagement in financial inclusion, economic development and reducing digital divide Despite positive behaviour towards accepting technology, Amani (2015) noted that determining consumer online behaviour is challenging. The challenging consumer online behaviour has resulted in increasing academic research on mobile commerce, but with fewer studies on the contextual challenges and continuous usage (Fleischmann et al., 2016; Lu et al., 2017), and in particular within the context of developing countries (Odoom & Kosiba, 2020). Nevertheless, evidence indicates that some studies have examined certain contextual factors in Nigeria (Chiejina & Olamide, 2014; Ugonna et al., 2017; Okolo et al., 2018). However, with the importance of technology, there appears to be a gap between factors influencing adoption and the continuous usage of mobile commerce among telecommunication consumers. Therefore, this calls for a need to focus on contextual issues as they explain technology adoption and continuous usage (Chau et al., 2020; Oyetunde et al., 2019; Pandey & Chawla, 2020). Also,

identifying these characteristics will proffer theoretical and practical implications for technology adoption research in developing economies like Nigeria.

With regard to the Nigerian context, there is an apparent lack of virtual airtime adoption literature, despite the increased mobile telecommunication penetration and Internet services. For example literatures on the continuous usage of the prepaid scratch card voucher (Olu & Adekunle, 2017; Micah et al., 2017), despite its health risk associated with silver coatings (Ndhlovu & Hokonya, 2020), and government cash lite economy. In the study conducted by Osakwe and Okeke (2016), the researchers revealed that the slow adoption of e-commerce was due to non-recognition of its benefits. Therefore, this study is significant as technology awareness of virtual airtime, expectations and experiences with consumers can enhance online buying behaviour in the Nigerian mobile phone industry.

Additionally, studies have investigated e-commerce and mobile commerce adoption (Myovella et al., 2020; Humbani & Wiese, 2019; Okolo et al., 2018), with less emphasis on technology adoption and continuous usage of innovation such as virtual airtime. Also few studies have focused on virtual airtime in developing context despite the observation that early adoption of digital mobile money starts with the adoption of airtime purchase (Batists & Vicente, 2018). Hence, the awareness and experience of virtual airtime will enhance the adoption of other virtual payments and mobile commerce in general. Therefore, this study aimed to examine mobile commerce through the e-voucher in the Nigerian context. Its adoption and continuous usage are vital to the national growth as demand for the voucher will increase with increasing population, digital consumer awareness and technology benefits. Again, it has become a digital currency for making transfer by credit third party mobile phone account especially those in rural arear or anyone who have no access to bank accounts. For example, online payments by households have increased due to the Covid-19 pandemic (Kerigan, 2020; Keffer, 2020). Besides, there is a lack of academic literature in the e-voucher domain of mobile commerce and patronage. The moderation effects on satisfaction level in the relationship between actual adoption and continuous usage are yet to receive adequate attention. Therefore, it is essential to understand this relationship and identify the factors enhancing e-voucher adoption and continuous usage for consumers' behaviour prediction and the future growth of mobile commerce in Nigeria.

Studies have focused on the online behaviour of the youths towards technology acceptance (Aziz & Wahid, 2018; Faqih, 2016; Jadhav et al., 2016; Nwankwo et al., 2019), with less emphasis on adults. The present study has focused on adults' segments as contemporary adults depend on mobile gadgets as a lifestyle (Widayat & Irfani, 2020; Pew Research Center, 2019). Hence adults can be targeted as a new marketing segment for virtual airtime adoption. Again, the more adults engaged in technology adoption, the increased contribution to the national economy (Volkova, Plotnikov, & Rukinov, 2019).

This study is crucial for the telecommunication industry as well as other organisations engaging in online activities as the national economy can benefit from technology development (Ali & Odularu, 2020; Wardhani et al., 2018; United Nations, 2015) there will be financial inclusion (Chatterjee, 2020), personal development (Swanzy et al., 2020), the benefit of introducing technology (Ogbanufe & Gerhart, 2018). Other benefits include employment (Chege & Wang 2020), contributing to the national economy (Volkova et al., 2019), improving the quality of life (Soomro et al., 2020); reducing the technology gap (Centeio, 2017), and avoiding the risk of lagging behind in the global economy drive (Kazachek et al., 2020). Such an understanding and knowledge of characteristics influencing technology adoption are essential for future adoption and acceptance of similar innovations.

Theoretically, studies have employed various technological models that influence consumers' behaviour acceptance. However, this study is an early study that has integrated TAM, UTAUT, DOI and ECT to determine e-voucher in mobile commerce adoption, usage and continuance intention. Empirically, this study will provide a better explanation and understanding of mobile commerce usefulness regarding e-voucher intention, satisfaction and continuous usage of the telecommunication industry market in Nigeria. Besides, it will assist consumers in their readiness to welcome a lite cash economy to drive mobile commerce services. Finally, the study is significant for individuals, telecommunication providers and the government to understand crucial factors increasing or decreasing consumers' adoption of innovative services like virtual airtime.

1.8 Delimitation of the Study

There are certain aspects of this research that may put limitations to the study. First, the study focused on factors that influence telecommunication consumers of prepaid vouchers in the context

of broader mobile commerce services. By implication, this study did not consider consumers of mobile banking services, mobile education services, social network services, ticketing services and other aspects of mobile commerce. Another delimitation is the research model employed for the study. If the model fits the data, it means the model represents a good fit. Conversely, if the model does not fit into the data collected, it implies an alternative integrated model could exist for the data collected. Also, data collected from the urban, adult, educated, working class may likely not represent the rural, uneducated, unemployed, disadvantaged socioeconomic placed and youth segments. Other delimitations were time and financial limitations as the study had to be completed within a specific time frame. In addition, convenient and purposeful sample methods and quantitative approach were adapted compared to other alternative methods.

1.9 Definition of Terms

Table 1 is used to depict the variables used for this study.

Table 1

Definition of Variables

VARIABLE	DEFINITIONS	SOURCES
Perceived usefulness (PU)	PU is the degree the users of technologies are sure that using it will improve their work.	(Mou et al., 2017)
Compatibility (CO)	CO is the extent an innovation or new technology is in line with existing technology and beneficial to a company or an individual.	(Roger, 2003)
Phone self-efficacy (PSE)	Self-efficacy is the confidence to choose and utilise suitable technology solutions to satisfy needs.	(Lai et al., 2012)

Mobile Phone Habit (MPH)	Habits are automatic or habitual activities which form consumers' behaviour and are repeated.	(Shah et al., 2014)
Mobile Phone Attitude (MPA)	An attitude is a motivational factor that impacts on behaviour.	(Solomon et al., 2013; Lee & Ma, 2012)
Social Influence (SI)	SI is the extent a consumer understands how significant others (reference group) believe they should adopt a novelty technology.	(Venkatesh et al, 2012)
Facilitating Conditions (FC)	FC is the extent to which a technical system is available to assist the users of technology, be it an organisation or individual.	(Venkatesh et al., 2012)
Behaviour Intention (BI)	BI represents the extent and readiness an individual is prepared to apply and use a specific action.	(Ajzen, 1991)
Actual usage (AUS)	AUS is a consumer decision to reject or accept a technology.	(Straub, 2009)
Continuous usage (CUS)	CUS refers to the extent users of technology decided to use it and continue with its usage in the future.	(Setterstrom et al., 2013)
Satisfaction (SA)	SA reflects the continuous intention of a user's judgment to proceed in using a particular technology.	(Nabavi et al., 2016)

1.10 Chapter Summary

This chapter has looked into the transformation of technology adoption of mobile phones from the global view, the SSA perspective and, lastly, as it relates to the Nigerian context. The chapter has considered the research problems, research gaps and the justification for the study. The research purpose, research objectives, research questions, research significance, and delimitation of the study were discussed in detail, culminating with the chapter summary.

The next chapter - Chapter Two - will focus on the context of the study. The third chapter will deal with the empirical and theoretical literature as it relates to the research study. The fourth chapter will cover the conceptual model and hypotheses development. The fifth chapter will address the research methodology, that is, the process the researcher will adopt for the study in collecting data to answer the research questions. Chapter Six will present data analysis for the research study, while Chapter Seven will analyse the result, and Chapter Eight will focus on the discussion of findings. Lastly, Chapter Nine will cover the conclusion and recommendations based on the research findings.

Chapter Two: Context of the Study

2.1 Introduction

In this chapter, the focus is on the context of the study. Emphasis is on the geographical location of Nigeria and justification for choosing Nigeria. This chapter will provide an overview of the Nigerian telecommunication industry, the telecommunication contribution to the nation, and stakeholders in the Nigerian telecommunication industry. The chapter describes the telecommunication subscribers' shopping attitude, the major network providers, methods of crediting virtual airtime, and the challenges of telecommunication in the country. Lastly, the justification for studying virtual airtime voucher is presented.

2.2 An Overview of the Nigerian Telecommunication Sector and Justification for the Study

According to nationsonline.org, the Federal Government of Nigeria is a West African country at the South-East of West Africa, bordered by the Gulf of Guinea, situated between Cameron and Benin, Chad and Niger. It has 36 states and a federal capital territory at Abuja. Nigeria is a tropical country with two seasons (the wet and dry season) and covers 924,000 sq. km of land. There are 374 diverse ethnic groups and various different languages. While the official language is English, the major languages are Igbo, Yoruba and Hausa-Fulani. The nation's natural resources are petroleum, natural gas, iron ore, coal, tin, columbine, lead, limestone and zinc, and its official currency is the Naira. Nigeria has a literacy level of 39%-50%. The World Population Review (2020) described Nigeria as a developing country, listed among the poorest countries of the world.

In the view of Adebiyi et al. (2016) and Kalinic and Marinkovic (2016), the telecommunication industry is a strategy for political, economic and social development of a nation. While the upsurge of Global System for Mobile (GSM) has enhanced worldwide telecommunication development, Nigeria has not been left out (Opele et al., 2020). Telecommunication commenced in Nigeria in 1886 during the colonial era, strictly for administrative purposes (Opele et al., 2020; Iwuagu, 2014). Nigerian Telecommunications Limited (NITEL), the nation-owned telecommunication firm, was established in 1985 and had a monopoly of the telecommunication industry (Opele et al., 2020). However, the transformation of the telecommunication industry took effect when, in 2001, the Federal Government of Nigeria decided to deregulate the telecommunication sector by

issuing operating licenses to the network operators who could afford them (Nkordeh et al., 2017). Accordingly, MTEL, Airtel, MTN, and Etisalat were registered in 2001, while Globacom was registered in 2008, with Code Division Multiple Access CDMA operators under the name of Multilink, Starcom and O'Net (Iwuagu, 2014).

The spread and penetration of mobile phones have exponentially increased and promoted a notion of indispensability as users carry them everywhere, using them for various purposes (Rahaman, 2017). Moreover, mobile phones have improved human lifestyle, the business environment, and economies between countries, due to the Internet facility. In the Nigerian context, researchers have shown an explosion in mobile phone adoption and the Internet. (Nwachukwu & Onyenankeya, 2017; Tunmibi et al., 2015). Hence the urge to investigate what influences telecommunication services adoption due to the rate of Internet penetration in the country. Adamkolo et al. (2018) have noted that online shopping has increased with mobile phone adoption, data availability and wireless technology. There is, therefore, a need to determine mobile phone customers' acceptance and continuous usage attitude towards telecommunication services for a better understanding of their acceptance or non-acceptance of telecommunication services.

2.3 Contribution of the Telecommunication Sector to the Nigerian Economy

The telecommunication industry's contributions to GDP, Internet facilities, products and services to the Nigerian economy has resulted in growth in a way that has enhanced communication within and among other sectors, individuals, and local and international governments. It has been stated that deregulation in the communication sector has boosted commercial activities in both foreign and domestic investment, created employment opportunities, improved the standard of living, and overall production (Adebayo Folorunso, 2014; Nkordeh et al., 2017; Oluwatoyin, 2015).

From GSMA's (2018) view, it was estimated 2019 4G to lead the mobile economy because global subscription penetration in 2017 was at 66% and was expected to increase to 71% in 2025. From the sub-Saharan region, subscription penetration which in 2017 was 44%, is predicted to increase to 52% in 2025. From the Nigerian context, mobile penetration in 2017 rose to 49% and is estimated to increase to 55% in 2025. Looking at the above figures, the network providers will reach new unique Internet users and subscribers due to 4G and possibly 5G connectivity strategy. Again, the increasing use of mobile phones due to their affordability and necessity is also

improving the platform for digital devices' services and applications. The implication of these is that the GDP will also increase globally, internationally and locally.

At the micro-level, the telecommunication market has accounted for 10.23% GDP in 2018 (National Bureau of Statistics (NBS), 2019b). Other contributions of the telecommunication sector to the Nigerian environment are in the areas of taxation, levies and licensing fees, sports sponsorship (Awobamise & Jarrar, 2019; Nkordeh et al., 2017), improving financial inclusion in education, health care, agriculture, and employment (AIRTE, 2017-18).

2.3.1 Challenges of the Telecommunication Sector in the Nigerian Economy

The network providers in Nigeria's telecommunications industry have contributed to the national development since its inception in 2001, as mentioned above. However, their continuous growth in subscriber numbers, even during the recession period of 2015–2016 (Gillwald et al., 2018), has not been without some challenges. Literature has shown that the telecommunication industry in the country faced issues affecting the quality of their performances, like government inconsistency in policy, heavy and multiple taxations, unhealthy competition, consumer satisfaction, inadequate infrastructure, asset vandalism, insecurity and land dispute (Nkordeh et al., 2017).

In the empirical study by Nyarko-Boateng et al. (2020), it was noted that the telecommunication industry has experienced high-cost damages to telecommunication infrastructure caused by accidents during road construction, besides the higher cost of rights of way, terrorism, and sabotage. Other problems are unreliable electricity supply, and reduction in the importation of heavy duties on which telecommunication depends for production. These challenges have resulted in the high cost of production and low quality services (Gillwald et al., 2018), which has hindered investment by the telecommunication providers to provide effective and efficient quality services. On the other hand consumers' perception may likely result to non-continuous usage.

2.4 Stakeholders in the Nigerian Telecommunication Industry

The inquiry into virtual airtime consumers' attitude cannot be complete without looking into the different interest stakeholders in order to understand the subscribers' position in the regulatory process. In the Nigerian context, the Nigerian Communications Commission (NCC) is the sole governing regulatory body for the telecommunication industry. The NCC is responsible for

supporting and encouraging favourable competition within and among telecommunication providers in the nation (www.ncc.gov.ng a). According to the NCC Strategic Management Plan, SMP 2014-2018, stakeholders in the telecommunication industry include the consumers, network providers, government, media and the international community.

2.4.1 Consumers

These are the final consumers of telecommunication services and products. The consumers expect network providers to provide services and products that are affordable, reliable, available, reasonably fast, as well as ensuring secure transactions in addition to responding to complaints (itu.int, 2018; www.ncc.gov.ng b; Nigerian Communications Act (NCA), 2003). Generally, it is the responsibility of the NCC to ensure consumers' expectations and interest is protected. To ensure that consumers are protected, empowered and dissatisfied consumers redressed, the commission works via agencies such as the Telecommunication Consumer Parliament (TCA), Consumer Township Meeting (CTM), Consumer Outreach Programme (COP), to mention but a few (www.ncc.gov.ng c). Also, to create consumer awareness, the commission, via bureau periodicals, handbills, and ICT trade fairs, publish consumer rights with regard to telecommunication providers. The establishment of these agencies is to ensure network operators provide quality service and products by not taking advantage of the consumers by providing only poor network connectivity, costly charges for data, calls and SMSes (www.ncc.gov.ng a).

2.4.2 Network Providers

The network providers are other stakeholders in the telecommunication industry. They are the marketers of telecommunication services and products. They have the responsibility to ensure quality services and products that are affordable, reliable, available, reasonably fast, and secure while also responding to complaints (Kadioglu et al., 2015; Mudzanani, & Molaoa, 2018: lexology.com, 2018). To provide quality service and products, the network providers introduced virtual airtime as part of their strategy to improve consumer satisfaction. In addition to network providers' efforts, the government has the responsibility to be objective in their decision making, to protect their investment, and ensure that all parties abide by the rules and regulations as contained in the license agreement.

2.4.3 Government

According to www.ncc.gov.ng, government as a stakeholder in the telecommunication industry represents the NCC. The commission is responsible for making and implementing rules and regulations, maintaining consistency between the telecommunication policies and national policies, and ensuring customer satisfaction to benefit all stockholders. Other governmental responsibilities are issuing licenses, technology statistics reports, and media centres, to enable a competitive environment (Research ICT African.net).

To achieve this objective, the commission established the Consumer Affairs Bureau (CAB), to educate, protect and inform all consumers of telecommunication services of their rights and responsibilities. They also ensure network providers' investment is protected, and all activities are performed legally (Nigerian Communications Act, 2003). Regarding ICT promotion, the commission initiates programmes such as the State Accelerated Broadband Initiative (SABI) and the Wire Nigeria Project (WIN), to ensure efficient and qualitative telecommunication services. Again, to support ICT, the federal government, with the NCC and the infrastructure companies, stressed the need for technology innovation and infrastructure to sustain and promote growth in the telecommunication industry.

The government also made a commitment to enhance ICT by increasing Mobile Broadband penetration to 70% by 2021 (www.budde.com). To achieve this, the government will have to raise N265 billion to develop broadband infrastructure (Nairametrics, 2019), while www.techpoint.africa (2020) noted that the government has a plan to project 90% coverage for her population via 4G and 5G technology by at least two operators by 2025. In the view of www.techpoint.africa (2020), such plans include facilitating local assembly of the smartphone, and 100%, 50% and 25% fixed broadband coverage for tertiary, secondary and primary schools respectively. The aim is for 90% coverage for the 774 local government areas and 100% coverage for unserved rural areas and communities. Another government strategic plan to boost ICT is minimum downloads speed of 10Mpbs and 25Mpbs in urban areas for 2023 and 2025, with5Mbps and 10Mbps by 2023 and 2055 for rural areas. With this plan, the demand for telecommunication services and mobile commerce will likely increase.

2.4.4 Media

The media as telecommunication stakeholder is responsible for information dissemination among other stakeholders for better understanding between the public and the consumer about telecom products and services (Lee, 2018). Again, the media serve as a watchdog to independently investigate and monitor authorities (Gainaka et al., 2020), create awareness, inform, enlighten, exchange value and educate all interested stakeholders (Dauda et al., 2018). Thus, the media accomplish their responsibility through seminars, conferences and forums about the telecommunication sector. Moreover, the media acts like a watchdog under section 22 of the country constitution and is compelled to be accountable to the general public (Agbo & Chukwuma, 2017). Although the media responsibilities as watchdog are below expectation (Apata & Ogunwuyi, 2019), a person such as the late journalist Dele Giwa is credited with journalism's transition to democracy in Nigeria (Gainaka et al., 2020).

2.4.5 International Communities

The international communities are part of the telecommunication stakeholders because most of these communication providers are multinational organisations (MNO). According to the Organization for Economic Co-operation and Development (OECD) (2010), regulation is a framework by which government, national and international bodies establish requirements on businesses and citizens to have legal force and ensure that stakeholders' regulations are in the public interest. Based on this definition, the MNO, like GSM, operators must comply with regulatory policies to ensure their purpose is justified, for viable business and quality services.

Again, the international communities must sustain competition, ensure consumers' and citizens' interests, and engage in innovative investment to enhance local and international digital growth (GSMA, 2018). Under these circumstances, the regulatory body (NCC) must ensure a balance when stakeholders' interests conflict (NC Act, 2003). Therefore, it is pertinent that the international community sticks to global standards in performing their activities at both the local and international levels.

2.5 Telecommunication Subscribers' Shopping Attitude

The behaviour of consumers making online purchases is as a result of the awareness of its benefits (Khan, 2016), satisfaction (Rahman et al., 2018), convenience (Zhu et al., 2017; Levy & Weitz, 2016), attitude (Praveena & Thomas, 2014; Mwin & Kritzinger, 2016), ubiquity (Ariff et al., 2014), and time savings (Adnan, 2014). By implication, these telecommunication subscribers' satisfaction, convenience, attitude, time saving and 24/7 services are likely factors driving people to prefer shopping online, and possibly enhancing subscriber buying attitude. On the other hand, a negative attitude may arise when consumers see online services as a bad idea in terms of spending more money due to repeated bank account debits over the same transaction (multiple SMS alerts) or deduction without delivery (Dai et al., 2014). And in some extreme cases, not having reliable network coverage, or constant power failures. These challenges are likely to discourage an online shopping attitude.

Virtual airtime recharging is a form of service shopping via the Internet introduced by the telecommunication industries to their consumers. It, therefore, requires consumers' positive attitude towards innovation to ensure actual purchase and continuous usage. Nevertheless, some network providers give bonus airtime to make calls, send messages, and browse the Internet or browsing at night when you meet certain conditions. Such conditions are in the form of recharging online or buying a particular bundle (Airtel, 2017-18) as a marketing strategy to attract new prospects and maintain existing customers. According to the Global Mobility Report (2018), Nigeria's telecommunication consumer market is among the four most populated markets in sub-Saharan Africa and the fourth in the world data mobile subscriptions. With an economy of this report, it is necessary to understand subscribers' attitude towards telecommunication services. Global Mobility (2018) noted that Nigerian consumers are welcoming and adopting online transactions due to the revolution in the telecommunication and the banking sectors to meet the global standard (United Nations, 2015).

Moreover, a new policy on mobile money has been harnessed by the Nigerian government to enhance mobile money financial inclusion. This act will attract attention to online engagement and reduce online challenges to promote mobile commerce adoption (GSMA, 2018). Thus, the effort to meet global standards with the federal government's cashless policy has created various virtual payment options. These alternatives for virtual payment options are in the form of electronic bill

payments, tickets, Automated Teller Machines (ATM), bank transfers, banking services, third-party airtime credit transfer and the use of POS. However, with the increasing penetration of mobile phones in the country, virtual recharging is still lagging in adoption as the bricks and stone method is widely accepted compared to virtual recharging (Omolewa et al., 2018). The likely explanation for the bricks and stone attitude could be that Nigeria is still a cash economy (Soyemi et al., 2015).

With the current state of cash, the attitude of subscribers can influence the perception toward online behaviour. Hence, a positive perception will drive actual purchase and continuous usage, while a negative perception will result in resistance towards purchase. Virtual airtime shoppers are subscribers who see online activities as time saving because they purchase without changing their present location. Rizwan et al. (2014) observed that online shoppers do not leave their work to shop online. On the other hand, some subscribers enjoy the freedom of self-service that has reduced the constraint of place and time and they find it a convenient reason for accepting the virtual purchase. Evidence has shown that previous experience determines consumer attitude to buy online (Inegbedion et al., 2016), and demographic factors such as income, education, age, marital status, and residence (Nittala, 2015; Nwankwo et al., 2019) impact online activities.

Conversely, some subscribers are not using virtual airtime for various reasons, such as having phones without Internet services, being unbanked consumers, personal loss of profits gained from selling scratch cards and security issues. Other reasons include dislike of online activities, inadequate service quality, and unnecessary bank deductions. Despite the perception of online shopping behaviour, adoption of virtual airtime may be fast gaining acceptance because it is a technology that has come to stay. Moreover, all major communication providers provide virtual mobile services for their subscribers. Interestingly, subscribers' experience associated with social distance, due to the Covid-19 pandemic, has increased online shopping like virtual attitude. Thus, the increase and continuous usage may result from the positive experience of convenience, usefulness and satisfaction.

2.6 Major Network Providers in Nigeria and Market Share by Operators

In the Nigerian telecommunication industry today, there are several mobile operators. However, the major four are MTN, Airtel, Globacom and 9mobile. At present, the Nigerian mobile

subscribers stand at 97.5M, expected to rise to 130M by 2025, and mobile penetration stands at 49% with the expectation to rise to 55% by 2025, while total connections which are 51M at present, are expected to rise to 210M by 2025 (GSMA, 2018). The GSMA (2018) further noted that mobile phone adoption stands at 53M and will rise to 144M by 2025. With this in mind, the Nigerian consumers' attitude is likely to be changing towards technology adoption. The GSMA 2018 report also showed that MTN has a subscriber base of 65,870,174 (36.57%), Globacom 50,255,796 (27.9%), Airtel 49,081,899, (27.25%), and 9mobile 14,792,206 (8.21%) respectively (NCC, 2019). With this subscriber base, the outlook of mobile commerce transactions, such as virtual airtime, is promising. Figures 1 and 2 depict the four major operators in the country and their market share.

Figure 1

The Four Major Telecommunication Providers

Figure 2

Market Share by Operators

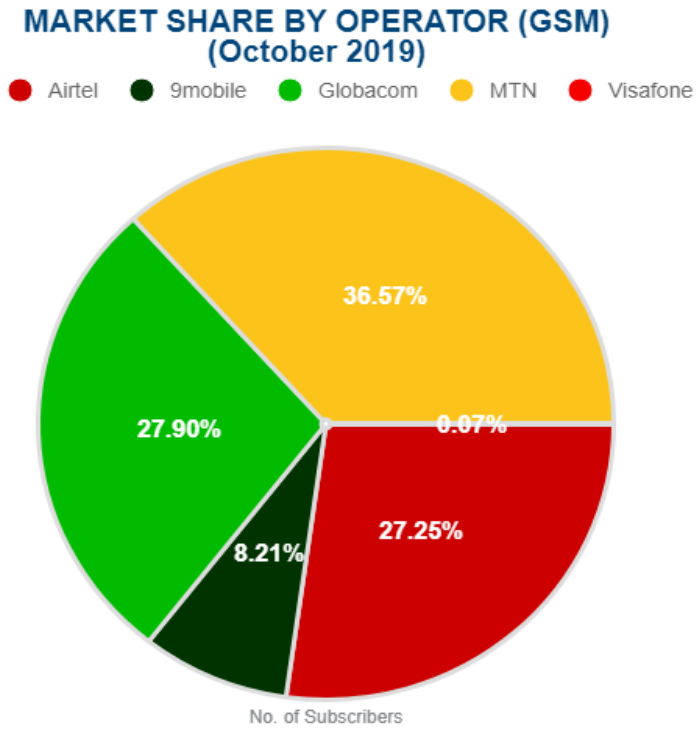


Diagram adapted from https://www.ncc.NCC, 2019

2.6.1 MTN Nigeria

Mobile Telephone Network (MTN) Nigeria is a subsidiary of the South African MTN group. It is identified with a yellow colour and a brand name "everywhere you go". It has been in operation for the past 19 years since being licensed in 2001 and is popularly referred to as the network with the widest coverage. MTN operates on a prepaid basis, while its marketing strategies are transmitted through outdoor signage, social media advertisements, radio and television. MTN also uses print, sponsorship programmes, flyers, word of mouth (WOM), bundle and bonus options. Besides, to appeal to their customers, MTN uses different languages and ethnicity in relevant themes. Their services include mobile money, voice, data and digital services to customers in 21 countries such as the Middle East and Africa in which they are licensed (MTN, 2019).

Currently, MTN is investing and growing its 4G LTE to increase subscribers' value, reduce data trafics and fluctuation signals in the rural and urban locations. Again, airtime distributed is via

digital (ATM, POS, myMTN app, bank channels) and retail outlets (physical stores, retail touchpoints, activation points). Accordingly, the company will continue to grow in future due to a growing population, low mobile data penetration and limited fixed-line coverage etc. MTN's (2019) report recorded revenue of about N1.039 billion for the year ended 2018 against N887 billion for 2017 and a voice revenue of N784 billion at the year ended 2018 as against N660 billion in 2017. In the same report of 2019, MTN expected a fall in revenue due to subscribers' adoption of over-the-top (OTT) and Voice over IP services.

2.6.2 Airtel Nigeria

Airtel Nigeria is a subsidiary of the Indian telecommunication conglomerate popularly referred to as the 'smartphone network'. Airtel is identified with a red colour brand to distinguish it from other network providers, and operates in 17 countries in Africa and Asia. Airtel is the second mobile phone provider launched in Nigeria in 2001 as Econet Wireless Nigeria Limited (Airtel, 2019a). Since its operation in Nigeria, it has changed brand name five times from Econet, Vmobile, Celtel, Zain and finally in 2010 to Airtel, which it has to date. Airtel major's competitor is MTN Nigeria (itnewsafrica, 2018), while her products and services include mobile commerce, 3G, 4G wireless services, fixed line, international and national long-distance services and high-speed home broadband. Others are mobile voice, business lines, mobile data and Airtel Money (Airtel, 2019a). But in recent times, as part of its activities to broaden its market base, it is giving attention to the unbanked to deliver Internet services to everyone everywhere. Again, the company has made an effort to increase its customer base through network excellence, utilising cost strategy to gain more customers and win existing customers.

An Airtel airtime prepaid voucher can be purchased through digital and physical stores. As of March 2019, the Airtel customer base stood at 37.1M against 31.7M of the previous year, an increase of 17.0% (Airtel Africa report, 2019a). However, in September 2019, NCC market share reported Airtel market subscribers to be 49,081,899, representing 27.25% of the mobile market share. Although there has been an increase in subscriber numbers, this has placed Airtel in third position, and Globacon has taken a second position while 9Mobile still retains the fourth position (NCC, 2019) Regardless of the third position, revenue in Nigeria was US$1,106M - equivalent to 35.9% of group revenue (Airtel, 2019b).

2.6.3 Globacom

Globacom is an indigenous Nigerian private telecommunication provider licensed in 2003 and operating in four African countries. The network provider has a brand colour of lime green and has made a remarkable impact in the Nigerian telecommunication industry. The company was the first to commence per-second billing and cheapest Internet services (Awobamise & Jarrar, 2019). According to the NCC (2019) report, Globacom emerged in second position after MTN in subscriber numbers at the end of 2018 and the first quarter of 2019. In line with MTN and Airtel, Glo equally operates on 3G and 4G to attract new customers and retain existing ones. The strategy for airtime distribution is both digital and non-digital to accommodate both the bank and unbanked subscribers. Apart from operating on a prepaid basis, their products and services are through radio, flyers, advertisements, television, sponsorship, WOM, outdoor signage, and social media. Like MTN and Airtel, Glo operates on voice, data, mobile money, and digital services.

2.6.4 9mobile

9mobile Nigeria, formerly Etisalat, has a different deeper green as a brand colour. At present, the active subscribers' data stands at 14,792,206, equivalent to 8.21% of the market share (NCC, 2019). Etisalat was owned by a United Arab Emirates (UAE) telecommunication corporation that operates across Africa, the Middle East and Asia. It began operation in 2008 in seven cities but now serves in all 36 states in the country (Okonba & Iroegbu, 2014). They operate on 3G and 4G mobile Internet to ensure customers' satisfaction. However, Etisalat withdrew from the Nigerian market in 2017, due to an unpaid $1.2 billion loan debt (Nairametrics, 2017). Nevertheless, a local operator acquired the company and rebranded it to 9mobile in 2017. Airtime recharge for 9mobile customers is purchased both in the digital and scratch card, while advertising strategies are flyers, sponsorship, television, radio, outdoor signage and billboards.

2.7 Channels of Crediting Airtime

A prepaid scratch card is a telephone card to credit a specific amount of money to a mobile phone to enable a subscriber to make calls, subscribe for data, engage in Internet activities, share or transfer credit, and send messages. As the name implies, the scratch card means to scratch or remove an outer layer of a card to access a recharge pin to credit a phone account. Apart from scratching, some prepaid airtime comes in paper form that does not require it to be scratched. On

the other hand, the virtual recharge is a technology that enables a person to add airtime/credit automatically to a mobile phone account with the service providers or designated agents in a virtual environment.

A virtual recharge could be referred to as the e-voucher, e-recharge, v-recharge, m-recharge, or online recharge. The reason telecommunication providers introduced it could be for a long-term relationship with consumers, breaking the obstacles of time and space, as well as working in compliance with the Nigerian government's cashless policy and the UN's economic development goal (United Nations, 2015). Consequently, some consumers prefer it because of its flexibility in making payments (Chen et al., 2019; Zhu et al., 2017). Virtual airtime recharge can take the form of a direct bank recharge, direct network operator's recharge, or retail recharge, as suggested in the Northstream White Paper (2009). Thus, the bank method enables virtual airtime subscribers to transfer credit from their bank account to the telecommunication provider's account with the subscribed amount. A direct network provider's approach is the use of a connection managed by telecommunication providers for virtual recharging. However, the retail method is an approach that enables the amount to be credited without the subscriber using a recharge code on the phone. In the Nigerian context, every network provider has its unique format to enable customers to have direct access to a recharge request using the scratch card method. Thus, for MTN users to subscribe for airtime, they use *555* PIN #, for Airtel *126* PIN #, while GLO is *123* PIN #, and 9mobile uses *222* PIN #. However, recharging via the virtual method does not require the use of codes. Below are the various steps to add airtime to a mobile phone via the Internet.

2.7.1 Airtime Recharge via the Bank

Step 1: Make sure you have enough money in your bank account.

Step 2: On your phone, dial the bank code you choose to recharge with; for instance, from a first bank account dial *894*amount#.

Step 3: You will receive a text message about a successful recharge.

Step 4: You can now place calls, send messages, buy data bundles etc.

Alternatively, you can use the bank app. When the app is activated, you log in using your password and follow the steps:

Step 1: Select the icon (Buy airtime).

Step 2: Fill the dialog box.

Step 3: Fill the amount, select the network, enter the phone number or retrieve the phone number from phone contact, and click continue.

Step 4: Then, enter your transaction pin/password, and click submit.

2.7.2 Airtime Recharge via Network Providers

Step 1: Go to any nearby network provider office around your location, for instance, MTN.

Step 2: Meet any of the staff and ask them to give you an airtime amount of your choice.

Step 3: Pay for the airtime.

Step 4: Give them your phone number.

Step 5: You will receive a text message of successful recharge.

Step 6: You can now place phone calls, send text messages, buy data bundles etc.

2.7.3 Airtime Recharge via Agents

Step 1: Go to any shop that sells airtime.

Step 2: Tell the agent the network you need.

Step 3: Pay the agent for the service.

Step 4: The agent will process the request by entering the cell phone number and amount into the GSM terminal and top up the requested phone.

Step 5: The agent will give you a receipt when the transaction is successful.

Step 6: You can now place phone calls, send text messages, buy data bundles etc.

2.8 Challenges of Prepaid Airtime Scratch Cards

One of the industries that technology has influenced could be the telecommunication industry. Specifically, the telecommunication industry has transcended from telegram to fixed phones/lines

and now to mobile phones/lines. This act of transcendence has resulted from the prepaid scratch voucher to prepaid virtual voucher. Before now, the adding of airtime credit to the phone was only via prepaid scratch cards. However, this method has its challenges such as cost of production, fraud, shortage of cards, wearisome recharging process, loss/theft, product quality and holding stocks (www.commsrisk.com; www.strandreports.com). Others include pin security, incomplete pin, subscribers' dissatisfaction and inconvenience (GSMA, 2015).

2.9 Benefits of Prepaid Airtime Scratch Cards

Despite the challenges of scratch cards, the benefits are reasons why telecommunication providers continue producing them. In other words, removing cash transactions from a base cash society like Nigeria (Soyemi et al., 2015) will not be an easy task. Besides, the cards are used by unbanked consumers, rural dwellers, and low wage/salary earners. According to Airtime-Product-Image-Security-Magazine (2010), the prepaid scratch card has the following benefits: a convenient method of deferring consumption, as an advertising strategy, it makes resale easy, unscratched prepaid card provides trust to buyers, and it occupies a space in the distribution channel. Looking at the benefits, it is obvious the prepaid scratch card still has a long lifespan.

2.10 Challenges of Virtual Airtime Adoption

Adoption of new technology is not without some challenges. Some of these challenges are that people still live outside 3G and 4G technologies and face difficulties like network connectivity, network performance, cost and maintenance of handset, poor digital literacy, and low income (GSMA, 2018). Other issues include the working of mobile phones (Kim, 2016) usability and dysfunction of mobile phone (Billieux et al., 2015). These challenges undermine the adoption of prepaid virtual airtime.

2.11 Benefits of Virtual Airtime Recharge

Despite the challenges of virtual airtime recharging, it is not without benefits. The major benefits of prepaid virtual airtime are associated with mobile commerce features such as ubiquity, real-time, immediate service, localisation, personalised service, and convenience, (Turban et al., 2015; Liébana-Cabanillas et al., 2017b). Other benefits of prepaid virtual airtime are cost reduction (production/logistic), voucher availability, an avenue to obtain airtime on credit, request for any

denomination (amount), an increased distribution chain, increased subscriber services, and establishing a direct relationship with customers (VAS-X's, 2012; www.net.1.com). These benefits are because the prepaid virtual airtime transaction is a wireless connection. Again, virtual airtime reduces cash handling; thus enabling subscribers to participate in mobile commerce. Prepaid virtual is also a new source of employment, revenue and channel distribution for the service providers, and has enhanced consumers' buying experiences. (www.net.1.com).

2.12 Justification for Studying the Nigerian Virtual Airtime Purchase Customers

The Nigerian population is estimated to be 200,963,599, and ranks number seven in global population indices (United Nations, 2019). However, Internet users in 2018 were estimated at 92.3 million, to increase to 187.8 million in 2023 (Clement, 2019). Along the same line, Internet penetration has reached 47.1% and is estimated to be 84.5% in 2023 (Clement, 2019). Moreover, Odea (2020) observed mobile cellular registered subscribers for every 100 people in 2019 to be 88.18% per 100 citizens. With this population figure, Internet usage and mobile subscription per inhabitants, Nigeria could be a promising consumer market that needs to be harnessed by the telecommunication providers.

It is possible to say that these categories of consumer market may represent an increased demand for Internet data and potential subscribers of virtual airtime for the next decade. Being aware of this, the network providers are strategising growth with 4G and 5G connectivity. This growth in population, subscriptions and Internet usage will increase investments and GDP. Evidence has shown that the telecommunication industry contributed 11.57% to the GDP in 2016 (NBS, 2017), 10.04% in 2017 and 10.23 % in 2018 (NBS, 2019b). Although not stated in the literature, the virtual airtime subscribers in Nigeria will increase with the proportion to the population figure, Internet users and data subscribers.

Finally, telecommunication services have become a necessity for economic development (Adebiyi et al., 2016), international and national competition in such areas as customer satisfaction, loyalty and consumer preferences (Opele et al., 2020).

2.13 Chapter Summary

This chapter has provided an overview of the context of the study, and has discussed what a recharge card is, the two types of recharge cards (scratch and virtual), and various ways to add airtime credit to a mobile phone to continue enjoying the services of telecommunication providers. Other areas discussed in this chapter included a brief background of telecommunication history and GSM in the Nigerian context. The aim was to have a view of the Nigerian telecommunication industry, mobile commerce development and growth as the new form of market strategy. Other aspects discussed were the major network providers such as MTN, Airtel, Globacom and 9mobile, as well as the telecommunication contribution to the nation, and the stakeholders in the Nigerian telecommunication industry. These stakeholders are the consumers (subscribers), network providers, government, media and the international communities. Finally, this chapter considered the telecommunication subscribers' shopping attitude as well as the justification for studying the virtual airtime voucher.

Chapter Three: Theoretical and Empirical Literature Review

3.1 Introduction

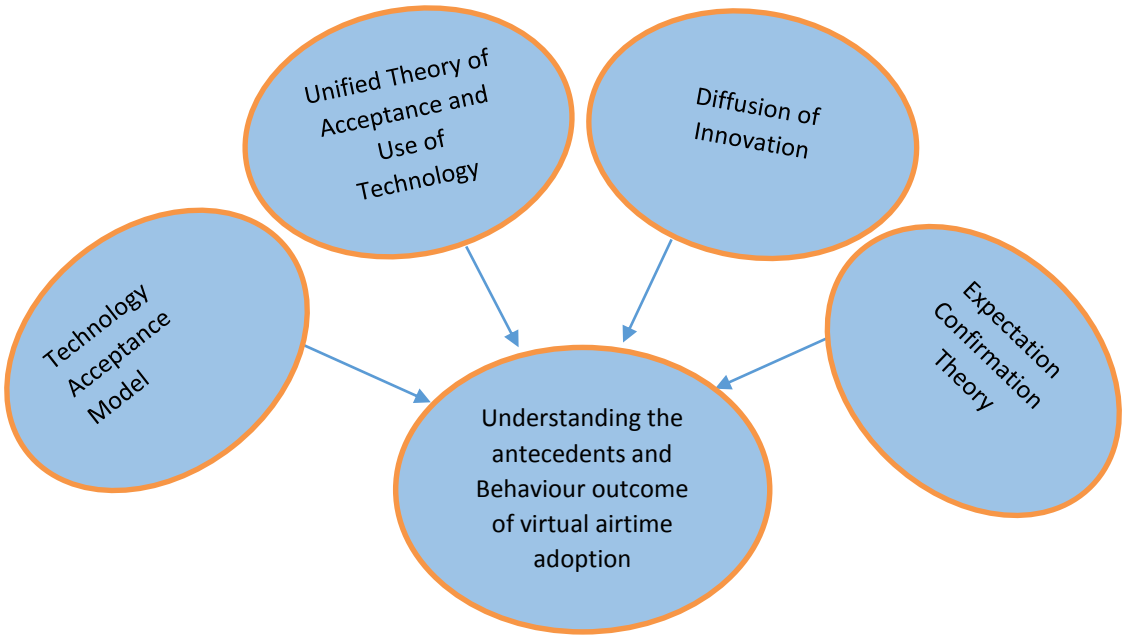
This chapter discusses the underpinning grounding theories used to explain technology adoption by organisations and individuals. The focus here is to discuss the grounding theories as they relate to mobile commerce intention to adopt the virtual airtime voucher of the Nigerian telecommunication sector. Emphasis is on the Technology Acceptance Model (TAM) by Venkatesh and Davis (1996), Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2012), Diffusion of Innovation (DOI) by Rogers (2003) and the Expectation Confirmation Theory (ECT) by Oliver (1980). The study reviews these theories because they have been used in prior studies to explain how behaviour changes towards technology adoption. However, there is a lack of literature in the same theories explaining virtual airtime technology acceptance and consumers' attitude in the telecommunication sector.

Academic literature noted that consumers were reluctant to adopt innovations but are gradually using it for convenience (Turban et al., 2015), satisfaction, (Chau et al., 2020), compatibility (Humbani & Wiese, 2018; Pick et al., 2014), societal demand (Singh et al., 2018), and benefits (Lai & Zainal, 2015). The adoption may be full or partial, but there is evidence of an increase in technology adoption (Pew research, 2015; Rajabion & Sarasota-Manatee, 2015). Again, countries such as Nigeria and South Africa have witnessed an upsurge in demand for mobile phones (Pew research, 2018).

This research integrates different aspects from various theories to improve on the model for the study; thus, perceived usefulness and attitude from TAM, compatibility from DOI, satisfaction and continuous usage to address the expectation confirmation theory (ECT), habit and social factors, and facilitating conditions from UTAUT. The integrating of more than one model is for better insight (Albashrawi & Motiwalla, 2019). These theories have been adopted because they have support to explain the factors influencing virtual airtime purchase behaviour and the consequences of behavioural intention. Again, the four models complement each other as they are focused on technology influences on their users. Figure 3 depicts the four theoretical models adopted in this study to explain technology adoption of the virtual airtime voucher. Thus:

Figure 3

Theoretical Models



3.2 Theoretical Review

3.2.1 The Theory of the Technology Acceptance Model (TAM) (Davis, 1989)

TAM has been used to conduct studies in mobile services (Eyüboğlu & Sevim, 2016), App adoption (Roy, 2017), E-payment (Lai, 2017) and mobile money acceptance (Gbongli et al., 2019). TAM is an extension of the Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) (Wang et al., 2019), and a theory that can motivate users to adopt new technology and thus impact behaviour usage (Chakiso, 2018; Joo et al., 2018; Olumide, 2016). The theory of TAM proposed two external constructs in determining consumers' behaviour intention to adopt new technology. The two external constructs are perceived usefulness (PU) and perceived ease of use (PEOU) for accepting the technology-related system. According to Davis (1989), perceived usefulness is the degree an individual believes that using a new system will improve job performance, while perceived ease of use is the belief that using a system is free of effort. Thus, enhancing job performance to this study is in the speed and convenience of adding credit to a

network account and saving the time of scratching and entering the lengthy 14-16 digits. Therefore, it is crucial virtual airtime recharge is beneficial for the users to increase acceptance and continuous usage of the new telecom innovation.

Moreover, Howells (2020) noted that consumers face digital transaction and communication activities in marketing and accomplishing the online task. Therefore, there is a need for mobile phone subscribers to continue welcoming and adopting these telecommunication innovation services. Again, TAM believes that when an innovation is perceived as beneficial, there is a tendency to adopt such a system. However, a system perceived having fewer benefits will not be accepted or will stand a chance of being resisted. Similarly, when innovation is perceived to be easy, its adoption is faster than when it is perceived to require skills before using it. Also, TAM expresses that PU and PEOU determine attitude and behaviour intention to use a system which predicts actual usage. Therefore, it is likely that usefulness and ease of use are fundamental in order to use innovation like a virtual airtime voucher. From the above literature, virtual airtime usefulness is subscribers believe that the telecommunication services will improve and enhance their daily performance in using their mobile phones.

Extant studies have shown TAM to be a successful model that drives technology adoption (Alalwan et al., 2017; Gbongli et al., 2019; Kalinic & Marinkovic, 2016; Roy, 2017). Therefore, the TAM construct has been dapted into the virtual airtime model to determine its influence on behaviour intention. Moreover, mobile phone users who perceived virtual airtime usefulness are likely to have a positive behaviour attitude intention because of its advantages over the scratch card voucher and this may result in continuous use.

A study conducted by Luqman et al. (2014), to review mobile commerce continuance intention, revealed that perceived usefulness influences mobile commerce continuous intention. Another study was carried out in Russia by Trachuk and Linder (2017) to identify factors determining the adoption of mobile payment services using the TAM framework. The results indicated perceived usefulness and social influence as the main factors that influence technology adoption. Also, in a study carried out by Kalinic and Marinkovic (2016), to explain consumers' technology acceptance in mobile payments and services, TAM was shown to be effective in determining mobile payment services.

Apart from PU and PEOU, TAM went further to explain that behaviour intention influences attitude. This attitude of users towards technology is a function of PU and PEOU developed over time and could be positive or negative toward behaviour intention. This study has included attitude as a predictive factor in determining behaviour intention and not mediating it as in the TAM model, because attitude has both a direct and indirect effect on behaviour intention (Aydin & Burnaz, 2016; Urhiewhu & Daniel, 2015; Venkatesh, 2000). The reason for using attitude as a predictive factor is to expand our understanding of factors influencing virtual airtime vouchers in mobile commerce services. According to Inegbedion et al. (2016), attitude is a factor that impacts on behaviour from the online experience. By implication, mobile phone users who like making purchases online will have a more positive attitude than non-online purchasers (Makhitha, 2014).

Originally the TAM theory was to determine technology acceptance in the work environment but was later applied outside the workplace to understand its effects on individuals' performance (Lai, 2017; Momani & Jamous, 2017; Olumide, 2016). Irrespective of the environment in which TAM is applied, it is noteworthy that our world today is entwined with technology that will be a continuous process. Therefore, it has become necessary to embrace mobile commerce in all sectors as it involves using a mobile device for marketing activities.

In this study, perceived usefulness was paramount in determining customers' acceptance of new behaviour (Venkatesh & Davis, 2000). Accordingly, the use of perceived usefulness arises from the fact that the mobile phone has gradually become a common household item, used by the educated and uneducated, banked and unbanked, young and old, due to the usefulness and importance attached to mobile commerce. However, PEOU was omitted in this study because some technology may be easy to adopt but if it’s not useful or beneficial to the consumers, the aim of adopting it is defeated. Put differently, a technology need to be beneficial to the user before the user can have the intention to understand how to use it. Also, self-efficacy is the same as PEOU (Bandura, 1986, in Wang et al., 2019).

Additional studies that have shown that TAM is effective in determining technology acceptance include studies related to mobile banking (Avornyo et al., 2019), mobile commerce service (Du & Li, 2019), management system and information system (Alharbi & Drew, 2014), as well as education (Al-Azawei et al., 2017; Cullen & Kabanda, 2018). These studies have revealed TAM as a valid theory in understanding new technology adoption. Despite the successful application of

TAM in adopting new technology, the model uses only two variables as determinants for behaviour intention and did not explain if actual usage can result in continuous technology usage. On this premise, TAM was combined with other theories to achieve the research objective.

3.2.1.1 Relevance of TAM to the Study.

- TAM is a theory used to explain and predict the reasons why technology adopters reject or accept innovation.
- TAM has shown to be a successful model in many studies as mobile commerce, mobile banking, mobile payment, online shopping and is likely to predict the acceptance or non-acceptance of virtual airtime behaviour.
- It was relevant to consider the TAM theory in this study because it would help reveal how telecommunication consumers react to new service when launched.
- TAM helps identify factors that determine subscribers' acceptance of new technology to determine why the system is not accepted.
- Perceived usefulness is one crucial attribute of TAM theory; an innovation perceived to be a more convenient, beneficial, faster, and time-saving method which may probably increase intention and usage.

3.2.1.2 Challenges of TAM to the Study.

- TAM does not include social influence as a factor in determining technology adoption and thus requires an additional model to achieve the research objectives.
- Another challenge of TAM theory is that it uses only two predictive variables - PU and PEOU - to explain behaviour intention. The simplicity of TAM makes it insufficient in determining technology acceptance (Torres & Gerhart, 2017), as well as determining virtual airtime adoption.

3.2.2 The Unified Theory of Acceptance and Use of Technology (UTAUT) (2012)

The unified theory of acceptance and use of technology (UTAUT) is a consolidation of eight models based on a unified view of Venkatesh et al.'s (2003) study. The eight theories from which UTAUT developed are: Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA), Social Cognitive Theory (SCT), Motivation Model (MM), Technology Acceptance Model (TAM), Diffusion of Innovation (DOI), Model of PC Utilization (MPCU), and Model Combining the

Technology Acceptance Model and Planned Behaviour (C-TAM-TPB). From these models, UTAUT developed four specific variables which are social influence (SI), performance expectation, effort expectation (EE) and facilitating conditions (FC). According to Venkatesh et al. (2003), the four variables influence behaviour intention to use a specific technology, while behaviour intention and facilitating conditions influence technology usage. In addition to these four variables, gender, age, and experience were the moderating effects on behaviour intention and usage intention.

Venkatesh et al. (2012) developed another model and called it UTAUT2, to include additional variables such as habit, price value and hedonic motivation to adjust technology adoption to fit into the consumer environment. As in the previous model, age, gender, and experience remained the moderating factors in both UTAUT 1 and 2 for technology intention and usage. For this study, UTAUT2 was adapted to understand consumers' acceptance and use of virtual airtime intention and continuous usage. The reason for adapting UTAUT2 was because of the additional variables which made it more comprehensive than UTAUT1.

However, due to limited literature on virtual airtime adoption, emphases on literature for this study focused on mobile commerce and mobile payment studies on UTAUT models. Abrahão, et al. (2016) conducted a study on mobile commerce payment adoption among the Brazilian mobile phone consumers. Findings revealed that perceived cost, risk, social influence and effort expectation are significant factors in determining mobile commerce adoption. In another study, Gupta and Arora (2019) investigated the factors influencing mobile payment adoption. Performance expectation, facilitating condition, effort expectation, and habit were crucial determinants of intention to adopt mobile payment - also known as mobile money technology (Leng et al., 2018). In addition, Njenga et al. (2016) studied the Kenyan telecommunication industry; the findings revealed companies adopting mobile commerce outperform the companies with traditional views. In another empirical study of mobile payment, Slade et al. (2015) explored consumer adoption of proximity mobile payment. The findings showed that social influence, performance expectation, habit, perceived risk and trust determine users' behaviour intention.

The adaptation of UTAUT was to test its application on virtual airtime, a subset of mobile commerce technology. Moreover, the inclusion of other theories was because UTAUT2 focused on behaviour intention to adopt technology, while the current study was on post-purchase

behaviour. However, UTAUT2 has proven significant in e-commerce as a determinant for technology acceptance (Awiagah et al., 2016; Goswami & Dutta, 2017).

Extant studies with UTAUT are in the areas of Internet banking (Al-Qeisi et al., 2014; Baptista & Oliveira, 2015; Martins et al., 2014; Sarfaraz, 2017; Shaikh et al., 2015), mobile phone technology (Forenbacher et al., 2019), mobile payment acceptance (Gupta & Arora, 2019), personal innovation (Sair & Danish, 2018), mobile enterprise (Berg & Lingen, 2019), mobile money usage (Mugambe, 2017), and continuous usage of mobile application (Chen & Li, 2017; Malik et al., 2017; Rodríguez-Torrico et al., 2019).

3.2.2.1 Relevance of UTAUT to the Study.

- The use of UTAUT2 would identify the key factors that would enhance the adoption of virtual airtime.
- Another relevance was the impact of social and facilitating factors in technology adoption of virtual airtime.
- Again, it is considered that a good habit of virtual airtime would promote telecommunication services and enhance mobile commerce continuous usage.
- Another relevance was the validation of UTAUT in the technology adoption of virtual airtime.

3.2.2.2 Challenges of UTAUT2 to the Study.

- The environmental context in which UTAUT was developed is different from the Nigerian context and may result in contradictory findings.
- The impact of social influence in one society may differ from another.
- UTAUT2 has too many variables - as such a subset of UTAUT2 is applied to most studies (Dwivedi et al., 2019), and in this study.

3.2.3 The Diffusion of Innovation (DOI) (Rogers, 2003)

Telecommunication technology is gradually bridging the gap between the developed and developing countries as telecommunication services are within reach of people's service (Lashitew et al., 2019; Kumari & Sharma, 2017). A prepaid virtual airtime voucher is a telecommunication innovation service that enables subscribers to add credit to their sim account or transfer to a third

party through a wireless device. In this study, DOI helped explain the channels by which e-voucher, a new idea and innovation, diffuses over some time among societies. According to Rogers (2003), diffusion is the rate and stages at which technology penetrates the environment by the interplays of relative advantage, compatibility, trial-ability, complexity and observability. Rogers (2003) further explained that market forces of social systems, communication channels, times and innovation efforts influence these interplay variables. These variables are explained below as they relate to the research:

Relative advantage: This means that virtual airtime must have higher benefits in cost, time, and convenience for users performing their daily activities.

Trial-ability: This is the degree of user involvement to improve self-efficiency and experience in using virtual airtime.

Compatibility: This implies that using virtual airtime should be consistent with the outcome of the traditional method. For example, checking your balance after online activity must be visible, timely and quick.

Observability: The non-users of virtual airtime could benefit from this technology when they see others using it with ease, convenience and benefits. A good example is free data to browse the Internet, free local calls and messages when you recharge online, to attract potential users.

Complexity: It is essential that virtual airtime be easy to use and not difficult to enhance the adoption rate. These elements of adoption have the probabilities to drive technology acceptance according to DOI theory.

Therefore, for effective implementation of DOI theory, Roger (2003) further categorised individual adoption of technology into five groups: innovators, early adopters, early majority, late majority and laggards. Hence, the innovative mobile phone virtual airtime users in this study were people with mobile commerce experiences. These groups of consumers are quick to try something new. The next is the early adopters, followed by the early majority who may enjoy virtual airtime technology compatibility and benefit more from the technology than the late majority and laggards in the adoption process. Although being innovative may likely quicken the adoption rate, however, compatibility of a new idea without corresponding connectivity like poor infrastructure, slack communication, wrong individual/group perceptions could become a barrier to technology adoption and diffusion. From DOI theory, virtual airtime adoption in sub-Sahara is relatively new

(GeoPoll Survey Report, 2019). In the Nigerian context it is likely to be at the early stage since online buying is a new technology of making purchases (Omolewa et al., 2018; Nwankwo et al., 2019).

In this study, compatibility is the degree to which a technology matches subscriber needs, wants, experiences, lifestyle, expectations and position. The reason for choosing compatibility from the DOI theory was because some of the DOI concepts are represented, with other constructs such as the relative advantage in line with perceived usefulness, trial-ability related to self-efficiency, and observability associated with social influence. The main focus of DOI theory is that the degree of adoption and diffusion rate differs in societies. Again, individual/group perception, social factors, and available communication channels determine adoption or resistance over time. The rationale for including the theory of DOI was to determine the adoption stage of virtual airtime in Nigeria. Extant studies reveal that the DOI theory positively contributed to technology adoption (Ahmad et al, 2015; Al-Jabri, 2015; Govender & Pretorius, 2015; Mairura et al., 2016; Magsamen-Conrada & Dillonb, 2020). It was, therefore, applied in this study to successfully predict and explain behaviour acceptance or adoption of technology telecommunication consumers.

3.2.3.1 Relevance of DOI to the Study.

- DOI theory was relevant in this study because it predict the adoption and diffusion rate of virtual airtime in the telecommunication industry in the Nigerian context.
- DOI theory was relevant to this study, as its application to virtual airtime could validate or refute the theory as a technology adoption theory.
- Another relevance of DOI to this study was that Rogers' theory explains the effectiveness and importance of communication channels in technology adoption and diffusion in any society. Therefore, the effective communications of e-voucher benefits could influence the rate of early adopters.
- Apart from adoption stages, DOI specifies the factors that will enhance adoption. This study provides evidence of the factors that can enhance or hinder innovation adoption and diffusion.
- DOI was relevant because diffusion stages and the channels are central to the success of consumer behaviour in accepting new ideas.

3.2.3.2 Challenges of DOI to the Study. One challenge of DOI to this study was that great emphases on communication sources and particularly the social system. The social system includes opinion leaders, celebrities and the elites as the agents of diffusion. However, these channels may not be effective in every environment. Moreover, research has observed that social factors do not influence the adoption of technology (Koloseni & Mandari, 2017) and therefore may not fully be responsible for the late majority, late adopters and laggards in all society.

3.2.4 The Expectation Confirmation Theory (ECT) (Oliver, 1980)

Expectation confirmation theory (ECT) is a theory designed to explain how consumers express continuous behaviour towards a particular technology. ECT is a model in evaluating consumer satisfaction and post-purchase behaviour (Zhang et al., 2015; Lai et al., 2016; Nabavi et al., 2016), and specifically explains consumer continuous behaviour usage in technology adoption (Oliver, 1980; Bhattacherjee, 2001). ECT is focused on consumer behaviour continuous purchase, which is based on expectation before purchase and to determine satisfaction or dissatisfaction of technology after usage (Oliver, 1980). From the ECT model, post-purchase starts from a user of technology having an expectation, which leads to consumption. The outcome of the consumption (performance) is then evaluated based on the initial expectation to determine satisfaction or dissatisfaction. The outcome will then predict the continuity or discontinuity of the technology (Guo et al., 2018). However, it is necessary to state that confirmation is likely to exist when the expectation is lower than actual preformation. Besides, disconfirmation can exist when the expectation is higher than technology performance (Chen & Li, 2017; Lu et al., 2017). According to Oliver (1980), expectation confirmation theory is based on expectation, perceived performance, confirmation, satisfaction and continuous intention. These constructs are explained below.

Expectation is a pre-behaviour stage of evaluating performance and actual performance before purchase (Guo et al., 2018).

Perceived performance is the likelihood of actual exceeding expectation (Lawan, 2014).

Confirmation is a realization of higher performance or lower anticipation which results in satisfaction or dissatisfaction (Guo et al., 2018).

Disconfirmation is the gap between perceived performance and actual expectation (Lawan, 2014.)

Satisfaction is the pleasure perceived in adopting technology for continuing usage (Malik et al., 2017).

Continuous intention is the judgment to proceed using a particular technology or a mindset to repeat a purchase behaviour (Lu, 2014; Nabavi et al., 2016).

In line with the above, satisfaction could be higher or lower than expected. A high satisfaction means that the expectation is confirmed and will lead to continuous repurchase behaviour, while a lower satisfaction will result in resistance in using the service. Therefore, applying the theory to this study means that consumers' satisfaction will be the positive difference between expectation and confirmation for decision making. Oliver (1980) indicated that satisfaction influences the consumer's attitude to change towards repurchase behaviour intention. The telecommunication consumer with a positive attitude towards mobile commerce will find more satisfaction adopting virtual airtime than those with a negative attitude towards technology. The knowledge here is that if a subscriber of e-voucher satisfaction exceeds expectation due to convenience, speed and ubiquity characterised by e-voucher technology, the subscriber will continue with the service. Additionally, several studies have shown the relationship between satisfaction and continuous usage (Kang & Lee, 2015; Fernandes & Pedroso, 2017; Oghuma et al., 2016; Sarkar & Khare, 2019). In the context of virtual airtime, satisfaction from actual usage will affect repurchase intentions (continuous usage), while dissatisfaction will result in the discontinuation of the behaviour action.

3.2.4.1 The Relevance of ECT to the Study.

- One relevance of ECT to this study is the emphasis on the continuous usage of technology, which was the focus of this study.
- The ECT enabled the researcher to confirm the effect of satisfaction on continuous usage of virtual airtime service.
- Another relevance was the validation of ECT in virtual airtime, a subset of mobile commerce technology.

3.2.4.2 The Challenges of ECT for this Study.

- ECT focused on satisfaction as the predictive determinant for post-technology acceptance behaviour, whereas there could be other constructs for technology continuous usage.
- ECM focused on post-technology adoption with less emphasis on pre-adoption of technology.

For this study, no single theory was adopted, but rather a combination of the models discussed to suit the research purpose. The integration was to overcome the shortcomings of a single model. Thus, the research model had a combination of relevant concepts that complemented each other to strengthen the study. This model explained the relationship between technological, social and contextual factors to behaviour intention and post-adoption behaviour. Moreover, the combination was in line with Albashrawi and Motiwalla (2019), that to determine consumers' adoption of technology and continuous usage demands the integration of models. The theories integration helped obtain a better understanding of factors influencing technology usage intention, for predictable strength (Albashrawi & Motiwalla, 2019). Furthermore, some authors have argued that not all theories are applicable in all contexts (Dwivedi et al., 2019), while some opined that some are inadequate in technology adoption by the firm (Ajibade, 2018), and suitable for individual usage (Raza et al., 2017). Hence, integrating more than one theory was necessary to understand technology adoption of virtual airtime by addressing technological, social and contextual concerns; behavioural intentions, actual behaviour and usage continuance.

3.3 Empirical Review

The empirical literature focusses on the antecedents of adoption, to be discussed under technology factors, social factors and contextual factors. In addition, individual variables such as behaviour intention, actual usage, satisfaction and continuous usage are discussed.

3.3.1 Technology Factors

The emphasis on technological context is because it helps to predict the likelihood of behaviour towards technology adoption. The technology components for this study included perceived usefulness, compatibility, self-efficacy, habit and attitude.

3.3.1.1 Perceived Usefulness (PU). With the advances of mobile commerce, and particularly telecommunication technology, virtual airtime has become a daily solution to crediting mobile phone accounts. Besides, the increasing customer demand for convenience has made the telecommunication industry develop an automated service system for exclusive consumers. The provision of the automated service will likely require convincing customers to consider using it for its benefits. According to Davis (1989), PU is the extent a person believes that using a specific technology would improve achievement or performance. Performance in this context involves

people going about daily activities, yet still connected with others by making calls, sending SMSes, chatting, paying bills, and making purchases, irrespective of time and place. Accordingly, Mou et al. (2017) referred to PU as the degree the users of the technology accept that using it will enhance their effort.

Lin et al. (2019, examined mobile payment usage intention among the Chinese and Korean customers at Kakaopay. The study integrated UTAUT, Information System Success Model (ISS) and Task Technology Fit Model (TTF). A sample size of 908 respondents was analysed using AMOS 24.0. The result confirmed that PE, EE, SI, FC and satisfaction, are determinants for mobile payment usage intention. The finding is consistent with that of Saprikis et al. (2018). However, Lin et al.'s (2019) study has some limitations, such as the respondents were from a single mobile payment provider in Korea. Again, it focused only on behaviour intention rather than actual usage. Therefore, the present study adopted an integrated model to determine attitude towards mobile commerce, actual usage and continuous behaviour intention. Also, Partial Least Square (PLS 3) was used to analyse the data.

In another study, Sair and Danish (2018) wanted to understand the effect of performance expectancy (PE) and effort expectancy (EE) on mobile commerce adoption in Pakistan. The researchers employed UTAUT and a sample size of 320 respondents was analysed using AMOS version, 23. The result revealed that PE and EE influence mobile commerce adoption. One limitation of the study was that the age segment was small (20-30 years), and only a single model was used. The implication is that the youth age segment may not reveal the actual representation of behaviour towards mobile commerce adoption in Pakistan. Therefore, the present study employed an integrated model, increased the age size and used PLS data analysis for a better understanding of consumer behaviour towards mobile commerce adoption.

Saprikis et al. (2018) investigated mobile shopping behaviour in Greece. The researchers employed an integrated framework to theoretically identify factors enhancing mobile commerce satisfaction. Thus, with a sample size of 473, Structure Equation Modelling (SEM) was used to analyse the data. The result revealed PU and enjoyment are crucial factors that impact behaviour towards mobile shopping adoption. This result supports Lu et al.'s (2017a) study. Despite the findings, the study was limited to behaviour intention rather than behaviour usage; as usage would

determine how successful technology is. Therefore, the current study incorporated behaviour usage and the continuous usage of commerce technology.

Prior studies of PU on mobile commerce adoption have been in the areas of the mobile coupon (Jayasingh & Eze, 2015), mobile payment (Gao & Waechter, 2017; Liébana-Cabanillas & Lara-Rubio, 2017), mobile wallet (Aydin & Burnaz, 2016), mobile banking adoption (Sharma et al., 2017), e-commerce intention (Awiagah et al., 2016), and technology adoption (Ramayah et al., 2016).

3.3.1.2 Compatibility (CO). According to Roger (2003), compatibility is the extent an innovation or new technology is in line with existing technology and beneficial to a company or an individual. Similarly, Liu and Tai (2016) referred to compatibility as a factor associated with technology adoption for mobile payment services with consumers' values, needs and ability to attempt a new service, while Liebana-Cabanillas et al. (2017) referred to compatibility as the reliability of technology based on needs, experience and current consumers' standard. Therefore, based on existing studies on mobile commerce, the present study attempted to determine the intention to use virtual airtime as a subset of the mobile commerce services. Compatibility of virtual airtime in this context is the extent of the effective use of technology over the prepaid voucher scratch card. Thus, mobile phone users' experience, lifestyle, existing technology, and current situations may strongly determine the behaviour intention to accept prepaid virtual innovation.

Oliveira et al. (2016) conducted a study in Portugal to determine customer adoption and intention to recommend mobile payment. The researchers developed a model by integrating UTAUT2 and DOI with perceived security and intention to recommend. The researchers employed SEM to analyse data from 301 respondents. The findings revealed that compatibility, social influence, security, PE, and innovativeness have both a direct and indirect effect on mobile payment adoption and intention to recommend. The study has a limitation, omitting the adult population and the continued usage. These two limitations were considered in this current study for a better understanding of mobile commerce adoption.

Khan and Ali (2018) explored factors affecting retail stores' adoption of mobile payment in China. They employed the extended TOE model and added personal factors. Thus, using SEM and Neural Network Analysis (NNA), the data of 188 respondents were analysed. The result revealed that

compatibility and customisation were significant in Mobile Payment (MP) adoption. One major gap in this study is that Khan and Ali's (2018) study were based on general mobile payment behaviour intention. It is a limitation because consumers' attitude towards different mobile payment technology is not static but differs due to various factors like needs, benefits, convenience. The study was also limited to the context of China. Again, the sample size was small. Therefore, this current study employed an integrated model and focused on a particular subset of mobile payment services to examine usage intention and continuance use.

In another empirical study by Aydin and Burnaz (2016), to identify factors affecting mobile wallet adoption in Turkey, the findings revealed compatibility and perceived usefulness as a strong influence on attitude to adopt mobile payment. Other factors influencing adoption included innovativeness, security, perceived ease of use, PU, compatibility, social norm, reward and attitude. The researchers employed Partial Least Square (PLS), with a sample size of 1395. One limitation of Aydin and Burnaz's (2016) study is that respondents were all from one network provider, despite there being several network providers in Turkey. As such, the sample may likely not represent the behaviour of other network users in Turkey. This limitation was considered in this present study by using respondents from three network providers. Prior studies of compatibility influence on technology adoption in the mobile payment system have been conducted by Liu and Tai (2016) and Tang (2016).

3.3.1.3 Phone Self-Efficacy (PSE). Bandura (1986) referred to self-efficacy as individual confidence to achieve a task successfully. This means that persons with confidence will have the ability to exhibit competence to accomplish any difficulty compared to those with less confidence in their skills. Blut and Wang (2020) noted that people sceptical about technology view it as challenging, while Ross et al. (2016) maintained that people who avoid challenges in performing activities are less willing to develop self. Gitau and Nzuki (2014) noted that perceived self-efficacy enhances the ability to undertake a task effectively with a mobile app. According to Marriott et al. (2017), online consumers with self-efficacy are more comfortable and confident with mobile commerce transactions. By implication, prior mobile commerce knowledge will drive a person to use the latest application, that includes the e-voucher, to increase self-efficacy.

Self-efficacy is a personal belief and self-capacity to perform m-technology (Ozturk et al., 2016; Ashraf et al., 2014), confidence and ability to perform a task evident in behaviour (Lata & Nasa,

2014), activities of seeking, manipulating and learning (Ross et al., 2016), and individual evaluation to achieve specific activity (Chao, 2019). For Nikou and Economides (2017), mobile self-efficacy is the capability to accomplish a task using mobile gadgets. In other words, phone self-efficacy is the confidence mobile phone consumers have to effectively perform phone-related technology to meet needs that will result in satisfaction. However, in this study, phone self-efficiency was applied to determine the adoption of virtual airtime technology. The reason was that several people carry phones without knowing the functions of the product and at other times have a phobia about using the technology they have acquired.

Alalwan et al. (2016) conducted a study with Jordanian banking customers to examine mobile banking adoption. They employed TAM by including self-efficacy and trust. SEM (AMOS) was used to analyse the data from 343 respondents. The finding reveals that PU, trust and self-efficacy influence behaviour intention. The study was limited to consumers with mobile banking experience, excluding those without experience in the Jordanian banking sector. By implication, the result cannot represent the behaviour of other sectors engaged in mobile services in the city of Jordan and elsewhere. The finding is consistent with Bandura (1986), Faqih and Jaradat (2015), and Marriott et al. (2017) that self-efficacy influences technology adoption. This current study included telecom consumers with experience and without experience, to understand their behaviour intention, usage and continuous usage. Also, PLS data analysis was applied to test the hypotheses.

Singh et al. (2018) investigated the factors that impact mobile commerce adoption in Malaysia. The researchers employed TAM with an additional two variables, with a sample of 160 respondents. Data were analysed using regression studies. The researchers confirmed that perceived self-efficacy determines mobile commerce adoption. The finding is consistent with Alalwan, et al. (2016), Faqih and Jaradat (2015). However, one major limitation of this study is the sample size. The result may mitigate the actual impact on adoption. Therefore, this current study filled this gap by using a larger sample and applying PLS to analyse the data for a clear understanding of factors influencing mobile commerce adoption.

In yet another study, Foroughi et al. (2019) wanted to determine mobile banking continuous usage in Malaysia. The researchers employed Technology Continuance Theory (TCT) and added channel preference and self-efficacy to the model. The PLS technique was used to analyse data from 369

respondents. The result confirms that self-efficacy and channel preference drive bank customers to continue the usage of technology. The main limitation of the study is that most respondents were in their 30s; the finding may not reflect the knowledge and attitude of adult segments. Again, behaviour intention and usage were missing in the model. Instead, the determinant and mediating variable were directly influencing continuance intention. These missing factors were considered in the current study to fill the knowledge gap of self-efficacy on adult adoption.

From the above definitions and empirical studies, it can be seen that self-efficacy enables a person to apply their ability to execute actions and achieve goals, with or without difficulty. Also, telecom consumers with high phone self-efficacy will exhibit confidence to perform mobile phone tasks successfully or express positive behaviour towards the use of phone technologies, even with challenges, to achieve results.

3.3.1.4 Mobile Phone Habit (MPH). The world is gradually and steadily becoming mobile dependent and particularly on the mobile phone. According to Chao (2019), the mobile phone has changed our lifestyle through various technologies. The modern lifestyle is seen, in consumer habits, as having a phone every time for mobile activities. In the view of Morosan and DeFranco (2016), habits make it easy for people to transfer behaviour because of repetitive use of mobile devices in mobile commerce, which becomes evident in mobile services. The implication of this is that habits will enable consumers to react to different situations, resulting in readiness to perform actions like virtual airtime.

Several studies have shown that habit is the disposition to use technology due to experience and learning (Ahuja & Khazanchi, 2016; Venkatesh et al., 2012), which influences behaviour (Yeh & Tseng, 2017), and enhances the adoption of technology (Changchit et al., 2017). The learning can only result when people are using the technology regularly. In the context of a virtual airtime voucher, consumers in the habit of using mobile services will have higher intentions to use virtual airtime services than consumers with fewer habits.

In a study conducted by Oliveira et al. (2016), to determine customer adoption and intention to recommend mobile payment in Portugal, the researchers employed a conceptual model of DOI and UTAUT. Data from 301 respondents were analysed with SEM, and the results revealed compatibility, perceived expectation, perceived security, social influence and innovativeness -

crucial factors influencing mobile payment adoption and intention to recommend. In Oliveira et al.'s (2016) study, habit was omitted because, according to the researchers, mobile payment is a new field that has not gained sufficient widespread adoption to generate habitual behaviour. Therefore, consumer habit was included in this study because mobile commerce is gaining ground due to the increase in mobile phone adoption.

Acharya et al. (2019) examined the behaviour intention to adopt e-payment by Indian rural bank customers. Based on the UTAUT2 model, the sample size of 300 respondents were analysed using multiple regression. The result indicated that PE, EE, FC, habit, and hedonic motivation (HM) influences behaviour intention. One main limitation of this study is that it focused only on the rural dweller, excluding urban bank customers who may be conversant with similar mobile commerce technologies. Another limitation is the use of a single model. Therefore, this current study considered urban dwellers, actual usage and continuance intention in addition to using more than one technology model.

In a study by Malik et al. (2017), to explore factors that trigger app adoption and continuous usage among Indian consumers, the researchers developed a theoretical model, based on UTAUT2, but extended it by including post-purchase behaviour. According to Malik et al. (2017), PE, PEOU, SI, FC, enjoyment, incentive, aesthetic and trust are the likely factors, mediated by habit and satisfaction, that influence app adoption and continuous usage. One major limitation of this study is the use of only a 10-man focus group of self-opinion as a sample. This limitation was considered in this current study by using a larger sample size, an integrated model and a different research method to determine behaviour intention and continuous usage.

Again, Jia et al. (2014) carried out a study to determine the technology habit on consumers' behaviour intention and continuous usage in m-payment. The result showed that habit influences m-payment usage behaviour intention indirectly. In line with the above, Arenas-Gaitán and Ramón-Jerónimo (2015) examined Internet banking by the elderly; the result revealed that habit is related to behaviour intention for Internet banking adoption. Studies have revealed that consumer habit is a result of convenience (Teo et al., 2015), for flexible payments (Trachuk & Linder, 2017), and exert an influence on behaviour intention (Yeh & Tseng, 2017). Other studies include the adoption of mobile technology (Hew et al., 2015), in making choices (Maruyama & Wu, 2014), and proximity to mobile payments (Slade et al., 2015).

3.3.1.5 Mobile Phone Attitude (MPA). According to Asiegbu et al. (2012), attitude is the general evaluation of a person towards an object. The object here could be a service, products, physical evidence, advertisements, and prices, among others (Asiegbu et al., 2012). Results of a study by Solomon et al. (2013) captured attitude as a motivational factor that impacts behaviour and is lasting. Therefore, consumers' feelings towards goods and services affects buying intention (Sahney, 2018). Mubaraq et al. (2015) submitted that attitude has three components: affective, cognitive and conative. Affective deals with human emotion which could be positive or negative feelings; cognitive is associated with consumers' intellectual ability, experience, and knowledge; while conative reflects the motivation state that is the likelihood of intention to evaluate/act (Chen et al., 2016; Perner, 2018). The knowledge of how attitude influences human behaviour is necessary for understanding online behaviour intention.

This attitude can influence a consumer to form a favourable or unfavourable behaviour towards innovation and mobile commerce activities. In this study, consumer attitude was not determined by PE and PEOU as in TAM, because research has indicated that attitude has both a direct and indirect impact on behaviour (Davis, 1989; Fong & Wong, 2015). In addition, novelty technology, not in contrast with consumers' attitude, will exact a positive relationship (Simester, 2016). Fong and Wong (2015) carried out a study to examine the factors determining the behaviour intention of mobile commerce; their findings revealed attitude as the most influential factor.

Near Field Communication (NFC) technology acceptance for payment in Brazil was investigated by de Luna et al. (2017). Employing an integration model from TAM, TRA and DOI, data from the sample of 423 respondents, over 81% of which were aged between 18 and 34, were analysed using SEM. The result revealed attitude, perceived usefulness and personal innovation towards technology determine behaviour intention for mobile payment. The main limitation of this study is that the respondents were limited to only Brazilian consumers. Also, the sample only consisted of the younger segment. Therefore, this study designed an integrated model to determine the influence of attitude on technology adoption of mobile commerce in the Nigerian context.

Ting et al. (2016) investigated the m-payment behaviour intention of Malaysian and Chinese in Malaysia. The researchers employed the Theory of Planned Behaviour (TPB) to analyse data from 311 respondents, using multiple regression. The results showed that attitude, perceived behaviour control, subjective norm, and belief predicts behaviour intention to use m-payment. The missing

link in Ting et al.'s (2016) study is that the researchers used only one technology model and data from only two ethnic groups to determine mobile payment intention. These limitations do not consider the attitude of other ethnic groups that have access to mobile payment technology. Also, the study focused on the behaviour intention to use mobile payment and not usage behaviour. Therefore, this current study used a multi-ethnic segment to understand factors enhancing consumers' attitude towards mobile commerce adoption.

Studies have revealed that attitude influences behaviour intention (Liébana-Cabanillas et al., 2017a), behaviour usage (Kumar et al., 2019), post-purchase intention (de Luna et al., 2017; Foroughi et al., 2019; Nascimento et al., 2018), mobile commerce shopping (Ghazali et al., 2018), technology usage (Ashraf et al., 2014), and the banking system (Alqasa et al., 2014).

3.3.2 Social Factors

Social influence is the extent a consumer understands how significant others (reference group) believe they should adopt a novelty technology, or the consideration of others' beliefs in using a system (Venkatesh et al., 2012). Group influence is when more consumers adopt a particular technology within a group, the action on individuals gets stronger. This new action will result in others directly or indirectly conforming under the influence of the majority. On the other hand, when few consumers adopt a particular technology, the impact on the individual will be weak. In the context of this study, social influence is the degree of influence others like peers, family and colleagues have on the individual adoption of the e-voucher.

Prior studies have shown that social factors determine mobile learning adoption (Sabah, 2016), mobile commerce adoption (Fong & Wong, 2015; Sathye et al., 2018; Wasfi, 2014) and mobile payment (Abrahão et al., 2016; Slade et al., 2015; Tan et al., 2014; Ting et al., 2016). Hence, when the influential others (family, affiliates, colleagues, relatives, role models, friends) suggest mobile services, their opinions may directly or indirectly be accepted. Literature has shown that consumers' decisions can be influenced and shaped by the recommendation of others who are important to the person (Yadav et al., 2016; Hamza & Shah, 2014). For this study, the social factors are discussed under family and peers.

3.3.2.1 Family (FA). Despite sources of information becoming unlimited, due to information and communication technology (ICT) and its influence on behaviour intention, other sources of

information such as affiliates, relatives, and friends equally influence behaviour intention. Accordingly, families are a part of the reference group that impact consumer attitude, lifestyle, habits or behaviour (Muda et al., 2017; Perreau, 2014; Schiffman & Kanul, 2014).

In Khawar et al.'s (2018) study to determine mobile banking adoption in Pakistan, the researchers adopted TAM with additional variables. Thus, with a sample size of 446 respondents, regression analysis was employed to analyse the data. The result revealed that social influence determines technology adoption. The limitation of this study is it focused only on the banking customers from Pakistani. Again, the study employed only one technology, the adoption model. Therefore, to fill this link, the present study adopted more than one model to determine the social impact on behaviour intention, usage and continuous usage of the telecommunication service in Nigeria.

Phonthanukitithaworn et al. (2016) investigated factors that influence intention to adopt mobile payment by current and potential users in Thailand. Based on TAM theory, and additional variables, an integrated model was developed for the study. The study employed AMOS to analyse a sample of 785. The findings revealed social norm and compatibility as strong indicators influencing potential users and current users' behaviour intention. The missing links are that the study focuses only on TAM theory and behaviour intention to determine factors influencing general mobile payment adoption. Therefore, this current study adopted more than one theory to extend the study by including behaviour intention, usage and continuous usage to determine mobile commerce adoption. Also, data were analysed using PLS.

3.3.2.2 Peers (PE). Apart from the family influences on behaviour intention to adopt technology, other social factors such as peers also exert an influence on behaviour action because people's social context influences opinions (Akman & Mishra, 2017; Fong & Wong, 2015). The social influence here refers to consumer affiliations, political groups, colleagues, religious groups, social cliques, or even cultural groups that directly or indirectly influence behaviour intentions. It is noteworthy to mention that mobile phone users who perceive the credibility of a peer group will be influenced to adopt mobile commerce and, similarly, technology services. Accordingly, Gulati (2017) noted that peers' conformity in response to taste, values, lifestyle, experience, ideology, because of exposure to the outside world, determines what people follow. A good example was when the mobile phones were launched, followed by the blackberry and the iPad, if you did not

have it, then you did not belong. When peer influence is related to technology acceptance like mobile commerce, consumers' adoption is likely to be influenced by majority peer pressure.

Mokhtar et al. (2017) investigated factors that drive mobile banking usage in Saudi Arabia. The researchers developed a model and SEM was employed to analyse the data from 263 respondents. Their findings indicated that social influence determines mobile banking adoption. The finding is consistent with Yadav et al. (2016) and Fong and Wong (2015), that consumers are influenced by peers, family and friends. Some of the limitations of this study are that 58% of the respondents were under 31 years of age. By implication, the result represents the opinion of the youths. Again, the model reflects 44% variance of consumers' loyalty, which means that other variables may have more impact on behaviour intention. Therefore, the present study incorporated other variables to determine what factors drive telecom consumers' usage of virtual airtime. Again, the current study included behaviour usage and continue use intention for a better understanding of consumers' post-purchase actions.

Yadav et al. (2016) examined predictors of mobile commerce adoption in India. This study integrated the TAM and UTAUT models. Based on SEM and the Neural Network Model analysis, data from 213 respondents were analysed. The results revealed that social influence, cost, perceived usefulness and trust influence the intention to adopt mobile commerce. This research is in line with Aydin and Burnaz (2016) and Oliveira, et al. (2016). However, the missing gap with the current study is that Yadav et al.'s (2016) study was based on a general behaviour intention to adopt and use mobile commerce among Indian consumers. Therefore, the present study filled the gap by investigating a specific mobile commerce technology to identify crucial factors influencing its adoption and continuous usage intention.

3.3.3 Contextual Factors

The environmental factors here represent the facilitating condition (FC) in UTAUT. According to Venkatesh et al. (2012), the FC is the extent to which the technical system is available to assist the users of technology. The users of technology are employees in the organisation or individuals that technology adoption affects their behaviour. Facilitating conditions have to do with mobile phone users' knowledge of the available resources to engage in mobile services technology. Again, knowledge of supportive environments such as connectivity, cost, people, and stable electricity

can enhance technology adoption. In other words, lack of FC or knowledge of available resources may result in non-usage or hinder behaviour intention and adoption. Prior studies have shown that FC determines technology adoption (Fianu et al., 2018, Lin et al., 2019, Oechslein et al., 2014, Venkatesh et al., 2012). For this study FC is discussed under network coverage, electricity and data cost.

3.3.3.1 Network Coverage (NC). The innovation of telecommunication technology changing and slowly affecting lifestyle is not without challenges. These challenges are inhibiting consumers' confidence to participate in mobile commerce adoption. Such challenges are network coverage, cost and customer care services (Dongre, 2016). These challenges have resulted in consumer complaints and dissatisfaction towards network providers' services (Chinedu et al., 2020; Chinedu et al., 2017). The reason is that inconsistency and unstable network quality can lead to mobile phone users' resistance towards mobile services and similar technology services. Although subscribers who are actively engaged in mobile commerce due to perceived convenience and benefits may likely be influenced, adoption could differ with non-regular users. The non-adoption will result from poor network connectivity (Dube & Gumbo, 2016; Ouko et al., 2020), which mitigates technology adoption.

Nwakamma, et al. (2018) carried out a study in Nigeria to determine what influenced telecommunication consumers to port among the network providers. This study developed a conceptual framework. Regression analysis was employed to analyse data of 378 respondents. The findings showed network coverage and call rates among other factors responsible for subscribers' porting. One major inadequacy of this study was the lack of theory. Again, the study was limited to the behaviour intention to port and not the behaviour usage after porting. Therefore, the present study has considered these missing links, based on an integrated framework, while the PLS was employed to analyse the data.

Customer loyalty in the mobile phone industry in Thailand was investigated by Pumim et al. (2017). The study employed a conceptual framework, while the data from 515 structured interviewed respondents were analysed using AMOS, 21. The result demonstrated that service quality, satisfaction and perceived value, influence customer loyalty. This study was limited to customer loyalty and not customers' continued loyalty. The study was confined to only Thailand's telecommunication customers. Therefore, the present study considered the missing link to

determine the continuous behaviour usage of telecommunication consumers of mobile commerce services in the Nigerian context.

Adebiyi et al. (2016) explored customer preference and satisfaction with Nigerian telecommunication services. The study employed a sample size of 200, and data were analysed with correlation and regression statistical methods. The findings showed that service quality, price, and satisfaction, among other factors, are significant in determining mobile subscribers' preference for telecommunication service providers and patronage. Some of the limitations are in the small sample size, respondents being below the age of 30, and research not based on any theory. Therefore, this present study filled these gaps by employing a larger sample size, extending respondents to include other age segments, and analysing data with a different statistical method.

Prior studies have shown that network coverage, network connectivity and customer care services, increase behaviour intention and usage of telecommunication services (Chogo et al., 2015, Dongre, 2016, Park et al., 2016, Ugonna et al., 2017).

3.3.3.2 Electricity (EL). Consumers may be resisting innovation due to inadequate supportive facilities which are clashing with technology acceptance. For instance, irregular electricity supply may be a barrier among some consumers' adoption of new technologies. Research has shown that access to the electricity supply is a basic necessity for technology innovation (Okolo et al., 2018; Alli & Elogie, 2015; Soyemi et al., 2015). Although not in the literature, it is noteworthy to mention that communities like Ogwashi Uku, Ibusa, and Isheagu in the district of Aniocha South and the neighbouring communities in Delta State can stay in darkness for weeks, months or years except for the privileged ones who have access to a generator. A regular and steady power supply implies that phone owners are able to recharge their phone batteries in order to access the internet and engage in online activities. However, in most cases, a generator is the main electricity supply, rather than electricity generated by the government. This challenge has discouraged many from buying a mobile phone (Armey & Hosman, 2016). However, a regular power supply will probably make it easier for consumers to engage in mobile commerce transactions anytime and anywhere, provided the phone battery is functional.

Twi-Brempong et al. (2020) explored the factors that impact e-commerce adoption in Ghana, with an emphasis on electricity. An integrated conceptual model for the study was developed based on TPB, TAM, Technology Organisation-Environment (TOE), DOI, and Perceived e-readiness

Model (PERM). The study adopted regression to analyse the data collected from 2007-2017. The result revealed power crises as a crucial factor that impaired e-commerce adoption for both individuals and the small and medium-sized enterprises (SMEs) in Ghana. The major limitation of the study is that the result has an implication only for Ghanaian e-commerce adoption. Therefore, the present study integrated other theoretical models to pay attention to electricity on mobile commerce adoption in the Nigerian context.

3.3.3.3 Data Cost (DC). The spread of technology, and mobile phone adoption will continue to increase as more people are demanding digital services (Nielsen, 2015; GSMA, 2019). Hence, determining factors influencing consumer perception of telecommunication services is pertinent (Awobamise & Jarrar, 2019). The understanding of consumers' attitude is necessary because gaining new customers, maintaining existing customers and sustaining market share, in particular in the telecommunication sector, has become a challenge due to saturation and competition (Nuhu & Abubakar, 2014; Opele et al., 2020; Adebiyi et al., 2016; GSMA, 2020). Studies have revealed that the price/cost of mobile services is still high and is a barrier that affects the demand for new products and services (Alli & Elogie, 2015). Omonedo and Bocij (2017) echoed that mobile phone users will pay for affordable services; in other words, consumers will prefer services for the value of the money they can afford.

Humbani and Wiese (2019) carried out a study to explain the mobile payment app adoption and intention to continue by the South Africans. The researchers developed a conceptual framework from TRI and E-ECM-IT. In addition, data collected from 426 mobile payment users were analysed using SEM. The result of the study indicated that risk and cost factors reduce consumer adoption of mobile payment. The main limitation of this study is that the finding is only applicable to the South African context. Again, 66% of the sample of respondents were aged between 20-39 years and therefore may not reflect the actual app adoption and continuous intention for the less represented age segment. The present study adopted an integrated model to examine the impact of cost on mobile commerce adoption and continuous usage in another developing economy.

In yet another study, Humbani and Wiese (2018) determined consumers' readiness to embrace mobile payment technology. The study applied the Technology Readiness Index (TRI) with additional variables. Using a sample of 416 youth respondents, the hypotheses were analysed using Multiple Regression Analysis (MRA). The result indicated that perceived cost, insecurity and risk

inhibits the adoption of technology, while compatibility and convenience enhance adoption. The limitation of this study is the use of a single theory. Furthermore, the study did not specify if factors that drive technology adoption could lead to post-purchase readiness. Another limitation is the focus on general mobile payment adoption as consumers' perception towards different payment systems differs. Therefore, the present study considered these missing links by considering more than one model, extending the age segment, and employing PLS for data analysis.

Some studies have investigated the cost influence on technology adoption on mobile commerce (Turban et al., 2015; Aziz & Wahid, 2018), mobile payment (Phonthanukitithaworn et al., 2016), online activities (Anthony & Mutalemwa, 2014; Nwakamma et al., 2018), and behaviour intention (Yadav et al., 2016; Gupta & Arora, 2019).

3.3.4 Behaviour Intention (BI)

Behaviour intention (BI) is a marketing concept used to refer to individual or consumer likelihood to be engaged in an action. Behaviour intentions reflects the actual usage of a product or service (Chang, 2016). In this context, it would imply an individual's deliberate decision to use mobile telecommunication services. In other words, BI could also mean the decisions of mobile phone users to exert effort in using virtual airtime technology. Ajzen (1991) defined behaviour intention as the degree of effort a person is willing to exercise to perform a behaviour, while Ho et al. (2015) noted that behaviour intention is an antecedent to predict actual purchase. Studies like Venkatesh et al. (2012), Lin et al. (2019) and Saprikis et al. (2018) have shown various constructs as determinants of BI. However, in this study, BI was determined by technology factors, social factors and contextual factors.

Teng et al. (2018) paid attention to factors that influence customers' intention to accept mobile payment in China. The researchers adapted the TAM and Modified Theory of Reasoned Action. Data from 612 respondents were analysed using multiple regression. The result indicated that perceived usefulness, risk, subjective norm and attitude influence adoption. One limitation of this study is that all respondents were from China. Therefore, the present study considered the missing link by considering a developing nation and employing PLS data analysis for a better understanding of factors that influence telecommunication consumers of mobile services.

Rehman et al. (2019) investigated elements of consumer purchasing online shopping behaviour in Pakistan. The researchers employed trust and commitment as moderating elements between purchase intention and online shopping behaviour. The researchers adapted the TPB and TAM theories. In addition, the PLS was used to analyse data from a sample size of 187 respondents. The result indicated that PU, PEOU, attitude, subjective norm, and perceived behaviour control influence purchase intention and shopping behaviour, while trust and commitment moderate between purchase intention and shopping behaviour. One major limitation of this study is that the sample size was small. Therefore, this present study considered this gap by using a larger sample size. Besides, satisfaction was adapted in this current study to determine the moderating effect between actual usage and continuous intention.

Aslam et al. (2017) studied consumer behaviour intention towards mobile payment in Pakistan. This study adapted TAM with additional variables. Data from the sample size of 335 respondents were analysed using SEM (AMOS 22.0). The result revealed that perceived usefulness, compatibility and social norms influence the behaviour intention to adopt mobile payment by firms and consumers in Pakistan. The missing link here is using a single model. Again, the study ended in behaviour intention. This present study filled this missing link by combining TAM with other models and including behaviour usage. Additionally, PLS was used to analyse the data.

The factors influencing the continuous usage of mobile money services in Tanzania were explored by Koloseni and Mandari (2017). The study adapted TPB with additional concepts and employed SEM to analyse 309 responses. The results revealed that attitude, trust, and behaviour control influence continuous intention. Also, satisfaction and continuous intention influence actual continuous behaviour. The missing link in this study is that behaviour intention and usage are missing. Instead, the antecedents were directly influencing continuous intention and actual usage of mobile money services. Another limitation is using a single model. The present study, therefore, considered behaviour intention and usage variables to fill the knowledge gap. Also, an integrated conceptual model was employed rather than one model for the study.

Studies have investigated factors determining behaviour intention for technology adoption in mobile banking (Chakiso, 2018), and mobile commerce (Kavitha, 2017; Zhang et al., 2018). Researchers like Fong and Wong, (2015); Almaiah, et al. (2016); Islam (2017); Han et al. (2016);

Sair and Danish (2018); and Lwoga and Lwoga (2017), have conducted studies on factors determining behaviour intention.

3.3.5 Actual Usage (AUS)

According to Davis (1989), Venkatesh et al. (2012), and Rogers (2003), the intention to use a specific technology is a determinant for its actual usage. In other words, actual usage is when consumers use a particular innovation and benefit from it. In this study, actual usage were the consumers, as well as the adoption of an e-voucher service to benefit from mobile devices and mobile commerce activities. Baabdullah, et al. (2019) conducted a study to understand factors impacting Saudi Arabian mobile banking customers' usage. The study combined UTAUT and Delone and McLean Information System (D&MIS) models, based on 429 respondents. The data were analysed using SEM. The results revealed that PE, FC, habit, price value, hedonic motivation, system quality and service quality influence actual behaviour. However, because 76% of the total sample size of the respondents were within the 21-39 age group, the finding may not reflect other age groups in mobile banking usage. Also, the population of the study was limited to Saudi Arabian bank customers. By implication, the finding may not accurately reflect other sectors of the economy, like the telecom consumers engaged in mobile commerce services. Therefore, this current study considered these missing links and focused on telecommunication consumers of mobile services. Data were analysed using PLS to understand factors impacting on actual usage and continuous intention.

Akman and Rehan (2016) investigated factors influencing mobile commerce and mobile services' adoption in Turkey. The study focused on demographic, personal and organisation variables in the private and public sector. The study employed TRA and TAM theories and multiple regression was employed to analyse the data from the 129 respondents. The results showed that attitude, among other variables, influences actual usage of both mobile services and mobile commerce. One limitation of this study is the sample size. Another limitation is that respondents were all from Turkey. Thus, the result may not apply to some developing nations. Therefore, the current study filled this gap by using a larger sample size and collecting data from another developing economy to determine the actual usage of mobile commerce.

Yeh (2020) investigated factors in the mobile payment ecosystem influencing customers' intention and actual usage in Taiwan. The study employed the DOI theory with other additional variables to develop a conceptual framework. Based on 709 respondents, AMOS was used to analyse the data. The results indicated that policy, cost, innovation service quality influence usage intention and usage behaviour, while service quality, switching cost, service innovation, public policy and brand equity moderate usage intention and usage behaviour of mobile payment. The major limitation of this study is the adoption of a single model. Therefore, this current study used an integrated model, in a different context, to determine factors influencing mobile commerce behaviour intention, behaviour usage and continuous usage.

Studies validating BI as a function of actual usage of technology have been conducted by Tella and Olasina (2014), Olasina (2015), Akman and Rehan (2016), Ashraf et al. (2017), Zhang et al. (2018) and Anning-Dorson (2018).

3.3.6 Satisfaction (SA)

In today's marketing environment, customer satisfaction and continuous usage should be paramount to telecommunication providers since a satisfied customer is likely to make a repeat purchase for same or similar services. According to Taherdoost (2018), satisfaction is a major factor in technology acceptance, which results in the continuous usage of technology (Rahman et al., 2017). Kim et al. (2016) referred to satisfaction as a degree of evaluation given to a product or service in purchasing and usage, while Malik et al. (2017) observed that customer satisfaction is the pleasure users of technology perceived when they decided to use a specific technology (Nabavi et al., 2016). According to Tahir and Abdullah (2014), satisfaction is the belief people have in technology due to perceived usefulness and a reflection of re-use.

Quoquab et al. (2018) investigated the antecedents of switching intention in the Malaysian telecommunication industry. The researchers integrated expectation confirmation theory, exploratory buyer behaviour theory and economic models of consumer behaviour. Data from535 respondents were analysed using PLS. The findings revealed satisfaction, consumer innovativeness and service switching cost influences service switching intention and customer loyalty. The major limitation of this study is that the study focused on behaviour intention rather

than behaviour usage. Therefore, this present study extended the research to incorporate behaviour usage and continuous intention.

Koloseni and Mandari (2017) explored factors affecting continuous usage of mobile money in Tanzania. The researchers adopted the TPB model and included additional variables. Information from the 309 respondents was analysed using the SEM approach. The findings indicated that attitude, trust, satisfaction and continuance intention influence continuous usage intention. The missing link in this study is that behaviour intention and behaviour usage were excluded in the study. Instead, the antecedents and mediating elements where influencing continuance intention and continuance usage of mobile money. Therefore, this present study filled this gap in the context of virtual airtime innovation.

Lu et al. (2017a) examined mobility, privacy protection and social influence as post-purchase factors influencing mobile payment continuance in China. The researchers employed expectation confirmation theory and included espoused cultural values as a moderating effect for continuous usage. Based on the PLS analytical approach, data from the 724 respondents were analysed. The result revealed privacy protection and social influence continue intention directly. Also, mobility showed an indirect influence on mobile payment continuance usage. However, the moderating effect of espoused cultural value was insignificant. One limitation of this study is that the respondents were below 30 years of age, and thus represented the attitude of youths towards technology adoption. The findings may not reflect the impact of mobile payment continuance among an older age group who have access to mobile payment. Therefore, this current study considered both young and old adults, moderating the effect of satisfaction to determine actual usage and continuous usage of mobile commerce.

Yew et al. (2019) studied the effects of perceived quality and satisfaction and the mediating effects of satisfaction on consumer loyalty in the Malaysian telecommunication sector. They paid attention to the Expectation Disconfirmation Theory (EDT). The data of 431 respondents were analysed using PLS. The findings revealed that perceived quality and satisfaction impacts on consumers' loyalty. The missing gap here is that the sample was from one university with over 67% of the respondents below 30 years of age. By implication, it was a youth sample. Therefore, the present study widened the age group for a more crucial overview of factors influencing mobile commerce adoption in another context.

3.3.7 Continuous Use (CUS)

The ECT is one of the models that explains consumers' continuous use of technology after initial adoption and usage (Chen & Demirci, 2019; Malik et al., 2017). ECT theorised that the continued use of innovation is based on users' satisfaction or dissatisfaction. According to Oliver (1980), consumer satisfaction is a function of expectation and disconfirmation. In the mobile commerce context, the actual use of technology satisfaction results in continuous usage (Hsiao et al., 2016; Tella & Olasina, 2014). In a study carried out by Lai et al. (2016) to examine the impact of habit on consumers' continuous usage, the researcher concluded that habit and satisfaction significantly influence post-purchase behaviour intention. In another similar study by Kim et al. (2016), to understand users' continuance intention in smartphone augmented reality, the result confirmed that information quality and relative vividness influence continuous behaviour intention.

Olivier and Terblanche (2018) conducted a study using TPB to examine factors affecting consumers' intention to continue online shopping with a mobile phone. The researchers employed SEM to analyse data from 486 respondents. The results revealed that hedonic experience, subjective norm and usefulness influence the intention to continue with online mobile phone shopping. The main limitation of this study is the use of only TPB to determine online shopping behaviour. In addition, the study focused on the general perception of mobile phone online shopping continuance behaviour. Therefore, this current study filled this gap by focusing on a specific mobile service technology, in a particular industry, for a better prediction of the shopping behaviour of mobile services.

Cao et al. (2018) studied the effect of trust on satisfaction on mobile payment continuance intention in China. This study used the Trust Transfer Theory (TTT) framework. Information from the sample size of 219 respondents was analysed using PLS. The result revealed that trust continues to influence mobile payment usage through satisfaction. The missing link of this study was the small sample size. Again, over 85% of the respondents were below 29 years of age. Therefore, the present study employed a larger sample size and a wider age segment. Additionally, satisfaction was adapted as a moderating effect between actual usage and continuous usage.

Park et al. (2017) investigated mobile payment service continuous usage intention in South Korea, based on the expectation confirmation model. The result of the analysis from 200 respondents using SEM indicated that perceived usefulness influences satisfaction and continuous usage. One

missing link was that the research data was limited to only consumers with mobile payment experience, excluding the potential user. Again, 86% of respondents were below 30 years of age. By implication, it was a youth sample and restricted to only experienced mobile commerce users. Therefore, the present study considered both those with and without mobile commerce experience. Also, a wider sample segment was employed to determine the intention and continuous usage of mobile services.

Extant studies have confirmed satisfaction as a strong influence in predicting mobile payment (Chen & Li, 2017; Humbani & Wiese, 2019), mobile banking (Foroughi et al., 2019), buying decisions (Adebiyi et al., 2016), and mobile apps (Chung et al., 2016).

3.4 Chapter Summary

The chapter has discussed in detail the grounding theories of technology adoption models used in this research. Among them are the TAM, UTAUT, DOI and ECT models as they relate to the study. The empirical literature review was discussed under perceived usefulness, compatibility, phone self-efficacy, mobile phone habit and attitude. Other variables were family, peers, network coverage, electricity and data cost. The empirical constructs are the antecedence that influence behaviour intention. Behaviour intention, on the other hand, influences actual usage that drives continuous usage. Again, satisfaction moderates between actual usage and continuance intention. The next chapter will discuss the conceptual model and hypotheses development. In addition, the next chapter will focus on relating the technology, social and contextual variables to the research objectives.

Chapter Four: Conceptual Model and Development of Hypotheses

4.1 Introduction

This chapter will evaluate prior research on mobile commerce, mobile payment, online shopping, mobile banking, e-transactions, mobile money, and e-commerce as they relate to technology adoption. Again, the hypotheses developed were based on the literature for the study, while the conceptual model will enable us to understand the relationship between the variables. According to Carlson and Wu (2012), the relationship between and among the variables can assume independent, mediating, moderating and dependent variables. Thus, independent variables - as the name implies - influences other variables while it remains unchanged. The mediating variable(s) links the independent and dependent variable. However, the mediating variable could be single or multiple (Hair et al., 2017). The dependent variable is the outcome variable of the influences of independent, mediating and moderating variables. In this study, the behaviour intention and behaviour usage were the consequences for behaviour continuous usage.

From the conceptual model, the continuous usage of virtual airtime was depicted as the dependent variable, while the technology factors, social factors and contextual factors were the antecedent variables. Also, behaviour intention and actual behaviour represented the mediating variables, while satisfaction was the moderating variable influencing actual usage which influenced continuance intention. The use of continuous usage as the dependent variable is in line with the studies of Hidayat-ur-Rehman et al. (2016), Kim et al. (2016), Koloseni and Mandari (2017), and Lai et al. (2016). In addition, the research framework was based on the four grounding theories to explain virtual airtime consumers' attitude.

4.2 Conceptual Model

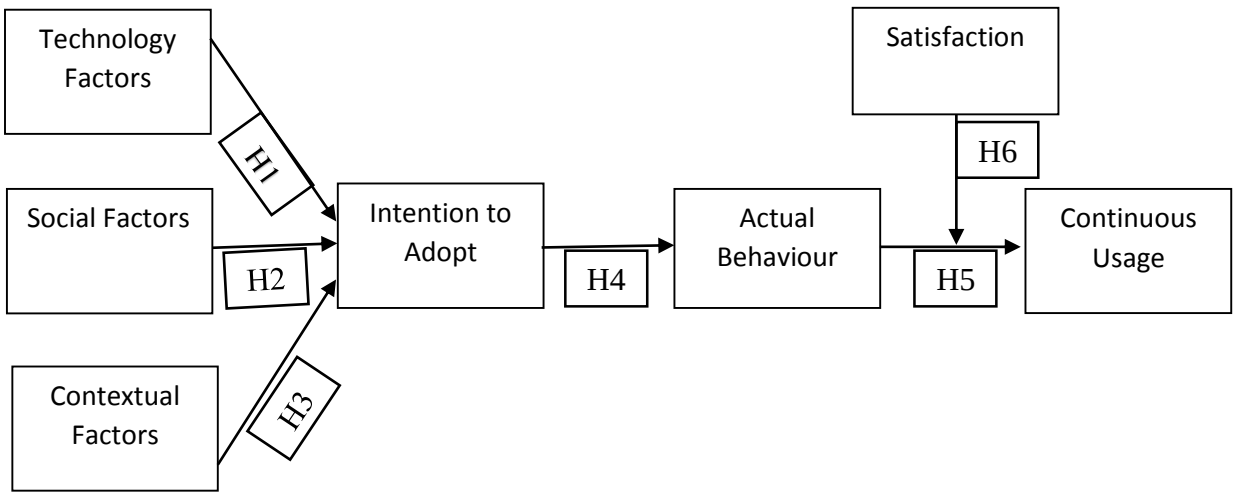
The conceptual model is to aid the understanding of factors that determine users' behaviour towards virtual airtime. The conceptual model comprises the antecedent variables, mediating variables, moderator and dependent variables. The antecedent variables are discussed under the technology, social and contextual factors. The technology factors were perceived usefulness, compatibility, phone self-efficacy, habit, and mobile phone attitude; the variables under the social

factors were family and peers, while the contextual factors emphasised the network coverage, electricity and data costs.

In this study, satisfaction represented a moderating factor influencing continuous usage of virtual airtime. The consideration for technology, social and contextual factors - despite other factors such as trust, security, risk and resistance factors – was because related studies rooted in mobile commerce focused on some of the adapted variables. The issues of trust, security, risk was not examined per se rather the study captured some broad variables in mobile commerce adoption. One reason for non-use of security/ risk in this context is because these factors were missing from the theories adopted besides, topping airtime account has become some banking services to their customers. As a result, users are not likely to feel insecure with leakage of personal information using their banking apps in addition to convenience and time saving. Again digital users are becoming aware of some rules, regulations, practices via awareness and educative programs to minimizing digital fraud, enhance consumer empowerment, enhance e-trust, just to mention a few (Gkioulos, et al., 2017; OECD, 2018). Technology factors were used because these factors support the adoption of a system, while social factors demonstrate crucial cultural differences in understanding new technology acceptance, and the contextual factors stress the availability of infrastructures to sustain the adoption of new technologies. This study, therefore, adapted pertinent constructs from prior research which relates to mobile commerce. Figure 4 shows the diagrammatic representation of the conceptual model.

Figure 4

Conceptual Model



4.3 Hypotheses

Hypothesis 1: Technology factors

Technology factors are perceived attributes for behaviour intention to adopt innovation. Technology factors explain the ability of mobile commerce consumers to use relevant skills to accomplish actions. The network operators consider technology factors as strategies to improve operation, reduce cost, increase revenue, derive growth and benefit from e-commerce (Khan, 2016). However, to achieve this growth and benefit from e-commerce, the technology must be of benefit, easy to use, compatible, and provide an enabling environment. Therefore, this research identified salient variables from prior literature most appropriate in influencing virtual airtime behaviour intention and continuous usage.

4.3.1 Perceived Usefulness and Behaviour Intention

Demand for convenience is promoting technology dependence due to digital services availability. Again, modern-day people are busy and will where they are comfortable by patronising online services. The behavioural attitude for convenience has engaged firms to keep space with digital services for exclusive customers. Studies have confirmed that PU explains users' behaviour intention to adopt a technology (Davis, 1989; Fleischmann et al., 2016). According to Davis (1989), perceived usefulness is the degree to which an individual believes that using a new system will improve job performance. Teng et al. (2018) referred to PU as users' measurement of efficiency of a service to improve living standard. Mou et al. (2017) referred to PU as the degree the user of the technology is convinced using it will improve their effort. Improving effort means that the system can enhance the consumers' job experience positively.

Consumers' experience has to do with reducing the challenges of carrying a large amount of money, increasing the payment methods, and mobile commerce engagement. In a study conducted by Tella and Olasina (2014), PU was significant in predicting e-payment behaviour intention, usage and continuous behaviour. Also, in Mou et al.'s (2017) study, PU was significant in consumer acceptance of e-service. In yet another work, this time by Ammar and Ahmed (2016), PU and PEOU were the crucial determinants of behaviour intention for mobile banking adoption. Studies by Saprikis et al. (2018) and Chou, et al. (2018), the researchers demonstrated that PU

effect on behaviour intention to shop online and to adopt mobile commerce. By implication, perceived usefulness of online recharging, when compared to the traditional method, will impact users' intentions to adopt the new system.

Apart from convenience, modern-day consumers are becoming conversant with the Internet and, therefore, take refuge more in technology services than offline/traditional services. No wonder Gupta and Sethi (2015) submitted that technology benefits make users respond to it over being offline. Studies have shown PU to have the strongest significance in BI adoption of mobile commerce (Raza et al., 2017; Barry & Jan 2018; Gangwal & Bansal, 2016; Mahmoud et al., 2018; Ramayah et al., 2016; Yıldız, 2016). These studies specifically emphasise the relevance of PU in understanding behaviour intention. On the other hand, Phonthanukitithaworn et al. (2015) and Daştan and Gürler (2016) maintained that PU had no significant relation with behaviour intention to adopt mobile payment service. These studies are consistent with Wang et al. (2016), that relative advantage is not significant with the adoption of e-commerce in the hotel industry. Based on the above works of literature, it was, therefore, hypothesised that:

Hypothesis 1a: Perceived usefulness has a significant influence on behaviour intention.

4.3.2 Compatibility and Behaviour Intention

Technology and innovation are changing consumers' lifestyles and ways of doing business. Mobile devices, in particular mobile phones, are now becoming one of the most common products/services demanded by consumers. These products/services have become essential in most consumers' daily lives as they create value for the users. Roger (2003) described compatibility as the extent innovation is in line with existing technology and beneficial to a company or an individual. According to Liu and Tai (2016), compatibility is a factor associated with technology adoption for mobile payment services with users' values, needs and ability. From Liu and Tai's (2016) definition, consumers' compatibility is a combination of beliefs, knowledge, need and the behaviour intention toward technology. Considering these definitions, a system that is incompatible to users will result in non-adoption. Put differently, when an innovation is not consistent with users' lifestyle, experience, values and belief, it will lead to technology resistance and will result in a negative attitude. However, a less confusing system will enhance the intention to adopt it (Tang, 2016).

Liu and Tai (2016) examined the factors influencing mobile payment services and identified compatibility as the most significant influence affecting mobile payment services adoption. Isaac et al.'s (2016) findings indicated that perceived compatibility positively influences Internet technology adoption. Several studies have shown that compatibility is significant in mobile banking adoption (Raza et al., 2017), as well as adoption and recommendation of mobile payment (Oliveira et al., 2016) and behaviour intention (Phonthanukitithaworn et al., 2015). Compatibility also enhances online buying (Ravichandran et al., 2016) and mobile apparel (Sun & Chi, 2018). In addition, compatibility was evident in related studies like Sharma et al. (2017), Aslam et al. (2017), and Awa et al. (2015). On the contrary, Abebe and Lessa (2020) revealed that compatibility has a negative relationship with merchant behaviour intention to adopt mobile payment.

In virtual airtime adoption, compatibility needs to align with subscribers' experience, lifestyle and values to bring about behaviour change and usage. However, if innovation requires a drastic change in behaviour with previous experience, it may lead to resistance or non-acceptance. Based on the above findings, there is a need to understand the impact of compatibility on behaviour intentions to adopt virtual airtime. Hence, the hypothesis was that:

Hypothesis 1b: Compatibility has a significant influence on behaviour intention.

4.3.3 Self-Efficacy and Behaviour Intention

Mobile commerce has the characteristics of mobility, ubiquity, localisation, personalisation, flexibility and convenience (Du & Li, 2019). These features may be igniting consumer attitude towards its adoption, resulting in conducting transactions online. According to Bandura (1986), self-efficacy is a feeling of confidence a person has in performing a behaviour and overcoming challenges to achieve that behaviour. Nikou and Economides (2017) referred to mobile self-efficacy as a person's perception to undertake a task using a mobile device, while Chao (2019) viewed self-efficacy as an individual evaluation to achieve the specific activity. Also, Ozturk et al. (2016) noted that self-efficacy is a personal skill and confidence to engage in mobile technology and similar tasks. In these definitions and studies, self-efficacy is an aptitude to enhance self-skill, self-confidence, self-worth and self-evaluation.

Studies in the past have found self-efficacy as a salient factor in technology adoption. For instance, in a study by Alalwan et al. (2016), self-efficacy was significantly related to BI in telebanking

adoption. In another study, Faqih and Jaradat (2015) perceived that self-efficacy was significant to mobile commerce acceptance. According to Akazue (2016), technology services enhance adoption. A study by Foroughi et al. (2019) confirmed that self-efficacy influences mobile banking adoption. In this study, phone self-efficacy was a consumer's ability to perform a task effectively based on their ability not just for the present but also for similar services. This self-discovering can impact on mobile phone users' confidence to efficiently use prepaid virtual airtime technology.

Therefore, the more mobile phone users realise that virtual airtime will achieve the self-set goals, the higher the adoption and perception as being useful. On the other hand, lack of confidence to navigate mobile application contents will result in resistance towards virtual airtime technology and mobile commerce. Put differently, the flexibility of buying virtual airtime will increase consumers' self-confidence in acceptance of mobile applications and raise their behaviour intention to use similar services. Prior studies that confirmed the impact of self-efficacy on technology behaviour intention were conducted by Alalwan et al. (2016) and Gangwal and Bansal (2016). However, a study by Weng et al. (2015) found no significant relationship between self-efficacy and behaviour intention. Despite the controversies in some of these studies, the current study sided with the numerous positive significant empirical findings and hypothesised that:

Hypothesis 1c: Consumer phone self-efficacy has a significant influence on behaviour intention.

4.3.4 Habit and Behaviour Intention

With the recent advancement in mobile telecommunication, consumers are increasingly using the mobile device, as it provides new possibilities. Likewise, these new possibilities are influencing habits which in turn have effects on mobile services adoption. According to Shah et al. (2014), habit is a routine behaviour or impulse that is initiated automatically upon encountering a situation. Ahuja and Khazanchi (2016) refer to habit as a compulsive behaviour due to past learning and a prominent variable in early post-technology adoption due to curiosity (Malik et al., 2017). For Venkatesh et al. (2012), habit is an influential factor in determining behaviour intention because habit is both a conscious and an unconscious action that affects consumers' attitude.

In the study conducted by Jia et al. (2014), the results indicated that habit determines behavioural intention to adopt mobile payment directly or indirectly. Again, the positive effect of habit on behaviour intention to accept Internet banking was observed in Arenas-Gaitán and Ramón-

Jerónimo's (2015) study. In another empirical study, conducted by Alsamydai et al. (2014), the result revealed that habit has a positive effect on mobile service usage. Other studies on habits determining technology adoption and mobile phone continuous usage were carried out by Hew et al. (2015) and Amoroso and Lim (2017). In the context of telecommunication services, consumers with higher automaticity to use telecom services will exhibit a higher behaviour intention tendency, bringing about openness with regard to e-voucher behaviour intention. Likewise, consumers with less automaticity will express lower behaviour intention.

In other words, consumers who are in the habit of using mobile services may have less resistance to adopting virtual airtime payment service. The fact is that persons with the experience of using a mobile device are likely to engage in the online payment system and accept virtual airtime services. The reason is that habit is an impulsive behaviour, and thus the adoption of innovative services may not require decision before behaviour intention. Therefore, based on Venkatesh et al.'s (2012) assertion that habit determines BI, this study hypothesised:

Hypothesis 1d: Habit has a significant influence on behaviour intention.

4.3.5 Attitude and behaviour intention

Continuous technology change may be creating resistance while also opening avenues for novel services (Lai, 2016). On the other hand, consumers are welcoming these innovative services determined by factors such as attitude. In a study by Deb and Lomo-David (2014), consumers' attitude has a positive relationship with behaviour intention to adopt mobile banking. In another study by Fong and Wong (2015), consumers' attitude was significant with regard to mobile commerce adoption. The above findings support the view that attitude towards mobile technology will influence the adoption of mobile commerce. Therefore, consumers' attitude towards a product or service can influence a person to choose a scratch card and maintain the status quo rather than using a virtual voucher. Put differently, telecom consumers with a negative attitude toward virtual airtime are more likely to resist the adoption.

In these studies conducted by Mishra (2014) and Tella and Olasina (2014), the researchers identified a positive relationship between attitude and technology behaviour intention. Based on the above empirical evidence, this study assumed that positive attitude influences virtual airtime adoption. Thus, it was hypothesised that:

Hypothesis 1e: Attitude has a significant influence on behaviour intention.

Hypothesis 2: Social Factors

A man by nature is a social being, living not in isolation but the social environment. Again, the action of the consumers' immediate environments may result in a behaviour change. Notably, community over time affects technology adoption through the process of diffusion (Rogers, 2003). This process is through the social interpersonal relationship of families, friends, reference group, role models, peers, media and associates. According to Venkatesh et al. (2012), social factors are the human aspect of explaining behaviour decisions towards technology acceptance. However, social factors on technology adoption may vary with culture, level of development, age, experience, income and education. Therefore, technology adoption by the majority in society is likely to influence consumers' decisions towards e-voucher adoption. For this study, the social factors are discussed under family and peers.

4.3.6 Family Influence and Behaviour Intention

In this age of technology consciousness, consumer adoption is becoming encouraging and challenging due to the increase in the mobile phone (GSMA, 2019). Specifically, mobile devices create value for users (Aydin & Burnaz, 2016). However, this value created can occur when consumers decide to comply with the behaviour of others. An example is a family to which a consumer belongs and complies with their suggestions. Family is any household member considered knowledgeable and whose actions affect the decisions of other members. The person could be a father, a mother or a relative who influences behaviour intention (Basu & Sondhi, 2014). A study by Zheng and Chi (2015) indicated that families influence individuals' decision making. Also, Musa et al.'s (2015) study revealed that families directly influence technology adoption. The impact of the family on technology adoption was also significant in studies by Gangwal and Bansal (2016), Lu et al. (2017b), Mokhtar et al. (2017) and Oliveira et al. (2016). On the contrary, the studies of Aydin and Burnaz (2016), Ravichandran et al. (2016) and Gupta and Arora (2019) revealed that social influence does not influence mobile banking adoption.

By implication, a positive family input will influence the decision to adopt virtual airtime technology, while a negative family input will result in resistance towards virtual airtime technology. Likewise, seeing the benefits and recommendation from family members may reduce

resistance and uncertainty in accepting virtual airtime. Based on the above literature, the current study followed the theories of Rogers and the UTAUT and hypothesised that:

Hypothesis 2a: Family has a significant influence on behaviour intention.

4.3.7 Peer Group and Behaviour Intention

The widespread ownership of the mobile phone may be impacting users' perception, evaluation and behaviour decisions through interaction with others. In other words, social interaction builds trust and influences the consumers' behaviour intention (Yadav et al., 2016). According to Gulati (2017), peer influence is strong and seductive with younger consumers and has direct and indirect attitude exertion on a group or individual. Gulati (2017) further argued that this strong tendency occurs when people perceive the peer group as credible and conform as a socially acceptable individual. Conversely, a peer group not perceived as credible will have a weak influence on the group and the individual. In Fong and Wong's (2015) study, the result revealed that peer group pressure influences mobile commerce adoption. In other studies, such as those conducted by Wasfi (2014) and Zhao and Kurnia (2014), peer influence was significant in influencing mobile payment services by telecom consumers. Additional studies validating peer influence on technology adoption are by Burgess and Paguio (2016) and Tan et al. (2014).

Therefore, when the circle of peers perceives virtual airtime as useful and beneficial, it is likely to influence behaviour intention, since group pressure influences attitude, value, test, and ideology of members. Based on the evidence of previous studies, this study hypothesized that:

Hypothesis 2b: Peer group has a significant influence on behaviour intention.

Hypothesis 3: Contextual Factors

According to Venkatesh et al. (2012), successful adoption of technology depends on available infrastructure to accept the new system. Contextual factors in this context are used to measure the availability of technical facilities in the environment that drives technology adoption. Again, the value attached to technology adoption in an environment varies, and this variance is associated with BI. By implication, a user of technology in an enabling environment will be more influenced than one in a non-supportive environment. For instance, an enabling environment will enable the use of virtual airtime services to credit the account at home, work, in transit, or at any time.

However, the absent or inadequate availability of facilities, such as irregular network coverage when adding airtime, is likely to affect the BI to adopt. Again, the availability of technical infrastructures in any surrounding context will encourage a positive attitude towards its adoption. The contextual factors will be discussed under internet coverage, electricity and data cost.

4.3.8 Internet Coverage and Behaviour Intention

In today's virtual business environment, the increasing dependence on mobile devices and network availability make products and services offerings faster and easier. No wonder, Dongre (2016) noted, that consumers confident of network coverage, support mobile services adoption. In this study, network coverage was the degree to which service providers make available Internet connectivity to support virtual airtime adoption. In other words, network coverage implies reliable connectivity to enhance virtual airtime adoption and, subsequently, mobile commerce.

In an empirical study by Sharma (2014), network coverage, mobile Internet and service quality were found to be factors that influence telecom consumers. In another study by Makame et al. (2014), results showed a lack of technical infrastructure as a barrier to e-commerce adoption. Furthermore, Tarhini et al. (2015) found Internet connectivity/coverage and convenience as the key factors determining customers' intention to accept online banking. Also, Pankomera and Greunen (2018) affirmed that poor mobile network connectivity were constraints in performing mobile banking transactions. Several studies, such as those by Morosan and DeFranco (2016), Lallmahomed, et al. (2017), Asongu (2018), and Ammar and Ahmed (2016), also found infrastructure facilities to have a significant influence. However, Oliveira et al.'s (2016) study found no relation between available facilities and technology adoption.

Hence, the environment that has sufficient infrastructure to support existing innovation will accept virtual airtime services. Conversely, an environment that lacks the infrastructure to support online activities may probably resist virtual airtime. Thus, it was the hypothesis that:

Hypothesis 3a: Internet coverage has a significant influence on behaviour intention.

4.3.9 Electricity Supply and Behaviour Intention

Advances in technology may be improving human lifestyle as well as imposing challenges in an unstable infrastructure environment. Likewise, technology has made payment transactions very

convenient but not without issues like the unavailability of electricity supply. For instance, in the study conducted by Tarhini et al. (2015), electricity was a barrier to people engaging in online banking services. Also, Okeke (2014) identified electricity supply, Internet availability and cost as factors affecting electronic banking usage. Other related studies from Onochie et al. (2015) and Nkalo and Agwu (2019) revealed that power supply is a barrier to technology adoption. These studies emphasised the challenges of electricity concerning efficiency, affordability, adequacy and steady supply as a constraint to the national growth. From these studies, it can be said that the electricity supply affects mobile commerce users' behaviour intention because the power supply is a driver for enhancing technology adoption. Besides, network providers need the power to keep operation costs low, while consumers need the electricity to sustain the phone battery.

In a developing country like Nigeria, factors influencing mobile commerce adoption may not be based only on social or technological competence but also on the availability of infrastructure such as electricity supply. However, it is imperative to say that with steady and reliable electricity supply, mobile commerce consumers are likely to make airtime an online purchase, to increase online experience. Conversely, the unreliability and non-availability of electricity can discourage mobile phone users' engagement in online activities. Therefore, this study hypothesised:

Hypothesis 3b: Electricity supply has a significant influence on behaviour intention.

4.3.10 Data Cost and Behaviour Intention

One of the features of mobile commerce is convenience, which plays a critical role in online activities. Likewise, mobile data determine mobile commerce adoption (Alturaigi & Altameem, 2015). Accordingly, GSMA (2018) reported that reducing the cost of using smartphones will encourage people's involvement in mobile services. Thus, the higher the perceived cost, the more the negative impact on adoption intention. Data cost is the degree to which a mobile phone user believes that using mobile commerce services is costly.

Osakwe and Okeke (2016) carried out a study on mobile money adoption, and the findings revealed that perceived cost is a determinant of mobile money adoption. In another empirical study by Han et al. (2016) and Singh et al. (2018), the results indicated that perceived cost influences the decision to engage in mobile commerce. Additionally, Venkatesh et al. (2012) noted that the price value is a determinant of technology adoption. Other cost-related studies determining technology adoption

are by Yadav, et al. (2016), Abdinoor and Mbamba (2017), Deshprabhu-Sadekar and Pereira (2018) and Martins et al. (2014). However, studies such as those of Abrahão et al. (2016), Alkhaldi (2019), Moorthy et al. (2017), Tan et al. (2014), Upadhyay and Jahanyan (2016), and Ojiaku and Osarenkhoe (2018) revealed that, for consumers, cost has no significant relationship with mobile payment and mobile banking adoption. From the above-related studies, it is notable that online engagement is associated with costs which the consumer may be willing or unwilling to incur.

Costs associated with mobile commerce are communication costs, maintenance costs, upgrading phones, transaction costs, bank charges for SMS alerts and subscription costs. The implication of this is that the awareness of these costs could discourage consumers from accepting innovative services such as virtual airtime. Again, if services cost is perceived to be higher than the perceived benefits, this may also hinder adoption and vice versa. The current study posited that the cost factor would influence the adoption of virtual airtime. It was, therefore, hypothesised that:

Hypothesis 3c: Data cost has a significant influence on behaviour intention.

Hypothesis 4

4.3.11 Behaviour Intention and Actual Use

Behaviour intention is the degree of effort a person is willing to exercise to perform a behaviour (Ajzen, 1991) or an action to predict actual purchase (Ho et al., 2015). It could also mean the desire to engage in online services using the mobile phone. Prior studies by Davis (1989) and Venkatesh et al. (2012) have posited that BI determines the actual usage of technology. Besides, Akman and Rehan (2016) indicated that the work environment, experience and gender of consumers, influence behaviour intention, and actual usage of mobile technologies.

Islam (2017) conducted a study and the findings revealed that behaviour intention and facilitating conditions are significant factors driving the actual usage of mobile Internet among Bangladesh consumers. In another empirical research by Sair and Danish (2018), BI significantly influences mobile commerce behaviour usage. Also, in Lwoga and Lwoga's (2017) study, it was found that BI influences consumers' mobile payment behaviour usage. From these related works of literature, it can be seen that BI influences behaviour usage, therefore the stronger the intention, the greater likelihood for actual behaviour. Also, the more consumers of telecommunication innovation

services believe that buying virtual airtime will save time and increase performance, the more the behaviour usage. Therefore, the hypothesis was:

Hypothesis 4: Behaviour intention has a significant influence on actual usage.

Hypothesis 5

4.3.12 Actual Usage and Continuous Behaviour

With the increasing acceptance and use of mobile technologies, mobile services may be gaining attention as the behaviour intention often results in actual usage and continuous usage (Olivier & Terblanche, 2018; Sun & Mouakket, 2015; Zhang et al., 2018). Therefore, the more behaviour usage for innovation, the greater the likelihood the behaviour will continue using technologies. Koloseni and Mandari (2017) revealed that behaviour continuous usage intention influences the actual continuous use of mobile money. Likewise, Olivier and Terblanche (2018) indicated that behaviour usage influences continue e-shopping adoption. Again, Lai et al. (2016) indicated that habits influence continuous usage intention. Basically, actual usage predetermines the continuous usage of technology. In other words, the consumers who have experienced and benefited from virtual airtime will be more likely to continue using such innovations. Therefore, it was hypothesised that:

Hypothesis 5: Actual usage has a significant influence on continuous usage.

Hypothesis 6

4.3.13 Satisfaction and Continuous usage

Customer satisfaction is gaining significant attention in the mobile service industries to achieve success (Ram & Wu, 2016), for adoption purposes (Albashrawi & Motiwalla, 2019) and to ensure continuous service usage (Akazue, 2016; Lu, 2014). However, Ye and Li-Qiong (2017) referred to consumer satisfaction as a conscious state to repurchase a product or service, while Aziz and Wahid (2018) maintained that satisfaction is a product of experience. Accordingly, Oliver (1980) referred to technology satisfaction as the interaction of expectation and perception. Therefore, virtual airtime satisfaction is the mobile phone consumer's post-adoption conscious behaviour after the initial experience.

In the study carried out by Kim et al. (2015), the researchers revealed that repeat purchase of mobile commerce results in future mobile spending. Also, Shaikh et al. (2015) noted that satisfaction affects the continuous usage of mobile banking technology. Furthermore, Oghuma et al. (2016) confirmed that usability and service quality influences satisfaction and post-purchase behaviour intention to use mobile instant messaging (MIM). In yet another study, Fernandes and Pedroso (2017) indicated that satisfaction influences continuous usage of technology, while Koloseni and Mandari (2017) revealed that satisfaction influences the repeat purchase of mobile money services. On the contrary, Park et al. (2017) opined that continued use of a product/service is not related to satisfaction.

Despite the contradictory findings, it is reasonable to say that virtual airtime users who are satisfied with mobile commerce will likely favour its continuous usage. However, a consumer that is dissatisfied will equally likely discontinue their involvement with the same services. It was, therefore, the hypothesis that:

Hypothesis 6: Satisfaction has a significant moderating influence on continuous usage.

4.4 Chapter Summary

This chapter has described the hypothesis statement and the conceptual framework to determine consumer behaviour intention, actual usage and continuous usage of virtual airtime services. Previous studies were reviewed to describe the relationships between the antecedent and dependent variables to understand consumers' attitude towards technology adoption. Also, the research model shows that the independent variable will have an indirect relationship with the dependent variable. Finally, the model reflected behaviour intention and behaviour usage as mediating variables, while satisfaction was a moderating variable. The following chapter will address the methodology adopted in this study to achieve the research objectives.

Chapter Five: Research Methodology and Design

5.1 Introduction

The previous chapter explained the conceptual model, the hypotheses and the relationship that exists between the variables. This chapter will focus on the research methodology and design for the study. Also, areas stressed are the research philosophy, research approach, sample design, population, sample size and sampling methods.

5.2 Research Philosophy

This section will first look at the concept of research, for a better understanding of research philosophy. Research is a systematic process of gathering data and analysing the data for a specific research purpose (McMillan & Schumacher, 2010). According to McMillan and Schumacher (2010), this means that research is a deliberate plan of action to provide data for a research problem. Petty et al. (2012) stated that research is a technique used to obtain data, process data and analyse data to gain knowledge. Research methodology, according to Leedy and Ormrod (2010), is the approach taken by the researcher to select and direct the pattern to adapt in the study. Therefore, research methodology was a systematic process taken by the researcher to gather data, analyse it, and to predict e-voucher adoption, usage and continuous usage. These various processes involved positivism, interpretivism and pragmatism (Creswell, 2014).

5.2.1 Positivism

Collins (2010) refers to positivism as research thought to increase knowledge. Here, the increase in knowledge was based on the scientific method of investigation in understanding human behaviour. The philosophy behind positivism is that it uses a deductive approach (Rovai et al., 2014), and the quantitative approach in data analysis to confirm established theories (Caetano et al., 2018). Also, positivism's emphasis is on obtaining knowledge through empirical results from respondents' experience. According to Cohen et al. (2000), empirical results entail the processes of verifiable data collection, grounded theory and the test of hypotheses. Aliyu et al. (2014) also noted that positivism research is rooted in truth and reality based on independent observation and view, from hypotheses testing (Boateng et al., 2016).

According to Kivunja and Kuyini (2017), the research in this paradigm applies hypotheses, mathematical equations, operational definitions, calculations, and expressions to generalise findings. Kivunja and Kuyini (2017) added that this process of conclusion enables the researchers to provide explanations and make statements on a future occurrence based on findings. Positivism is a research philosophy based on human understanding, through a systematic scientific procedure to discover the reality, and to conclude the outcome of research problems.

5.2.2 Interpretivism

The interpretivism paradigm is a research philosophy with a view that a human being is observed, understood and interpreted based on a researcher's personal judgment on a social structure. Interpretivism is associated with the inductive approach (Levitt et al., 2017; Mohajan & Mohajan, 2018), while theories are from a deepened understanding of a research problem (Parvaiz et al., 2016), based on data collection and interpretation. Also, interpretivism assumes that using scientific methods to relate to human beings does not give the same result to determine behaviour outcomes. Instead, the emphasis is on understanding humanity as a social construct from within (observation). Apart from being an inductive approach, interpretivism is within the context of a qualitative research approach, not based on numbers but observations and individual interpretations (Addae & Quan-Baffour, 2015). Nevertheless, this philosophy was not adopted in this study because this study had established theories before data collection. Besides, the conclusion was based on the quantitative data collected and analysed using the scientific process.

5.2.3 Pragmatic

Another research philosophy is the pragmatic paradigm. The philosophers in this paradigm believe that social reality cannot be determined from a single process but from combinations of positivism and interpretivism philosophies (Goldkuhl, 2012; Feilzer, 2010; Venkatesh et al., 2016). They advocate for mixed-methods research to view human behaviour. The objective is to get a better understanding of a particular subject under investigation. However, the pragmatic philosophy was not adopted because both paradigms follow the different processes of arriving at an outcome. Therefore, switching two opposite thoughts in the same research purpose was not logical for this study. Also, the non-adoption of a pragmatic is in line with Hathcoat and Meixner (2017), and Maarouf (2019) who believe that the ontology for pragmatic philosophy requires clarification.

Lohse (2016) maintained that research requires a clear understanding of reality to determine the methodological approach to follow.

5.2.4 Choice of Philosophy

This study adopted the positivist philosophy because knowledge discovery was through a scientific research procedure that was objective. Besides, this study was quantitative and deductive, which holds the view of positivist philosophy, that results from research be quantifiable. The positivist approach was also adopted because the study was based on established theories for testing and validation.

5.3 Research Approach

The research approach is a systematic way of data collection and methods applied (Cohen et al. 2011; McGivern, 2009; Malhotra, 2010), to answer research questions. However, a research approach could either be quantitative, qualitative or a mixed-method approach. These approaches are detailed below.

5.3.1 Qualitative Research

Qualitative research is a process of data gathering by observation, interview, open-ended questionnaire, and note-taking, which result in a broader understanding of real-life surroundings (Leedy & Ormrod, 2014), or the study of observation and interpretation in a natural setting of daily life (Charles et al., 2015). Berg and Lune (2012) referred to qualitative research as a researched paradigm by descriptions of things, concepts used, definition and metaphors. Rahman et al. (2017) noted that data gathering in a qualitative study is subjective since qualitative research is to describe, interpret and generate new theories and concepts. Based on the above definitions, it can be seen that qualitative research is based on the immediate understanding of the environment, situation, place and time of the study. Therefore, it is referred to as an inductive study (Levitt et al., 2017).

5.3.1.1 Advantages of Qualitative Research.

- Qualitative research has the advantage of understanding human behaviour in a specific natural environment.
- It is flexible in design, as it can be constructed and reconstructed during research processes.
- Smaller samples size saves cost.

- Data collection includes observation, open-ended questionnaires and interviews (Cohen et al., 2011).

5.3.1.2 Disadvantages of Qualitative Research.

- One major disadvantage is that sample size is usually small and, therefore, it is a challenge to generalise results (Harry & Lipsky, 2014, in Rahman et al., 2017).
- Data analysis and interpretation is difficult, time-consuming and stringent (Berg & Lune, 2012).
- It is expensive and time-consuming, especially in the case study (Rahman et al., 2017).
- Replicating the result is an issue as data collection, analysis and interpretation are based on researcher interest (Cohen et al., 2011; Atkins & Wallac, 2012).

5.3.2 Quantitative Approach

Quantitative research, according to Williams (2007), is gathering of data to obtain quantifiable information using a statistical procedure to agree or disagree with the claimed statement. Muijs (2004) referred to quantitative research as the numerical collection and analysing of data using statistical methods. According to Bryman (2012), quantitative research is the quantity in data collection, analysis and numeric interpretation. Considering the above, quantitative research involves collecting a sample of data from a population to be measured and analysed numerically. Likewise, quantitative research follows techniques and procedures to arrive at an objective conclusion and is deductive. Notably, quantitative research falls under the paradigm of positivism; it is adopted to achieve objectivity, replicability, reduce subjectivity and save time and costs (Bryman, 2001).

5.3.2.1 Characteristics of Quantitative Research.

- Much emphases are on quantitative methodology.
- It is suitable for hypotheses testing.
- It is suitable for a survey study.
- Focuses on convergent rather than divergent reasoning.
- Data are presented in charts, graphs, numbers, tables, figures, and other non-textured formats.

5.3.2.2 Advantages of Quantitative Research. The following are the benefits of quantitative research according to Daniel (2016).

- It uses statistical data, numbers and figures in gathering and analysing data to provide facts.
- The scientific approach makes it objective and reliable.
- It has the advantage of saving time and resources.
- It gives room for generalisation since it uses scientific methods and processes.
- The reliance on hypothesis testing allows replicability of a study since the research follows defined guidelines and objectivity (Lichtman, 2013).
- The use of a large sample size results in the generalisation of findings.
- The use of a cause and effect relationship in quantitative research enables the researcher to make generalisations and predictions for a larger population.

5.3.2.3 Types of Quantitative Research. According to Muijs (2004) and Sukamolson (2007, both in Apuke, 2017), the various types of quantitative research are survey research, correlational research, experimental research and causal-comparative research.

5.3.2.3.1 Survey Research. Survey research is one of the data collection methods in social sciences and other fields of study in understanding the social phenomenon. Besides, survey research is classified under quantitative research (using a scaled item questionnaire), qualitative research (using an open-ended questionnaire), or mixed research (Brant et al., 2015). Survey research's emphasis is on a sample collection of data from the target population of study for statistical analysis. However, data collection is usually through using the questionnaire approach to understand the attitude of the population. Again, statistical analyses are involved, using scientific procedures for generalisation (Daniel, 2016).

5.3.2.3.2 Correlational Research. As the name implies, correlational research involves establishing a relationship between two or more variables in a given population. In the view of Creswell (2002), correlation research is a statistical test to examine the characteristics of two variables. This type of research is used to determine the degree or extent to which a relationship exists between two or more variable in the studied population.

5.3.2.3.3 Experimental Research. This type of research is known as the scientific method. The main focus is on controlling the independent variable to understand its effect on the dependent

variable. Also, it deals with refuting or supporting the cause and effect of behaviour. According to Qasim and Alvi (2014), experimental research has three components: the dependent variable, the independent and the treatment variable. These three components enable the independent variable to be manipulated; add or remove treatment to stimulate the dependent variables. Accordingly, the findings will determine the possible causes and effects of the phenomenon (Boettger & Lam, 2013). Experimental research follows the scientific procedure in research design (Qasim & Alvi, 2014).

5.3.2.3.4 Causal-Comparative Research. Causal-Comparative research is also referred to as Ex-post facto research. The focus of causal-comparative research is to examine the cause and the effect relationship between two or more groups (variables), under study (Khaldi, 2017). The emphasis here is to carefully observe the dependent variable to identify what causes the effects on the variable.

5.3.3 Mixed Method

According to Molina-Azorin (2016), mixed-method research integrates quantitative and qualitative methods in one study. Studies have also shown that the mixed paradigm has gained recognition as the third approach in research methods (Johnson & Onwuegbuzie, 2004; Creswell, 2014), and is accepted (Cameron, 2010), for better understanding and result findings of a research phenomenon (Creswell & Clark, 2011; Bangi, 2018). Also, Tashakkori and Teddlie (2010) pointed out that research should not be based on a specific methodology but on what is most appropriate for a particular study, with less weakness and more strength. Therefore, a mixed method is an empirical enquiry merging quantitative and qualitative approaches in solving a research problem.

5.3.3.1 Advantages of mixed method. Below are some advantages of the mixed method in the opinions of Creswell and Clark (2007; 2011).

- It will add value to the study.
- The integration of quantitative and qualitative research provides a better understanding of a problem (Creswell & Clark, 2007).
- The mixed methodology is better than a single approach in broadening knowledge (Creswell & Clark, 2011).

5.3.3.2 Disadvantages of the mixed method. Despite the advantages of the mixed method, it is not without some limitations. Below are some disadvantages in the views of Creswell and Clark (2007; 2011) and Bryman (2007). The mixed method is not easy and is very demanding with regard to prioritising data collection, implementation and interpretation.

- There is the challenge of balance between the qualitative and quantitative methodology in the same study.
- Mixed research may result in inconsistency and/or contradiction in the methodological approach.
- It is very expensive and time-consuming in data collection, analysis and interpretation.

5.3.4 Choice of Approach

A research approach could take the form of qualitative, quantitative or mixed approach in arriving at an outcome. These approaches have their strengths and weaknesses. However, this study adopted the quantitative approach because the data gathering was achieved through quantifiable information, and statistical procedure to make claim statements. The quantitative approach enables the researcher to generalise from the sample. Besides, the use of hypotheses gives room for objectivity and replication of the study in the same or different context. Consequently, this approach saves time, resources and was most appropriate for the research.

5.4 Sampling Design

Sample design is the methods and plans a researcher will follow in selecting a sample from a defined population, using a statistically formulated technique for computation (Kabir, 2016). A sample design should be simple but include the basic approaches necessary to measure the sample (Grafström, 2010). Therefore, a sample design is a pattern a researcher adopts to determine the basis for a survey study. Also, sample design is necessary as it affects other aspects of the study.

5.4.1 Population

According to Neuman (2014), a population is the universe or elements of units that contain research information from which a sample is drawn. Kabir (2016) referred to a population as the total number of elements from which research information is desired. However, a population could be finite or infinite. Finite means it has a boundary or is fixed, while infinite means it does not

have a fixed number. The population for this research was all mobile phone users in Nigeria, with a focus on Delta state. Delta state was chosen because it perfectly represents the different demographic strands of the Federal Republic of Nigeria. It is an oil and agricultural producing state, situated in the South-South geo-political zone with a population of about 4 million. Besides, there are about 4.26 million mobile phone users within the state (nairametrics.com, 2019).

5.4.2 Sample Frame

A sample frame is a complete list of every element of the population (Kabir, 2016). Kabir (2016) further explained that a sample frame is the contact information of all subjects in the population. A sample frame, therefore, is the list of target population from which a sample is drawn. An example is a list of everyone owning a mobile phone in the three universities under study. Therefore, the sample frame was 232 for Edwin Clark University (ECU), 2213 for Delta State University (DELSU), and 695 for the Federal University of Petroleum Resources Efurun (FUPRE). This sample frame was the list of staff from all units/departments. The list included the teaching staff, non-teaching staff, security staff, health workers, cleaners and socioeconomic placed. In summary, the sample frame was 3140.

5.4.3 Sample Size

As the name implies, the sample size is a determined number from a defined population. According to Malhotra (2010), the choice of sample size must be sufficient to represent the population under study. Thus, the larger the sample, the less the likelihood of error and bias it will hold (Taherdoost, 2016). Besides, Singh and Micah (2014) suggested that sample size could be determined based on the statistical package to be used or similar studies. The university environment was used for the sample because it is a population for the educated, semi-educated, young and old working adults. Also, the university environment is a consumer market with internet access and is a finite population. Additionally, it is a diverse ethnic, regional, political, social and economic group. Therefore, the sample size was determined using the Yamane (1967) formula computation with a 95% confidence level. Thus: Sample size (n) is shown in Equation 5.1

Equation 5.1:

The calculation for Taro Yamane is presented as

n=N/(1+N〖(e)〗^2) Equation 5.1

Where N = number of people in the population (Mobile phone users' population)

n = Sample size

e = Level of significance (e.g. 0.05 or 5%)

Thus, substituting numbers into formula:

N = 232+ 2213 + 695= 3140

e = 0.05

n=3140/ (1+3140〖 (.05) 〗^2)

= 399.872 = 400

After calculation, the sample size was 399.872; however, this was rounded up to 400 to obtain reliable data. Apart from the sample size computation, further justification for using 400 as the sample size was that Structure Equation Model (SEM) requires a sample size of 300 as good, and above as very good for data analysis result (Tabachnick & Fidell, 2013; DeVellis, 2017).

5.5 Sample Method

The sampling method could either be a probability or non-probability sample method (Taherdoost, 2016). The probability sampling method is a sampling technique where all elements have a chance of selection. It is also known as random sampling because every item in the population has an equal probability of representativeness in the sample. Again, the emphasis in probability sampling is to randomly select a sample from among the population units using a technique. Conversely, the non-probability sampling method is where some elements have an unequal chance of being sampled. As the name implies, non-probability sampling is a non-random method that is subjective and based on the researcher's judgements. Accordingly, Bryman (2016) enumerated the probability sample method to include simple random sampling, systematic sampling, stratified sampling and multi-stage cluster sampling. Subsequently, the non-probability sample includes

convenience sampling, purposive sampling, quota sampling and snowball sampling. The two sample methods are discussed below.

5.5.1 Probability Sample Method

The probability sampling technique is a random sampling method that follows a defined process in collecting samples from the target population for studies. Probability methods include simple random sampling, systematic sampling, stratified sampling and multi-stage cluster sampling (Taherdoost, 2016).

5.5.1.1 Simple Random. This technique gives every element of the population a chance to be represented in the sample. The simple random technique provides high sample representatives because it uses a defined or finite population that is listed. The simple random technique method can use a lottery or random table generated through the computer to obtain the required sample. According to Cochran (1953, in Mujere, 2016), the simple random method can be applied on the basis that the researcher adopts the following steps: (1) defines research population; (2) determines sample size; (3) lists the population; (4) assigns numbers to the cases; (5) finds random numbers; (6) selects sample from random number table.

5.5.1.2 Systematic Sampling. The systematic sample method uses a homogeneous population. Here, samples are collected or gathered at regular intervals in a consistent process. This method involves specifying the population characteristics to give an equal chance to all elements. The use of a systematic sample method requires seven steps (Fink, 1995, in Mujeres, 2016): (1) define research population; (2) determine sample size; (3) list the population; (4) assign number to cases; (5) calculate sample fraction by dividing sample size with total sample size; (6) select the first unit from the random number table; (7) select your sample.

5.5.1.3 Stratified Sampling. The stratified sampling technique in a survey involves using a heterogeneous population. The heterogeneous groups are formed into subgroups (strata) with homogenous characteristics to determine the population. The stratification sampling could be on the basis of sex (male/female), age (young/old), socioeconomic status (high income/low income) or education (educated/ uneducated). The main reason for a researcher to adopt stratification is to enable the researcher to focus on the particular strata of interest within a population. Therefore, by

stratifying or dividing the population into strata, the sample is generated from each participant. Steps to use the stratified method, according to Smith (2013), are: (1) define population; (2) choose relevant strata; (3) list population; (4) list population according to the relevant strata; (5) calculate a commensurate stratification; (6) use a systematic or simple random technique to select the sample.

5.5.1.4 Multi-Stage Cluster Sampling. The multi-stage cluster sampling random method uses a population that is spread over a geographical location. Here, the participants for research are across a state or a country. The population is divided into groups or clusters, for example into states, urban and rural, because the participants occurred naturally. Thus, based on the natural location of the participants, homogeneous samples are collected from each cluster. According to Berinstein (2003), the procedure for the multi-stage cluster sample is: (1) choose sample area; (2) select sample of the respondent from chosen location; (3) based on geographical location, divide the population into a cluster of homogenous units; (4) group sample units; (5) select sample from each cluster; (6) finally, the selected cluster is studied.

5.5.2 Non-Probability Sample Method

Non-probability sampling, unlike the probability sample, is a non-technique random sample selection of research participants. This method is used for survey studies when it requires an understanding of particular characteristics within a population. Besides being based on the researcher's subjective judgement, it focuses on the literature review to test a theory. The non-probability sample ensures that the selection of subjects is from the determined population. The following are the various methods of non-probability sampling.

5.5.2.1 Convenience Sampling. Convenience sampling is also called accident sample. This is because participants are those available at the point of data collection that willingly gave consent to participate in the study (Etikan et al., 2016). The crucial elements here are convenience and easy access. Again, convenience sampling is most appropriate when the population is broad, heterogeneous sex, different socioeconomic status, age, educational levels, ethnicity, religion. etc.

5.5.2.2 Judgment / Purposive Sampling. Judgment / Purposive sampling is a non-random sampling method in which participants are carefully or deliberately selected to provide needed

information that the researcher cannot obtain from others (Etikan et al., 2016).. This selection with the participants is purposive in understanding behaviour and problems as it relates to the research objective. Besides, purposive sampling enables the researcher to be focused to get the required information from willing participants. The very fact that the researcher is using this method means there is prior intention in mind about the participants (Creswell & Clark, 2011).

5.5.2.3 Quota Sampling. As the name implies, the quota sampling technique is a method by which the basis on which to select sample characteristics is predetermined (Taherdoost, 2016). It is determined because the population is heterogeneous and needs to be grouped into a homogenous segment. In this regard, the population is divided into sub-groups, then units are selected from the sub-groups with the same characteristics. Thus, the desired sample will be drawn from each selected sub-group until the required target (fixed quota) is realised.

5.5.2.4 Snowball Sampling. The snowball sampling technique is used when there is a little knowledge about the population (participants) of the study. This sampling method requires the researcher to identify a few of the population elements (participants) who will make referrals or recommendation to others within the population. This process of selection is called a chain selection or a sample, achieved through a network connection (Naderifar et al., 2017). In summary, the snowball sampling method is appropriate when the population is small, unique, rare and not easily or readily available. Examples of such populations are secret cults, religious monks or billionaires.

5.5.3 Choice of Sampling Method

Despite the various sampling techniques of probability and non-probability methods, the convenience / purposeful technique of the non-probability sample method was appropriate for this study. The choice of a convenience / purposeful sample is due to the easy access to select respondents who are willing to participate. Also, a convenience / purposeful sample enhances the deliberate selection of subjects beneficial to the research study. The use of convenience and purposive sampling is that the technique provides quantitative data. Retrieving of the research instrument is easy, convenient and economical in time and cost.

5.6 Measuring Instrument

This research adopted a questionnaire as a measuring instrument, based on the research model, to generate primary data to measure the factors influencing airtime purchase consumer attitude, behaviour and continuous usage in the Nigerian telecom sector. An ordinal scale for measurement on a 5-point Likert scale was adapted to indicate the extent to which the respondents agree or disagree with the questions, ranging from strongly agree to strongly disagree. The questions were divided into fourteen sections based on the variables. The first section of the questionnaire was based on the respondents' bio-data, while subsequent sections measured the variables used in the conceptual model for this research. Section A (for perceived usefulness), Section B (compatibility), Section C (phone self-efficacy), Section D (phone habit), Section E (phone attitude), Section F (family), Section G (peers), Section H (internet coverage), Section I (electricity), Section J (data cost), Section K (behaviour intention), Section L (satisfaction), Section M (actual usage), and Section N (continuous usage). The Likert scale was suitable as it allowed respondents to agree or disagree with the research statement (Malhotra, 2010). The participants were the entire teaching staff, non-teaching staff and every other unit from the selected universities. For this study the items were measured on a five-point scale with 1 = strongly agree, 2 = agree, 3 = neutral, 4 = strongly disagree, and 5 = disagree.

The study selected participants from a federal, state and private universities for measuring the instrument. Therefore, based on previous validated questions, the current study paraphrased the questions, to fit the context of virtual airtime system. To ensure on the validity and reliability of the instrument, convenient pre-test sample was used on 50 participants and was further refined so that only respondents with mobile phone, access to internet, awareness of e-voucher, with bank account were given the questionnaire to fill. Thus, those outside these criteria were excluded. All constructs were modified and measured using the guideline as showed in table 2.

5.6.1 Operationalisation of Variables, Notation and Terminology

Perceived usefulness (PU) is the degree a user of a mobile phone accepts to use the technology and believes it will enhance their daily online activity.

Compatibility (CO) is the extent virtual airtime complements the scratch card and is beneficial to the user.

Phone self-efficacy (PSE) is the confidence a virtual airtime consumer has to effectively undertake a specific action independently, with assistance and/or with built-in facilities to satisfy or meet needs.

Mobile Phone Habit (MPH) is the undertaking of the virtual airtime user to automatically respond to action intentionally or unintentionally due to their conditions and learning.

Mobile Phone Attitude (MPA) is an evaluation of the virtual airtime user due to their belief, feeling, knowledge and experience of the existing technology.

Social Influence (SI) is the level a mobile phone user considers others' opinion is necessary for using virtual airtime technology.

Family (FA) is a household member that influences the behaviour of other family members.

Peers (PE): Mobile phone peers are groups whose tastes, values, lifestyles, experiences, and ideology determine their individual perceptions towards virtual airtime adoption.

Facilitating Conditions (FC) have to do with mobile phone users' basic understanding of the available facilities to engage in virtual airtime services.

Network coverage (NC) is the confidence a mobile phone user expects from a network provider during virtual airtime recharging and similar online activities.

Electricity (EL) is the extent to which power supply is available to the virtual airtime user to sustain the battery of a mobile phone in mobile commerce engagement.

Data cost (DC) is the cost associated with browsing the internet, transaction costs, and subscription costs related to quick access to using virtual airtime technology.

Behaviour intention (BI) is the readiness and deliberate decision of a mobile phone user to exert effort in using virtual airtime technology, services, based on the individual predetermined intention.

Actual Usage (AUS) involves a mobile phone user taking the opportunity to use virtual airtime technology to benefit from mobile devices and telecom innovation services.

Satisfaction (SA): Customer satisfaction is the degree of pleasure users of virtual airtime perceive when they adopt, use and continue utilising it in the future due to perceived usefulness.

Continuous usage (CUS) is the extent a user of virtual airtime decided to use it and continue with its usage in the future.

The study utilised one (1) dependent variable, ten (10) independent variables, two (2) mediating variables and one (1) moderating variable. The dependent variable was measured by behaviour

usage, which was measured by behaviour intention, which were the actual variables that were caused by the independent variables (technology factors (TF), social factors (SF) and contextual factors (CF)) in the institutions. While satisfaction, which is the moderating variable, influences continuous behaviour usage, perceived usefulness (PU), Compatibility (CO), Phone self-efficacy (PSE), Mobile Phone Habit (MPH), Mobile Phone Attitude (MPA), Family (FA), Peers (PE), Network coverage (NC), Electricity (EL), and Data cost (DC) were the actual independent variables. These independent variables had a mediating influence on behaviour intention (BI), Actual Usage (AU) and Continuous usage (CU). As mentioned earlier, Satisfaction (SA) in this context was a moderating variable influencing Continuous usage (CU).

5.6.2 Measuring Instrument Table

Table 2

Adapted Measuring Instrument and Study Measuring Items

Research construct	**Adapted measuring instrument**	**Research measuring instrument**
	Perceived usefulness. Source: Davis, (1989); Kim et al., (2010)	**Perceived usefulness**
PU1	Using electronic mail improves my job performance	Using online airtime will enhance my job performance
PU2	Using mobile payment would enable me to pay more quickly	Using online airtime will enable me to pay more quickly
U3	I would find mobile payment a useful possibility for paying	I would find online airtime a useful possibility for payment
PU4	Using electronic mail makes it easier to do my job	Using online airtime makes me easily connected to others 24/7
	Compatibility. Source: Karahanna et al. (2006); Kim et al., (2010)	**Compatibility**

CO5	Using the CRM is compatible with my past experience	Using online airtime fits well with my experience
CO6	I believe mobile payment is compatible with my daily routine	Online airtime fits into my lifestyle
CO7	I believe mobile payment is compatible with existing technology	I believe online airtime is compatible with existing technology
CO8	To use the CRM system, I don't have to change anything I currently do	I believe online airtime is compatible with my current situation
	Phone self-efficacy. Source: Venkatesh and Zhang (2010)	**Phone self-efficacy**
PSE9	I could complete a job or task if there was no one around to tell me what to do as I go	I could complete online airtime if there's no one to direct me on what to do
PSE10	I could complete a job or task If I had just the built-in system help facility for assistance	I could complete online airtime If I have just a built-in help facility for assistance
PSE11	I could complete a job or task if I had a lot of time to complete the job for which the software were provided.	If I have a lot of time, I could complete online airtime for which the software was provided
	Mobile phone habit. Source: Limayem et al. (2003)	**Mobile Phone Habit**
MPH12	The use of WebBoard has become a habit for me.	The use of online airtime has become a habit for me
MPH13	I am addicted to using WebBoard	I am addicted to using online airtime
MPH14	Using WebBoard has become natural to me	Using online airtime has become natural to me

MPH15	I must use WebBoard	I must use online airtime
	Mobile phone attitude. Source: Davis, (1989); Venkatesh and Zhang (2010)	**Mobile Phone Attitude**
MPA16	Using the system is a bad/good idea	Using online airtime is a good idea
MPA17	Overall, I find the electronic mail system useful in my job	Using online airtime is beneficial to me
MPA18	I like working with the system	I like using online airtime
	Family. Sources: Venkatesh and Zhang (2010); Venkatesh et al. (2012)	**Family**
FA19	People who are important to me think that I should use the system	Family who are important to me think that I should use online airtime
FA20	People who influence my behaviour think I should use the system	Family who influence my behaviour think I should use online airtime
FA21	In general, the organisation has supported the use of the system	Families around me support the use of online airtime which is the latest fashion
FA22	People whose opinions that I value prefer that I use mobile internet	Using online airtime indicates to me that I have a family base style
	Peers. Sources: Limayem et al. (2003); Venkatesh et al. (2012)	**Peers**
PE23	People whose opinions that I value prefer that I use mobile internet	Peers whose opinions I value prefer that I should use online airtime
PE24	People who influence my behaviour think that I should use mobile internet	The image of peers around me influence my behaviour to think I should use online airtime recharging

PE25	My friends think it is important to use WebBoard	The identity of peers around me will influence me to use online airtime
PE26	People who are important to me think that I should use the system	The personality of peers around think that I should use the online airtime
	Network coverage. Source: Gao et al. (2011); Limayem et al. (2003)	**Network coverage**
NC27	I have easy access to the internet	I have the internet geographic coverage to use online airtime
NC28	I have a fast internet connection	I have the network timely coverage to use online airtime
NC29	I could use the system if it is meaningful and relevant to my daily task	I have reliable internet coverage to use online airtime
NC30	I could use the system if am out of home or office	I have access to network to use online airtime
	Electricity. Source: Datta (2011); Gao et al. (2011)	**Electricity**
EL31	I intend to adopt Ecommerce if there is wide availability of IT support	I have reliable electricity to use online airtime
EL32	I intend to adopt Ecommerce if hardware and software are readily available	I have frequent electricity to use online airtime
EL33	I intend to adopt Ecommerce if connectivity (data network) is reliable	The electricity voltage is standard to use online airtime
EL34	I could use the system if the system was easy to obtain and install	Electricity availability will enable me to use online airtime
	Data cost. Source: Oliveira et al. (2016)	**Data Cost**

DC35	Mobile payment is reasonable priced	Cheap data price enables me to use online airtime
DC36	At the current price mobile payment provides good value	The data cost of accessing the internet is good value
DC37	Mobile payment is good value for money	The quality of service is excellent for data cost
	Behaviour intention. Source: Gao et al. (2011); Venkatesh and Zhang (2010)	**Behaviour Intention**
BI38	I intend to use the system in the next (n) months	I intend to use online airtime
BI39	I will always try to use the mobile internet in my daily life	I intend to use online airtime in my daily life
BI40	If most people around me are using the system	I intend to use online airtime when it becomes widely use
	Actual usage. Source: Venkatesh and Zhang (2010)	**Actual usage**
AU41	I intend to use the system in the next (n) month	I have been using online airtime for the past 6 months – 1 year
AU42	I predict I would use the system in the next (n) months	I have been using online airtime for the past 1 year to present day
AU43	I plan to use the system in the next (n) months	I am still using online airtime
	Satisfaction. Source: Bhattacherjee (2001)	**Satisfaction**

SA44	How do you feel with the overall experience of OBS? Very dissatisfied/ very satisfied.	I am pleased with the experience of using online airtime
SA45	Very displeased/very pleased	I am delighted with using online airtime
SA46	Absolutely terrible/ absolutely delighted	I am pleased with the reliability of online airtime.
	Continuous usage. Source: Bhattacherjee (2001); Venkatesh et al. (2012)	**Continuous usage**
CU47	I intend to continue using OBD rather than discontinue its use	I will continue using online airtime in the future
CU48	I plan to continue to use mobile internet frequently	I plan to continue to use online airtime frequently
CU49	My intentions are to continue using OBD than use any alternative means	It is possible to continue using online airtime without stopping

5.7 Data Collection Technique

The questionnaire distribution and collection method used the personal and direct distribution method. Thus, this research used primary data to source the information needed. The primary source of data was a structured questionnaire based on the research objectives given to the selected subjects from the different institutions. Also, the questionnaire was paraphrased from various previous similar studies because it appeared suitable for data collection. Primary data has the advantage of generating first-hand information from the respondents, it is easy to distribute/collect, and it has a higher response rate. Besides, the questionnaire technique is cheap and can cover a wide area (Ruparathna & Hewage, 2015). Apart from primary data, secondary data were also collected from academic journals related to the study.

5.8 Ethics

One major important part of social sciences research is the application of ethics. Ethics is necessary because participant rights, privacy and welfare need to be respected (McMillan & Schumacher, 2010). One reason for ethical approval, apart from research method, is that the integrity of research lies in the ethics application and approval. Besides, it is a professional guild in dealing with research participants (AERA Council, 2011). Moreover, the participants are human and all information must be confidential and protected. The researcher submitted an ethical application to the ethical committee at the University of Witwatersrand. South African (WITS) Evidence of a permission letter from the selected institutions to conduct research was also presented to WITS. Then, an approved ethics certificate was issued from WITS before data collection was begun.

Before administering the research instruments, the researcher introduced herself to the registrars at different times and places. Evidence of the permission letters on request by various units gave the researcher access to all offices, departments and individuals willing to participate. The participants were assured anonymity, confidentiality and the right to withdraw from participation at any given time. The explanation for complete anonymity, confidentiality, withdrawal at will, and the purpose of the research-built trust and motivated them to participate. The participants were also informed that no incentive is attached to the study. At this stage, the researcher administered the informed consent form, participant forms and the research questionnaire to the willing participants.

5.9 Chapter Summary

This chapter has focused on research methodology and design. The emphasis was on the various research philosophies like positivism, interpretivism and pragmatism. The qualitative, quantitative and mixed approaches as well as the choice for a qualitative study were investigated. This section also discussed the sample design, population, sample frame, sample size, various sampling methods - like the probability and non-probability method – and, finally, the measuring instrument, ethics and the chapter summary.

Chapter Six: Data Analysis Procedure and Statistical Approach

6.1 Introduction

Data analysis involves extracting meaningful information from raw data to address a research problem (Ullah, 2010). This section focuses on how data collected was analysed and the instruments used for the analysis. The emphasis here is on the statistical and analytical approaches applied in this study. For instance, the data collected were cleaned, coded with the excel spreadsheet, and descriptive statistics performed for the demographic variables using SPSS version 26. Besides descriptive statistics, reliability and validity instruments adapted are also discussed. Also, the research hypothesis is analysed using the structural equation model (SEM).

6.2 Data Cleaning and Coding

Data cleaning involves a careful and deliberate repetitive process of eliminating errors identified during data collection, entering, and analysis to enhance the accuracy, reliability and usability of existing data (Rana et al., 2016). Data cleaning entails detecting and removing inconsistencies in data collected and making corrections in the data collected to improve data quality (Broeck et al., 2005; Rahm & Do, 2016). However, Bhattacherjee (2012) noted that data coding involves converting raw data into a numerical format. Since the research instrument was a hard copy questionnaire, the researcher cleaned the data by eliminating irrelevant, insufficient and inaccurate data from the sets of data collected before entering it into the excel spreadsheet. This process of detecting and eliminating the unwanted data resulted in coding 390 relevant questionnaires from the 400 data collected into Microsoft excel spreadsheet in numerical format for easy extraction and analysis. 10 questionnaires were therefore, disregarded because they had large missing data while minor missing values where replaced with -99 in the excel sheet recognised by Smart-PLS 3.

6.3 Descriptive Statistics

The descriptive statistics focused on mean statistics, standard deviation, skewness statistics, and kurtosis statistics. Descriptive statistics for this study aimed to utilise the statistical methods for quantitative organisation, summary and presentation of data collected (Mordkoff, 2016).

6.4 Structural Equation Modelling (SEM) Approach

This section considers the concept of SEM, its advantages and the various approaches of SEM. SEM is a measured approach for assessing multiple relationships among variables (Wothke, 2010). According to Schumacker (2016), the structural equation model is a statistical technique that shows the relationship surrounding observed variables to provide a quantitative test in the theoretical model. Besides providing theoretical evidence to which the theoretical model agrees with sample data (Schumacker, 2016), it has gained acceptance due to the highly multi relationship application in research constructs. For this reason, applying a single analytical technique is no longer sufficient in data analysis with multivariables (Mertler & Reinhart, 2016; Diesing, 2017). The multi relationship between research variables was expressed in this study by the roles of technology, social and contextual factors (antecedent variables) influencing behaviour intention and the behaviour intention and actual behaviour (mediating variables) effecting continuous usage. This multi relation was expressed in the relationship between satisfaction moderating between actual use and continuous usage.

SEM was therefore adapted based on this statistical and simultaneous testing of combined multivariate models. Besides, it falls into the Multivariate Data Analysis (MDA), which uses statistical data with multiple constructs (Hair et al., 2014; Sarstedt et al., 2020). It is the best statistical method to adopt when research involves multiple relationships (Hair et al, 2017). Thus, looking at the conceptual framework, this current study reflects multiple independent and mediating variable and therefore, the justification for using SEM. Additionally, SEM analysis can express the reliability and validity of observed scores from the measuring instrument (Schumacker, 2010; Civelek, 2018).

6.4.1 Advantages of SEM

- SEM estimates error variance, while older multivariate analysis is not capable of estimating measurement error.
- SEM tests individual parameter estimate and model fit estimate simultaneously and thus provides an overall model fit.
- SEM conducts the confirmatory approach as well as the exploratory approach to data analysis using some packages such as PLS and CB-SEM (Rigdon, 2012).

- Comparing means, regression coefficient and variances across different groups are possible simultaneously using SEM.
- SEM methodology is useful in both experimental and non-experimental studies because of its database, auto error correction structure, incomplete data which SEM can handle.
- Unlike the older methodological approaches, which do not take into cognisance latent variables, SEM identifies observed and latent variables.

6.4.2 Components of SEM

The components or terms in SEM are the exogenous and endogenous, observed and latent variables, path model, confirmatory factor analysis (CFA) and exploratory factor analysis (EFA).

Exogenous and endogenous latent variable: This is also synonymous with the independent and dependent variable. However, the exogenous variable influences the endogenous variable directly or indirectly (Malkanthie, 2015).

Observed and latent variable: The observed variable is observed directly, while the latent variable is unobserved (Malkanthie 2015).

Path: This is a diagrammatic presentation of the relationship among variables in a study (Malkanthie 2015), or a visual diagram that represents the causal relationship among variables (Costa, 2018).

Confirmatory factor analysis (CFA), or Covariance-Based Structure Equation (CB-SEM), is one technique used in scale adaptation in SEM. CFA is performed to determine the observed and latent variables and link them to theory.

Exploratory factor analysis (EFA), or variance-based Partial Least Square Structure Equation Modelling (PLS-SEM), is another technique used in scale adaptation. EFA is employed when the link between measured and unmeasured variable is uncertain (Malkanthie, 2015). Alternatively, when the relationship is not known, EFA is recommended.

6.4.3 Partial Least Square Structure Equation Model (PLS-SEM)

PLS is a statistical model used to indicate the structural paths, the complex models and the indicator variables. It is a casual-predictive technique (Hair, et al., 2017). According to Henseler et al. (2016a), the PLS model has two linear equations; the structures model - also referred to as the inner model - and the measurement model - called the outer model. The former links relations

between constructs, while the later links relations between constructs and the manifest indicators. PLS is also a statistical analysis technique applicable in the explanatory study (Henseler et al., 2016b), as a variance-based matrix that supports total variance for estimates parameters (Hair, et al, 2017). Hair et al. (2019) also observed that the application of PLS analysis in research studies is based on its efficiencies and contributions when certain conditions are met such as:

1. The study is focusing on theory testing.
2. The study is MDA involving complex relationships within and among the variables (dependent, independent, moderator and mediators).
3. When the population is restricted (sample size).
4. When the study requires latent variables score for analysis.
5. When there is a need for a better understanding of an existing theory.
6. When the study requires more than one measure constructs.
7. When you require a statistically significant confidence interval of construct reliability and validity using a bootstrap-based test (Aguirre-Urreta & Rönkkö, 2017; Henseler et al., 2015).
8. The study requires to estimate measurement models as a composite factor (Dijkstra & Henseler, 2015).
9. You require to assesses both the structures model and the measurements model.

Looking at the above efficiencies and contributions of PLS to research analysis, it offers researchers the ability to identify the nature of measurement errors (relationship among variance) of model indicators. PLS analysis enables the researcher to understand the hypothesis relationship between observed and latent variable, using root mean square error (RMSE) values.

6.5 Measurement Model

The features of SEM, and in particular PLS-SEM, necessitated its adoption in this study in analysing the measurement model. The measurement model is the estimated relationship between the construct and their manifest variables (Henseler et al., 2016a). Thus, the relationship that exists in this study is represented below as:

1. Relationship between technology factors (TF) and its variables and indicators.
2. Relationship between social factors (SF) and its variables and indicators.

3. Relationship between contextual factors (CF) and its variables and indicators.

The current study adopted Cronbach's alpha (CA) and composite reliability (CR) to measure the internal consistency reliability, discriminant validity for heterotrait- monotrait (HTMT) and the indicator reliability for outer loading. Other techniques adopted were convergent validity for average variance extracted (AVE), variance inflation factor (VIF) to indicate collinearity and significance level for p-value.

6.5.1 Reliability and Validity Measurement Scales

Reliability is a consistency in results by a measurement scale whenever the same construct is repeated (Creswell, 2014). It is an instrument that enhances the accuracy and evaluation of a research study (Mohajan & Mohajan, 2017; Morris & Burkett, 2011; Tavakol & Dennick, 2011), the degree a test is free from measurement error (McMillan & Schumacher, 2010) and a trustworthy measurement scale (Chakrabartty, 2013). From these definitions, reliability has to do with consistency, accuracy, trustworthiness, and error-free measurement of an instrument scale under the same condition with similar subjects. By implication, the degree to which a reliability instrument reflects inconsistency and less precise the less reliable will be the results. Conversely, the degree to which inaccuracy exists in the measurement instrument, the less reliable will be the results generated. The concept of reliability is based in the predictable, error-free, consistency, precision, accuracy and stability of the research instrument (Kumar et al., 2019).

On the other hand, measuring the validity of a research instrument is compulsory (Oliver, 2010). The need to measure validity in the research instrument is that validity determines if the scale measures what it intended to measure (Drost, 2011). A validity instrument could be convergent, discriminant or criterion, and the adoption of a particular validity measurement depends on the nature of the research (Sarstedt & Mooi, 2014). Despite the various validity instruments, the most commonly used is convergent and discriminant validities (Henseler et al., 2016a). Therefore, this study, being a variance-based structure equation model (PLS-SEM), adopted convergent and discriminant validity to estimate the validity of the construct under study.

6.5.1.1 Reliability Measurement Scales. According to Hair et al. (2019), PLS-SEM measures two reliability criteria: internal consistency reliability and indicator reliability. The internal consistency in PLS is further divided into two criteria: The Cronbach alpha (α) and composite

reliability (CR). However, Cronbach's alpha reliability is acceptable at 0.7 or above ($\alpha \geq 0.7$). It is also acceptable at 0.5 or above ($\alpha \geq 0.5$) for exploratory studies (Hair et al., 2014), while the composite reliability, at 0.7 or above ($\alpha \geq 0.7$), is acceptable. Therefore, this study adopted Cronbach's alpha (CA) and composite reliability (CR) values for internal consistency measures (Hair et al., 2019).

6.5.1.2 Validity Measurement Scales. Convergent validity is the degree a measure converges with its alternatives to explain the items within the same constructs (Hair et al., 2019). The emphasis here is that converged constructs are estimated to share a high proportion of the correlated variance. In PLS, the matrix used to evaluate convergent validity is the average variance extracted (AVE) and is acceptable at 0.50 or above. The 0.50 and above indicates that the converged construct explains variance in the items. Thus, this measure was used in this study to determine the correlation of technology factors, social factors and contextual factors with their specific dimensions.

The second validity measurement is discriminant validity. Accordingly, Hair et al. (2017) referred to discriminant validity as the degree to which a construct is distinct from other constructs in the same structure model. An example is a conceptual model, where the technical factors, social factors and contextual factors represent different constructs with unique phenomena in the same structure model. Heterotrait-Monotrait (HTMT) criteria are suggested as the best measurement for discriminant validity in PLS analysis. HTMT is the mean value of all the correlated items across different constructs (Hair et al., 2014). Thus, the discriminant validity is indicated when the HTMT is below 0.90 or 0.85 thresholds.

Apart from using Cronbach's alpha, composite reliability, and average variance extract to measure the model, PLS-SEM equally recommends the variance inflation factor (VIF) in evaluating measurement models (Hair et al., 2017). The variance inflation factor is used in PLS-SEM to indicate collinearity in the measurement construct. Besides specifying collinearity in PLS-SEM, it reduces bias in regression results. Thus, when VIF values are greater than or equal to 5 ($VIF \geq 5$), it indicates critical collinearity issues among the indicators. Also, the VIF values greater than 3-5 ($VIF \geq 3\text{-}5$), indicate possible collinearity, whereas VIF less than 3 is ideal ($VIF < 3$) (Becker et al., 2015). In this study, VIF was measure at less than 3 ($VIF < 3$).

6.6 Structure Model

SEM consists of the measurement model and structure models. The structure model also has two components, namely, the exogenous construct and the endogenous constructs. The exogenous constructs (outer) are not influenced by other constructs in the model, neither are they explained by other constructs nor have an arrow pointing towards them. However, the endogenous constructs are influenced by other constructs as they are assumed to have a linear relationship with other constructs (Becker et al., 2015). It is based on the capability of the exogenous constructs in predicting the endogenous constructs. Therefore, the PLS statistical analysis was adopted to determine the structure models in understanding the relations between the constructs. This structure relation is expressed in this study between TF, SF, CF and BI, between behavioural intention and actual behaviour, between actual behaviour and continuous usage, between actual usage, satisfaction and continuous usage. Therefore, the relationship was measured using the path coefficient, t-statistics and p-value. The path coefficient estimated by Hair et al. (2017) was adopted. It states that the path coefficient should line from -1 to +1 ($-1 \leq \beta \leq +1$). Thus, a path coefficient with ($\beta = -1$) indicates a perfect negative relationship, while a path coefficient with ($\beta = +1$), indicates a perfect positive relationship. Also, a path model close to -1 ($-0.9 \leq \beta$ -0.5) represents a strong negative and a path model close to +1($0.5 \leq \beta \leq 0.9$), represents strong positive relations between the independent and dependent variables. Basically, when the path coefficient is 0 ($0 < \beta < 0.5$), it indicates weaker positive relation and when it is ($\beta = 0$), it implies no or zero relationship.

Besides determining the path coefficient, the coefficient of determination (R^2), was measured to determine the effect of independent variables on the dependent variables, predictive and explanatory power of the path model (Hair et al, 2017). Therefore, R^2 ranges from 0 to 1 indicate a high predictive power. Again, R^2 of 0.25, 0.50, 0.75 and 0.90 and higher is regarded as weak, moderate, substantial and overfit (Hair et al., 2011; 2019; Henseler et al., 2009; Rigdon et al., 2017). Also, the significant level at 95% confidence interval level was adopted in this study using p-value at ($p < 0.05$) and t-value at ($t > 2.57$).

6.7 Chapter Summary

This chapter discussed the research approaches, data coding, reliability and validity measures. Other areas of focus were the SEM, PLS, structure and measurement models adopted. Finally, this session ended with the chapter summary.

Chapter Seven: Results of Data Analysis

7.1 Introduction

This section presents the results of the study. The focus is on the descriptive statistic, measurement model and structure model analysis. Concerning the descriptive statistics, the emphasis is on demographic variables, research constructs, frequency and percentage tables, mean, standard deviation, kurtosis and skewness. This chapter also presents an analysis of the measurement model with a focus on reliability and validity. The chapter further presents the path model focusing on the control variable, direct effects and moderation effect.

7.2 Demographic Descriptive Analysis of the Participants

Table 3

Demographic Response of Gender

Variable	Category	Frequency	Percentage
Gender	Male	205	53%
	Female	181	46%
	No Response (NR)	4	1%
	Total	390	100%

Source: Field data, 2019

Table 3 shows that 390 respondents participated in this study. There were 205 males (53%) and 181 females (46%). Also, 4 represents no respond (preferred not to say) (1%). Table 3 shows that most of the respondents were male. A total of 99% of the participants answered this question, while 1% did not respond.

Figure 5

Diagrammatic Representation of Gender

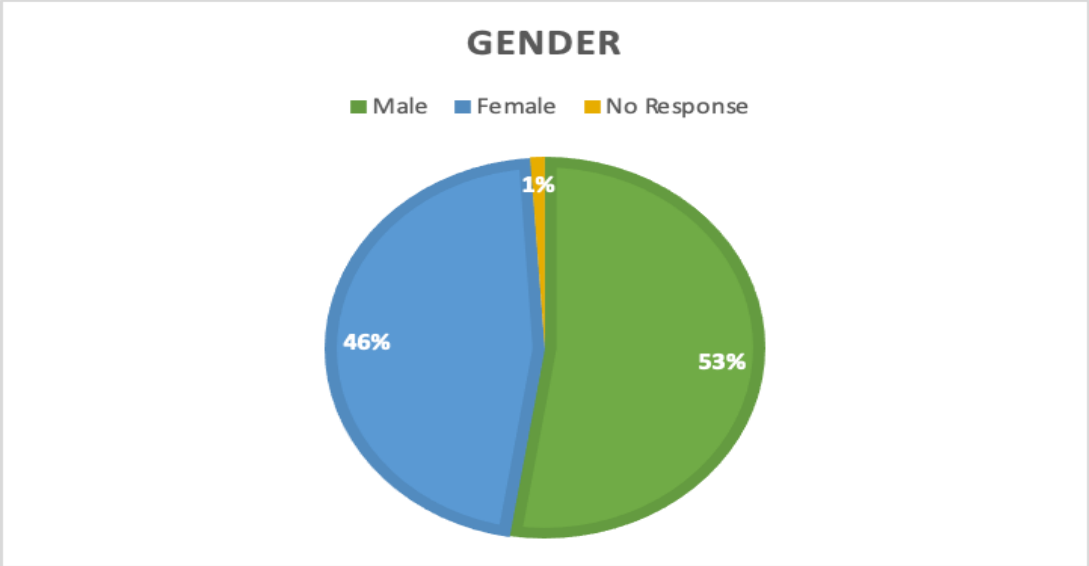


Table 4

Demographic Response of Age

Variable	Category	Frequency	Percentage
Age	20-30	41	11%
	31-40	110	28%
	41-50	155	40%
	50-60	66	17%
	No Response	16	4%
	Total	388	100%

Source: Field data, 2019

With regard to the respondents' age, 41, representing 11%, were between the ages of 20 and30; 110, representing 28% were between 31-40 years; 155, representing 40%, were between 41-50; 66, representing 17% were between 50-60, while 16, representing 4%, were non-responds. From Table 4 it can be seen that the largest age group that participated were those within the 41-50 age

range, followed by those who were 31-40, then the 50-60 age group, and, lastly, those in the 20-30 age range. By implication, the participants in this survey were adults and not youths, since 68% were within the age group of 31-50, while 11% were youths 20-30 years of age.

Figure 6

Diagrammatic Representation of Age Distribution

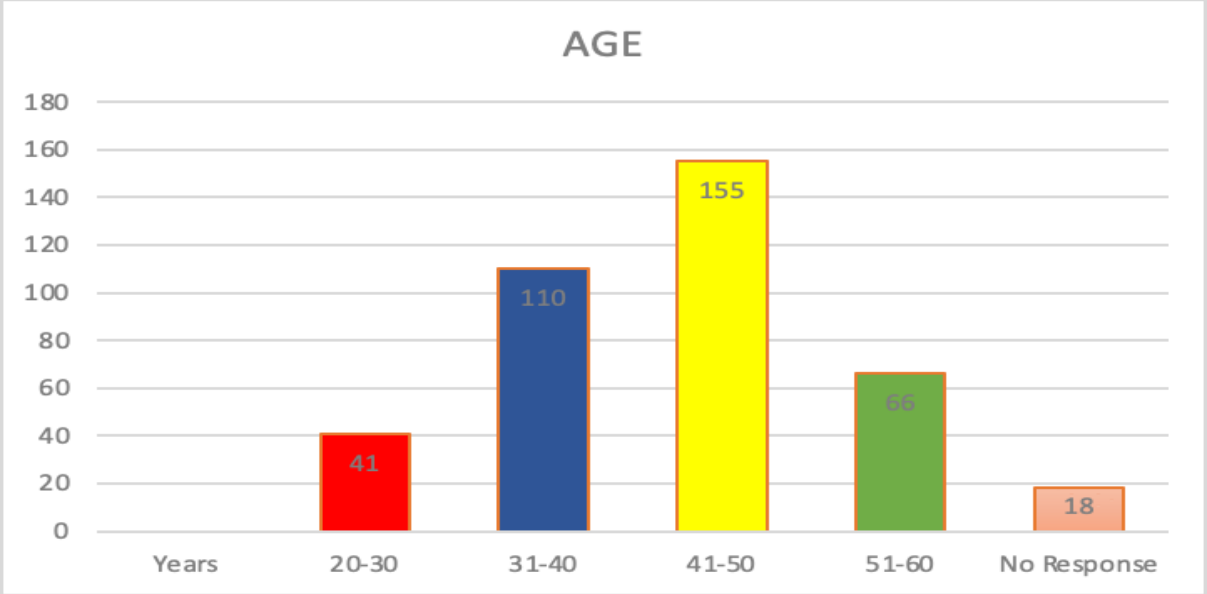


Table 5

Demographic Response of Education

Variable	Category	Frequency	Percentage
Educational level	Ordinary National Diploma (OND)	74	19%
	Higher National Diploma (HND)	86	22%
	BSc	125	32%
	Masters	89	23%
	No Response	16	4%
	Total	390	100%

Source: Field data, 2019

Considering the respondents' educational background, 74, representing 19%, hold an OND; 86, representing 22%, have a HND; 125, representing 32%, have BSc degrees; 89, representing 23%, have master's degrees, while 16, representing 4%, did not respond. From the educational data, it can be seen that the respondents were well educated; the largest number of respondents having BSc degrees.

Figure 7

Diagrammatic Representation of Educational Distribution.

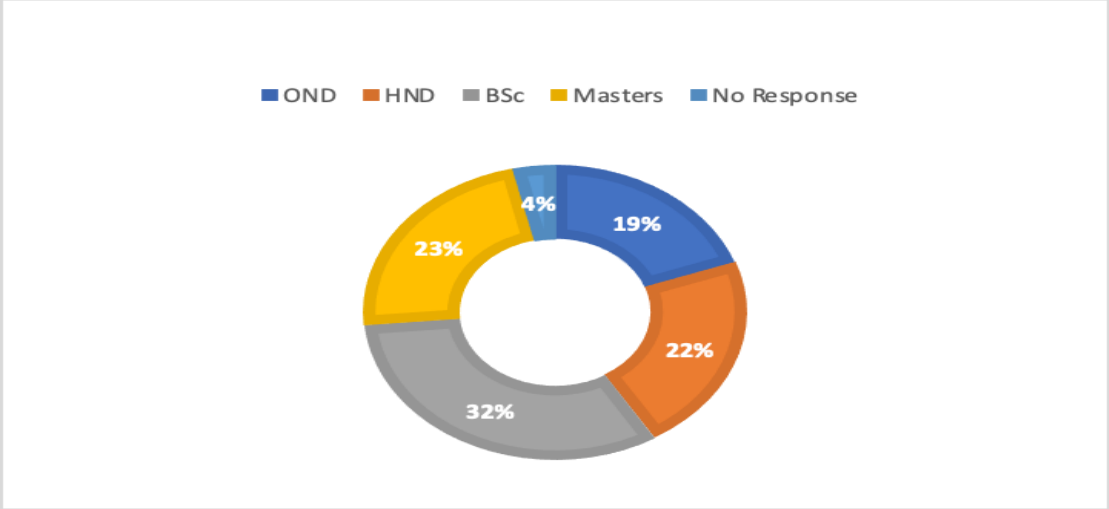


Table 6

Demographic Response of Preferred Network

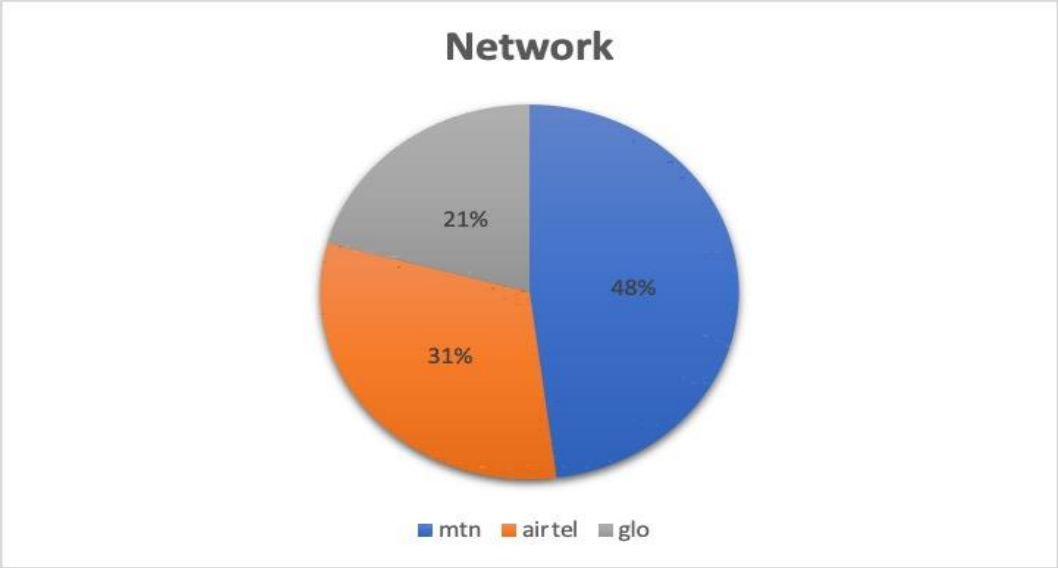
Variable	Category	Frequency	Percentage
Network	MTN	187	48%
	AIRTEL	122	31%
	GLO	81	21%
	Total	390	100%

Source: Field data, 2019

Considering the four major network providers, Table 6 indicates that 187 (48%) are MTN subscribers, 122 (31%) subscribe to Airtel, and 81 (21%) are Glo subscribers. None of the respondents indicated 9mobile network. However, Table 6 has revealed that MTN is the network with the most subscribers – 187 - representing 48% of the subscribers.

Figure 8

Diagrammatic Representation of Preferred Network



7.3 Descriptive Statistics on Items and Constructs

Descriptive statistic for technology factors were based on the mean, standard deviation, kurtosis and skewness. The measurement was on a 5-point scale of 18 items. The descriptive analysis of these items and constructs is represented in Table 7.

Table 7

Scale Items of Descriptive Statistics for Technology Factors

Scale Items	Mean	Standard Deviation	Kurtosis	Skewness
Perceived usefulness				
Using online airtime will enhance my job performance	2.32	1.281	-.568	.721
Using online airtime will enable me to pay more quickly	1.90	1.111	1.064	1.324
I would find online airtime a useful possibility for payment	1.99	1.085	.622	1.123
Using online airtime makes me easily connected to others 24/7	1.86	1.137	1.319	1.452
Compatibility				
Using online airtime fits well with my experience	2.18	1.165	-.041	.893
Online airtime fits into my lifestyle	2.26	1.176	-.200	.822
I believe online airtime is compatible with existing technology	1.74	.927	2.953	1.638
I believe online airtime is compatible with my current situation	2.23	1.128	-.091	.777
Phone self-efficacy				
I could complete online airtime if there's no one to direct me on what to do	1.89	1.173	.788	1.328
I could complete online airtime if I have just a built-in help facility for assistance	2.43	1.174	-.158	.723

If I have a lot of time, I could complete online airtime for which the software was provided	2.24	1.104	.427	.964
Mobile Phone Habit				
The use of online airtime has become a habit for me	2.29	1.338	-.713	.744
I am addicted to using online airtime	2.78	1.375	-1.212	.265
Using online airtime has become natural to me	2.52	1.322	-.884	.549
I must use online airtime	2.99	1.365	-1.260	.026
Mobile Phone Attitude				
Using online airtime is a good idea	1.72	1.005	2.361	-1.135
Using online airtime is beneficial to me	1.98	1.037	1.321	1.259
I like using online airtime	2.04	1.088	.869	1.168

In Table 7, on a scale of 1 to 5, the mean scores ranged between 1.72 and 2.99. Therefore, this indicates that the distribution is a good fit, the mean score is high, and the items and constructs well indicated. The standard deviation ranges between .927 and 1.375 This reveals a low standard deviation and indicates the values obtained from the data are close to the mean and signifies the items and constructs are close to the average of the responses. Also, kurtosis ranges from -1.260 to 2.953, indicating a light tail than the normal distribution table and since the values are less than 3, the kurtosis is closer to the normal distribution. However, the skewness ranges from -1.135 to 1.638 in the table. This skewness value indicates no skewness. Since it is less than 2, it indicates no significance and therefore is closer to symmetry than asymmetry.

This section measures the descriptive statistics for social factors on a 1-5 scale, using 8 items based on the mean, standard deviation, kurtosis and skewness of the sample distribution. The descriptive analysis of these items and constructs is represented in Table 8.

Table 8

Scale Items for Social Factors (SF)

Scale Items	Mean	Standard Deviation	Kurtosis	Skewness
Family				
Family who are important to me think that I should use online airtime	2.67	1.138	-.590	.350
Family who influence my behaviour think I should use online airtime	2.88	1.176	-.834	.212
Families around me support the use of online airtime, which is the latest fashion	2.42	1.119	.010	.783
Using online airtime indicates to me that I have a family s base style	3.18	1.233	-.990	-.007
Peers				
Peers who are important to me have the opinion that I should use online airtime	3.11	1.294	-1.153	.008
The image of peers around me influence my behaviour to think I should use online airtime recharging	3.30	1.265	-.994	-.225
The identity of peers around me will influence me to use online airtime	3.32	1.232	-1.070	-.189
The personality of peers around think that I should use the online airtime	3.12	1.308	-1.183	.007

From Table 8, using a 5-point scale, the mean score shows values ranging between 2.42 and 3.32. This indicates that the distribution is a good fit, the items and construct are well indicated, and the mean score is high. Table 8 also reflects the standard deviation ranging between 1.119 and 1.308. This range indicates that the values obtained from the data are close to the mean. Also, kurtosis

values range from .010 to -1.183. By implication, the kurtosis indicates a lighter tail and, since the values are less than 3, the kurtosis is closer to a normal distribution. The skewness ranges from -.225 to .783 in the table. This skewness value indicates no significance. Since it is less than 2 and close to zero, it implies symmetry in the data distribution.

This section measures the descriptive statistics for contextual factors on a 1-5 scale. There are 11 items based on the mean, standard deviation, kurtosis and skewness of the sample distribution. The descriptive analysis of these items and constructs is represented in Table 9.

Table 9

Scale Items for Contextual Factors

Scale Items	Mean	Standard Deviation	Kurtosis	Skewness
Network coverage				
I have the internet geographic coverage to use online airtime	2.15	1.126	.387	1.031
I have the network timely coverage to use online airtime	2.27	1.093	.168	.900
I have reliable internet coverage to use online airtime	2.28	1.157	-.119	.831
I have access to network to use online airtime	2.12	1.047	.953	1.167
Electricity				
I have reliable electricity to use online airtime	3.35	1.327	-1.133	-.306
I have frequent electricity to use online airtime	3.44	1.234	-.884	-.447
The electricity voltage is standard to use online airtime	3.26	1.286	-1.169	-.121
Electricity availability will enable me to use online airtime	2.88	1.378	-1.239	.202
Data Cost				
Cheap data price enables me to use online airtime	2.84	1.371	-1.217	.146
The data cost of accessing the internet is good value	2.85	1.239	-.968	.187
The quality of service is excellent for data cost	2.92	1.236	-1.021	.127

From Table 9, the mean score is between 2.12 and 3.44 inclusive. It implies that the mean score is high, the distribution is a good fit, and the items and constructs well indicated. The standard deviation ranges between 1.047 and 1.378. Table 9 reveals low standard deviation, an indication

that the values of the items and constructs are close to the average of the responses. Also, the kurtosis shows value ranges from -1.239 to .953. It implies a lighter tail than the normal distribution table and since the values are less than 3, the kurtosis is closer to normal distribution. Again, the skewness ranges from -.447 to 1.167 in the table. The skewness also implies asymmetry rather than an asymmetric distribution.

This section measures the descriptive statistics for behaviour intention on a 1-5 scale, considering three items based on the mean, standard deviation, kurtosis and skewness of the sample distribution. The descriptive analysis of these items and constructs is represented in Table 10.

Table 10

Descriptive Statistics on Items and Constructs for Behaviour Intention

Scale Items	Mean	Standard Deviation	Kurtosis	Skewness
Behaviour Intention				
I intend to use online airtime	2.19	1.091	.576	1.016
I intend to use online airtime in my daily life	2.64	1.229	-.736	.470
I intend to use online airtime when it becomes widely used	2.97	1.225	-.916	.136

As can be seen from Table 10, the mean score is between 2.19 and 2.97. The values imply that the mean score for behaviour intention is high, and the distribution, the items and constructs are well indicated. Again, the standard deviation ranges between 1.091 and 1.229. It also shows a low standard deviation; an indication that the values of items and constructs are not far from the mean of the responses. Also, the kurtosis reveals that the values range from-.916 to .576. It means a lighter tail than the normal distribution table, and since the values are less than 3, the kurtosis is

closer to normal distribution. The skewness ranges from.136 to 1.016 in the table. It implies asymmetry rather than an asymmetric distribution.

This section measures the descriptive statistics for behaviour intention on a 1-5 scale with regard to three items based on the mean, standard deviation, kurtosis and skewness of the sample distribution. The descriptive analysis of these items and constructs is represented in Table 11.

Table 11

Descriptive Statistics on Items and Constructs for Actual Usage

Scale Items	Mean	Standard Deviation	Kurtosis	Skewness
Actual usage				
I have been using online airtime for the past 6 months – 1 year	1.98	1.275	.119	1.157
I have been using online airtime for the past 1 year to the present day	2.00	1.265	-.002	1.107
I am still using online airtime	1.80	1.146	1.105	1.440

From Table 11, the mean score is between 1.80 and 2.00. It implies that the mean score for behaviour intention is high, and the distribution, the items and the constructs are well indicated. The standard deviation ranges between 1.146 and 1.275. The table shows a low standard deviation, and an indication that the values of the items and constructs are not far from the mean of the responses. The kurtosis reveals the values range from -.002 to 1.105. It shows a lighter tail than the normal distribution table and, since the values are less than 3, the kurtosis is closer to normal distribution. Again, the skewness ranges from 1.107 to 1.440 in the table. It implies asymmetry rather than an asymmetric distribution.

This section measures the descriptive statistics for behaviour intention on a 1-5 scale, on three items based on the mean, standard deviation, kurtosis and skewness of the sample distribution. The descriptive analysis of these items and constructs is represented in Table 12.

Table 12

Descriptive Statistics on Items and Constructs for Satisfaction

Scale Items	Mean	Standard Deviation	Kurtosis	Skewness
Satisfaction				
I am pleased with the experience of using online airtime	2.07	1.178	.140	1.037
I am delighted with using online airtime	2.08	1.074	.525	1.037
I am pleased with the reliability of online airtime	2.22	1.142	.102	.891

Table 12 shows that the mean score is between 2.07 and 2.22. It implies that the mean score for behaviour intention is high, and the distribution, the items and constructs are well indicated. Again, the standard deviation ranges between 1.074 and 1.178. There is a low standard deviation, and an indication that the values of the items and constructs are not far from the mean of the responses. Also, the kurtosis reveals the values range from .102 to .525. It shows a lighter tail than the normal distribution table, and since the values are less than 3, the kurtosis is closer to normal distribution. The skewness ranges from .891 to 1.037 in the table. It implies asymmetry rather than an asymmetric distribution.

This section measures the descriptive statistics for behaviour intention on a 1-5 scale, considering three items based on the mean, standard deviation, kurtosis and skewness of the sample distribution. The descriptive analysis of these items and constructs is represented in Table 13.

Table 13

Descriptive Statistics on Items and Constructs for Continuous usage

Scale Items	Mean	Standard Deviation	Kurtosis	Skewness
Continuous usage				
I will continue using online airtime in the future	1.95	1.128	.656	1.180
I plan to continue to use online airtime frequently	2.11	1.100	.353	.962
It is possible to continue using online airtime without stopping	2.30	1.231	-.409	.746

As seen from Table 13, the mean score is between 1.95 and 2.30. This indicates that the mean score for behaviour intention is high; the distribution, the items and constructs are well indicated. The standard deviation ranges between 1.100 and 1.231. The table shows a low standard deviation, and an indication that the values of the items and constructs are not far from the mean of the responses. Also, the kurtosis reveals the values range from -.409 to .656. It shows a lighter tail than the normal distribution table and, since the values are less than 3, the kurtosis is closer to normal distribution. The skewness ranges from .746 to 1.180 in the table. It shows an asymmetry rather than asymmetric distribution.

7.4 Reliability and Validity Measurement Scale

The Cronbach alpha (CA) and composite reliability (CR) measurement scale for internal consistency was used in this study. Therefore, Cronbach alpha measures at 0.7 and 0.80 are regarded as acceptable, while the CR at 0.7 and above are considered acceptable. In addition to the reliability measurement, this study also adopted convergent validity and discriminant validity to determine the validity instrument. The convergent validity and discriminant validity measures are acceptable at the threshold of at least 0.5, HTMT at 0.85, while the variance inflation factor (VIF) measures threshold at less than 3, is acceptable.

7.4.1 Measurement scale for Cronbach alpha (CA), composite reliability (CR), average variance extract (AVE) and variance inflation factor (VIF)

Table 14

Measurement Scale for Perceived Usefulness

Perceived usefulness CA=0.802; CR=0.871; AVE=0.629	Loadings	VIF
Using online airtime will enhance my job performance	0.781	1.570
Using online airtime will enable me to pay more quickly	0.839	1.987
I would find online airtime a useful possibility for payment	0.808	1.874
Using online airtime makes me easily connected to others 24/7s	0.740	1.397

An analysis of Table 14 shows the loading for perceived usefulness ranges between 0.740 and 0.839, while VIF is between 1.397 and 1.987. In this study, the required thresholds for CA, CR and AVE are 0.7; 0.7 and 0.5 respectively. However, the constructs have revealed 0.802; 0.871 and 0.629. The values indicate that the scales are reliable since the values are higher than the required threshold. Also, the VIF values are less than 3. The VIF also shows that there is no problem of multicollinearity among the variables. By implication, the constructs for perceived usefulness are well indicated and measured both in reliability and AVE.

Table 15

Measurement Scale for Compatibility

Compatibility CA=0.814; CR=0.896; AVE=0.683	Loadings	VIF
Using online airtime fits well with my experience	0.814	1.804
Online airtime fits into my lifestyle	0.860	2.252
I believe online airtime is compatible with existing technology	0.767	1.336
I believe online airtime is compatible with my current situation	0.861	2.011

From Table 15 it can be seen that the loading for compatibility ranges between 0.767 and 0.861, while VIF is between 1.336 and 2.252. However, the required thresholds for CA, CR, AVE and VIF are 0.7; 0.7; 0.5 and less than 3 respectively. The constructs have revealed 0.814; 0.896; 0.683 and all values of VIF to be less than 3. It is an indication that the scales for compatibility are reliable and valid since the values are greater than the required threshold. Moreover, the VIF also shows no problem with multicollinearity.

Table 16

Measurement Scale for Phone Self-Efficacy

Phone self-efficacy CA=0.752; CR=0.842; AVE=0.640	Loadings	VIF
I could complete online airtime if there's no one to direct me on what to do	0.817	1.089
I could complete online airtime if I have just a built-in help facility for assistance	0.788	1.428
If I have a lot of time, I could complete online airtime for which the software was provided	0.794	1.518

Table 16 shows the loading for phone self-efficacy ranges between 0.788 and 0.817, VIF, is between 1.089 and 1.518, while the threshold for CA, CR, AVE and VIF is 0.7; 0.7; 0.5 and less than 3 respectively. However, the constructs have revealed 0.752; 0.842; 0.640; and <3. The values indicate that the scales for phone self-efficacy are reliable and valid since the values are greater than the required threshold. Also, the values of VIF indicate that the data has no collinearity problem.

Table 17

Measurement Scale for Phone Habit

Mobile Phone Habit CA=0.855; CR=0.902; AVE=0.699	Loadings	VIF
The use of online airtime has become a habit for me	0.884	2.674
I am addicted to using online airtime	0.859	2.515
Using online airtime has become natural to me	0.836	2.007
I must use online airtime	0.759	1.598

Table 17 indicates the loading for phone habit ranges between 0.759 and 0.884, while the VIF is 1.598 and 2.674; however, the thresholds for CA, CR, AVE and VIF are 0.7; 0.7; 0.5 and less than 3 respectively. In this table, the constructs have revealed 0.855; 0.902; 0.699 and <3. The values indicate that the scales for phone habit are reliable and valid since the values are greater than the required threshold. Again, the VIF has no problem of collinearity.

Table 18

Measurement Scale for Phone Attitude

Mobile Phone Attitude CA=0.755; CR=0.855; AVE=0.664	Loadings	VIF
Using online airtime is a good idea	0.760	1.353
Using online airtime is beneficial to me	0.809	1.572
I like using online airtime	0.871	1.729

Table 18 indicates the loading for phone attitude ranges between 0.760 and 0.871, while the VIF is 1.353 and 1.729. However, the thresholds for CA, CR and AVE are 0.7; 0.7; 0.5. The constructs have revealed 0.755; 0.855; 0.664, indicating that the scale for phone attitude is reliable since the values are greater than the required threshold. Also, all the values of VIF are less than three and indicate the construct for phone attitude is well correlated and valid.

Table 19

Measurement Scale for Family

Family CA=0.794; CR=0.866; AVE=0.619	Loadings	VIF
Family who are important to me think that I should use online airtime	0.827	1.884
Family who influence my behaviour think I should use online airtime	0.814	1.854
Families around me support the use of online airtime which is the latest fashion	0.735	1.400
Using online airtime indicates to me that I have a family-based lifestyle	0.768	1.531

Table 19 shows the loading for family ranges between 0.735 and 0.827, while the VIF is 1.400 and 1.884. However, the thresholds for CA, CR and AVE are 0.7; 0.7; and 0.5 respectively. The constructs measured 0.794; 0.866; and 0.619. These values are greater than the threshold and, therefore, the measurement scale is reliable and valid. Table 19 also revealed that all the values for VIF are less than 3, suggesting there is no problem with the data.

Table 20

Measurement Scale for Peers

Peers CA=0.883; CR=0.919; AVE=0.739	Loadings	VIF
People who are important to me are of the opinion that I should use online airtime	0.831	2.158
The image of people around me influence my behaviour to think I should use online airtime recharging	0.850	2.468
The identity of people around me will influence me to use online airtime	0.885	2.669
The personality of people around me will influence me to use online airtime	0.871	2.446

From Table 20 it can be seen that the loading for peers ranges between 0.831 and 0.885, also, the VIF is 2.158 and 2.669, while the thresholds for CA, CR, and AVE are 0.7; 0.7 and 0.5 respectively. Again, the constructs have revealed 0.883; 0.919 and 0.739. It is an indication that the measurement scales for peers are reliable and valid since the values are greater than the required threshold. Besides, the values for VIF range between 2.158 and 2.669 and are less than 3. The data variable has no collinearity issues.

Table 21

Measurement Scale for Network Coverage

Network coverage CA=0.858; CR=0.903; AVE=0.701	Loadings	VIF
I have the internet geographic coverage to use online airtime	0.825	2.259
I have the network timely coverage to use online airtime	0.852	2.362
I have reliable internet coverage to use online airtime	0.876	2.580
I have access to network to use online airtime	0.793	2.146

Table 21 indicates the loading for network coverage ranges between 0.793 and 0.876. Also, the loading for VIF is between 2.146 and 2.580. However, the thresholds for CA, CR and AVE are 0.7; 0.7 and 0.5 respectively. Meanwhile, the construct measurement has revealed 0.858; 0.903 and 0.701. It suggests that the scale for network coverage is greater than the required threshold and, therefore, is considered reliable and valid for this study. Also, from Table 21, the VIF values are less than 3, an indication that the data has no multicollinearity problem.

Table 22

Measurement Scale for Electricity

Electricity CA=0.826; CR=0.876; AVE=0.638	Loadings	VIF
I have reliable electricity to use online airtime	0.764	2.676
I have frequent electricity to use online airtime	0.823	2.955
The electricity voltage is standard to use online airtime	0.801	1.947
Electricity availability will enable me to use online airtime	0.807	1.336

Table 22 shows the loading for electricity ranges between 0.764 and 0.823. However, the required thresholds for CA, CR, AVE are 0.7; 0.7 and 0.5. The constructs have revealed 0.826; 0.876 and 0.638. Therefore, the electricity scale measures are greater than the threshold and indicate a reliable and valid instrument. Also, from Table 22 can be seen that the VIF values are all less than 3 because it ranges between 1.336 and 2.955. The VIF has also shown that the data has no problem of collinearity.

Table 23

Measurement Scale for Data Cost

Data Cost CA=0.783; CR=0.874; AVE=0.700	Loadings	VIF
Cheap data price enables me to use online airtime	0.770	1.391
The data cost of accessing the internet is good value	0.887	2.059
The quality of service is excellent for data cost	0.848	1.904

Considering Table 23, the loading for data cost ranges between 0.770 and 0.887. However, the thresholds for CA, CR and AVE are 0.7; 0.7 and 0.5. The measurement scale have revealed 0.783; 0.874 and 0.700. It is an indication that the instrument scales for data cost are reliable and valid since the values are greater than the required threshold. Also, the VIF values range between 1.391 and 2.059. It also revealed that all the values of VIF are less than 3, and therefore the data has no problem.

Table 24

Measurement Scale for Behaviour Intention

Behaviour Intention CA=0.751; CR=0.855; AVE=0.664	Loadings	VIF
I intend to use online airtime	0.870	1.412
I intend to use online airtime in my daily life	0.819	1.400
I intend to use online airtime when it becomes widely used	0.752	1.128

Table 24 shows the loading for behaviour intention ranges between 0.752 and 0.870, while the thresholds for CA, CR, and AVE are 0.7; 0.7 and 0.5. Table 24 has revealed that behaviour

intention measured 0.751; 0.855 and 0.664. It indicates the measurement scale for behaviour intention is greater than the required threshold and is considered a reliable and valid instrument. However, the VIF values range between 1.128 and 1.412 and are less than 3. It also suggests that the data has no collinearity problem.

Table 25

Measurement Scale for Actual Usage

Actual usage CA=0.882; CR=0.948; AVE=0.859	Loadings	VIF
I have been using online airtime for the past 6 months – 1 year	0.917	2.998
I have been using online airtime for the past 1 year to present day	0.953	2.934
I am still using online airtime	0.910	2.783

From Table 25 it can be seen that the loading for actual usage ranges between 0.910 and 0.953. The threshold for CA, CR, and AVE is 0.7; 0.7; 0.5 respectively. However, the measurement scale for actual usage revealed 0.882; 0.948 and 0.859. Therefore, since the measurement scale is greater than the threshold, the measure is considered reliable and valid for this study. Table 25 also shows that the VIF values are all less than 3 that is between 2.783 and 2.998. It is an indication that the data has no collinearity problem.

Table 26

Measurement Scale for Satisfaction

Satisfaction CA=0.903; CR=0.939; AVE=0.838	Loadings	VIF
I am pleased with the experience of using online airtime	0.930	2.914
I am delighted with using online airtime	0.933	2.936
I am pleased with the reliability of online airtime	0.882	2.190

Table 26 indicates the loading for satisfaction ranges between 0.882 and 0.933. The threshold for CA, CR and AVE is 0.7; 0.7 and 0.5. However, the constructs revealed 0.903; 0.939 and 0.83. The measurement scale confirms that the scale is reliable since it is greater than the threshold measure.

Also, the table values for VIF ranged between 2.190 and 2.936 are all less than 3. It implies that the constructs have no multicollinearity issues.

Table 27

Measurement Scale for Continuous usage

Continuous usage CA=0.882; CR=0.927; AVE=0.809	Loadings	VIF
I will continue using online airtime in the future	0.918	2.828
I plan to continue to use online airtime frequently	0.921	2.927
It is possible to continue using online airtime without stopping	0.858	2.059

Table 27 indicates the loading for continuous usage ranges between 0.858 and 0.921. The thresholds for CA, CR, and AVE are 0.7; 0.7 and 0.5 respectively. However, Table 27 indicated that the measurement scale for continuous usage is 0.882; 0.927 and 0.809. It suggests that the instrument for measurement scale is reliable and valid. Also, Table 27 shows the values of VIF range between 2.059 and 2.927, that is less than 3. The VIF indicates that the data has no problem of collinearity.

7.4.2 Measurement Scale for Discriminant Validity

As mentioned in the previous chapter, the study adopted convergent validity and discriminant validity to determine if the constructs are correlated. Table 28 reflects discriminant validity. However, to determine the discriminant validity, the HTMT criteria ratio table was used. The acceptable value of HTMT for this study was any value lower than 0.85, as suggested by Henseler et al. (2015).

Table 28

Heterotrait-Monotrait Ratio (HTMT) (Discriminant Validity)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Actual Usage														
Behaviour Intention	0.46													
Compatibility	0.48	0.37												
Continuous usage	0.44	0.42	0.30											
Data Cost	0.20	0.49	0.34	0.29										
Family	0.18	0.43	0.36	0.28	0.30									
Habit	0.45	0.45	0.43	0.36	0.29	0.45								
Network problem	0.40	0.35	0.30	0.36	0.23	0.26	0.36							
Peers	0.14	0.38	0.28	0.28	0.27	0.73	0.40	0.19						
Perceived Usefulness	0.41	0.35	0.42	0.36	0.23	0.40	0.43	0.40	0.31					
Phone Attitude	0.40	0.45	0.46	0.43	0.20	0.42	0.40	0.44	0.21	0.58				
Electricity	0.27	0.36	0.31	0.22	0.29	0.25	0.37	0.48	0.22	0.21	0.41			
Satisfaction	0.48	0.48	0.44	0.46	0.33	0.30	0.48	0.47	0.24	0.44	0.43	0.32		
Self-efficacy	0.36	0.44	0.40	0.43	0.26	0.42	0.42	0.38	0.33	0.49	0.48	0.21	0.47	

Table 28 suggests that the values of HTMT used to determine discriminant validity are less than 0.85 (HTMT<0.85). Table 28 indicates that actual usage, behaviour intention, compatibility, continuous usage, data cost, family, habit, network problem, peers, perceived usefulness, phone attitude, electricity, satisfaction and self-efficacy differ. Therefore, discriminant validity was demonstrated.

7.5 Analysis of the Structural Model

The analysis of the structure model depicts the relationships in the model. This study first analyses the control effects, the direct effects and the moderation effects, as the research objectives reflect.

Table 29

SEM Path Analysis Between Gender: Behaviour Intention; Actual Usage and Continuous usage

	Path Co-efficient	t Statistics	p Values
Controls			
Gender -> Behavioural Intention	-0.061	1.581	0.114
Gender -> Actual Usage	0.052	1.307	0.191
Gender -> Continuous usage	-0.024	0.673	0.501

Behaviour Intention = R^2 =0.229; Adjusted R^2 =0.227, Actual Usage = R^2 =0.423; Adjusted R^2 =0.408 and Continuous usage =R^2 =0.653; Adjusted R^2 =0.651

From Table 29, the path co-efficient indicates a negative (-0.061) relationship between gender and behaviour intention. It suggests that the sex of consumers negatively determines their behaviour intention. Also, the t-statistics indicate (t=1.581), while the p-values indicate ($p \leq 0.114$). The t-value and p-value imply that there is no significant relationship that supports that gender of consumers determine behaviour intention. Table 29 again shows adjusted R^2 =0.227. It indicates a weak fit because the value is not closer to 1. However, the R^2 explains 22% variance in the behaviour intention. Concerning the relationship between gender and actual usage, the path co-efficient indicates a positive (0.052) relationship, a t-statistic (1.307) and a p-value (0.191). These values of path co-efficient reflect a positive relationship between gender and actual usage. However, t-statistics and p-values indicate not significant as their values are not far from the mean. Table 29 also reveals that path co-efficient shows a negative (-0.024) relationship between gender and continuous usage. It suggests that gender negatively determines continuous usage. Also, the t-statistics indicate (t=0.673), while the p-values indicate ($p \leq 0.501$). The t-value and p-value imply that there is not enough evidence that supports that gender of consumers determine continuous usage. However, the R^2 explains (0.408) 40%, for influence on gender and actual usage, and (0.651) 65% for gender and continuous usage. R^2 equally indicates a good fit for actual usage and continuous usage.

Table 30

SEM Path Analysis Between Age: Behaviour Intention; Actual Usage and Continuous usage

	Path Co-efficient	t Statistics	p Values
Controls			
Age -> Behaviour intention	-0.030	0.715	0.474
Age -> Actual Usage	-0.005	0.110	0.912
Age -> Continuous usage	0.083	2.189	0.029

Behaviour Intention = R^2 =0.229; Adjusted R^2 =0.227, Actual Usage = R^2 =0.423; Adjusted R^2 =0.408 and Continuous usage =R^2 =0.653; Adjusted R^2 =0.651

From Table 30 the path co-efficient indicates a negative (-0.030) relationship between age and behaviour intention. It suggests that the age of consumers negatively determines their behaviour intention. Also, the t-statistics is (t=0.715), while the p-value indicates (p≤0.474). The t-value and p-value shows that there is no sufficient significant relationship that suggests that consumers' age determines behaviour intention. Concerning the relationship between age and actual usage, the path co-efficient indicates a negative (-0.005) relationship, t-statistic (0.110) and p-value (0.912). These values of path co-efficient indicate that there is a negative relationship between age and actual usage. However, the t-statistic is (0.110), while the p-value indicates (0.912). Table 30 also reveals that the path co-efficient indicates a positive (0.083) relationship between age and continuous usage. It suggests that age positively determines continuous usage. Also, the t-statistic is (t=2.189), while the p-value indicates (p≤0.029). The t-value and p-value imply there is evidence that supports consumers' age determines continuous usage because the t-statistic is above 1.96, and the p-value is below 0.05. However, the R^2 values explain behaviour intention (0.227) 22%; actual usage (0.408) 40%, and continuous usage (0.651) 65%, respectively. The R^2 values indicate good fit except for behaviour intention.

Table 31

SEM Path Analysis Between Educational Level: Behaviour Intention; Actual Usage and Continuous usage

	Path Co-efficient	t Statistics	p Values
Controls			
Educational Level -> Behaviour intention	0.064	1.482	0.138
Educational Level -> Actual Usage	-0.095	1.992	0.046
Educational Level -> Continuous usage	-0.061	1.494	0.135

Behaviour Intention = R^2 =0.229; Adjusted R^2 =0.227, Actual Usage = R^2 =0.423; Adjusted R^2 =0.408 and Continuous usage =R^2 =0.653; Adjusted R^2 =0.651

As shown in Table 31, the path co-efficient indicates a positive (0.064) relationship between education and behaviour intention. The value suggests that education positively influences consumers' behaviour intention. Also, the t-statistic is (t=1.482), while the p-value indicate ($p \leq 0.138$). The t-value and p-value suggest that there is not enough significant relationship that consumers' education level determines behaviour intention. Again, the relation between education and actual usage in the path co-efficient indicates a negative (-0.095) relationship, t-statistic (1.992) and p-value (0.046). The values of the path co-efficient indicate there is a negative relationship between education and actual usage. Conversely, the t-statistic and p-value indicate a significant relationship as their values are above and below the threshold level of significance levels. Table 31 also reveals that the path co-efficient has a negative (-0.061) relationship between education and continuous usage. The evidence suggests education negatively determines continuous usage. Also, the t-statistic is (t=1.494), while the p-value is ($p \leq 0.135$). The t-value and p-value imply that there is no evidence that education of consumers determines continuous usage. The lack of significance is because the t-statistic is below 1.96, and the p-value is above 0.05. However, the R^2 values explain the degree of variance of education in behaviour intention to be (0.227) 22%; actual usage (0.408) 40% and continuous usage (0.651) 65% respectively. The R^2 values indicate good fit except for behaviour intention.

Table 32

SEM Path Analysis Between Network Type: Behaviour Intention; Actual Usage and Continuous usage

	Path Co-efficient	t Statistics	p Values
Controls			
Network Type -> Behaviour intention	-0.039	1.055	0.292
Network Type -> Actual Usage	0.060	1.583	0.113
Network Type -> Continuous usage	0.020	0.579	0.563

Behaviour Intention = R^2 =0.229; Adjusted R^2 =0.227, Actual Usage = R^2 =0.423; Adjusted R^2 =0.408 and Continuous usage =R^2 =0.653; Adjusted R^2 =0.651

From Table 32 it can be seen that the path co-efficient indicates a negative (-0.039) relationship between network type and behaviour intention. The evidence suggests that the choice of the consumer network type negatively determines their behaviour intention. Also, the t-statistic is (t=1.055), while the p-value is (p≤0.292). The t-value and p-value imply there is no significant relationship that consumers' network type determine behaviour intention. Besides, the relation between network type and actual usage in the path co-efficient indicates a positive (0.060) relationship, t-statistic (1.583) and p-value (0.113). These values of path co-efficient indicate a positive relationship between education and actual usage. However, the t-statistic and p-value indicate not significant as their values are below and above the significant level. Table 32 also reveals that the path co-efficient indicates a positive (0.020) relationship between network type and continuous usage. It suggests that network type positively determines continuous usage. The t-statistic is (t=0.579), while the p-value is (p≤0.563). The t-value and p-value imply that there is no evidence that supports that the network type of consumers determines continuous usage. The non-support is because the t-statistic is below 1.96, while the p-value is above 0.05. However, the R^2 values explain behaviour intention (0.227) 22%; actual usage (0.408) 40% and continuous usage (0.651) 65%, respectively. The R^2 values indicate a good fit for actual usage and continuous usage, but not a good fit for behaviour intention.

7.5.1 Objective 1: The influence of technology factors on behaviour intention

The focus here is to analyse the relationships between the variables under technology factors and behaviour intention.

Table 33

Objective 1: The Influence of Technology Factors on Behaviour Intention

Direct Effect	**Path Co-efficient**	**t Statistics**	**p Values**
Perceived Usefulness -> Behaviour Intention	0.177	3.579	0.000
Compatibility -> Behaviour Intention	0.066	0.916	0.360
Self-efficacy -> Behavioural Intention	0.159	2.713	0.007
Habit -> Behavioural Intention	0.127	2.324	0.020
Phone Attitude -> Behavioural Intention	0.261	3.786	0.000

Behaviour Intention = R^2 =0.229; Adjusted R^2 =0.227. The *f-squared* for all the paths were above the threshold of 0.15 except Compatibility to BI, which was not significant

The direct effect relationship between perceived usefulness and behaviour intention is presented, in Table 33. Path-coefficient values for perceived usefulness and behaviour intention; compatibility and behaviour intention; self-efficacy and behaviour intention; habit and behaviour intention; phone attitude and behaviour intention are (0.177; 0.066; 0.159; 0.127; 0.261), respectively. These values of path co-efficient indicate a positive relationship between the exogenous and endogenous variables. The values indicate that the exogenous variables positively correlate with the endogenous variables and therefore determine the endogenous variable. Importantly, an increase in the behaviour intentions will increase the measured constructs in the same proportion to their coefficient.

Table 33 also reveals the t-statistic values between perceived usefulness and behaviour intention; compatibility and behaviour intention; self-efficacy and behaviour intention; habit and behaviour intention; phone attitude and behaviour intention to be (3.579; 0.916; 2.713; 2.324; 3.786), respectively. The values in the t-statistics imply that there is sufficient evidence to support that exogenous variables determine behaviour intention. The influence of exogenous variables on BI

is because the t-statistic is above 1.96, except for compatibility, which is below the acceptable threshold.

Table 33 also reveals the p-values between perceived usefulness and behaviour intention; compatibility and behaviour intention; self-efficacy and behaviour intention; habit and behaviour intention; phone attitude and behaviour intention are (0.000; 0.360; 0.007; 0.020; 0.000), respectively. These p-values indicate that there is statistically significant evidence, that exogenous variables determine behaviour intention. The supports for evidence is that the p-values are below ($p \geq 0.05$), except for compatibility, which is above the acceptable (95%) level and therefore is not significant. The degree of their significance in ascending order ranges from perceived usefulness, phone attitude, self-efficacy to habit. Concerning the R^2 value for technological constructs, behaviour intention showed ($R^2 = 0.227$) despite a weak fit. However, it reflects a 22% strength of endogenous variability in the model.

Table 33 demonstrated the direct effect of the technology factors of perceived usefulness, self-efficacy, habit and phone attitude to have a significant influence in determining behaviour intention. Therefore, the hypothesis is supported. On the other hand, compatibility has no significant impact on behaviour intention, and therefore did not support the hypothesis.

7.5.2 Objective 2: The influence of social factors on behaviour intention

The focus here is to analyse the direct influence of the family and peer relationships on behaviour intention.

Table 34

Objective 2: The Influence of Social Factors on Behaviour Intention

Direct Effect	**Path Co-efficient**	**t Statistics**	**p Values**
Family -> Behaviour Intention	0.109	2.192	0.013
Peers -> Behaviour Intention	0.098	2.009	0.041

Behaviour Intention = $R^2 = 0.229$; Adjusted $R^2 = 0.227$. The *f-squared* for all the paths were just above the threshold of 0.15

The direct effect relationship between family and behaviour intention is presented in Table 34. The path co-coefficient values for family and behaviour intention; peers and behaviour intention are (0.109; 0.098), respectively. The values of path co-efficient indicate a positive relationship between the exogenous and endogenous variables. It means that the exogenous positively correlate with the endogenous variables and therefore influence the endogenous variable. Also, an increase in the behaviour intentions will result in a direct increase in the measured constructs in the same proportion to their coefficient. Table 34 indicates the t-statistic value for family and behaviour intention is (2.192), while the value between peers and behaviour intention is (2.009).

The values in t-statistic imply there is significant evidence to support the hypothesis that family and peers determine behaviour intention. In addition, Table 34 reveals that the p-values between family and behaviour intention and between peers and behaviour intention are (0.013; 0.041), respectively. The p-values indicate significant support that the exogenous variables determine behaviour intention because the p-values are below ($p \geq 0.05$), and therefore are significant. Concerning the R^2 value for social factor constructs and behaviour intention ($R^2 = 0.227$ or 22%), the R^2 represents a weak fit on the endogenous variability but does not affect the level of significance.

The results in Table 34 demonstrated that relationship exists between family and behaviour intention, and peers and behaviour intention and therefore supports the hypotheses that both variables have a direct influence on behaviour intention.

7.5.3 Objective 3: The influence of contextual factors on behaviour intention

The focus here is to analyse the direct impact of technical factors such as network type, electricity and data costs on behaviour intention.

Table 35

Objective 3: The Influence of Contextual Factors on Behaviour Intention

Direct Effect	**Path Co-efficient**	**t Statistics**	**p Values**
Network problem -> Behaviour Intention	0.184	2.788	0.000
Power (Electricity) -> Behaviour Intention	0.038	0.818	0.413
Data Cost -> Behavioural Intention	0.185	3.779	0.000

Behaviour Intention = R^2 =0.229; Adjusted R^2 =0.227. The *f-squared* for all the paths were above the threshold of 0.15 except power to BI which was not significant

The direct effect relationship between network type and behaviour intention; power and behaviour intention; data cost and behaviour intention is presented in Table 35. The path co-coefficient values between network type and behaviour intention; power and behaviour intention; data cost and behaviour intention are (0.184; 0.038; 0.185), respectively. The values of the path co-efficient indicate a positive relationship between the exogenous and endogenous variables. It suggests that network type, power, and data cost positively correlate with the behaviour intention. Therefore, an increase in the behaviour intentions will result in a direct increase in the measured constructs in the same proportion to their coefficient.

Table 35 reveals that the t-statistic values for network type, power and data cost are (2.788; 0.818 and 3.779), respectively. These values in t-statistics imply that there is a significant relationship supporting network type and data cost to determine behaviour intention because their values are above 2.0. However, power indicates no relationship and thus does not have strong evidence to determine behaviour intention. The weak evidence in electricity is also reflected in the p-value which is (0.413). Therefore, the p-value for electricity is insignificant and above the acceptable threshold of ($p \leq 0.05$). However, the p-values for network type and data cost indicated a significance level as the values reveal (0.000; 0.000) respectively. Concerning the R^2 for contextual factors and behaviour intention, the adjusted value reveals (R^2 =0.227). Therefore, the R^2 indicates a weak fit, and the strength of endogenous variability in the model to be 22%.

The illustration in Table 35 of the direct effect between network type and behaviour intention; data cost and behaviour intention, supports their hypotheses. However, power (electricity), did not

support the hypothesis because the table values reveal that it does not have enough significant influence.

7.5.4 Objective 4: The direct influence of behaviour intention on actual usage

Table 36

The Direct Influence of Behaviour Intention on Actual Usage

	Path Co-efficient	t Statistics	p Values
Direct Effect			
Behaviour Intention -> Actual Usage	0.596	14.649	0.000

Actual Usage = R^2 =0.423; Adjusted R^2 =0.408. The *f-squared* for direct BI and actual relationship above the threshold of 0.15, while the Q^2 (predictive relevance) was high and above 0.35 (signifying a large predictive relevance)

Table 36 reflects the direct effect relationship between behaviour intention and actual usage. The path coefficient is (0.596), suggesting a positive value and a positive influence of the exogenous on the endogenous construct. The value of the t-statistic (14.649) and the p-value (0.000) reveal a positive significant relationship between the behaviour intention and actual usage. Again, the R^2 shows a 40% variability in the model. Therefore, the results in Table 36 demonstrated that a direct relationship exists between behaviour intention and actual usage and thus supports the hypothesis that behaviour intention influences actual usage.

7.5.5 Objective 5: The direct influence of actual usage on continuous usage.

Table 37

The Direct Influence of Actual Usage on Continuous Use

	Path Co-efficient	t Statistics	p Values
Direct Effect			
Actual Usage -> Continuous usage	0.377	4.797	0.000

Actual Usage = R^2 =0.423; Adjusted R^2 =0.408 and Continuous usage =R^2 =0.653; Adjusted R^2 =0.651. The *f-squared* for direct actual usage and continuous usage relationship was above the threshold of 0.15, while the Q^2 (predictive relevance) was high and above 0.35 (signifying a large predictive relevance)

Table 37 establishes the direct effect relationship between actual usage and continuous usage. Table 37 shows the coefficient is (0.377), suggesting a positive value and a positive influence of actual use on the continuous usage. The effect of the t-statistic is (4.797), while the p-value is (0.000). Both the t-statistic and p-value show strong positive significant influence between actual usage and continuous usage. Moreover, the R^2 reveals 65% variability in the model. Table 37 shows that a direct relationship exists between actual use and continuous usage and thus supports the hypothesis that actual use influences continuous usage.

7.5.6 Objective 6: The moderation influence of satisfaction on continuous usage

Table 38

The Moderation Influence of Satisfaction on Continuous usage

	Path Co-efficient	**t Statistics**	**p Values**
Moderation Effect			
Satisfaction x Actual Usage -> Continuous usage	0.082	2.730	0.006

Usage =R^2 =0.653; Adjusted R^2 =0.651

The *f-squared* for the moderated relationship just below the threshold of 0.15, however, the Q^2 (predictive relevance) was high and above 0.35 (signifying a large predictive relevance)

Figure 9

Satisfaction-Actual Usage Moderation effect.

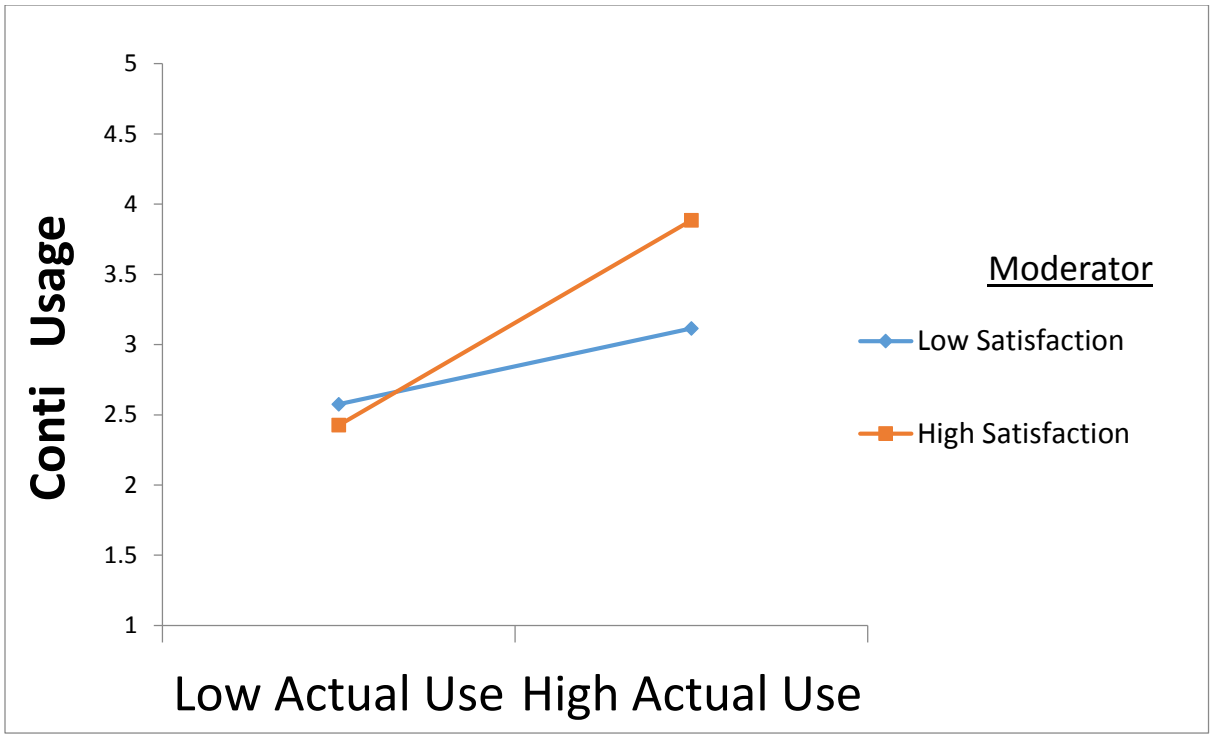


Table 38 reveals the moderating relationship of satisfaction between actual usage and continuous usage. In the moderating analysis, multiplicative approaches were used to create a single indicant out of the product between the two variables. Therefore, for the moderating effect, Table 38 indicates the coefficient is (0.082). It implies a positive value and a positive influence relationship among the constructs. The moderating effect of the t-statistic is (2.730), while the moderating p-value is (0.006). Both t-statistic and p-value show strong positive moderating significant influence. Also, the R^2 reveals a 65% variability in the model. The analysis of Table 38 also provides a supportive argument that satisfaction moderates a strong significance. While Fig 9 strengthen this by pointing out that satisfaction strengthens the positive relationship between actual usage and continuous usage. Therefore, hypothesis 6 is supported, that satisfaction moderates between actual usage and continuous usage.

Table 39

Hypotheses Assessment

Number	Hypothesis	Path Co-efficient	P Values	Decision
H1a	*Perceived usefulness has a significant influence on behaviour intention*	0.177	0.000	Supported
H1b	*Compatibility has a significant influence on behaviour intention*	0.066	0.360	Unsupported
H1c	*Consumer phone self-efficacy has a significant influence on behaviour intention*	0.159	0.007	Supported
H1d	*Habit has a significant influence on behaviour intention*	0.127	0.020	Supported
H1e	*Attitude has a significant influence on behaviour intention*	0.261	0.000	Supported
H2a	*Family has a significant influence on behaviour intention*	0.109	0.013	Supported
H2b	*Peer group has a significant influence on behaviour intention*	0.098	0.041	Supported
H3a	*Network coverage has a significant influence on behaviour intention*	0.184	0.000	Supported
H3b	*Electricity supply has a significant influence on behaviour intention*	0.038	0.413	Unsupported
H3c	*Data cost has a significant influence on behaviour intention*	0.185	0.000	Supported
H4	*Behaviour intention has a significant influence on actual usage*	0.596	0.000	Supported
H5	*Actual usage has a significant influence on continuous usage*	0.377	0.000	Supported
H6	*Satisfaction has a significant moderating influence on actual usage-continuous usage relationship*	0.082	0.006	Supported

7.6 Chapter Summary

In this chapter, an attempt was made to demonstrate the relationships between the variables by describing the descriptive analysis. Other aspects discussed were the reliability and validity measurement scales and the analysis of the structural models. Finally, was the hypothesis assessment to express whether variables were supported or unsupported.

Chapter Eight: Discussion of Findings

8.1 Introduction

This study adopted various models to illustrate mobile commerce acceptance to determine virtual airtime adoption and continuous usage. The findings and discussion in this chapter are based on the data analysis in the previous chapter. Therefore, this chapter identifies how technology, social and contextual factors directly influence behaviour intention and indirectly influence continuous usage, based on the research objectives. The findings and discussion are, therefore, to support or refute the research objectives proposed.

8.2 Control Variable

The control variables adapted for this study were gender, age, education and network preference. The aim was to find out the potential influence such background characteristics would have on the results. Tables 3, 4, 5 and 6 present the specifics with regard to these control variables. Regarding the age group, the largest number of respondents were in the 41-50 age group; therefore, they were not youths but mature adults. The educational data revealed a literate environment, with holders of BSc degrees being the largest group of respondents. In addition, the data showed MTN as the network with the most subscribers. It also points to the male gender as dominant in education, employment and technology use compared to the female gender.

Therefore, telecom stakeholders should create awareness programmes to involve and motivate females in technology adoption (mobile phone activities) to increase mobile commerce engagement. However, Akman and Rehan (2016) noted that the female gender is more involved in technology than the males in Turkey. This calls for further investigation in another context.

Table 30 reveals that age significantly influences continuous usage. The educational level also has a significant impact on actual use. This finding confirms the studies of Ifeanyichukwu (2016) and Nittala (2015) that education and age determine online activities. Again, Akman and Rehan (2016) opined that age and income do not determine mobile commerce adoption. However, gender and network indicate no effect on behaviour intention, actual usage and continuous usage. It means there is not statistical significance between age and gender and behaviour intention.

8.3 Research Objective 1: To determine the extent to which technology factors such as perceived usefulness, compatibility, phone self-efficacy, phone habit and phone attitude influence behaviour intention to adopt virtual airtime purchase

Objective 1a: Perceived usefulness is the degree to which technology enhances consumers' productivity and performance. Studies have revealed the statistical relationship between perceived usefulness and technology adoption on mobile money (Liébana-Cabanillas & Lara-Rubio, 2017; Lin et al., 2019), mobile banking (Sharma et al, 2017), mobile payment (Liébana-Cabanillas & Lara-Rubio, 2017; Trachuk & Linder, 2017). These studies point to a positive relationship between technology adoption and behaviour intention. Conversely, some studies have revealed that perceived usefulness is not significantly related to the adoption of e-commerce (Wang et al., 2016), and mobile payment (Phonthanukitithaworn et al., 2015; Daştan & Gürler, 2016). However, based on the data analysis from Tables 14, 33 and hypothesis 1a, this study has statistical evidence that perceived usefulness significantly influences technology adoption of virtual airtime. The influence of perceived usefulness is because telecom consumers perceived e-recharge to enhance job performance, convenience, as a faster means of making payment and crediting airtime account to continue enjoying the services of the network providers.

This finding is consistent with Barry and Jan (2018), Mahmoud et al. (2018), Saprikis et al. (2018) and Chou et al. (2018), that technology benefits and convenience are keys to behaviour intention. Therefore, telecom stakeholders should embark on effective advertising strategies and promote the usefulness of virtual airtime in complementing their job performance and mobile commerce activities.

Also, this study has validated the theory of TAM that perceived usefulness determines behaviour intention. The validation of TAM is in line with Eyüboğlu and Sevim (2016), Gbongli et al. (2019), and Lai (2017), with regard to mobile services, e-payment and mobile money acceptance.

Objective 1b: Compatibility of technology has a positive relationship with technology adoption (Ahmad et al., 2015; Al-Jabri, 2015; Magsamen-Conrada & Dillonb, 2020), mobile payment (Liu &Tai, 2016; Oliveira et al., 2016; Tang, 2016), and mobile banking (Raza et al., 2017). However, the result in Tables 15 and 33 indicate that compatibility has a negative relationship with virtual airtime technology of mobile commerce in the context of this study. The statistical insignificance

indicates that telecommunication subscribers do not have a high level of compatibility accepting virtual airtime. It suggests that virtual airtime is not consistent with the consumers' existing technology, current situation, values and experiences. The finding explains why certain people still prefer the scratch card method and/or use both scratch card and e-voucher method.

However, the non-significant relationship between compatibility and behaviour intention is consistent with Abebe and Lessa's (2020) findings that compatibility is statistically insignificant with merchant attitude to adopt mobile payment. Importantly, e-voucher adoption is influenced by other factors. The finding of this study, therefore, is inconsistent with the previous studies of Aydin and Burnaz (2016), Humbani and Wiese (2018), Khan and Ali (2018), that compatibility influences mobile payment and mobile commerce adoption. The insignificant influence of compatibility implies it does not drive e-voucher adoption, and therefore requires decision making to enhance mobile commerce growth. Thus, providers should ensure technology complies with existing values and online experience to retain online users and attract potential users. The findings have refuted hypothesis 1b and theory of DOI, where compatibility determines users' adoption of new ideas.

Objective 1c: The concept of self-efficacy has shown to be a crucial significant direct relationship with behaviour intention to adopt the technology (Ding & Er, 2018; Foroughi et al., 2019). The current study provides support for the previous studies. The evidence from Tables 16, 33 and hypothesis 1c shows a substantial statistically prove that self-efficacy has a significant positive relationship with behaviour intention to adopt virtual airtime. Therefore, this result is considered consistent with Ding and Er (2018) and Foroughi et al.'s (2019) findings that self-efficacy is necessary to support the adoption of new technology. The impact of self-efficacy thus enables the consumers to complete virtual airtime independently, with in-built facilities, and in some cases having enough time to achieve any given task. However, this study is not consistence with Weng, et al. (2015), that self-efficacy has no significant relationship with behaviour intention to adopt the technology. Therefore, it is expressed that the participants in this study are people with self-worth and confidence to overcome the challenges of new technology to benefit from it. Again, the outcome of this study indicates that Nigerian consumers are becoming conversant with technology, they get attracted and made themselves adaptive to the current trend to bridge the gap between the

developed and developing nations. Hence, the influence of self-efficacy cannot be overlooked by telecommunication stakeholders to attract and engage more people in mobile commerce activities.

Objective 1d: Habit is a behaviour tendency associated with repeated behaviour due to experience and/or learning. The impact of habits in technology adoption is evident in the studies of Arenas-Gaitán and Ramón-Jerónimo (2015), and Jia et al. (2014) that habit impacts behaviour intention to adopt mobile payment and internet banking, respectively. Again, the findings in Tables 17 and 33 have shown that habit has a direct positive relationship with behaviour intention to adopt virtual airtime. This evidence is consistent with Acharya et al. (2019), Yeh and Tseng (2017) and Gupta and Arora (2019) who found that habit is a salient factor in mobile banking, Internet banking, technology adoption and e-payment.

The significant relationship between habit and behaviour intention in hypothesis 1d indicates that adopting virtual airtime is based on routine behaviour in bill payments, bank transactions, and other online activities. Despite the incompatibility of virtual airtime, the participants have shown engagement in mobile commerce activities due to new and past experiences and knowledge gained from mobile commerce activities. The current finding confirms that habit is a salient influence towards behaviour intention to adoption of virtual airtime technology and basically motivate continuous usage. The study has revealed that telecom adults are in the habit of using virtual airtime, and this habit will reflect in the adoption of similar mobile commerce technology. Again, this study has validated UTAUT2, that habit determines behaviour intention.

Objective 1e: Another technological factor influencing virtual airtime adoption in this study is attitude. The concept of attitude in understanding behaviour intention is paramount to the adoption of virtual airtime technology. The significant relationship between attitude and behaviour intention is found in Fong and Wong (2015) and Ghazali et al. (2018), that attitude determines behaviour intention to adopt mobile commerce. Additionally, in Ting et al.'s (2016) study revealed that consumers' attitude influences mobile payment behaviour intention. Thus, based on these premises, hypothesis 1e, Tables 18 and 33 results indicate a relationship between attitude and behaviour intention. Therefore, virtual airtime is not in contrast with subscribers' belief, feelings and behaviour intention. This study reveals that participants' overall attitude towards virtual airtime is positive. The reason could be their educational background, socioeconomic status, convenience and awareness. Besides, most participants indicate that virtual airtime is a good idea,

based on its benefits. The finding also confirms the studies of Kumar et al. (2019) and Liébana-Cabanillas et al. (2017a), that attitude is a significant factor in technology adoption. Therefore, this study suggests that attitude has a directly significant relationship to predict the adoption of mobile commerce and virtual airtime.

8.4 Research Objective 2: To examine the influence of social factors such as family and peers on the behaviour intention to adopt virtual airtime.

Objective 2a: Social influence is the degree of association and engagement with people that determine, predict, or influence the behaviour intention of another. In other words, the level or degree of influence on the individuals can be weak or strong, depending on the perception of other suggestions. Studies such as Abrahão et al. (2016), Mugambe (2017), Musa et al. (2015) and Oliveira et al. (2016) point out that social influence is positively related to behaviour intention to adopt mobile payment. Other related studies carried out by Lu et al. (2017b), Mokhtar et al. (2017) and Forenbacher et al. (2019) confirmed that families and social engagements have a direct positive influence on behaviour intention to adopt mobile banking, mobile payment and mobile phone technology.

In line with the studies mentioned above, hypothesis 2a, Tables 19 and 34 confirm that families have a direct positive significant relationship with virtual airtime adoption. Therefore, the more family members perceive others as knowledgeable, important the more the intention to adopt mobile commerce. However, the present study is not consistent with the findings of Aydin and Burnaz (2016) and Ravichandran et al. (2016) that influential others have no significant influence on the adoption of mobile banking. Therefore, this study supports the view that family significantly influences behaviour intention to adopt mobile commerce as family-base style. The study also reveals that Nigerian citizens do not live an individualistic lifestyle but a collective lifestyle structure. The finding of the study is in line with Asawo and Blue-Jack (2016) and Olowookere et al., (2021), that Nigerian have collective culture The finding also shows that adults can be under social pressure to exhibit a change in attitude towards a product or service. Again, the current research has validated UTAUT2, that social pressure influences technology adoption of virtual airtime in the Nigerian context.

Objective 2b: Another aspect of social factors examined in the study is peer influence on behaviour intention. Peer influence has to do with a change in behaviour intention due to social affiliation, contacts, and association with people of like attitudes. The impact could arise from social, cultural, economic, political or religious groups to which consumers belong. The studies of Wasfi (2014) and Zhao and Kurnia (2014) noted that peer influence determines behaviour intention to adopt mobile payment services by telecommunication consumers. What Wasfi (2014), and Zhao and Kurnia (2014) mean is that telecommunication consumers who perceive peers with high credibility will express higher intention to adopt new products and vice versa. In line with the above studies, Aydin and Burnaz (2016), Gulati (2017), Mokhtar et al. (2017) and Yadav et al. (2016) argued that peers have a significant influence on behaviour intention to adopt online shopping and mobile commerce.

Therefore, the analysis in Tables 20, 34 and hypothesis 2b confirm that peers have a strong positive significant influence on the behaviour intention to adopt virtual airtime. The findings supported hypothesis 2b and reveal that peer pressure influences taste, lifestyle, values, ideology, perceptions, opinions, identity and attitudes of members to conform with what they are exposed to. However, this study is contrary to Gupta and Arora (2019) and Foroughi et al.'s (2019) findings that social engagement has an insignificant impact on mobile payment and e-banking adoption. The inconsistency from the finding could mean that when peers' impact is not strong enough, the attitudinal change for behaviour intention is ineffective. However, the objective statement that the peer group has a significant influence on behaviour intention is supported.

8.5 Research Objective 3: To investigate the extent to which contextual factors such as Internet coverage, electricity and data cost, determines behaviour intention to adopt virtual airtime purchase

Objective 3a: Contextual factors in this study are available facilities that enhance the adoption of technology. The emphasis here is that consumers' knowledge of the supportive environment will enhance behaviour intention, while the non-supportive environment will inhibit the technology adoption of a specific technology. In the studies conducted by Nwakamma et al. (2018), Adebiyi et al. (2016) and Pumim et al. (2017) to determine the behaviour intention of telecommunication consumers, the study revealed that network connectivity and quality of services have a positive influence in determining mobile subscribers' preference for telecommunication service providers

and patronage. Dube and Gumbo (2016), Momanyi et al. (2020), as well as Pankomera and Greune (2018) noted that an unstable network has a negative influence on technology adoption.

Therefore, based on the findings in Tables 21 and 35, this study reveals a strong significant positive relationship between network availability and behaviour intention to adopt virtual airtime. This finding is consistent with Ammar and Ahmed (2016), Asongu (2018), Sharma (2014) and Adebiyi et al. (2016), that the quality of services influence behaviour intentions of telecom consumers. However, the finding is not consistent with Oliveira et al. (2016), that a negative relationship exists between available facilities and behaviour intention for technology adoption.

The evidence in this study, therefore, confirms that a perceived supportive environment in terms of coverage, and a timely, accessible and reliable network enhance and drive mobile commerce engagement. However, stakeholder and marketers should ensure steady and efficient services to promote mobile commerce adoption. This study has indicated that MTN is the preferred network as indicated in table 6 and figure 8 having 48% of the Nigeria subscribers market share. The reason is likely that their services are better than their competitors. Therefore, network providers must identify the most responsive alternative technology to attract potential users and maintain current users. Again, the research objective, hypothesis 3a is supported and the theory of UTAUT2, that facilitating conditions determine technology adoption, is validated.

Objective 3b: Another contextual factor investigated in this study was electricity. Electricity, often referred to as power, is a key variable that influences the adoption of a mobile phone. Simply put, the non-availability of power is a barrier to owning a mobile phone (Armey & Hosman, 2016) and engaging in technology adoption (Okolo et al., 2018). In the studies conducted by Tarhini et al. (2019), and Twi-Brempong et al. (2020), electricity had a positive influence in behaviour intention to adopting the technology. However, the findings in Tables 22 and 35 reveal that electricity has a negative significance on behaviour intention to adopt virtual airtime. Therefore, this study is not consistent with Tarhini et al., (2019) and Twi-Brempong et al. (2020) and hypothesis 3b was not supported. However, it is consistent with Oliveira et al. (2016), that available facilities do not influence technology adoption. The non-influence of electricity in e-voucher adoption could be that it is not a regular or daily activity, besides users may find an alternative to charge their phones batteries even when the power is out.

This category of respondents has independent income (can afford generators at home); they are educated, working adults (with access to electricity during working hours) and have experienced the benefits and convenience of virtual airtime technology. On the other hand, the result may differ when considering the youths, uneducated, unemployed, the rural telecom consumers as well as a non-supportive environment. It, therefore, calls for further study in another context.

Objective 3c: The adoption of technology is not without an associated cost. The empirical studies of Deshprabhu -Sadekar and Pereira (2018), Han et al. (2016), Humbani and Wiese (2019), Osakwe and Okeke (2016), Singh et al. (2018), Aziz and Wahid (2018) and Nwakamma et al. (2018) all revealed that perceived cost is positively significant with technology adoption. Also, Tables 23 and 35 indicate that communication cost has a strong significant relationship with virtual airtime adoption. Therefore, the finding of this study is consistent with prior studies. Thus, when the cost of engaging in online activities such as bank charges for services, debiting the account without a corresponding crediting of airtime, subscription costs, is high, telecommunication consumers will be unwilling to adopt innovative services. On the other hand, when the cost associated with communication is low, consumers will be very willing to adopt the technology. Therefore, this study is inconsistent with Alkhaldi (2019), Moorthy et al. (2017), Upadhyay and Jahanyan (2016) and Ojiaku and Osarenkhoe (2018), that cost has no significant relationship with technology adoption.

Based on the finding and hypothesis 3c statement, there is a strong positive significant relationship between cost and behaviour intention to adopt an e-voucher of mobile commerce. Again, the Nigerian telecommunication consumers are sensitive to services cost/charges associated with online activities. Therefore, data cost should be cheaper to drive more adoption because consumers will often measure whether the cost outweighs benefits or vice versa (Baabdullah et al., 2015). However, consumers who perceive benefits over cost, will be engaged and encourage others - like families and peers - to adopt mobile commerce.

8.6 Research Objective 4: To determine whether behaviour intention to adopt virtual airtime influences actual usage

Behaviour intention is the likelihood or decision of a consumer to be involved in an action. Thus, it is necessary to understand the relationship between behaviour intention and actual usage of technology in the context of virtual airtime adoption. Based on the studies by Aslam et al. (2017),

Koloseni and Mandari (2017), Teng et al. (2018) and Islam (2017), it was revealed that perceived usefulness, subjective norm, attitude, and facilitating conditions among other variables are positively significant with behaviour intention to adopt technologies. Again, the result in Tables 24 and 36 has indicated that behaviour intention has a strong significant direct influence on actual usage of the e-voucher. This finding is consistent with Sair and Danish (2018), Lwoga and Lwoga (2017), Rehman et al. (2019), Zhang et al. (2018) and Farah et al. (2018) that perceived usefulness, attitude, habits, and the social factors significantly impact behaviour intention to adopt the technology.

The table values reveal that telecom subscribers are willing to use virtual airtime despite other prevailing circumstances such as compatibility and power, which may impose a barrier to its adoption. Again, the results of this study reveal that eight out of ten proposed antecedents have statistically significant effects on the behaviour intention to adopt virtual airtime. The findings, therefore, indicate a high tendency to adopt mobile commerce and suggest that these antecedents' factors need concentration to boost its impact on behaviour intention and continuous usage. Again, the research objective is supported, based on the evidence that behaviour intention has direct predictive power in determining actual use of technology.

8.7 Research Objectives 5: To examine the influence actual usage has on virtual airtime continuous behaviour usage

Actual usage is a deliberate effort by a consumer to know about a product or service for decision making. Decision making in this regard determines the continuous usage or intermittent usage of a specific technology. One aspect this study intended to fill is determining the continuous usage of virtual airtime after its initial adoption. Some extant studies have identified that actual usage influences the continuous usage of technology (Akman & Rehan, 2016; Malik et al., 2017; and Chen & Li, 2017). These studies noted that actual usage influences post-behaviour in mobile banking, mobile commerce and mobile payment adoption.

In line with a similar study, Tables 25 and 37 indicate a strong direct significant relationship between actual usage and continuous usage of virtual airtime adoption. Therefore, this study has statistical evidence that actual usage of technology determines it continuous usage by the power of R^2 =65% to explain the continuous usage. The findings of this study are consistent with the

empirical research of Baabdullah et al. (2019), Rodríguez-Torrico et al. (2019), and Yeh (2020), that actual usage has a significant relationship with continuous usage of technology.

As indicated in the conceptual model and research objective, the significant relationship between behaviour intention and actual usage, actual usage and continuous usage implies that demand for virtual airtime services will continue in the future. Again, this study has validated the ECT models in explaining consumers' continuous usage of technology. Therefore, the research objective that actual usage influences continuous usage is accepted.

8.8 Research Objective 6: To evaluate the moderating effect of the customer satisfaction between actual use and continuous usage of virtual airtime purchase

The impact of satisfaction on continuous usage behaviour cannot be underrated. In this study, consumer satisfaction was measured as moderation between actual usage and continuous usage of virtual airtime. Studies conducted by Lai et al. (2016), and Chen and Li (2017) indicated that satisfaction significantly influences the continuous usage of technology and mobile payment adoption. Although these studies measured satisfaction as a mediating factor, the analysis revealed a positive relationship between consumers' satisfaction and continuous usage. Other studies that have confirmed the strong impact of satisfaction in continuous usage of mobile payment, mobile banking and buying decisions are by Cao et al. (2018), Foroughi et al. (2019) and Humbani and Wiese (2019). However, Park et al. (2017) noted that satisfaction has no significant influence on the continuous usage of mobile payment.

The results from Tables 26 and 38 illustrate a strong positive significant influence of satisfaction in moderating between actual usage and continuous usage of virtual airtime. The finding is consistent with extant studies mentioned in this research on the predictive power of satisfaction as a mediating and moderating variable in determining continuous usage behaviour with regards to technology. The finding also suggests that an increase in user satisfaction will increase the tendency to continue mobile commerce services. Again, the moderation effect on actual usage and continuous usage of technology such as virtual airtime is most likely accentuated by the delivery of satisfactory service from the telecommunication companies.

Therefore, network providers should increase service benefits and convenience to increase consumers' satisfaction and, consequently, continuous usage. The finding, therefore, suggests that

service satisfaction derived from virtual airtime will likely form a habit and positive attitude towards mobile commerce. Additionally, this study has validated the predictive power of ECT as a model fit to determine the effect of satisfaction in technology adoption. Therefore, the research objective that satisfaction moderates the influence between actual use and continuous usage is supported.

8.9 Chapter Summary

This chapter started with the findings of the control variable. It has discussed the research findings by relating the research objectives and hypotheses with the data analysis. The chapter has specified the research objectives that were supported and those that were unsupported. Also, the chapter has explained the relationships between the independent, mediating, moderator and dependent variables. Apart from compatibility and electricity that did not support the research objectives, other objectives revealed positive significance.

Chapter Nine: Conclusion, Recommendations, Implications, Limitations and Further Study

9.1 Introduction

This study was focused on virtual airtime purchases of the Nigerian consumers' attitude, behaviour and continuous usage to determine factors that influence adopting virtual airtime of the mobile commerce services. Therefore, the present study has developed an integrated conceptual framework to cover the relevant constructs identified in existing mobile commerce literature. This section will discuss the research conclusions, make recommendations, contributions, limitations and suggestions for further studies.

9.2 Summary of Findings

This section presents a summary of the research findings. The findings have revealed the factors determining the behavioural intention and continuous usage of virtual airtime in Nigeria.

Firstly, concerning the factors that influence telecom consumers' behaviour intention, the finding points out that the technical factors at the personal level are fundamental to enhancing virtual airtime adoption of mobile commerce, except for compatibility. These variables (perceived usefulness, attitude, self-efficacy and habit) are significantly associated with behaviour intention that results in continuous usage. It means that consumers' online benefits, convenience, positive attitude, self-confidence and positive online experience influence virtual airtime adoption. Conversely, non-convenience, negative attitude due to bad experience, lack of confidence and non-online habit will impede virtual airtime adoption.

Another finding is that compatibility has no significant influence on virtual airtime adoption. Yet it does not mean that compatibility cannot hinder other technology adoption as the more compatible a technology is, the higher the level of adoption will be. However, the non-significant influence of compatibility may be overlooked by the participants of this study due to their self-confidence, positive attitude, perceived usefulness and the social impact.

Secondly, the study finds that telecommunication consumers are directly influenced by social environments. It implies that social factors are crucial drivers to adopt virtual airtime due to

perceived social benefit, a socially positive attitude towards innovation, and perceived social pressure from others. The finding also reveals that the Nigerian culture is not an individualistic but rather a collective system. This explains why families and peers with credible attitudes influence the behaviour of others towards technology adoption and, in particular, virtual airtime adoption.

Thirdly, concerning the contextual factors and behaviour intention, the research finds that telecom consumers are sensitive to cost and network coverage. High costs and irregular network coverage will discourage virtual airtime adoption, while cheaper data costs and reliable network coverage will promote mobile commerce adoption. However, electricity is not significant to virtual airtime adoption. The reason could be due to an alternative power supply source, achieved by a generator. Therefore, e-voucher consumers do not allow power failures to discourage them from engaging and benefiting from online activities.

Fourthly, the finding shows a significant direct relationship between behaviour intention and actual usage. It means that behaviour intention to adopt virtual airtime directly influences actual use. Fifth, the finding indicates a strong positive relationship between actual usage and continuous behaviour towards virtual airtime. The implication is that the current consumers of virtual airtime will likely continue its use. Simply put, actual usage has a direct relationship with continuous usage of virtual airtime.

Interestingly, the finding reveals that the continued purchase of virtual airtime is strongly moderated by consumer satisfaction. Therefore, network providers should pay attention to consumers' satisfaction in order to promote continuous usage. Finally, the findings provide evidence that the integrated conceptual model is fit and has indicated a better understanding of the factors that drive and inhibit virtual airtime behaviour intention and continuous usage. These findings will improve the competitive strategy of telecom providers as well as online service consumer benefits.

9.3 Conclusion

This research investigated the factors determining adoption and continuous usage of mobile commerce because of the challenges in continuous usage of technology. Besides, mobile commerce is now a crucial marketing method in the 21st century to ensure the survival of firms, individuals and governments. The research has focused on determining the technical, social and

contextual factors influencing continuous usage of e-voucher services in the Nigerian telecommunication context. Interestingly, studies have addressed the issues relating to general mobile banking, mobile payment, mobile shopping, and mobile commerce with a lack of literature on the emerging mobile airtime voucher. This study has provided an overview of the current virtual airtime usage and continuous usage in mobile commerce adoption. The research was based on four integrated models of information system, namely TAM, UTAUT, DOI, and ECT. The conceptual model had ten antecedents, two mediators, one moderator and one dependent variable. The study presents its conclusions based on the research questions posed in the initial chapter.

First research question: What factors influence the virtual airtime purchase attitude and continuous usage of mobile phone customers?

The findings indicate that 11 factors out of 13 antecedents found support in this study. Findings reveal that the factors that influence virtual airtime purchase attitude and continuous usage are perceived usefulness, phone attitude, network quality, data cost, self-efficacy, family, habits and peers. These are the drivers of virtual airtime adoption and continuous usage by mobile phone customers. Therefore, telecom providers should improve on these drivers in order to encourage the adoption of virtual airtime, controlled by the age and educational levels of consumers.

Second research question: Does perceived usefulness, compatibility, phone self-efficacy, phone habits, and phone attitudes influence virtual airtime purchase?

Concerning perceived usefulness, this study has confirmed that virtual airtime is perceived to have a better advantage over the scratch card. These benefits are associated with the ubiquitous nature of crediting airtime, 24/7 services, less cash handling, and timesaving in waiting or queuing to purchase scratch cards. Thus, perceived usefulness has encouraged satisfied consumers to continue with mobile commerce. It means that consumers' expectation that using innovation to enhance their productivity and performance is fulfilled. Therefore, perceived usefulness is a factor used to determine the behaviour intention to adopt a virtual airtime purchase.

This study suggests that self-efficacy is related to virtual airtime behaviour intention. It is opined that when consumers are challenged with a technological lifestyle, irrespective of age, the tendency to exercise their competence, confidence, intellectual ability and self-belief to succeed is satisfied. Again, consumers' determination to independently or dependently take advantage of benefits

offered by innovation is motivating technology adoption. Therefore, when consumers are confident with innovative services, this causes them to prefer the technological method as against the traditional norm. This study has provided evidence that high phone self-efficacy influences behaviour intention.

Habit in this study is a crucial factor influencing telecom consumers adopting virtual airtime of mobile commerce. This study reveals that Nigerian consumers are addicted to using virtual airtime and this, in turn, reflects their perception and readiness towards continuous technology usage. The finding also indicates that consumers are comfortable using virtual airtime because habit enables them to perform the virtual airtime task automatically despite its incompatibility. This study has opined that consumers with a high habit tendency to adopt mobile commerce will have higher automaticity to use virtual airtime. Besides, repeated similar online activities like banking transactions, money transfer, and making purchases produces a habitual attitude that can directly enhance cues to do something new. Therefore, it is evident that habit influences the behaviour intention of virtual airtime technology.

The findings of this study reveal that the consumers' behaviour intention is a determinant of their attitude embedded in their minds. This attitude is the sum of perceived usefulness, habit, self-efficacy, social factors, a supportive environment and satisfaction that influence virtual airtime adoption. Also, consumers of telecom innovative services have perceived a clear benefit of using virtual airtime that has influenced their behaviour intention. Therefore, this study concludes that attitude is an important variable that influences behaviour intention.

The study points out that compatibility is not significant to the adoption of virtual airtime. Put differently, the Nigeria telecom consumers are not disturbed by the level of incompatibility of virtual airtime as it was not a drawback to virtual airtime adoption and, therefore, has no relationship with behaviour intention. It implies that other factors like self-efficacy, habit, perceived benefits, and attitude are the driving forces behind consumers' adoption of virtual airtime. However, this does not mean that compatibility cannot hinder or become a barrier to other technology adoption. The fact is that the more compatible a technology is, the more likely it is that the level of adoption will increase. However, this finding did not support the research objective that compatibility influences behaviour intention to adopt the virtual airtime of mobile commerce.

Third research question: Does the influence of family and peers affect virtual airtime purchase?

The outcome of this study indicates that the family has a significant influence on technology adoption. It means that a consumer family tends to drive the demand for virtual airtime behaviour intention and usage. The impact of family on mobile commerce adoption motivates consumers to believe in the opinions, decisions and suggestions of credible family members around them. Thus, the collective family lifestyle enhances other members' engagement in perceiving virtual airtime as a useful, convenient and beneficial technology that facilitates payments. Thus, family leads consumers to develop a favourable perception for behaviour intention.

The findings also reveal that peers have a positive relative impact on virtual airtime adoption of mobile commerce. It means that direct interaction with peers has an influence on consumers' expectations to conform to group pressure. Therefore, the more telecom consumers identify that an association expects them to function in a particular way, the more likely the demand for such services. Also, peer-association explains why telecom consumers perceive virtual airtime as a social attitude in making purchases. Therefore, peers play an important role in enhancing mobile commerce engagement and, in particular, virtual airtime adoption.

Fourth research question: Does Internet coverage, electricity supply, and data cost influence the virtual purchase of airtime?

Another finding of this study is that regular network coverage drives consumers' behaviour intention, while irregular network coverage inhibits virtual airtime adoption. Network consistency is among other variables helping to fulfil telecom consumers' expectations. It is evident that, when consumers experience non-breaking of signal or network dropout during online transactions, it increases benefits, saves time, and promotes a positive attitude, habit and satisfaction. Besides, this will build confidence with network providers. Conversely, the inconsistency of network availability is a reason why subscribers are resisting mobile commerce adoption. Therefore, this study suggests that Nigerian consumers depend on timely, available Internet network coverage to increase mobile commerce adoption. Besides, this study concludes that high-quality network services will influence users, potential users and non-users to adopt mobile commerce.

Concerning data cost, this study posits that cheaper data cost is an inducement to virtual airtime adoption. Basically, when telecom consumers realise that their benefit in terms of convenience, comfort, and satisfaction exceeds data cost, the higher the likelihood to accept innovation services. Thus, cheaper data cost will enable consumers to remain connected to friends, family and business

partners. However, this study predicts that high data cost reduces motivation and thus discourages online engagement. Therefore, this study opines that Nigerian consumers depend on cheaper data cost to increase engagement and participation in mobile commerce activities.

This empirical study reveals that electricity has no direct relationship with behaviour intention to adopt virtual airtime. The participants in this research are indifferent when it comes to accessing national electricity because they have access to an alternative power supply. This access is through self and organisational generated power supply via a generator. Most of them will engage in online activities during working hours to make use of the employer's electricity supply, thereby robbing the organisation of time, for personal interest. Again, the non-significant impact of electricity, due to an alternative power supply, explains why there is a continues increase in people owning mobile phones, subscribing for data, and involved in mobile commerce activities. Also, the respondents are working class, educated adults and prefer to overlook the inconvenience of inconsistency in electricity, rather taking advantage of the convenience, benefit and satisfaction associated with technology adoption. However, a regular electricity supply is likely to encourage the youths, non-working segment, rural dwellers and other disadvantaged telecom consumers to engage in mobile commerce. Therefore, this study did not support the research objective that electricity influences virtual airtime behaviour intention.

Fifth research question: Does behaviour intention to adopt virtual airtime influence actual usage?

Another salient finding in this study is that consumer behaviour intention directly influences actual usage of virtual airtime. The sum factors of perceived usefulness, self-efficacy, habit and attitude, social factors, Internet coverage, and data cost, that directly determined behaviour intention, indirectly resulted in actual usage. Therefore, it is opined that behaviour intention determines actual behaviour.

Sixth research question: Does the actual usage of virtual airtime influence continuous usage?

Another finding of this study is that actual usage significantly influences continuous usage of virtual airtime. The desire to continue using technology services and mobile phone services is that, in this 21st century, the mobile phone has become a daily aspect of our lives. Besides, firms must have to measure up to some exclusive customers' demand for 24/7 services and regulatory policies. Therefore, it is evident that the actual usage of virtual airtime influences continuous behaviour.

Seventh research question: Does satisfaction moderate actual usage and continuous virtual airtime usage?

Besides actual usage directly determining continuous usage, this study also reveals that satisfaction significantly moderates between actual usage and post-purchase behaviour. The moderation evidence between actual use and continuous usage suggests that consumer benefits and convenience derived from the e-voucher have formed habits, positive attitudes, increased self-efficacy, and have become a social norm. Therefore, satisfaction is a crucial factor that moderates actual usage and post-purchase behaviour for virtual airtime and, subsequently, mobile commerce.

In summary, 11 predictive factors supported mobile commerce continuous usage, while compatibility and electricity were unsupported. Besides, three of the IS theories adopted supported the research objective, except for DOI. Therefore, the study recommendations are summarised below.

9.4 Recommendations

This study offers some insight that will benefit network providers, stakeholders, mobile commerce marketers and nations. It recommends that to achieve an increase in behaviour intention to adopt virtual airtime purchase requires a regular survey by network providers and stakeholders. The survey will provide evidence of what Nigerian consumers perceive as useful in innovative services, bearing in mind that consumer taste is not static but changes over time. Therefore, an understanding of what consumers consider convenient and beneficial at a specific point in time will enhance technology adoption.

This study also recommends sponsorship for digital training programmes by network providers and government at all educational levels. The training will enhance positive attitudes, good habits, and self-efficacy towards the adoption and continuous usage of innovative ideas. Concerning digital training, this can be achieved by providing ICT units to government schools at all levels to motivate the underprivileged citizens to engage in innovative services at an early age. The emphasis on public schools is because most private owned academic institutions have well-equipped ICT units. Again, the impact of such training and programmes will manifest in increased individual and economic development. This study also recommends that, apart from digital sponsorship at schools, the government should encourage network providers to provide free but

limited data at specific hours of the day to academic institutions. This incentive will motivate educated consumers to engage in digital activities, and thus enhance mobile commerce penetration. Other benefits will include consumer willingness to embrace technology and overcome challenges of incompatibility in new ideas. Besides, a literate and well-informed environment will be more inclined to adopt and continue technology usage than an ignorant, illiterate population, because education impacts technology adoption as shown in table 31.

Regarding social factors, network providers, mobile commerce service providers, and the government must embark on intensive awareness advertising to inform and educate telecom consumers of the benefits of adopting mobile commerce. Information dissemination can be through social media posters, sports sponsorship, pageant sponsorship, WOM, posters, and informative flyers to pressure groups to accelerate and stimulate adoption. These strategies are necessary for effective uptake of e-voucher and mobile commerce in the country.

Based on the finding that Internet coverage and data cost affect adoption, this study recommends that the government reduces heavy multiple taxations, levies and fees imposed on network service providers. These fees are levies on the importation of telecommunication infrastructures, levies on equipment installations and licensing fees. These levies are part of operational costs incurred by network providers that are a barrier to the efficient and quality services they render. Besides, the final costs are borne by the consumers in forms of data cost. Therefore, reducing these fees and duties will reduce operation costs, promote an enabling and competitive environment for network providers, catalyse broadband penetration and improve service quality. Thus, with improved quality services and lower data cost, the signal and network dropout during online transactions will be minimised and stimulate mobile commerce adoption. Therefore, service providers should ensure the right environment (facilities), to commensurate the data cost since consumer are cost sensitive to drive technology adoption for both organization and nation growth.

With regard to the direct roles of behaviour intention, actual usage and the moderating role of satisfaction, this study has provided evidence that continuous usage of virtual airtime and mobile commerce in general, is encouraging. The study recommends that stakeholders in the telecom sector ensure that the consumers' rights are protected, services are reliable, accessible, and affordable. This action will increase consumer satisfaction, perceived usefulness, consumer readiness, growth and continued use of the e-voucher and mobile commerce in the country.

Therefore, the more mobile phone users gain satisfaction in virtual airtime adoption, the higher the continuous usage and adoption of similar service innovations.

9.5 Contribution

The contributions of this study are discussed, under theoretical, empirical, contextual, and practical implications.

9.5.1 Theoretical Implication

Theoretically, there is a lack of academic literature explaining virtual airtime adoption and consumer attitudes in the telecommunication sector in developing contexts like Nigeria. The current research has contributed by providing the literature regarding the e-voucher adoption to enhance patronage in mobile commerce technology.

Again, the moderation effects of satisfaction between actual adoption and on the level of continuous usage have not received adequate attention. Therefore, this study has theoretically contributed to the understanding that consumer satisfaction has a moderating effect in enhancing e-voucher adoption and continuous usage. Thus, consumer satisfaction has a predictive impact on consumer post-purchase behaviour and the growth of mobile commerce.

This study is an early study that has integrated TAM, UTAUT, DOI and ECT to consider the e-voucher of mobile commerce consumers' behaviour intention, actual usage and continuous usage. Therefore, the integrated model has contributed to the relevant variables towards the adoption of virtual airtime services. These identified variables will enhance the consumers' online buying experience in the Nigerian telecommunication industry and mobile commerce in general. Finally, the finding has confirmed and validated the theories of TAM, UTAUT and ECT, except for DOI where compatibility was not significant with the adoption of virtual airtime.

9.5.2 Empirical Implications

Empirically, this study is among the first to determine the continued usage of virtual airtime technology after its initial adoption, in the context of Nigerian telecommunication consumers. The study has offered some key variables influencing the adoption and continued use of the e-voucher, in the context of a developing country, to enhance the quality of lives. Again, most studies

conducted on telecommunication consumer behaviour intention in Nigeria have been analysed using regression. However, this study has applied SEM-PLS in data analysis to proffer behaviour adoption, satisfaction and continuous usage.

Another empirical contribution is that studies have focused on general mobile commerce adoption such as mobile money, mobile banking, and mobile payment, with less emphasis on specific aspects of mobile commerce like e-voucher adoption. Therefore, the present study has investigated a particular subset of mobile commerce technology to identify predictors of its adoption and continued intention.

Additionally, the emphasis on technology has often been on youth segments to determine adoption. However, the understanding of mobile commerce adoption through e-voucher was achieved using the adult segment. The implication is that the demand for technology adoption and continuous usage by the youth segment has increased along with the adult segment. Thus, the adult segment can be a target to increase sales and mobile commerce activities.

9.5.3 Contextual Implications

This study has focused on Nigeria, a developing country, to consider the adoption of the e-voucher in the context of network coverage, data cost and electricity as it drives and inhibits technology adoption and continued usage. E-voucher adoption is a vital tool for economic growth as demand for the voucher will continue to increase. The increase will result from a rising population, awareness, benefits, government policies, regulations and digital engagement. Besides, without data purchase, there cannot be online activities.

Again, the study of the e-voucher has provided insight into a better explanation and understanding of mobile commerce behaviour intention, satisfaction and continuance adoption. The enquiry into the consumers' attitude towards the e-voucher has revealed readiness in welcoming government lite cash policy to drive nationwide and international mobile commerce services forward.

Another contextual implication is reducing heavy duties and taxes on telecommunication infrastructure to enhance network coverage, cheaper data cost and mobile commerce adoption. It will encourage the advantaged and disadvantaged consumers to benefit by participating in mobile commerce services.

9.5.4 Practical Implications

Practically, this current study has focused on the importance of technology. The study, therefore, promotes the adoption of e-voucher purchase, electronic payment and lite cash policy to expand the adoption of mobile commerce in Nigeria. Another practical implication is that the satisfaction derived from virtual telecom services has indicated a positive mentality in the consumer attitude towards continuous usage. Another practical evidence is the use of advertising media by stakeholders to educate, inform and demonstrate that the e-voucher is a better alternative to the scratch card. The intensive creation of awareness will influence the Nigerian collective social structure to exhibit technology adoption of similar services. Finally, the adult segment, which attracts less attention in technology adoption, is a crucial target for virtual airtime continuous usage. Besides, adults are switching to the mobile phone as a lifestyle in our technology age.

9.6 Limitations and Further Study

Despite the findings, conclusions and contributions of this study, it is not without certain limitations. First, research was based on a single specific mobile commerce service (virtual airtime) and a single economic sector (telecommunication industry). This has restricted data collection from other consumers of mobile commerce service participants. Therefore, further studies should incorporate more than one aspect of mobile commerce consumers' services. Data were restricted to only the educated, urban dwellers, working class and adults segment. Therefore, the data do not represent the behaviour intention, usage and continuous use of the uneducated, rural dwellers, unemployed and youth attitudes towards e-voucher adoption. Hence, further research should incorporate all age groups, rural/urban populations, uneducated/educated, unemployed/employed to get a better representation of the whole behavioural attitude of e-voucher consumers. The study used a cross-section in its data collection. Therefore, further studies should employ longitudinal studies and other research methods and approaches for data analysis. Testing the current model with longitudinal data will enhance the generalisability of the findings.

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APPENDIX

Approval Letter from Delta State University, Abraka, Delta State.

DELTA STATE UNIVERSITY
P.M.B. 1, ABRAKA, NIGERIA
OFFICE OF THE REGISTRAR

REGISTRAR
D. A. Urhibo, B.Sc. (Hons.) Uniport, MILR (Delsu), MANUPA, FICA, FIPMD

Tel: 08035019318, 07053066291
E-mail: delsuregistry@yahoo.com
registrardelsu@gmail.com

Your Ref:

Our Ref: DELSU/REG/L.56

Date: 7th January, 2019

Sebastina Okofu
Department of Marketing
School of Economics and Business Sciences
Faculty of Commerce, Law and Management
Univerity of the Witwatersrand
Johannesburg, South Africa.

Dear Sebastina,

RE: LETTER OF PERMISSION

I am directed to acknowledge receipt of your letter dated 27th December, 2018, on the above subject matter and to inform you that the *Vice-Chancellor, Professor Victor F. Peretomode*, has approved your request for permission to use the staff and postgraduate students in the Delta State University as participants in your current Ph.D. research titled, "Determinants of Virtual Airtime Purchase and Continuous Usage in the Nigeria Mobile Phone Industry, the Case of Delta State".

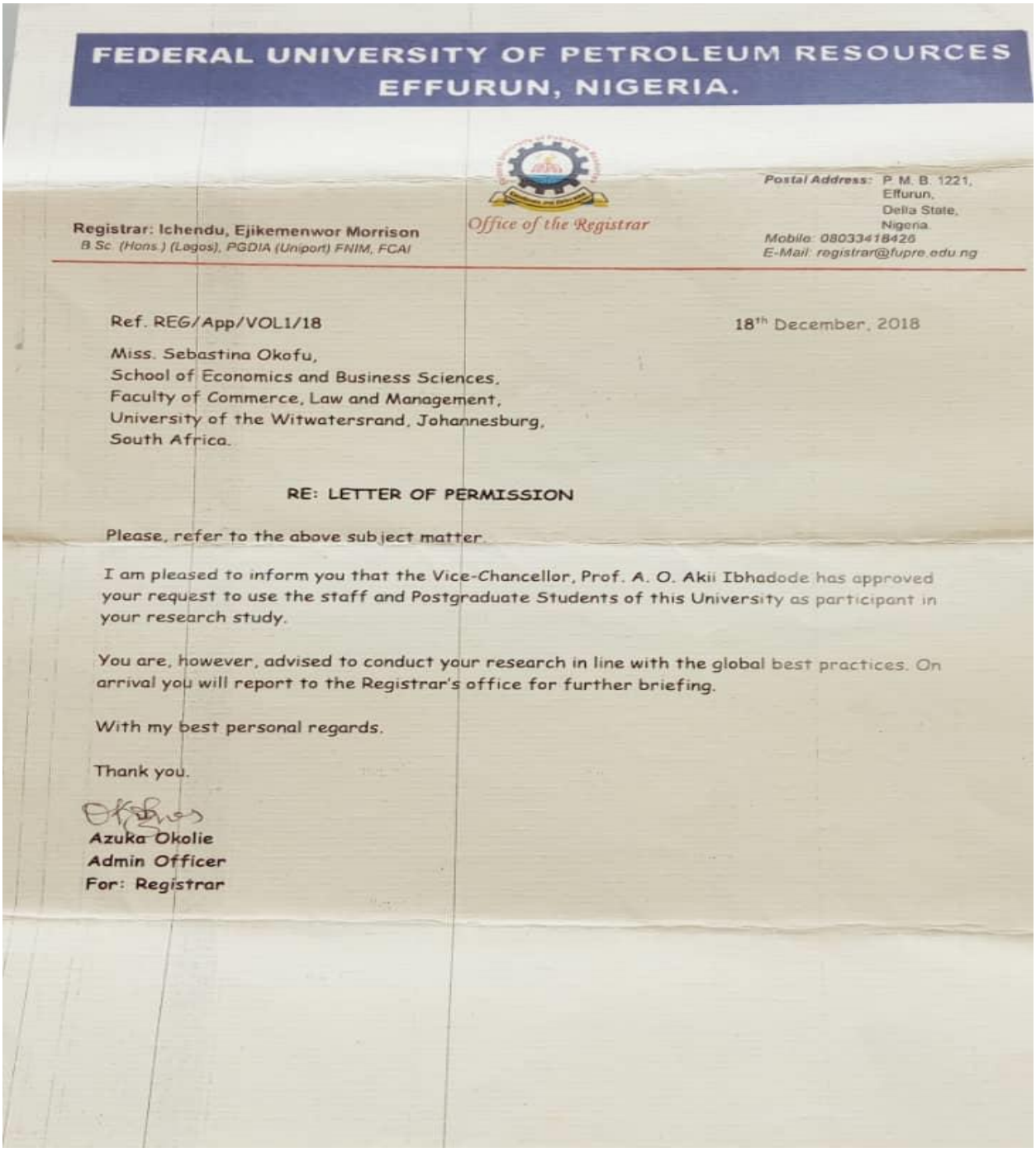
This is for your information and further necessary action, please.

Best regards.

Yours Sincerely,

Ovokeroye G. Ighoyivwi
Senior Assistant Registrar (Registrar's Office)
For: Registrar

Approval Letter from Federal University of Petroleum Resources Effurun, Delta State.



FEDERAL UNIVERSITY OF PETROLEUM RESOURCES
EFFURUN, NIGERIA.

Office of the Registrar

Registrar: Ichendu, Ejikemenwor Morrison
B.Sc (Hons.) (Lagos), PGDIA (Uniport) FNIM, FCAI

Postal Address: P. M. B. 1221,
Effurun,
Delta State,
Nigeria.
Mobile: 08033418426
E-Mail: registrar@fupre.edu.ng

Ref. REG/App/VOL1/18

18th December, 2018

Miss. Sebastina Okofu,
School of Economics and Business Sciences,
Faculty of Commerce, Law and Management,
University of the Witwatersrand, Johannesburg,
South Africa.

RE: LETTER OF PERMISSION

Please, refer to the above subject matter.

I am pleased to inform you that the Vice-Chancellor, Prof. A. O. Akii Ibhadode has approved your request to use the staff and Postgraduate Students of this University as participant in your research study.

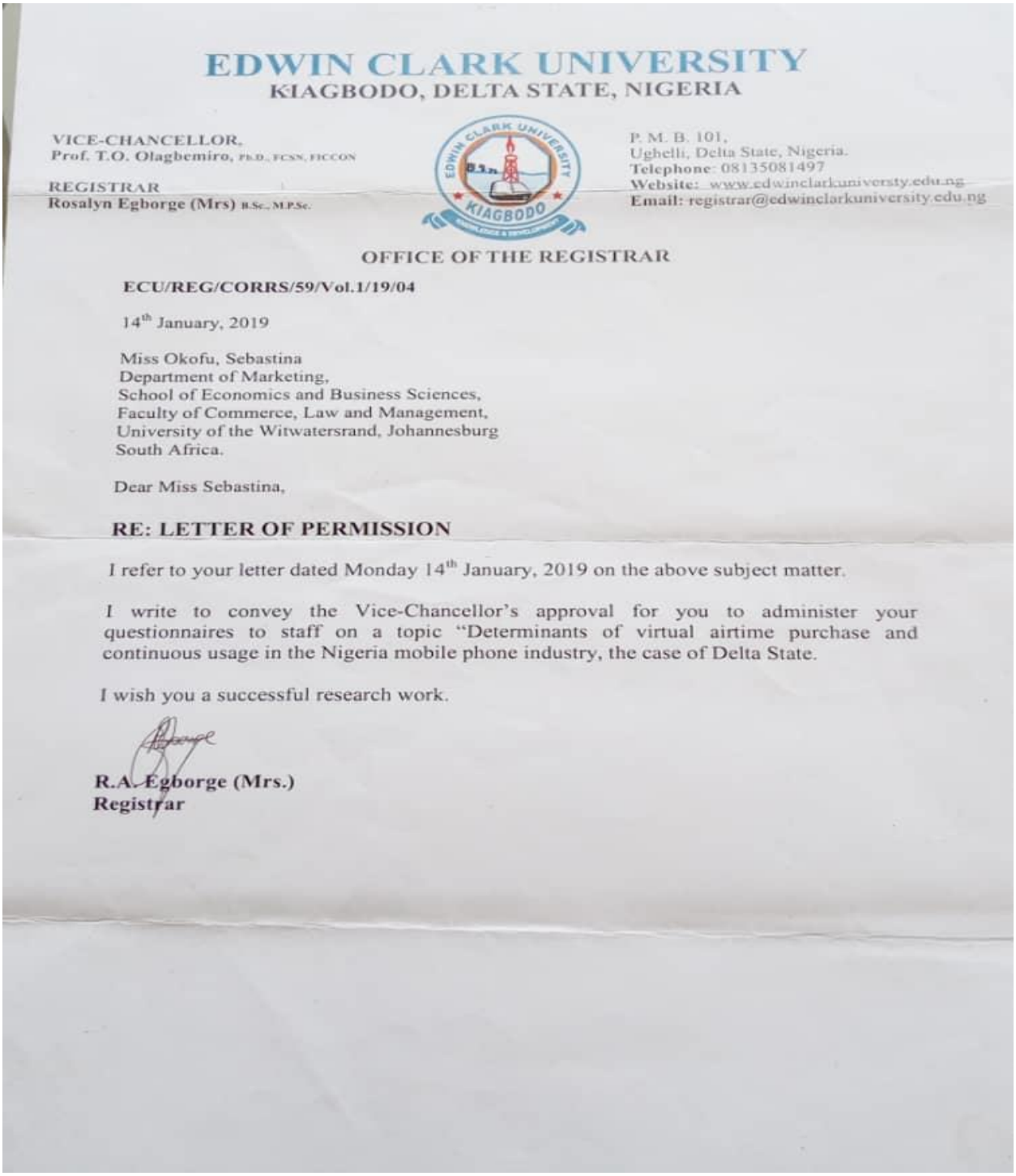
You are, however, advised to conduct your research in line with the global best practices. On arrival you will report to the Registrar's office for further briefing.

With my best personal regards.

Thank you.

Azuka Okolie
Admin Officer
For: Registrar

Approval Letter from Edwin Clerk University, Kiabgodo, Delta State.



EDWIN CLARK UNIVERSITY
KIAGBODO, DELTA STATE, NIGERIA

VICE-CHANCELLOR,
Prof. T.O. Olagbemiro, Ph.D., FCSN, FICCON

REGISTRAR
Rosalyn Egborge (Mrs) B.Sc., M.P.Sc.

P. M. B. 101,
Ughelli, Delta State, Nigeria.
Telephone: 08135081497
Website: www.edwinclarkuniversty.edu.ng
Email: registrar@edwinclarkuniversity.edu.ng

OFFICE OF THE REGISTRAR

ECU/REG/CORRS/59/Vol.1/19/04

14th January, 2019

Miss Okofu, Sebastina
Department of Marketing,
School of Economics and Business Sciences,
Faculty of Commerce, Law and Management,
University of the Witwatersrand, Johannesburg
South Africa.

Dear Miss Sebastina,

RE: LETTER OF PERMISSION

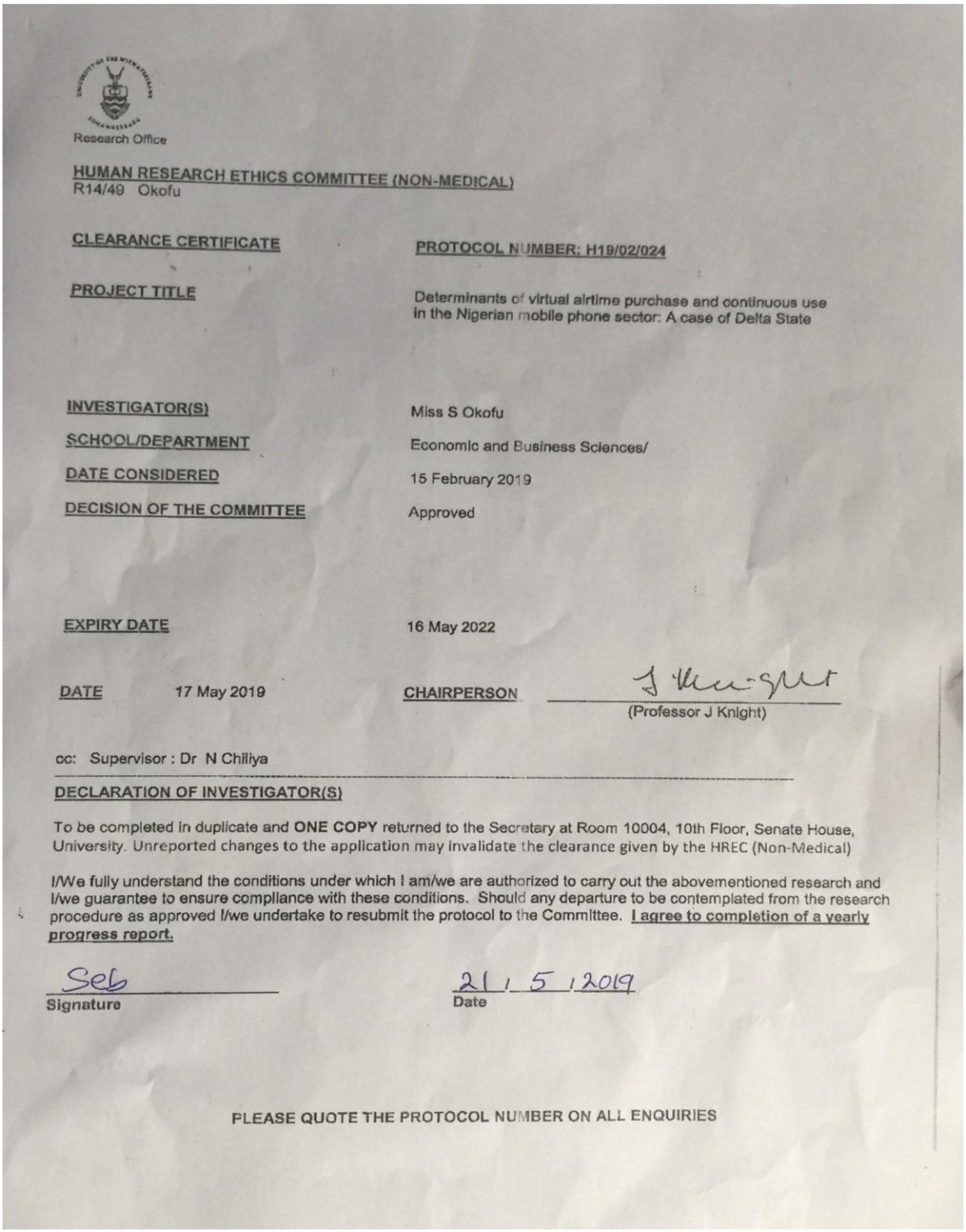
I refer to your letter dated Monday 14th January, 2019 on the above subject matter.

I write to convey the Vice-Chancellor's approval for you to administer your questionnaires to staff on a topic "Determinants of virtual airtime purchase and continuous usage in the Nigeria mobile phone industry, the case of Delta State.

I wish you a successful research work.

R.A. Egborge (Mrs.)
Registrar

Ethical Clearance Certificate



Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Okofu

CLEARANCE CERTIFICATE — **PROTOCOL NUMBER: H19/02/024**

PROJECT TITLE — Determinants of virtual airtime purchase and continuous use in the Nigerian mobile phone sector: A case of Delta State

INVESTIGATOR(S) — Miss S Okofu

SCHOOL/DEPARTMENT — Economic and Business Sciences/

DATE CONSIDERED — 15 February 2019

DECISION OF THE COMMITTEE — Approved

EXPIRY DATE — 16 May 2022

DATE 17 May 2019 **CHAIRPERSON** J Knight (Professor J Knight)

cc: Supervisor : Dr N Chiliya

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

Seb
Signature

21/5/2019
Date

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

Participant information sheet

Department of Marketing,
School of Economics and Business Sciences,
Faculty of Commerce, Law and Management,
University of the Witwatersrand, Johannesburg,
South Africa.
20th March, 2019

Participant information sheet

Good day,

My name is Sebastina Okofu and I am currently completing a doctorate degree (PhD) at the University of the Witwatersrand, Johannesburg. My current research is tilled **"Determinants of virtual airtime purchase of customers and continuous usage in the Nigeria mobile phone industry; the case of Delta state".** The study explores factors that influence the airtime purchase behaviour of mobile phone customers in Delta State. The results of this study will contribute to the proliferation of literature in technology adoption in mobile commerce. I am inviting you to be a participant in my current research study because you are a staff of the University, you have a mobile phone and a bank account.

By being a participant in this study, I would request you to complete the hard questionnaire attached to this information sheet. With your permission, I ask that you complete this questionnaire and kindly return it to the researcher. This should not take more than 30 minutes of your time.

Your participation in this research is voluntary and non-participation will not warrant any penalty. However, I can guarantee that your personal details will remain anonymous. As a participant may refuse to answer any question which you feel uncomfortable with and you are also feel free to withdraw from this study at any time. By being a participant in this research, you will not receive any payment in any form and the information you disclose will be used in the research report.

This research will be written into a doctoral dissertation in the School of Economics and Business Sciences (SEBS) and will be available through the University website. Should you require a summary of the research; the researcher can make it available to you.

Should you have any further question or queries you are welcome to contact the researcher or my supervisors Dr. Norman Chlliya and Dr. Freddy Mgiba at any time at the contact details provides below

Researcher name; Sebastina Okofu Email 1526112@students.wits.ac.za Phone: 0789394613

Primary supervisor: Dr. Norman Chlliya Email: Normanchlliya@wits.ac.za Phone: 0609854838

Secondary Supervisor: Dr. Freddy Mgiba Email: Freddy.mgiba@wits.ac.za Phone: 0799765162

Sample Questionnaire

QUESTIONNAIRE

Please answer the following questions by indicating the correct answer(s) with ×**.** The intention of this questionnaire is for research purpose only.

Section A: General demographic information

This section is about your background information. Please specify the correct answer by ticking (×), on the appropriate box.

A1 please indicate your gender

Male	Female	Prefer not say

A2 please indicate your age

20-30	31-40	41-50	51-60	61-70

A3 please indicate your qualification

OND	HND	BSC	MASTERS	PHD and above

A4 Do you have a phone with internet facility?

Yes	No	Prefer not say

A5 please indicate your institution?

DELSU	FUPRE	ECU

A6 Do you have access to the internet?

Yes	No	Prefer not say

A7 Are you aware of online airtime purchase?

Yes	No	Prefer not say

A8 my first awareness of online airtime purchase was through

Family	Peers	Colleagues	Media

A9 Have you ever been involved in online activity like

Bill payment	Banking transaction	Making purchase	Airtime transfer

A10 which method is most preferred for airtime purchase?

scratch card	online

A11 which of this online channel are you using?

Bank	Retail	Operators

A12 which network provider is most preferred for online purchase?

MTN	AIRTAIL	GLO	9MOBILE

Please indicate the extent to which you agree or disagree with the following statements as it relates to online airtime purchase.

Section B: Perceived usefulness 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

1	Using online airtime will enhance my job performance	1	2	3	4	5
2	Using online airtime will enable me to pay more quickly					
3	I would find online airtime a useful possibility for payment					
4	Using online airtime makes me easily connected to others 24/7					

Section C: Compatibility 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

5	Using online airtime fit well with my experience	1	2	3	4	5
6	Online airtime fits into my lifestyle					
7	I believe online airtime is compatible with existing technology					
8	I believe online airtime is compatible with my current situation.					

Section D: Phone self-efficacy 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

9	I could complete online airtime if there's no one to direct me on what to do	1	2	3	4	5
10	I could complete online airtime If I have just a built in help facility for assistance					
11	If I have a lot of time I could complete online airtime for which the software was provided					

Section E: Mobile Phone Habit 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

12	The use of online airtime has become a habit for me	1	2	3	4	5
13	I am addicted to using online airtime					
14	Using online airtime has become natural to me					
15	I must use online airtime					

Section F: Mobile Phone Attitude 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

16	Using online airtime is a good idea	1	2	3	4	5
17	Using online airtime is beneficial to me					
18	I like using online airtime					

Section G: Family 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

19	Family who are important to me think that I should use online airtime	1	2	3	4	5
20	Family who influence my behaviour think I should use online airtime					
21	Families around me support the use of online airtime which is latest fashion					
22	Using online airtime indicates me that I have a family style					

Section H: Peers 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

23	Peers who are important to me have the opinion that I should use online airtime	1	2	3	4	5
24	The image of peers around me influence my behaviour to think I should use online airtime recharging					
25	The identity of peers around me will influence me to use online airtime					
26	The personality of peers around think that I should use the online airtime					

Section I: Network coverage 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

27	I have the internet geographic coverage to use online airtime	1	2	3	4	5
28	I have the network timely coverage to use online airtime					
29	I have reliable internet coverage to use online airtime					

30	I have access to network to use online airtime					

Section J: Electricity1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

31	I have a reliable electricity to use online airtime	1	2	3	4	5
32	I have a frequent electricity to use online airtime					
33	The electricity voltage is standard to use online airtime					
34	Electricity availability will enable me to use online airtime					

Section K: Data Cost 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

35	Cheap data price enables me to use online airtime	1	2	3	4	5
36	The data cost of accessing the internet is good value					
37	The quality of service is excellent for data cost					

Section L: Behaviour Intention 1 strongly agree, 2= agree, 3=Nautral, 4= disagree, 5= strongly disagree

38	I intend to use online airtime	1	2	3	4	5
39	I intend to use online airtime in my daily life					
40	I intend to use online airtime when it becomes widely use					

Section M: Actual usage 1 strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

41	I have been using online airtime for the past 6 months - 1years	1	2	3	4	5
42	I have been using online airtime for the past 1 year to present day					
43	I am still using online airtime					

Section N: Satisfaction 1=strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

44	I am pleased with the experience of using online airtime	1	2	3	4	5
45	I am delighted with using online airtime					

46	I am pleased with the reliability of online airtime					

Section O: Continuous Usage 1=strongly agree, 2= agree, 3=Neutral, 4= disagree, 5= strongly disagree

47	I will continue using online airtime in the future	1	2	3	4	5
48	I plan to continue to use online airtime frequently					
49	It is possible to continue using online airtime without stopping					

Thank you for participating in this research study. All information will be treated with utmost confidentiality.