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Consumer Adoption and Continual Use of E-Vouchers: A Study of the Nigeria Telecommunication

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Abstract

The online payment industry is not an exemption from how the Internet affects people's lives. Once more, consumer knowledge, perceptions of the advantages, and high-quality services are the main drivers behind Internet adoption and usage. While digital technology is expanding in many areas of the economy, including governance, education, entertainment, and communication, to name a few, mobile phone services are also becoming more digital. Real-time operations are made possible via these technologies, and mobile commerce (MC) is an essential component. Even though these technologies are becoming more widely used, developing nations like Nigeria are taking a long time to accept and use them consistently. As a result, the study focuses on determining the variables that influence the intention, actual use, and continued usage of virtual airtime purchases. To accomplish the research aims, the present study incorporated the Expectation Confirmation Theory (ECT), the Diffusion of Innovation (DOI), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Technology Acceptance Model (TAM) at the individual level. With a representative sample of 390 participants, the study revealed that technological, social, and contextual elements are critical in encouraging the adoption of virtual airtime for mobile commerce accessible to all mobile phone users. The results have enhanced previous research by validating consumers' favourable attitudes about mobile commerce and a cashless economy.

Keywords: Continuous Usage, Mobile Commerce, Satisfaction, Virtual Airtime.

Introduction

Studies conducted in India, Ghana, Bangladesh, Peru, Malaysia to mention but a few have observed that digitalization policies promote digital payment (1), sustainability (2) quicken dissemination of information (3), enhance digital banking inclusiveness (4), creates competitive advantage (5) and improve technology adoption (6). Thus, at the national, international, and global levels, marketing is now cashless due to advancements in electronic transactions (payment) (7), and Self-efficacy (8). Along with these changes, these payment methods will also bring about changes in buyer-seller-related matters such as, trust (9), value, consumption, preference, consumer behaviour (10, 11), dynamic capacity entrepreneurship performance (12) and financial inclusiveness for economic growth (13). The new concepts and widespread use of mobile commerce (MC) are examples of inventive transformations that have improved people's lives (14), and sustained economic development (15). No wonder, a researcher pointed out that although technology has transformed mobile payments, its sluggish acceptance is technical proficiency (16). Mobile payments are therefore, crucial for boosting economic activities in developing nations like Nigeria that still do not fully accept them. According to a study the Nigeria mobile money's delayed acceptance is due to its novelty, and its benefits are not yet understood (17).

Study conducted in Vietnamese, have observed that further research is necessary in mobile commerce adoption to determine the organizations and customers that adopt mobile payments and are satisfied with their usage (18). Furthermore, citing some lopsidedness in developing economies due to the rising body of research in this area, suggested that adoption rather than usage continuation is receiving greater attention (19). Furthermore, some researchers, have demonstrated unequivocally that contextual elements should be the primary emphasis when elucidating the determinants, acceptance, and continuation of technology usage in Internet banking adoption and mobile marketing (20). With a population estimated at 206.1 million and a

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61.2% Internet penetration rate, Nigeria is one of the most populous economies in Africa (21) that should key into mobile commerce to enhance economic growth. Once more, Nigeria is a developing nation among the poorest in the world, with an anticipated 39%–50% literacy rate (22). Therefore, to meet global standards and the UN's economic development goal the Nigerian federal government implemented a "Cashless Policy" to further the country's tendency toward mobile commerce. The objective is to encourage electronic payments, minimize the handling of actual currency, and advance a cash-lite economy (23). The study in the past (24), observed that Nigeria is primarily a cash economy, despite the growing acceptance of mobile communications and Internet service. Imperatively, there appears to be a lack of ongoing usage adoption of mobile commerce, which has necessitated a thorough knowledge of adoption, difficulties, and usage persistence.

According to academic studies, Nigeria's telecommunication sector is crucial to the country's political, economic, and social development (25). As the Global System for Mobile (GSM) has grown, Nigeria has also benefited from this global advancement in telecommunication (26). However, the Federal Government of Nigeria deregulated the telecom sector and granted network operators operating licenses in 2001, which marked the beginning of the industry's change (27). Thus, MTEL, Airtel, MTN, and Etisalat registered in 2001, while Globacom registered in 2008. Past study (28), has indicated a surge in the usage of mobile phones, the Internet, data accessibility, and wireless technologies that have all contributed to a growth in online buying.

To promote mobile commerce engagement in Nigeria the study determined that it is necessary to investigate mobile commerce usage and related difficulties from virtual airtime by identifying the challenges of adoption, satisfaction, and ongoing use. Also, to increase the use of mobile commerce in Nigeria, this study supports the use of light cash policies, electronic payment methods, and e-voucher purchases. Furthermore, there is a lack of research on the popular mobile virtual airtime voucher, as previous studies have concentrated on general mobile banking, mobile payments, mobile buying, and e-commerce.

Using Nigeria as a developing nation, the study is probably a trailblazer of the elements influencing technology adoption in handling online transaction and predicting subscription services (29). The study provides microeconomic data on consumer behaviour, attitudes, and ongoing use of electronic payments for telecom services. This virtual airtime voucher will improve the interaction between buyers and sellers, promote a cashless economy, raise awareness of the advantages of electronic payments, advance the development of global telecommunications, and reduce the digital gap between developed and developing nations with regards to virtual airtime purchases.

As it relates to this study, the idea of mobile commerce, or m-commerce, is reviewed from pertinent studies. Therefore, one way to describe m-commerce is as a customized digital device for online transactions. As a result, buying, selling, and payment activities utilizing portable devices and the Internet are results of mobile commerce activities (30). Scholarly publications have observed that although customers were initially hesitant to embrace innovations, they are now gradually utilizing them due to many factors such as convenience (31). The enhancement of customers' trust in e-commerce through a secure payment model (32), satisfaction (18), compatibility (33), and social need (34).

There is evidence of growing technology use, whether complete or partial in Africa (35). For example, the demand for mobile phones has increased in nations like South Africa and Nigeria (36). Once more, even if m-payments and mobile money are becoming extensively deployed in business transactions, a sizable portion of the populace finds it challenging to embrace m-commerce. Thus, academics have noted that electronic transaction adoption is still sluggish, even with some convenience and advantages (37). Consequently, several authors have suggested that novel concepts impact the intention of behaviour to accept mobile payments due to sustainability usage and users trust (38), mobile shopping satisfaction (39), mobile commerce, mobile wallet payment, mobile banking compatibility, usefulness (40). self-efficacy, and social influence, mobile banking and mobile payment impact on purchase intention (41). These studies have focused more on the intentions and adoptions of general m-

commerce forms than on the specific purchase of virtual airtime, specifically essential to maintaining involvement in the virtual world.

Furthermore, earlier research has called attention to the problems of context and continuous usage (20). Thus, this study will contribute to existing knowledge by utilizing technological models to provide better criteria to drive or enhance m-commerce adoption in a developing setting. Research on scratched voucher purchases has been conducted in Nigeria as a decent work to reduce poverty and enhance small scale enterprises (42). The reasons for the study include the issue's ongoing use, which has received less attention than its potential to impede cashless policies and health-related concerns (43). The study was to increase our understanding of the acceptance, usage, and behaviour patterns of virtual airtime vouchers for comparable mobile commerce developments.

Theoretical Models and Hypotheses Development

Several adoption models, including TAM and UTAUT, have been used to assess individual acceptance of technology (44). However, to better understand behaviour intentions regarding the purchase of virtual airtime, this study incorporated four theoretical models. Thus, the technology acceptance model (TAM) (45), the Expectation Confirmation Theory (ECT) (46), the Unified Theory of Acceptance and Use of Technology (UTAUT) (47), the compatibility from Diffusion of Innovation (DOI) (48), and the perceived usefulness (PU) from each of these sources are all relevant.

TAM: Research on mobile shopping and mobile payments (34), have utilized TAM in conjunction with other technology models. Perceived usefulness (PU) and perceived ease of use (PEOU) are two external dimensions that the TAM suggested in predicting customers' desire to embrace new technology. Perceived usefulness is the extent to which a person believes that utilizing a new system will enhance job performance (49). Conversely, perceived ease of use is the notion that utilizing a system requires no effort.

Therefore, the advantages, speed, and ease of adding credit to a network account and saving time improve job performance in this study. Accordingly, perceived usefulness improves mobile banking (35), mobile shopping, and mobile payments. They found that cost, trust, inventiveness, utility, and skillfulness lower adoption barriers and encourage users to use mobile devices. Therefore, PU is integrated into the virtual airtime model to ascertain the impact on behaviour intention.

UTAUT: The theory from past study (50) combined eight models to create the UTAUT. Four key variables were the emphasis of the UTAUT model: facilitating condition (FC), performance expectation, effort expectation, and social impact. UTAUT, also noted that although technology utilization enhances behaviour intention (BI) and FC, BI to adopt a particular technology was influenced by the four variables in the model. The moderating effects on BI and usage intention were also related to gender, age, and experience. Another model, UTAUT2, was created by to account for hedonic motivation, price value, and habit when adjusting technology adoption in the consumer context. The studies conducted by researchers (51), utilized UTAUT to investigate the factors that influence the adoption of mobile money technologies, m-payment, and m-commerce. These researchers showed that, as these characteristics influence technology usage, service providers should focus on social influence, performance expectations, habit, and risk for customers to adopt m-commerce, m-payment, and m-money. Thus, to investigate the social impact of virtual airtime in the ongoing Nigerian context, the UTAUT model was incorporated into the study.

DOI: DOI is the mechanism via which technology proliferates within a system. Diffusion therefore, refers to the rates and stages at which technology permeates the environmental factors like complexity, observability, trial-ability, compatibility, and relative advantage (48). Thus, diffusions determine the pressures of social systems, communication channels, times, and innovative initiatives (48). For example, the DOI theory was employed in studies to investigate technology adoption and mobile payment and also looked at the use of mobile wallets (52). According to these studies, compatibility affects technology, usage of mobile wallets, and mobile payments. Once more, the DOI theory divided adoption patterns into five categories: laggards, innovators, early adopters, early majority, and late majority. Therefore, it is necessary to ascertain Nigeria's virtual airtime acceptance stage to execute the

novel notion of the e-voucher. Online shopping, for example, is a welcoming technology used for making purchases in Nigeria (53).

ECT: Expectation confirmation theory (ECT) describes how consumers use technology continuously and is a paradigm for assessing customer satisfaction and post-purchase behaviour (54). Accordingly, the ECT is based on user expectations to assess whether a technology will continue or discontinue. Expectation confirmation theory states that expectations, perceived performance, confirmation, satisfaction, and continuous intention are the main areas of concentration. Previous research has used ECT to look into the variables that affected mobile payment (55). They believed that PU, or satisfaction, dictates how long people use technology. To comprehend the behaviour of consumer switching intentions, ECT was integrated to survey customer creativity and satisfaction impact in ongoing use (56). Accordingly, applying ECT to this study will bring about higher customer happiness and encourage repurchase behaviour, whereas lower customer satisfaction will make them less likely to use the mobile service.

Perceived Usefulness and Behaviour Intention: Because digital services are readily available, the demand for convenience is increasing dependence on technology. Perceived usefulness, is the extent a person thinks a new technology will enhance work performance and favourably improve the consumer's employment experience (53). Extant research found that PU significantly predicted the adoption of e-payments and e-services (57). Additionally, the findings of the studies (35, 50) showed a favourable correlation between PU and BI in online purchasing and mobile commerce. However, a study asserted that there is no correlation between PU and the intention to use mobile payment services (58). Users' PU will impact aspirations to embrace the new system of the virtual airtime voucher. Thus, the study proposed the following hypothesis:

Hypothesis 1: Perceived usefulness significantly influenced behaviour intention.

Compatibility and Behaviour Intention: Innovation and technology are transforming how businesses operate and how people live (10). Because they add value for early adopters, these cutting-edge goods and services like mobile devices have become indispensable in the daily lives of the majority of consumers. Compatibility is the degree to which innovation is both advantageous to users and consistent with current technology (48). No wonder academic study has observed that compatibility is linked to an individual's values, wants, and abilities (54). Stated differently, resistance and a pessimistic mindset result when a new invention is incompatible with current technology. Accordingly, compatibility impacts the uptake of mobile payment services (56). Research results showed that perceived compatibility positively influences the adoption of Internet technologies (59). Compatibility has been linked to considerable uptake of m-banking (60), m-payment (34)**,** and online shopping (61). Conversely, researcher found no connection between compatibility and merchant m-payment uptake (62). Thus, the following hypothesis:

Hypothesis 2: Compatibility significantly influences behaviour intention

Family Influence and Behaviour Intention: Any person in the household deemed knowledgeable enough to influence other members' decisions is termed a family. The individual influencing behaviour intention could be a parent, a sibling, or a spouse (63). Research also showed that families impact people's decisions and adoption of new technology (64). Conversely, it was found that m-banking adoption does not influence social influence (37). It follows that supportive family input will increase the likelihood of adopting virtual airtime technology, but unfavourable family feedback will increase resistance. Thus, the present investigation postulated the following hypothesis:

Hypothesis 3: Family significantly influences behaviour intention.

Network Coverage and Behaviour Intention: In m-commerce services, network coverage can encourage users to embrace innovation. Research on network coverage in general and telecom users, in particular, has not examined how network coverage affects virtual airtime vouchers used in mobile commerce. The fact that m-commerce is gaining recognition does not mean that all aspects have gotten enough attention for a probable explanation. The increasing reliance on mobile devices in today's virtual corporate environment necessitates network availability to facilitate quicker and easier product and service

offerings. It makes sense that to observe that customers who are convinced about network coverage may likely encourage mobile services usage. Network coverage in this study refers to the extent to which service providers are available to facilitate the use of virtual airtime. Empirical studies found that service quality, network coverage, and mobile Internet influenced telecom consumers while deficiency of technical infrastructure (65). In yet another study to understand factors that influence technology adoption or hampered adoption, it was discover there was no connection between the adoption of technology and the availability of facilities (38). Consequently, the following hypothesis that:

Hypothesis 4: Network coverage significantly influences behaviour intention.

Behaviour Intention and Actual Use: The effort someone is willing to put out to carry out behaviour is known as their behaviour intention. It might also refer to the desire to use a mobile device to access online services. According to ideas of technology acceptability, behaviour intention (BI) influences how technology is used (53), accepted (52), and based on user-centric (66). These studies have demonstrated how crucial BI is to the real-world application of mobile technology and m-payments. Notwithstanding, other factors might affect real usage because BI's impact on actual usage is critical to new technology adoption. As a result, the following hypothesis was stated:

Hypothesis 5: Behaviour intention significantly influences actual usage.

Actual Usage and Continuous Behaviour: Mobile services may likely receive more attention due to the growing acceptability and use of mobile technology since behavioural intentions frequently translate into actual and future usage (67). The degree to which a technology user chooses to use it now and in the future is referred to in this context as continuous behavior utilization. Thus, the greater the possibility that behavior will persist in utilizing technologies, the more often creative ideas are used in that behavior. The continuous usage intention of behavior on the actual continuous usage of mobile money (68). Once more, research showed that the advantages of technology and trust satisfaction affect m-payment usage over time (58).

Hypothesis 6: Actual usage significantly affects continuing usage.

Satisfaction and Continuous Usage: Researchers have looked at many facets of e-commerce and found that customer satisfaction, trust are receiving attention in the mobile service sectors to succeed and guarantee usage (69, 70). In this context, consumer satisfaction refers to positive experience and the deliberate decision to repeat the purchase of a good or service. Thus, technological satisfaction is the result of the interaction between perception and anticipation (57). Furthermore, study revealed that further purchase intentions were influenced by usability, service deliver, service quality and satisfaction/experience (70). On the contrary, it was observed that customer satisfaction has nothing to do with how long a product or service is used (58). This study contends that the moderating influence on virtual airtime would be advantageous within m-commerce content with continuous purchases. Therefore, the hypothesis that:

Hypothesis 7: Continuous usage is significantly moderated by satisfaction

Figure 1 below is the pictorial, representation of virtual airtime model adopted for the study. It shows the exogenous variables (PU, CO, FA and NC) in the model and it relationship with the endogenous (CU) variable through the mediation variables (BI and AU) and moderating variable (SA).

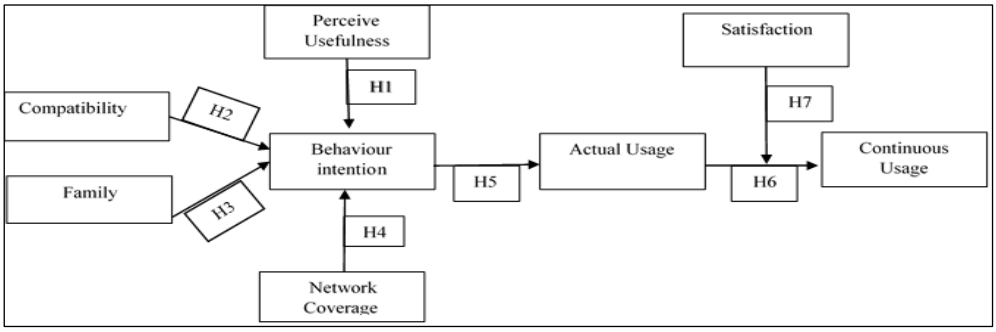

Figure 1: Virtual Airtime Adoption Model

Methodology

In poorer nations, m-commerce is now considered an emerging technology. However, to test hypotheses and display results, the study used a quantitative survey format. The University of Witwatersrand ethics committee provided a letter of ethical approval for the survey in Nigeria on the basis that no risk was envisaged from participant, the participants were promised anonymous and confidential non-disclosure of their identities, and no financial benefits was attached. The algorithm used to get the sample size with a 95% confidence level (71). Based on the study goals, a hard copy questionnaire non-probability convenient sample technique was administered as a measuring tool to produce primary data since few adults responded to extant Internet surveys. A hard copy questionnaire was used to ensure quicker response and return rate from available respondents and also to reduce data cost since no benefits are attached.

The convenient sample was used because participant was those available and willing to participate during data collection. A 5-point Likert scale with an ordinal scale from strongly agreed to strongly disagreed was adapted for measurement. Distribution and data collection were in contact with the study-relevant respondents who are walking adults, educated, urban telecom users. To achieve the research objectives, descriptive statistics, inferences, summarization and analysis were performed.

Additionally, for internal consistency measurements, this study used Cronbach's alpha (CA) and composite reliability (CR) values (72). Based on its statistical and simultaneous testing of mixed multivariate models, the Partial Least Square Structure Equation Modelling (PLS-SEM) was used to measure the model and structure (72). PLS-SEM was used to assess the hypotheses, dependent variables, theories of the elements that facilitate and impede the adoption of virtual airtime (73, 74). The use of (PLS-SEM) despite other statistical models was based on its ability to combine multivariate models, and it belongs to the family of Multivariate Data Analysis (MDA) that uses data with multiple constructs (73). It is the best model to adopt when a study requires multiple relationships (72).

Results

The composite and Cronbach's alpha reliability for the study was acceptable at least 0.7 ($\alpha \geq 0.7$). To gauge the validity of the research constructs convergent and discriminant validity were used, while variance infector factor (VIF) was at less than three (VIF< 3); additionally the path coefficient (72). It says that ($-1 \leq \beta \leq +1$) is where the route coefficient should line up. A weaker positive association exist when the path coefficient is 0 ($0 < \beta < 0.5$), and no or zero relationships are implied when it is 0. Again, the explanatory power of the path model and the impact of independent factors on dependent variables were assessed by measuring the coefficient of determination (R^2) (72). To determine the significance level of 95%, confidence interval level, was utilized with a p-value of $p < 0.05$ and a t-value of $t > 2.00$.

Table 1 below represent the demographic description of which three hundred and ninety of the samples gathered for this investigation were analyzed. Table 1 data also indicates a higher proportion of males (51%). In terms of age, the majority fell between 41 and 50 (41%), follows by 31 and 40 (28%), then comes 51-61 (15%), and lastly 19-29 representing (12%). A bachelor's degree (41%) was more common than a master's degree (32%), then followed by OND / HND with (27%). Concerning the network provider, MTN was the most favoured network among Nigerian mobile phone users with a (46%), Airtel (33%) and Glo (21%).

Table 1: Demographic Descriptive Statistics

Variable	Category	Frequency	Percentage
Gender	Male	200	51%
	Female	190	49%
Age	19-29	47	12%
	30-40	125	32%
	40-50	160	41%
	51-61	58	15%
Educational level	OND /HND	107	27%

	BSc	160	41%
	Masters	123	32%
Network	GLO	80	21%
	AIRTEL	130	33%
	MTN	180	46%

Table 2: Results of Measurement Model

Perceived usefulness CA=0.802; CR=0.871; AVE=0.629	**Loadings**	**VIF**
PU1	0.781	1.570
PU2	0.839	1.987
PU3	0.808	1.874
Compatibility CA=0.814; CR=0.896; AVE=0.683	**Loadings**	**VIF**
CO1	0.814	1.804
CO2	0.860	2.252
CO3	0.767	1.336
Family CA=0.794; CR=0.866; AVE=0.619	**Loadings**	**VIF**
FA1	0.827	1.884
FA2	0.814	1.854
FA3	0.735	1.400
Network coverage CA=0.858; CR=0.903; AVE=0.701	**Loadings**	**VIF**
NC1	0.825	2.259
NC2	0.852	2.362
NC3	0.876	2.580
Behaviour Intention CA=0.751; CR=0.855; AVE=0.664	**Loadings**	**VIF**
BI1	0.870	1.412
BI2	0.819	1.400
BI3	0.752	1.128
Actual usage CA=0.882; CR=0.948; AVE=0.859	**Loadings**	**VIF**
AU1	0.917	2.998
AU2	0.953	2.934
AU3	0.910	2.783
Satisfaction CA=0.903; CR=0.939; AVE=0.838	**Loadings**	**VIF**
SA1	0.930	2.914
SA2	0.933	2.936
SA3	0.882	2.190
Continuous usage CA=0.882; CR=0.927; AVE=0.809	**Loadings**	**VIF**
CU1	0.918	2.828
CU2	0.921	2.927
CU3	0.858	2.059

The measurement model used in this study to establish relationship between the manifest variables and the constructs were CA=Cronbach Alpha, CR=Composite Reliability, AVE=Average Variance Extract, and VIF= Variance Inflation Factor. VIF is the reciprocal of the tolerance value at <3. Under ideal circumstances, a small VIF number suggests a low correlation among the variables. However, all VIF values were less than three for PU, CO, FA, NC, BI, AU, SA and CU. Using Cronbach alpha (CA), composite reliability (CR), average variance extract (AVE), and variance inflator factor (VIF), PLS-SEM was utilized to analyze the measurement model. Accordingly, the CA is acceptable when it exceeds 0.7 and demonstrates the consistency and dependability of the internal constructions (72). In this way, PU=0.802, CO=0.814, FA=0.794, NC=0.858, BI=0.751, AU=0.882, SA=0.903, CU=0.882 respectively. Every construct for CA on table 2 was over 0.7, indicating that the scale for the constructs was reliable. CR of 0.70 or above was deemed acceptable (72).

Regarding CR, PU=0.871, CO=0.896, FA=0.866, NC=0.903, BI=0.855, AU=0.948, SA=0.939, and CU=0.927 are the results indicating it is higher than the necessary cutoff, which created CR. Once more, an AVE of at least 0.6 is acceptable for convergent validity. Thus, PU=0.629, CO =0.683, FA =0.619, NC=0.701, BI=0.664, AU=0.859, SA =0.838, CU=0.809 are the results of AVE in table 2. Again, the AVE indicates that the values were higher than 0.5, in line with past research (72). Additionally, because the scales are above the required threshold, they provide evidence of satisfactory convergent validity and reliability. Furthermore, every VIF was below the designated cutoff point (<3), demonstrating multicollinearity amongst the variables (75).

Table 3: Heterotrait-Monotrait Ratio (HTMT) (Discriminant Validity)

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Actual Usage												
Behaviour	0.46											
Intention												
Compatibility	0.48	0.37										
Continuous	0.44	0.42	0.30									
usage												
Family	0.18	0.43	0.36	0.28								
Network	0.40	0.35	0.30	0.36	0.23	0.26	0.36					
problem												
Perceived	0.41	0.35	0.42	0.36	0.23	0.40	0.43	0.40	0.31			
Usefulness												
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

Table 4: Results of Structure Model

Direct Effect	**Path co-efficient**	**t-statistics**	**p-values**	**R^2**	**Hypotheses**
PU -> BI	0.177	3.579	0.000		Supported
CO-> BI	0.066	0.916	0.360		Unsupported
FA -> BI	0.109	2.192	0.013		Supported
NC -> BI	0.184	2.788	0.000		Supported
BI -> AU	0.596	14.649	0.000	0.227	Supported
AU -> CU	0.377	4.797	0.000	0.408	Supported
Moderation Effect					
SA*AU -> CU	0.082	2.730	0.006	0.651	Supported

Table 3 above indicates that the HTMT values used to assess discriminant validity are less than 0.85 (HTMT<0.85). As a result, Table 3 shows differences in perceived utility, contentment, family, network issues, compatibility, continuous usage, actual usage, and behaviour intention. Table 3 thus provided evidence of discriminant validity.

Table 4 above showed the behaviour intention adjusted R^2 = 0.227, the actual usage adjusted R^2 = 0.408, and the satisfaction adjusted R^2 = 0.651. While the Q2 (predictive relevance) was 0.360, high and over required 0.35 (indicating a large predictive relevance). The f-squared for each path was only marginally above the 0.15 criterion. The structural pathways analysis for the Path co-efficient, t-Statistics, p-Values, and R2 was indicated using PLS-SEM, with the exception of hypothesis 2, which was found to be unsupported. This investigation validates all of the stated assumptions, implying that the exogenous variables in the model H1, H3, and H4 (PU, FA, and NC) have a direct, significant positive impact on H5(BI). Again, given that the p-values are less than 0.05 (0.000, 0.013, 0.000, 0.000, 0.000, 0.006) and the t-statistics are more than 1.96 (3.579, 2.192, 2.788). It denotes the support for the study hypotheses H1, H3, and H4. Additionally, H5 and H6 had a positive significant direct effect with a t-statistic of 14.649 and 4.797, and a p-value of 0.000 and (0.000) respectively revealed positive significant influences.

Furthermore, the outcome variable (continuous usage) is positively and significantly moderated by H7 (satisfaction) with a t-statistic (2.730) p-value (0.006). The variables that are dependent on them (BI, BI, AU) are most influenced by PU, NC, and BI. Similarly, AU has the greatest impact on the outcome variable (continuous usage). CO was not significant as hypothesis 2 was unsupported since its path coefficient at p-value is below 0.05 (0.360) and t-statistics were below 1.96 (0.916), despite the favourably significant impacts of PU, FA, NC, BI, AU, and SA.

Nonetheless, the degree of variance in BI, AU, and SA of endogenous variability in the model is explained by the R^2 values, which also explain behaviour intention (0.227) 22%, actual usage (0.408) 40%, and satisfaction (0.651) 65%. It implies that any increase in BI, AU and SA will likely accentuate and increase behaviour effect in the same proportion of 22%, 40% and 65% respectively. Similarly, R^2 denotes a good match between actual usage and user satisfaction. With the exception of intentions for behaviour that show weak fit, which has no bearing on the degree of significance. Table 4 clearly shows that the biggest factor influencing Nigerian telecom users' continued use of virtual airtime is satisfaction.

Discussion

In order to ascertain consumer uptake and ongoing e-voucher usage in the Nigerian setting, the research employed an integrated model. However, with the exception of the DOI theory, which necessitates additional research, six of the proposed hypotheses were supported and confirmed the theories of TAM, UTAUT, and ECI. According to the study, PU is a sign that an e-voucher should be adopted; this explanation is in line with the findings in past research (37, 45, 55, 57). These studies measured technological adoption, online shopping, acceptability of e-services, and adoption of mobile commerce instead of e-voucher usage. This study has closed this gap by elucidating the intention behind Nigerian consumers' e-voucher behaviour.

With a p-value of 0.013, the results regarding family confirmed that social variables like the family greatly impact technology adoption. The hypothesis is supported by the influence, which is not overly powerful. The result is in line with the findings in past research about the role of families on technology adoption (64). It demonstrates how consumers think their families should use a certain innovation.

One past study has demonstrated a positively significant influence in forecasting network coverage in terms of telecom consumer technology adoption and m-banking in Saudi Arabia and Africa (65). As a result, another factor that is helping to encourage the use of e-vouchers is network coverage. Conversely, this result did not align with the findings of the previous study on mobile payments in Portugal (38). In an extant research, the impact of performance expectation which is in line with network coverage was found to have both direct and indirect effect (38). It means that consumers intention to use a particular technology is determined by varied factors. In the case of virtual airtime and network performance, telecom performance expectations will greatly enhance adoption with other factors held constant. Thus, when m-commerce usage becomes more dependable and consistent, Nigerian customers' attitudes would improve.

Additionally, research has examined the important role compatibility plays in the adoption of Internet and mobile payment technologies. Some past studies found compatibility to have direct effect on adoption (52, 58, 59). The current investigation discovered that compatibility was unsupported, which is in line with past research, of non-adoption of mobile payment by merchants in Ethiopian (62). Compatibility's non-significant finding suggests that e-voucher adoption was influenced by additional characteristics such as PU, NC, FA, and satisfaction. Therefore, incompatibility across systems neither prevents adoption nor increases it. This finding necessitates more research.

A favorably significant influence was also demonstrated by the AU and BI factors. The results align with the findings in past studies (5, 47, 66), as well as the verified TAM and UTAUT models that establish a relationship between behaviour intention and actual usage.

This study not only validates that BI predicts AU, but also that AU affects CU of the e-voucher. AU drives CU, as evidenced by the direct link between AU and CU at p-value (0.000). As a result, network operators and other providers of virtual services will benefit from user usage as they create comparable advances.

In the end, e-voucher adoption was found to be significantly positively influenced by consumer happiness, with a p-value of 0.006. The study's top predictors of the e-voucher were PU, NC, BI, and AU factors; nevertheless, the moderating effect between AU and CU in m-commerce has not gotten enough attention. As a result, the survey has shown that people have a favorable attitude regarding using e-voucher and other e-commerce services continuously.

In summary the study revealed that the variables measure in the study played a significant influence except for compatibility in virtual airtime purchase intention and continues use in Nigeria. These observations will enhance network providers competitive marketing strategy to improve online consumer experiences.

Theoretical Implications

The empirical integration of the TAM, UTAUT, ECI, and DOI adoption models is one theoretical contribution of this study. The research has verified TAM, UTAUT, and ECI in PU, SF, and SA, with the exception of the DOI about compatibility within the Nigerian setting. These notions have not yet been included in any research on e-vouchers. As a result, the research has usually benefited m-commerce services, especially the deployment of e-voucher technology in the telecom industry. Once more, in contrast to previous research where satisfaction served as a mediating variable, this study has included satisfaction as a moderating determining factor between AU and CU of technology. The study has improved the body of knowledge in the field of m-commerce adoption research.

Additionally, this is a pioneering study on the uptake of virtual airtime in Nigeria, supporting the lite cash economy and the adult segment's present favorable involvement with cutting-edge service adoption. This understanding of the adult market explains why carrying a lot less cash has decreased, why there aren't as many lines for unsuccessful scratched cards, and why entering the longer 14–16 digit scratched card voucher pin takes less time.

Managerial Implications

The study has provided a more comprehensive knowledge of the elements that facilitate and hinder the purchase of virtual airtime in developing nations. The direct impact relationship between PU and BI suggests that network operators and other mobile service providers concentrate on raising consumer knowledge and advantages through extensive advertising. Since non-adoption implies unfamiliarity and lack of recognition, it will lessen technophobia.

Additionally, educating, enlightening, and raising public understanding will lower some logistical expenses and boost profit margins. Another conclusion is that MTN became the network of choice for Nigerian telecom users. To preserve its market, share and attract new clients, MTN must guarantee consistent and dependable network coverage and customer satisfaction. Again, to increase their market sizes, win more consumers' trust, and boost profit margins, other network providers need to improve their network signals, coverage, and customer happiness.

The beneficial effects of family provide proof that social interactions have an impact on adults on an individual basis. Because modern adults rely on mobile devices for daily activities, network providers should concentrate on the adult market. As a result, the adult market could be the focus of future marketing efforts to encourage the use of virtual airtime. Furthermore, the greater the number of adults adopting technology, the greater their impact on the country's economy, greater experiences and improved services.

Lastly, the online approach is preferable above the conventional status quo due to the substantial influence of satisfaction. To encourage continued usage, mobile service providers should prioritize customer happiness by ensuring that the facilities offered are quicker, simpler, more dependable, and compatible. The study has proven that more Nigerians are embracing technology due to increasing awareness of the ease and advantages of digital services.

Limitations and Further Study

Notwithstanding the study's conclusions and contributions, there are certain restrictions because it focused only on one particular type of mobile commerce. Thus, data gathering was restricted to adult, working-class, and urban telecom consumer segments. As a result, the data does not accurately reflect consumers' sustained use of the e-voucher or their intentions regarding technology adoption. Nor does it reflect the continual use of the e-voucher by rural residents, the unemployed, and young people. Once more, not all the variables that may likely be required to affect the adoption of e-vouchers in Nigeria were in

the research model. Further research should identify additional factors that could promote or discourage e-vouchers in other emerging nations.

Conclusion

The current study has concentrated on the variables that affected the acceptance and ongoing use of e-vouchers in the Nigerian setting. Out of the seven stated hypotheses, one was unsupported by the study. Notwithstanding the lack of statistical significance regarding compatibility, the research has yielded managerial and theoretical insights. Therefore, one could argue that user satisfaction will lead to a greater propensity to stick with mobile commerce services. Ultimately, acceptance of e-vouchers is essential to the country's progress because usefulness will rise as the population grows.

Abbreviations

AU: Actual Usage, BI: behaviour Intention, CO: Compatibility, CU: Continuous Usage, FA: Family, HND: Higher National Diploma, NC: Network Coverage, OND: Ordinary National Diploma, SA: Satisfaction.

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Author Contributions

Okofu Sebastina Nkechi: the study conducted, manuscript writing and editing. Anning-Dorson Thomas: mentorship, manuscript editing. Duh Helen Inseng: mentorship, manuscript editing.

Conflict of Interest

No conflict of interest was declared.

Ethics Approval

University of the Witwatersrand. Human research ethics committee (non-medical): R14/49.

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