



**BRIDGING THE DIGITAL DIVIDE:
Using A Modified Unified Theory of Acceptance and Use of
Technology to Predict the Determinants of Telecentre
Adoption**

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SUMMARY OF PRESENTER’S BIODATA

Abdulwahab, Lawan was born in Tsohuwar Kasuwa Quarters, Potiskum Local Government Area, Yobe State. He attended Buraima Primary School, Potiskum from 1973 to 1979, and Government Teacher's College, Potiskum where he obtained Teacher’s Grade II Certificate in 1984. He proceeded to College of Education, Azare, Bauchi State from 1985-1989 for his Nigeria Certificate in Education (NCE-Mathematics). He also obtained the degrees of B.Sc. Mathematics (First Class Honors) 1992, M.Sc. (Computer Science) 1997, from University of Maiduguri and Abubakar Tafawa Balewa University, Bauchi respectively. Abdulwahab was at Universiti Utara Malaysia from 2009 to 2012 for Ph.D. Information Technology.

Abdulwahab did his National Youth Service at Federal Polytechnic Ado Ekiti former Ondo State from 1992 to 1993. His working career started briefly as a classroom teacher at Government Science Secondary School Potiskum in 1993 and later secured appointment with the University of Maiduguri on 6th January 1994. In May, 2000 he moved his services to the defunct National Electric Power Authority as Officer I and left in 2013 as Senior Manager (IT) to join the services of Bayero University, Kano as a Senior Lecturer in the Department of Information Technology and rose through the ranks to become a Professor in October, 2019.

In his teaching career at university level, he has taught and still engage in teaching several courses in Computing at both undergraduate and postgraduate levels. Currently, he is supervising two Ph.D. candidates and has supervised forty (40) M.Sc. Computer Science candidates, many Professional Masters in Information and Communication Technology projects, and numerous Undergraduate candidates. He has conducted viva-voce on several Ph.D., and M.Sc. Computer Science and IT candidates. Abdulwahab served as external examiner in the Computer Science and IT program to several Universities across the country, notably among which are: Abubakar Tafawa Balewa University, Bauchi, ACETEL, NOUN, Abuja, Federal University Dutse, Federal University, Dutsin- Ma, Federal University Gusau, Federal University Gashua, Yobe State University, Damaturu and Umaru Musa Yar’adua University, Katsina State. From 2021 to date, Abdulwahab has assessed twelve candidates for promotion to the post of Professorial cadre in computing discipline from several Universities across the country. He has published widely in both local and International Journals of repute. His research interest in computing

includes Modeling and Simulations, IT Project Management, Information Systems, Community Informatics, and ICT4D. Abdulwahab is a visiting lecturer to North West University, Kano and Aliko Dangote University of Science and Technology, Wudil, Kano.

He is an editorial board member to *Dutse Journal of Pure and Applied Sciences*, Federal University, Dutse and *Journal of Sciences*, Faculty of Science, Federal University, Dutsin-Ma, Katsina State. He is also a reviewer to *Journal of Information and Communication Technology*, College of Arts and Science, Universiti Utara Malaysia, *African Journal of Information Systems*, Kennesaw State University, College of Business, USA, *Journal of Information Development*, *International Journal of Computer Application*, Nigeria Computer Society, Lagos, Nigeria, *Bayero Journal of Pure and Applied Sciences*. Abdulwahab has attended several local and international conferences around the world and served as technical chair at many of these conferences.

On administrative responsibilities, Abdulwahab held the two terms appointment as The Head, Department of Information Technology and Dean, Faculty of Computer Science and IT, Bayero University, Kano, from 2014-2020. Other administrative responsibilities held were Faculty of Computer Science and IT Postgraduate Coordinator and representative of the Faculty of Computer Science and IT to the School of Postgraduate Studies, Bayero University, Kano (2013). He is a Member of the Senate, Bayero University Kano, from September 2014 to date. He also served on several Committees of Bayero University, Kano as either a member or chair at the faculty level.

Abdulwahab was trained in 2021 by the Global University Network for Innovation (Africa) and the African Quality Assurance Network as a certified accreditor for Programmed and Institutional Accreditation in Computing Discipline in Higher Institutions. To date, he has participated in thirty (30) program accreditation and resource verifications exercises of Nigerian Universities, organized by National Universities Commission. Abdulwahab is the Chief Technical Adviser to the Registrar, Joint Admission and Matriculation Board on Computer-Based Test, Unified Tertiary Matriculation (UTME) Exercise in Kano State from 2017 to date.

Abdulwahab Lawan is a Fellow of Nigeria Computer Society (FNCS), Member, Computer Professionals of Nigeria (MCPN), Member, Academia in Information Technology Practitioner (MAITP), Member of the Society of Digital Information and Wireless Communication (SDIWC), Member Internet

Society and Member Telecentre.org.

Abdulwahab, Lawan is happily married with children.

BRIDGING THE DIGITAL DIVIDE: USING A MODIFIED UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY TO PREDICT THE DETERMINANTS OF TELECENTRE ADOPTION

...the new information and communication technologies are among the driving forces of globalization. They are bringing people together, and bringing decision-makers unprecedented new tools for development at the same time, however, the gap between information 'haves' and 'have-nots' is widening, and there is a real danger that the world poor will be excluded from the emerging knowledge-based global economy (Former UN's Secretary-General Kofi Annan, Nov. 5, 2002).

1. Introduction

The term digital divide originally coined in the mid-1990s, focused on the worrying disparities between haves and have-nots in terms of access to Information and Communication technologies (ICTs), and the use of the Internet for a wide range of activities. The digital divide comprises a variety of other factors not limited to access to the Internet, availability of software and hardware. Others include: digital literacy and the capacity to engage effectively and efficiently with online resources (Kuteesa *et al.*, 2024).

International Telecommunication Union (ITU) report in 2023 has shown that about 4.1 billion people globally are using the Internet, representing 67.4%, with most of this access in the developed world (ITU, 2023). However, In Africa on the other hand, only 37.1% are online. ITU report in 2022 showed household with Internet access at home in Nigeria was 35.5%. Limited ICT infrastructure poses a substantial challenge in several rural areas across Africa. Despite rapid advancements in mobile technology penetration, which has significantly increased access to telecommunications and Internet services, the gap in access to high-speed Internet and other advanced ICT services continue. Unequal access to ICTs has implications for the socio-economic development of underserved and unserved communities.

Whilst, Internet use continues to spread in the developed world, the low Internet penetration in most of the developing countries has been an issue to various Governments, Organizations and ITU (Sey & Fellows, 2009; Wan Rozaini *et al.*, 2010; Clark & Gomez, 2011). To bridge the aforementioned divide, Governments and ITU are sponsoring Telecentres in most of the underserved and unserved areas in developing countries (Sey & Fellows, 2009; Clark &

Gomez, 2011; Bjorn & Qystern, 2017). A telecentre is a public place where people can access computers, the Internet, and other digital technologies that enable them to gather information, create, learn, and communicate with others while they develop essential digital skills (Mayanja *et al.*, 2014; Cheng 2020). The provision of facilities for access to the Internet was expected to result in the promotion of positive change within communities in served and underserved areas (Maria *et al.*, 2012).

Although, government initiatives on broadband expansion projects, have made considerable strides in improving access to Internet, network coverage is still erratic and often limited to more urbanized areas. The goal of Telecentre deployments is the use of digital technologies to support communities' economic, educational, and social development—reducing isolation, bridging the digital divide, promoting health issues, creating economic opportunities, and reaching out to youths (Mayanja *et al.*, 2014; Bjorn & Qystern, 2017; Chong *et al.*, 2020). Studies suggested that despite the existence of mobile technology, users still patronize Telecentres. The decision to use Telecentres is attributed to cheaper access to services compared to the use of smartphones, provide services comparable to user requirements, socialize with other users and attain ICT skills (Sellina & Jim, 2024). Telecentres are found in almost every country, though, they sometimes go by different names: Village Knowledge Centre, Info Centre, Community Technology Centre (CTC), Community Resource Centres (CRCs), Community Communication Centre (CCC) etc.

Research have shown that providing access through Telecentre is not enough, rather the values created as a result of gain from adoption and access by the community that makes ICT meaningful Zulkhairi *et al.*, 2010; Gurstein, 2007). The models of telecentre adopted in Africa correspond with the various models that have been used in Scandinavian countries such as Denmark, Norway, and Sweden, where telecentre originated in the 1980s (Ojo, 2005). The initial idea behind telecentre was aimed at minimizing rural- urban migration as well as creating IT expertise. Ojo (2005) argued that in some European countries and U.S.A, telecentres are meant for creating new job opportunities and supporting the workforce, while in the UK and France most centres function as telework centres providing facilities for steelworkers.

Primarily, a Telecentre is meant to promote digital literacy, alleviate the digital divide, poverty alleviation, employment generation as well as improvement in e-governance and e-commerce initiatives (Bjorn & Qystern, 2017; Kamaruddin *et al.*, 2021). Despite the benefits of telecentre highlighted in contrast to other

for-profit shared access platforms such as Cybercafé and Information kiosks, telecentres research has received little academic attention specifically, on the DETERMINAT of its adoption and use (Wang & Shih, 2008; Syed, Zaini & Nilufar, 2009). The success of telecentres adoption depends largely on whether the users are willing to accept and use the information technology (IT) platform (Wang & Shih, 2008; Galadanci & Abdulwahab, 2016).

Adoption of IT platform is the demonstrable readiness within a user group to employ the use of IT for the tasks it is designed to support (Dillon & Morris, 1996; Galadanci & Abdulwahab, 2017). Thus, acceptance can be viewed as a function of user involvement in technology use. Previous research has suggested that despite the availability of Telecentres in developing countries of India and Taiwan the citizens were not using them (Pal, 2007; Wang & Shih, 2008). Typical Telecentre Network Communications Platform is shown in Figure 1.

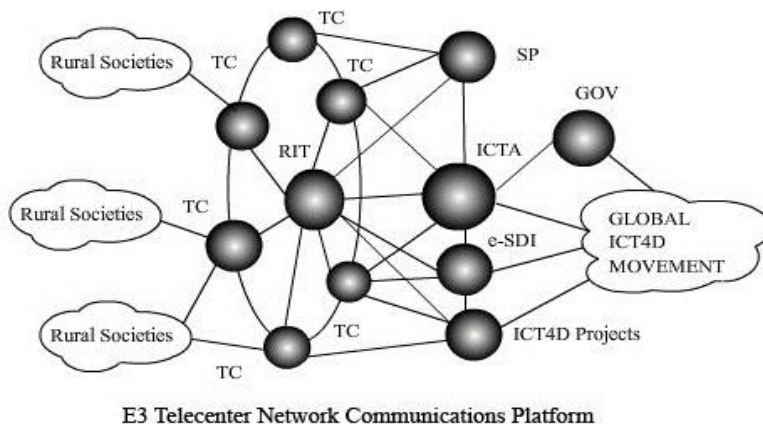


Figure 1: A Typical Telecentre Network Communications Platform (Source: Cheng et al., 2022)

1.1 Telecentre Implementation in Nigeria

From the last decade, Telecentres are being implemented through the support of the Universal Service Provision Fund (USPF), a subsidiary of Nigerian Communication Commissions (USPF, 2009a). The USPF developed a 5-year Strategic Management Plan (SMP) covering 2007-2011, which promotes universal access and universal services through broadband and telecentre projects. Among the models of telecentres in Nigeria are Community Communication Centres (CCC-Telecentres) and School Access Projects (SAP). The two models were implemented by USPF. These were established to

facilitate the widespread availability and accessibility of ICTs throughout the country (USPF, 2009a). As of 2009, the USPF has rolled-out 12 CCC, two centres in each of the six geopolitical zones of Nigeria, to serve as pilot projects. In the second phase, CCCs are projected to be established across the 109 senatorial zones in the country. It was then envisaged that by the end of 2011, CCCs are expected to be established in 60% of communities with a population of more than 5,000 spread across 774 LGA (USPF, 2009a).

Each CCC provides a public calling Centre, Internet, ICT training, and other services to underserved and underserved communities. The centres are also equipped with desktop computers, telephone, power generators, bandwidth to provide access to Internet, ICT and e-initiatives at rural, underserved and unserved areas. The partnerships were formed between the USPF and Internet Service Providers (ISP) in implementing the CCCs and SBT (USPF, 2009a). The project is funded through grants. Local Entrepreneurs are selected through open competitive biddings to establish the CCCs.

Table 1: *Community Communication Centre (CCC-Telecentre) in Nigeria*

Geopolitical Zone	State	L.G.A
1. North East,	Adamawa	Mubi
	Bauchi	Azare
2. North Central	Niger	Izom
	Benue	Ugba
3. North West	Jigawa	Gumel
	Kebbi	Kamba
4. South East	Enugu	Ishi-Ozalla
	Imo	Ihiteowerri
5. South-South	Bayelsa	Amarata
	Cross rivers	Itigidi
6. South West	Ogun	Igbogun
	Ekiti	Ido
Total		12

Source: (USPF, 2009a)

In 2012, following the expiration of the SMP 2007 – 2011 led to the Board and Management of the USPF developed a new 5-year SMP (2013 -2017), which relied on the experiences and lessons learned over the past years. The fund were designed and streamlined to focus on two broad areas – Access and Connectivity. Specific corresponding projects were also designed to be implemented under the programmers. Among the projects the USPF rolled-out

are Community Resource Centres (CRC) in partnership with local entrepreneurs and community-based organizations (USPF, 2025). The aim is to extend voice, Internet and ICT training and other e-services to unserved communities on shared basis with the aim of bridging the digital divide in the communities.

The CRC is housed in a purpose-built centre equipped with ICT tools and connectivity instead of rented properties as operated in CCC (USPF, 2011). CRC serves as one-stop shop for access to good quality ICT services at fair and affordable rate. The USPF has currently subsidized a total of 93 CRCs across the six geo-political zones of Nigeria (USPF, 2025). Figure 2 shows Telecentre Components and Services (Cheng *et al.*, 2022).

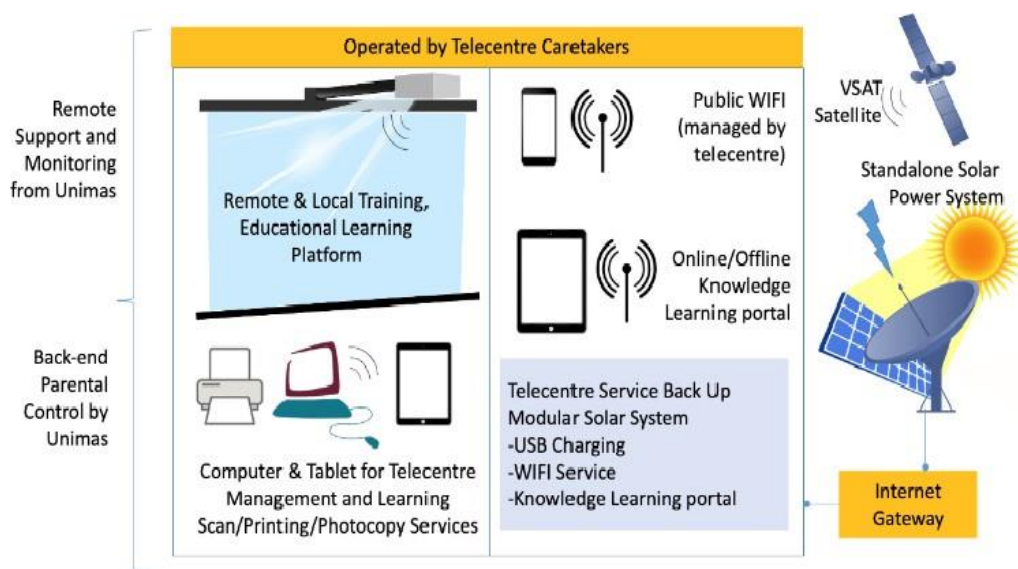


Figure 2: *Telecentre Components and Services (Source: Cheng et al., 2022)*

1.2 Background on Technology Adoption

Empirical research to show that IT adoption can be explained by various technology acceptance models have been reported in technology adoption literature (Mijinyawa, & Abdulwahab, 2014; Martins, 2022). Though, many theories abound in information systems (IS), the prominent of these are the original technology acceptance model (TAM) and its extension (TAM2) developed by Davis (1989) and the Unified Theory of Acceptance and the Use of Technology (UTAUT) (Venkatesh *et al.*, 2003). An overview of the telecentre context revealed a slight difference from the conventional IT

platform. Telecentre, despite providing physical access of ICTs to some members of the underserved community; also has the orientation toward Socio-economic development of the people in the communities it's intended to serve and for telecentre to meet the purpose of its implementation it has to be effective (Gurstein, 2007; Brown, 2023).

Effectiveness is viewed as a value-based judgment concerning the performance of an organization (Balduck & Buelen, 2008). Thus, UTAUTs' fundamental constructs may not completely reveal specific influences in the context that may affect adoption of telecentre (Abdulwahab & Zulkhairi 2011). Since the model does not address organizational factors except for facilitating conditions. A critical problem is the need to have a further understanding of organizational factors that contribute to the acceptance and usage of telecentres (Venkatesh *et al.*, 2003; Balduck & Buelen, 2008). Sowa, Selden, and Sandfort (2004) proposed two levels of competing value approach to measuring the effectiveness of non-profit initiatives like telecentres. The two levels were conceptualized as constructs measuring the effectiveness of the telecentre at program and management levels. These constructs have a theoretical foundation from the Competing Value Approach (CVA) originated by (Quinn & Rohrbaugh, 1983; Balduck & Buelen, 2008).

The UTAUT model is adapted to include individual factors (Performance expectancy, Effort expectancy and social influence) and organizational factors (Management effectiveness, Program effectiveness, and Facilitating conditions) which could influence users' acceptance of telecentre (Venkatesh *et al.*, 2003; Balduck & Buelen, 2008; Yeop *et al.*, 2019; Kamaruddin *et al.*, 2021). These constructs could be the main influencing factors of the intention of users towards telecentre acceptance in Nigeria. Theoretically, these claims have not been tested empirically. User acceptance is a regular yardstick of IT implementation, understanding what motivates users to adopt and use technology has been researched all over the world, specifically in the US (Davis, 1989; Davis, Bagozzi, and Warsaw, 1992; Venkatesh *et al.*, 2003), in Asia (Wang & Shih, 2008; Park, Yang, & Lehto, 2007; Yeop *et al.*, 2019) and the Middle East (Al-Gahtani, Hubona & Wang, 2007; Al-Somali *et al.*, 2009). Furthermore, studies on moderating effects in the telecentre's acceptance setting are sparse. Some studies only suggested the moderating effect of gender, age, experience and voluntariness on the determinants of behavioural intention (Venkatesh *et al.*, 2011; Yeop *et al.*, 2019). The findings of moderating effects obtained from the relationship between the determinants of behavioural intention were uncertain (Wang & Shish, 2008; Venkatesh *et al.*, 2011).

However, Sun and Zhang (2006) and Srite and Karahanna (2006) suggested the inclusion of location and ethnic identity intensity as moderators of the technology acceptance model. But few empirical tests were conducted to test the effect of these on the determinants of intention.

2. Theoretical Models of Technology Adoption

Substantial models have been developed to identify the factors that influence IT adoption. The models include: Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1977), the Theory of Planned Behaviour (TPB) (Ajzen, 1991), the Diffusion of Innovation Theory (DOI) (Rogers, 2003), and the Technology Acceptance Model (TAM) are among the most well-known of these (Davis, 1989). TAM is thoroughly explained being one of the most widely cited models in the literature on technology adoption (Lee, Kozar & Larsen, 2003; Venkatesh *et al.*, 2011). The models described subsequently form the basis of general theories adopted in this study.

2.1 The Theory of Reasoned Action

Theory of reason action (TRA) has its origin in the social psychology domain proposed by Fishbein and Ajzen (1975). The theory seeks to predict the behaviour of an individual in a specific condition (Fishbein & Ajzen, 1975). TRA seeks to explain the relationship among beliefs, attitudes, subjective norm, behavioural intentions and behaviour. Technology acceptance or rejection by an individual is measured by intention to perform a behaviour. TRA model (Fishbein & Ajzen, 1975) showed that intention is the direct determinants of behaviour. An individual believes to reflect his/her attitude towards the behaviour and subjective norm. The two Determinants of behavioural intention are influenced by belief. The TRA has been used widely in several IS research; it was also reported to measure success in the prediction and explanation of human behaviour in a variety of disciplines (Davis, Bagozzi & Warsaw, 1992).

2.2 The Theory of Planned Behaviour

Theory of planned behaviour (TPB) was developed by Ajzen (1991), to supplement the TRA. Also, the theory is grounded in sociology. While TRA is used to explain social behaviour and Information Technology use (Ajzen, 1991; Dillon & Morris, 1996). The additional construct combined to measure intention in TPB is perceived behavioural control (Dillon & Morris, 1996). Particularly, in TPB intention is conceived as the direct determining factor of behaviour. Moreover, attitude, subjective norm, and perceived behavioural control (PBC) are determined by intention. Ajzen (1991) defined PBC as “the perceived ease or difficulty of performing a behaviour” (Ajzen 1991, p.188).

The TPB posited that the control people have over their behaviour varies from behaviour that can be done easily to those requiring effort and resources.

2.3 Expectation-Disconfirmation Theory

Expectation disconfirmation theory or Expectation confirmation theory (EDT) was originally developed by Oliver (1980). The theory has a basis on cognitive dissonance theory (CDT) in Marketing. The EDT was introduced into the IT domain by Bhattachee (2001). EDT focuses in particular on reasons and how user reactions change over time. It consists of four main constructs: expectations, performance, disconfirmation, and satisfaction. Even though initial acceptance of IT initiatives is an important step towards realizing its success, Bhattachee (2001) argued that the long-term viability of IT and its eventual success depends on its use continuance rather than initial adoption, assessing use continuance is a crucial factor in understanding IT success (Bhattachee, 2001; Barnes, 2011; Abdulwahab & Galadanci, 2015).

2.4 Diffusion of Innovation Theory

Diffusion of innovation theory (DOI) (Rogers, 2003), is another well-established theory, also grounded on social psychology that has been widely used in IT research. The theory comprises five innovation characteristics: relative advantage, compatibility, complexity, Trialability, and Observability. These characteristics provide a basis on which predictions could be made about user adoption and the decision- making process and the prediction of implementation of new technological innovation. The main concept of DOI is that technological innovation is communicated through particular channels among the members of the social system. The stages involved in the communication channel include knowledge, persuasion, decisions, implementation, and confirmation (Rogers, 2003). Lee *et al.* (2003) has suggested that among the five stated characteristics of innovation only relative advantage, compatibility, and complexity are related to innovation adoption. Relative advantage and complexity are synonymous with perceived usefulness and perceived ease of use (Davis, 1989). Compatibility is the degree to which the innovation is perceived to be consistent with potential users' existing values, experience, and needs (Wu & Wang, 2005).

2.5 Technology Acceptance Model

Technology Acceptance Model (TAM) was proposed by Davis (1989) to explain and predict user acceptance of Information technology. The TAM was

adapted from the theory of reasoned action (TRA); a psychological theory that tries to explain an individual's action/intention to perform the behaviour (Martins, 2022). Taylor and Todd (1995) argued that TAM can be considered as TRA but applied to explain the specific model that is adopted by information technology. The TAM model theorizes that system use is determined directly by behavioural intention and the intention is influenced by the user's attitude towards using the system and the perceived usefulness of the system. The two constructs attitude and behavioural intentions are as well affected by perceived ease of use (Davis, 1989; Yi, Jackson, Park & Probst, 2006). The two constructs are described as belief constructs (Davis, 1989). Perceived usefulness is the degree to which an individual believes that using a particular system would enhance his/her job performance (Davis, 1989). Usefulness is quantified into three; job performance, productivity, and time-saving. Accordingly, using IT enhances job performance, productivity and makes jobs to be accomplished on time (that is, by reducing the time to carry out a task or providing timely information).

Perceived usefulness construct corresponds with Roger's (2003) attribute of relative advantage (Davis, 1989; Karahanna, Straub & Chervany, 1999). Perceived usefulness is found as the most important element of IT perception (Lee, 2010). Perceived ease of use has been defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989; Taylor & Todd, 1995). This construct corresponded with Roger's (2003) innovation attributes of complexity (Davis *et al.*, 1989; Karahanna *et al.*, 1999). According to Davis (1989), the actual use of IT is influenced directly or indirectly by user behavioural intentions, attitude, perceived usefulness, and perceived ease of use of technology. External factors affect intention and actual use through the intervening effect of the behavioural construct of perceived usefulness and perceived ease of use. Generally, TAM provides a community of IT researchers with a parsimonious model that examines factors leading to IT acceptance. The two constructs of perceived usefulness and perceived ease of use were conceptualized as important variables leading to attitudes towards intention in adopting a new system. These determinants are also easy to be understood by system developers and can be considered specifically during system requirement analysis and other system development (Taylor & Todd, 1995). Venkatesh and Davis (2000) proposed an updated TAM because of the theoretical and empirical advances that had taken place over the previous decades in TAM research. They presented a study that developed and validated a theoretical extension of TAM, referred to as TAM2. Based on the suggestion that TAM has to be integrated into a broader range to include variables related to

both social and cognitive processes extended TAM was proposed.

2.6 Extended Technology Acceptance Model and Limitations

Venkatesh and Davis (2000) scrutinized prior efforts of TAM and implemented the request of the model's expansion by developing TAM2. The model clearly defined the external variables of perceived usefulness and perceived ease of use to comprise social influence and cognitive instruments (Venkatesh & Davis, 2000). The external variables of perceived usefulness are social influence (subjective norms) and cognitive instruments such as image, job relevance, output quality, and result demonstrability. All the enumerated variables have direct effect on perceived usefulness. Further, subjective norm has an effect on intention with the moderation of experience and voluntariness. Previous research established that social influence processes, such as subjective norm, image, and voluntariness, besides cognitive instrumental processes, such as job relevance, output quality, result demonstrability, and perceived ease of use were theorized as success factors of new technologies (Venkatesh & Davis, 2000).

2.7 Limitations of TAM

A meta-analysis of TAM by Legris *et al.* (2003) identifies some shortcomings in TAM research. Among the identified limitation include: most of the studies used to examine only one IT with a regular group of the subject in a particular task, more often, performed in a single point of time thereby making a problem of generalization. Secondly, most studies measure self-reported use rather than actual usage. Whereas, self-reported use only served as an indicator, because it is susceptible to bias which may alter and or overstate the causal relationship between independent and dependent variables (Lee *et al.*, 2003). The prevalence of cross-sectional study is also a limitation of TAM research (Lee *et al.*, 2003). The fact that user intention and perception are not constant over time has shown the need to measure this concept at numerous points of time (Venkatesh & Davis 2000; Venkatesh & Morris, 2000). Finally, the low explanatory power of variance is a major limitation of TAM studies (Sun & Zhang, 2006). Analysis of 101 articles using TAM in the leading management information systems (MIS) journals and conferences were examined by Lee *et al.* (2003). About 36 articles adopt self-reported use. The finding also shows that 41 studies used students as a sample while 60 studies employed the use of knowledge workers. The research yielded only 13 longitudinal studies out of the 101 TAM papers studied (Lee *et al.*, 2003). Most studies used a cross-sectional method after exposing subjects to the new IT, usually through hands-on sessions or training. Majority of studies adopted a quantitative approach.

Only three studies used qualitative data and laboratory experiments which were mainly conducted on students in a university environment. Data analysis was done through regression in most of the studies using SPSS software. Few studies adopted structural equation modeling with Partial Least Square (PLS), LISREL, and Amos (Lee *et al.*, 2003). Table 2 shows the list of researchers that validated TAM and the corresponding methodological details.

Table 2. *Methodological Details of TAM Validation*

Usage	Methodology	No. of Papers	Details
Students	Self-reported use	36	Venkatesh and Davis (2000);
	Undergraduate	28	Matheson (1991); Taylor and Todd (1995)
	MBA or Graduate	13	Davis <i>et al.</i> (1989)
Knowledge workers		60	Venkatesh and Davis (2000); Venkatesh and Morris (2000)
	Longitudinal Study	13	Venkatesh (2000); Venkatesh and Morris (2000)
	Cross sectional	88	Straub (1994); Taylor and Todd (1995)
	Field study	86	Igbaria <i>et al.</i> (1995); Agarwal and Prasad (1999)
Analysis	Lab experiment	12	Mathieson (1991); Doll <i>et al.</i> (1998)
	Qualitative study	3	Briggs <i>et al.</i> (1999) De Verde <i>et al.</i> (1999)
	PLS	18	Sambamuthy and Chin (1994); Agarwal and Karahanna (2000)
	Lisrel	30	Taylor and Todd (1995) Karahanna and Limayem (2000)
	Amos	7	Chin and Todd (1995); Fenech (1998)
	Regression	32	Lucas and Spitler (1999)
	Discriminate	14	Szajna (1994); Chin and Gopal (1995)
	and Conjoint Analysis		

Source: *Lee et al. (2003).*

The original TAM and its successors were validated by researchers, but the results showed that the models were capable of predicting 30%- 40% of variances, sometimes, only 25% of the variance was reported (Sun & Zhang, 2006; Holden & Karsh, 2010). Researchers had suggested a better technology acceptance model that can generate a higher prediction of success. Legris *et al.* (2003) recommended that other variables should be included in TAM, to provide a more comprehensive model, which can integrate both human and social variables. This led to the improvement of TAM and finally, the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which was developed to explain a more complete picture of acceptance of technology by Venkatesh, *et al.* (2003).

2.8 The Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh *et al.* (2003) through the incorporation of eight famous models in the diverse discipline. The models were integrated in terms of their conceptual differences as well as empirical resemblances (Yi *et al.*, 2006). The idea behind the amalgamation of these models is to arrive at the unified view of user acceptance of IT (Venkatesh *et al.*, 2003). The eight models used, include the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Technology Acceptance Model (TAM), (Davis, 1989), the Theory of Planned Behaviour (TPB), (Ajzen, 1991), the Combined TAM and TPB (C-TAM-TPB) (Taylor & Todd, 1995), the Diffusion of Innovation Theorem (DOI), (Rogers,2003), the Social Cognitive Theory (SCT), (Bandura, 1986) the Motivational Model (MM), (Davis *et al.*, 1992), the Model of PC Utilization (MPCU) (Thompson, Higgins, Howell, 1991).

Four constructs were classified as the determinants of behavioural intention and usage behaviour. These are performance expectancy, effort expectancy, social influence, and facilitating conditions. Venkatesh *et al.* (2003) incorporated four moderating variables, gender, age, experience, and voluntariness of use. The moderating variables attempt to explain the influence of individual differences in technology use (Sun & Zhang, 2006). For instance, the effect of performance expectancy on behavioural intention is moderated by gender and age such that it is more significant for male and younger employees. The effect of effort expectancy on behaviour intention is also moderated by gender, age, and experience such that it is more significant for female and older employees. The effect of social Influence on behaviour is moderated by all variables, while the effect of facilitating conditions on actual use is moderated by age and

experience. Table 3 shows the UTAUT determinants and the sub-determinants showing the models/ theory from which each determinant originated.

Table 3: Sub-Determinants and Sources of UTAUT External Variables

UTAUT determinants	The sub-determinates	The sources of integrated model
Performance Expectancy	Perceived usefulness	TAM/TAM2/C-TAM-TPB
	Extrinsic motivation	MM
Effort Expectancy	Job-fit	MPCU
	Relative advantage	DOI
	Outcome expectation	SCT
	Perceived ease of use	TAM/TAM2
Social Influence	Complexity	MPCU
	Ease of use	DOI
	Subjective norm	TRA, TAM2, TPB/DPTB, C-TAM- TPB
Facilitating Conditions	Social factors	MPCU
	Image	DOI
	Perceived behavioural control	TPB/DPTB, C-TAM-TPB
	Facilitating conditions	MPCU
	Compatibility	DOI

Source: Venkatesh *et al.* (2003).

Venkatesh *et al.* (2003) formulated a unified theory of acceptance and use of technology by reviewing and empirically comparing the eight competing models. Seven constructs were initially identified to have a significant and direct relation with behavioural Intention or usage behaviour. However, only four constructs were advanced to have a significant role as direct determinants of usage behaviour as shown in (Figure 3). The other three constructs are: attitude using technology, self-efficacy, and anxiety were found not to be direct determinants of Intention/use (Venkatesh *et al.*, 2003). Venkatesh *et al.* (2011) have further developed a variant of UTAUT named UTAUT 2 comprising seven constructs.

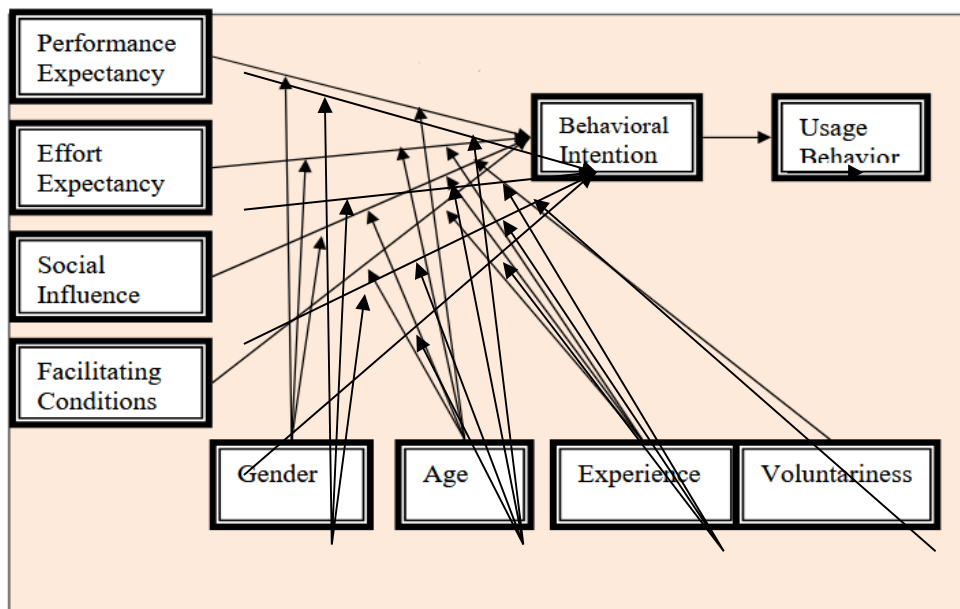


Figure 3: *The UTAUT Model* Source: (Venkatesh *et al.*, 2003)

The rationale behind the UTAUT model is to offer the managers a parsimonious tool to weigh the introduction of new technology and predict users' behavioural intention in accepting information technology implementation (Venkatesh *et al.*, 2003). Empirical results of this model revealed it was able to account for 70% of the variance in usage intention (Venkatesh *et al.*, 2003; Schaper & Pervan, 2007). This result, to a large extent, does better than any of the original eight models/theories and their extensions (Venkatesh *et al.*, 2003). The use of the UTAUT model has become more common in recent years. It is no longer confined to the research on the acceptance and use of IT but applied to various disciplines (Hennington & Janz, 2007).

2.9 Competing Value Approach

A two-level competing value approach to measure Telecentre effectiveness is integrated in the proposed model (Balduck & Buelen 2008). The two levels analysis are effectiveness of the Telecentre at program and management levels, which are proposed by Sowa *et al.* (2004) using multi-dimensional and integrated model of non-profit organizational effectiveness (MIMNOE). The two constructs have a theoretical foundation from Competing Value Approach (CVA) originated by Quinn and Rohrbaugh (1981; 1983). Balduck and Buelen (2008) have reported extensively on the effectiveness models and theoretical approaches developed with their relating criteria based on reflecting on different

values and preference of school of thought concerning effectiveness. Balduck and Buelen (2008) identified the best-known models as the goal models (Price, 1972; Scott, 1977), the system resource model (Yuchtman & Seashore, 1967) the internal process approach (Steers, 1977), the multiple constituency model (Tsui, 1990) and Competing Value Approach (CVA) (Quinn and Rohrbaugh, 1981, 1983). CVA is acknowledged as the most comprehensive and influential multidimensional organizational effectiveness theory (Balduck & Buelen, 2008). CVA postulated that individual assess organizational effectiveness is based on three super ordinate value continua (Balduck & Buelen 2008). The first dimension is organizational focus: an internal versus external focus (development of people in the organization versus development of organization itself). The second dimension is related to organizational structure: concern for flexibility versus concern for control. The third dimension is related to organizational outcome: a concern for means versus end (important process versus final outcomes). Further, Balduck and Buelen (2008) point out that each dimension corresponds to values that influenced the criteria used in assessing effectiveness through organizational focus and organizational structure which produced the four cells of CVA. A combination with the third axis, mean, and end, reveals that eight cells represent four basic models: (that is, Human relations, Open system, Internal process and Relational goal models) of organizational effectiveness as in Figure 4.

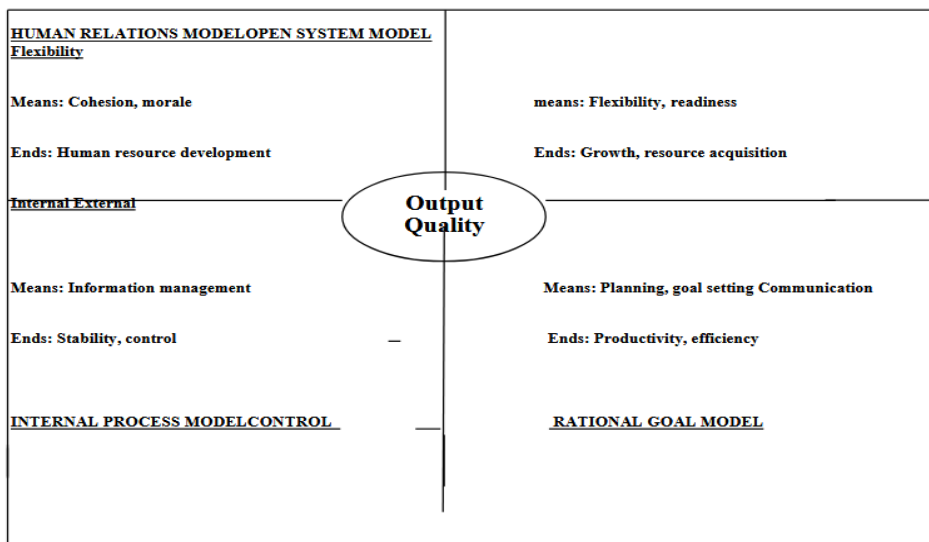


Figure 4: *Competing Value Approach Model (CVA)* Source: Quinn and Rohrbaugh (1983)

Balduck and Buelen (2008) suggested that the two-level competing values

model can be applied to different types of non-profit organizations (NPOs). The distinction should be made between management and program levels and then apply the CVA at each level. Appropriate criteria at each level within the four domains of CVA should be considered.

This research extends the UTAUT model by incorporating the four (4) UTAUT constructs with management effectiveness, program effectiveness, and anxiety. The construct of anxiety was introduced to IT by Compeau and Higgins (1985), Venkatesh *et al.* (2003) suggested that there was no evidence to support relationship between computer anxieties with behavioural intention. Hence the need to re-examine this construct in different contexts and cultures. The UTAUT model is considered as the most appropriate compared to other models and theories being the only theory that scrutinizes technology acceptance from the unified perspective (Venkatesh *et al.*, 2011). Reflecting on this, the UTAUT model is considered more suitable, since it addresses both organizational and individual factors in IT acceptance than other models of technology adoption (Venkatesh *et al.*, 2003; 2011). In addition, the constructs of UTAUT originated from eight prominent technology adoption theories and models (Venkatesh *et al.*, 2003). Venkatesh *et al.* (2011) and Bankole *et al.* (2011) reported that even though TAM is the most widely cited adoption model, yet it is contained within the UTAUT model. Moreover, the UTAUT model was able to account for 70% and 50% of the variance in intention and use respectively (Venkatesh *et al.*, 2011) while other models could only predict the acceptance of technology in about 40% of cases (Venkatesh *et al.*, 2003; Schaper & Pervan. 2007).

3. *Determinants of Telecentre with Theoretical Hypotheses*

3.1 *Performance Expectancy*

Performance expectancy (PE) is defined as “the degrees to which an individual believes that using an IT will help him/her better attain significant reward” (Venkatesh *et al.*, 2011). This construct was reported as the most influential among the four constructs by Venkatesh *et al.* (2003) in predicting behavioural intention. It remains significant at all points of measurement regardless of environmental settings and was supported by other studies (Wang & Shih, 2008). The theoretical foundation of performance expectancy has a basis from five similar constructs from various theories/models. The constructs include perceived usefulness, relative advantage, job-fit, extrinsic motivation, and outcome expectations (Venkatesh *et al.* 2003; Lai, 2017). Prior studies have suggested that the construct may have gender bias (Al Gahtani *et al.*, 2007; Wang & Shih, 2008).

3.2 Effort Expectancy

Effort expectancy (EE) is defined as “the degree of ease associated with the use of the IT” (Venkatesh *et al.*, 2011). This construct has a theoretical foundation from the three constructs based on different models that relate to effort expectancy. These are perceived ease of use (TAM/TAM2), complexity (MPCU), and ease of use (DOI) (Rogers, 2003). In most studies conducted using the UTAUT model, effort expectancy was found to positively influence behavioural intention to use IS platforms in both voluntary and mandatory settings (Venkatesh *et al.*, 2003) though, the significance is only during the first-time usage. On the other hand, becoming non-significant over periods of extended and sustained usage (Venkatesh *et al.*, 2003)

3.3 Social Influence

Social influence (SI) is defined as “the degree to which an individual perceives that he or she should use the new IT (Venkatesh *et al.*, 2011). Three constructs from the six models capture the concept of social influence (Venkatesh *et al.*, 2003). The constructs are social factors (MPCU), subjective norm (TRA, TAM2, TPB, and C-TAM-TPB) and Image (DOI). Social influence was posited as a significant factor in influencing individual behavioural intention to the acceptance of new IT platform (Venkatesh & Davis, 2000; Shaper & Pervan, 2007). Empirical validation has suggested that social influence was not significant in voluntary contexts (Venkatesh *et al.*, 2003; Lai, 2017). Though, significant in mandatory settings, social influence appears to be important only in the early stages of individual experience with the technology, with its role eroding over time and eventually becoming non-significant with sustained usage (Venkatesh *et al.*, 2003).

3.4 Anxiety

Anxiety (AX) towards the use of technology is described as evolving anxious or emotional reactions when it comes to performing an act (for example, using a computer). It is related to apprehension or even the fear an individual has towards the possibility to use a technology (Venkatesh *et al.*, 2003). Anxiety as a construct has the foundation from the Social Cognitive Theory (SCT) introduced to IS by Compeau and Higgins (1995) as an extended SCT in the context of computer utilization.

3.5 Management Effectiveness

Management effectiveness (MEF) is defined as the assessment of how well the

non-profit organization (NPOs) is being managed – primarily as perceived by users in achieving the objectives by which NPOs are established (Balduck & Buelen, 2008). Management structures are remarkably important in non-profit organizations (NPOs) since staff plays a vital role in translating the mission of NPO's into reality (Sowa *et al.*, 2004). Management effectiveness influences behavioural intention on the adoption of Telecentres (Venkatesh *et al.*, 2003; Balduck & Buelen, 2008). The construct is moderated by gender and age, such that the effect is mainly stronger in elderly females. A measure of management encompasses variables that tap capacity (structure and process), as well as those, represent the outcomes of these management systems and activities (Sowa *et al.*, 2004). This construct has the basis of the four quadrants of CVA (section 2.12). Management Effectiveness measurement is adapted from Balduck and Buelen (2008).

3.6 Program Effectiveness

Sowa *et al.* (2004) refers to a program as the “specific services or interventions provided by organizations.” Going by this definition Telecentre as an intervention to underserved people, suitably fit into this definition. Further, Sowa *et al.* (2004) argue that the program has a variable that relates to the capacity (structure and process) as well as outcomes created by the intervention. Program effectiveness (PEF) refers to the positive impacts associated with the services or programs provided by non-profit organizations (Balduck & Buelen, 2008). Users are viewed as an important source of information regarding the contents of services rendered by NPOs. Knowing the degree of satisfaction of service offered by NPO's would form the basis for comparison with the objectives for which the NPO's are established (Balduck & Buelen, 2008). Program effectiveness constructs have the same theoretical support from the four quadrants of CVA (section 2).

3.7 Facilitating Conditions

Facilitating conditions (FC) is defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of new IT” (Venkatesh *et al.*, 2011). The theoretical foundation of facilitating conditions is derived from four theories/models used by Venkatesh *et al.* (2003). The constructs are perceived behavioural control (TPB/DTPB, C-TAM-TPB) and the initial facilitating conditions (MPCU) by Thompson *et al.* (1991). Venkatesh *et al.* (2003) argued that when both performance expectancy constructs and effort expectancy constructs are present in a model, facilitating conditions becomes non-significant in predicting intention. Facilitating Condition being the only organizational construct in UTAUT, the effect is

expected to increase with experience as users of technology find multiple avenues for help and support throughout the organization (Venkatesh *et al.*, 2003). However, empirical results suggested that facilitating conditions do have positive influence on usage of information technology platform (Venkatesh *et al.*, 2003; Wang *et al.*, 2006).

3.8 Behavioural Intention

The behavioural intention construct was derived from the theory of reasoned action (TRA) by Fishbein and Ajzen (1975). Behavioural intention is defined as “a measure of the strength of one’s intention to perform a specified behaviour” (Davis *et al.*, 1989, p. 984). Research has shown that behavioural intention has a positive impact on the individuals’ actual use of a given technology (Davis, 1989). The construct of behavioural intention was introduced to IS literature through the technology acceptance model (Davis, 1986). Behavioural intention is reported as an extremely important construct in the IS research (Jackson & Leitch, 1997). Due to its importance, it is referred to “as a key criterion in adoption research” (Venkatesh *et al.*, 2003, p 470). Consistent with prior research, Venkatesh *et al.* (2003) *behavioural intention will have a significant positive influence on Telecentre adoption*. The model is used in examining the relationship between the independent variables with the behavioural intention and the relationship between behavioural intention and user acceptance. Previous studies have established the relationship between performance expectancy, effort expectancy and social influence with behavioural intention (Wang & Shih, 2008; Wu *et al.*, 2008; Venkatesh *et al.*, 2011). The variables used in the research model are operationalized and categorized as independent. The conceptual model of Telecentre acceptance is shown in Figure 5.

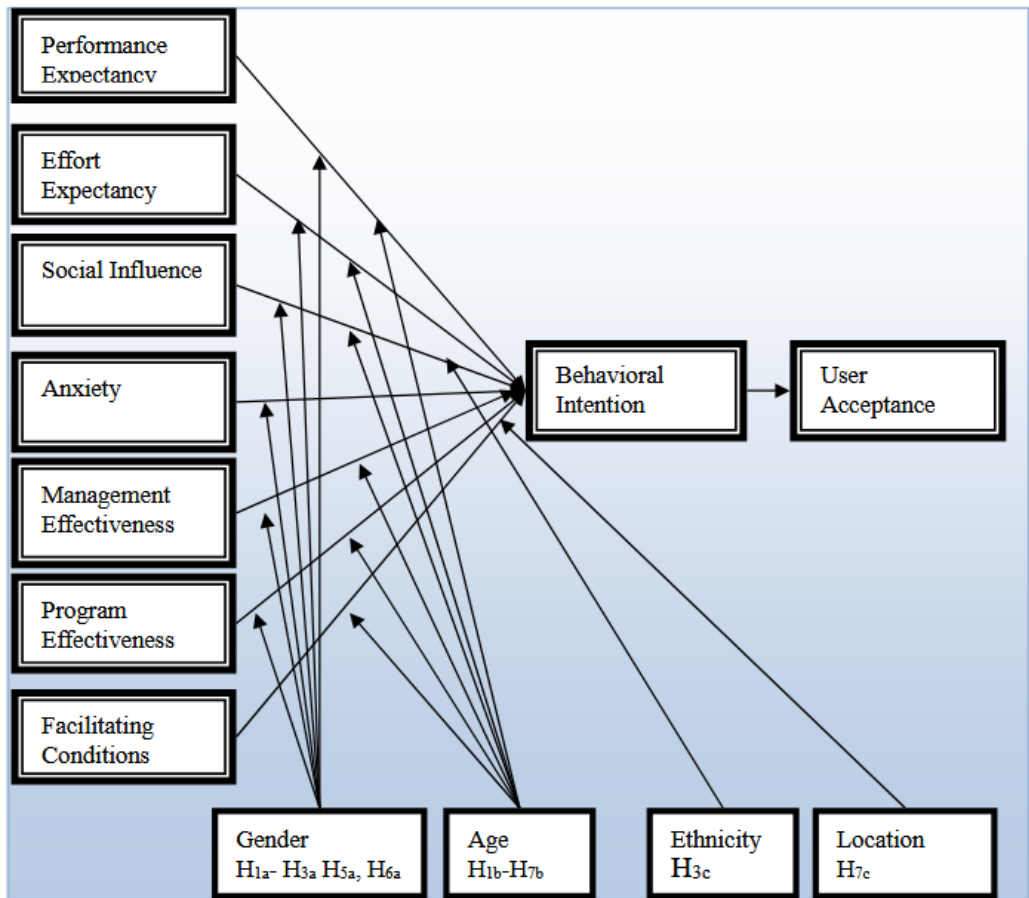


Figure 5: *Conceptual model of Telecentre Acceptance*

Methodology

4.1 Population and Sampling

Based on Krecjcie and Morgan's (1970) for a population of 12,000 sample sizes of 375 were appropriate. The unit of analysis is users of community Telecentres in Nigeria. Multi-stage sampling design was used initially by selecting the Telecentres to be covered. The minimum sample size tabulated for the purpose of this study was set at 119 respondents (Bartlett *et al.*, 2001). Based on the sampling frame, a Systematic Random Sampling was employed to administer questionnaires proportionate to the size of each of the six Telecentres covered. The selected Telecentres in which the questionnaire was administered based on random sampling from the Northern zone are: Izom, Azare, and Kamba. In the Southern zone are Ihteowerri and Itigidi Telecentres and lastly, from the South

West, Ido Telecentre was selected. Structural Equation Modeling (SEM) was employed as tool for conducting the analysis. SEM has the capabilities of identifying moderating variables, Multiplicative multiple regression (MMR) and multi-group analysis. Multi-group analysis is frequently used by IS researchers (Hair *et al.*, 2006).

Research Instruments

Cross-sectional survey was employed in this research. Closed ended questionnaire was used to gather primary data through a deductive approach. The questionnaire was adapted based on previous studies using a 7-point Likert-type scale (Compeau & Higgins 1995; Cavana *et al.*, 2001; Venkatesh *et al.*, 2003; Balduck & Buelen 2008; Wang & Shih, 2008; Hair *et al.*, 2010).

4.2 Multicollinearity

Multicollinearity occurs if any of the squared multiple correlations between variables are near or close to 1, specifically if the correlation values between constructs exceed 0.90 (Tabachnick & Fidel 2007; Coakes *et al.*, 2010). When two or more variables are too correlated, they contain redundant information that is not required in the same analysis. This unnecessary information tends to increase or inflate the size of error terms and hence undermine the analysis. Thus, Coakes *et al.* (2010) suggested that the inclusion of these offending variables needs to be reconsidered. To screen for multicollinearity in this study, both standardized correlations from SEM output and Pearson correlation of SPSS were employed as shown in Table 4.

Table 4: *Correlations among the Construct*

Factors	BI	A	MEF	FC	PEF	AX	SI	EE	PE
Behavioural intention (BI)	1								
Adoption (A)	.526	1							
Management effectiveness (MEF)	.152	.102	1						
Facilitating condition (FC)	.229	.267	.282	1					
Program effectiveness (PEF)	.312	.318	.504	.228	1				
Anxiety (AX)	-.132	-.034	.075	-.103	-.091	1			
Social influence (SI)	.553	.313	.355	.316	.311	.025	1		
Effort expectancy (EE)	.338	.206	.382	.471	.420	-.134	.562	1	
Performance expectancy (PE)	.436	.305	.307	.125	.225	-.092	.394	.376	1

From Table 4, it is obvious that none of the construct is highly correlated with any other construct based on the SEM (AMOS) output. Given that all the correlation values are well below the threshold of 0.9. The researcher could then conclude that there is no problem of multicollinearity between the variables under investigation.

4.2.1 Measurement Refinement

Conforming to the literature on structural equation modeling and scholarly recommendations, this study weighs it necessary to adopt a two-step model building method as reported by Yim, Anderson, and Swaminathan (2005). The first step involved the exploratory factor analysis (EFA) to purify and validate measurement scales within the inbound unit of a Telecentre. The second step involved performing confirmatory factor analysis (CFA) meant to validate pre-existing measure scales within the context of the current study (Byrne, 2010; Hair *et al.*, 2006). Hair *et al.* (2010) argued that the exploratory factor analysis (EFA) approach differs from the confirmatory factor analysis approach, being that factor analysis are extracted based on only statistical results rather than on theory. The extraction can be done without previous knowledge of the number of factors or the sources of the items. While in CFA, the researcher is aware of both the number of factors within a set of variables and the extent of loading on each item. The objective of conducting EFA as argued by Hair *et al.* (2010) is to prepare the data for any bivariate or multivariate analysis. CFA was used to confirm and reduce the numbers of the items from the constructs. In the subsequent report, the results of EFA's and the CFA of Independent (independent) and Dependent (dependent) variables are presented separately.

4.2.2 Exploratory Factor Analysis for Independent Variables

Exploratory factor analysis (EFA) is designed primarily to explore the data set to be used in research from the existing theoretical point of view. Essentially, such data is allowed to load statistically on factors that are independent of theory and any prior assumptions that are related to the measurement instruments (Cavana *et al.*, 2001; Hair *et al.*, 2006). In this study, all the items constituting the independent variables (independent) were subjected to principal component analysis (PCA) using SPSS software. However, before running the PCA suitability of data for factor analysis was examined. Visual inspection of the correlation matrix shows that several coefficients have values of 0.3 and above, therefore satisfying the first requirement for conducting PCA. Still, in the correlation matrix, there is no value above 0.9, meaning that the data are free from problems of singularity or multicollinearity (Nunnally & Bernstein, 1999). Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was computed.

Kaiser (1974) forwarded a rule of thumb for assessing KMO in which any value that falls between 0.5 and 0.7 could be referred to as mediocre. The values that are between 0.7 and 0.8 are good, values between 0.8 and 0.9 are categorized as great. Finally, those values above 0.9 are classified as superb. The value of 0.821 was obtained as KMO for the independent variables, this value is above the minimum threshold of 0.6 (Kaiser, 1974). Similarly, Bartlett's Test of Sphericity was found as 2614.39, significant at $P < 0.001$, the factorability of the correlation matrix is supported. PCA reveals the presence of nine components with Eigen values of above one explaining the cumulative variance of 51.4%. Communalities symbolize the amount of the variance in the original variables that are accounted for by the factor solution. The factor solution should explain at least half of each original variable's variance, so the communality value for each variable should be 0.50 or higher (Hair *et al.*, 2010). As expected, all the items have a communality value of 0.5 or higher. However, few items have complex structures that cross-loaded on more than one component. Factor loadings and communality values for each item is shown in Table 5.

Table 5: *Factor Loadings and Communalities for Independent Variables*

Code	Factor Loading	Communality
PE1	0.752	0.655
PE2	0.816	0.772
PE3	0.713	0.660
PE4	0.667	0.607
PE5	0.629	0.537
EE1	0.739	0.650
EE2	0.685	0.640
EE3	0.709	0.593
EE4	0.610	0.509
EE5	0.678	0.599
SI1	0.748	0.686
SI2	0.753	0.704
SI3	0.759	0.619
SI4	0.679	0.620
SI5	0.658	0.567
AX1	0.828	0.737
AX2	0.885	0.796
AX3	0.885	0.801
AX4	0.779	0.660
MEF1	0.702	0.638
MEF2	0.676	0.531
MEF3	0.692	0.661
MEF4	0.696	0.560
MEF5	0.732	0.635
PEF1	0.665	0.707
PEF2	0.682	0.580

Code	Factor Loading	Communality
PEF3	0.727	0.699
PEF4	0.709	0.621
PEF5	0.543	0.600
FC1	0.773	0.666
FC2	0.762	0.658
FC3	0.451	0.511
FC4	0.713	0.661
FC5	0.617	0.655
FC6	0.627	0.530

4.2.3 EFA for Dependent Variables

The dependent variables were also subjected to principal component analysis with the aid of SPSS software. The preliminary analysis showed that the data is appropriate for factor analysis. For instance, a clear inspection of the correlation matrix reveals that several coefficients have values of 0.3 and above, satisfying the first requirement. Moreover, checking the correlation matrix showed that no value was found to be 0.9 or above, thereby confirming that the data are free from the multicollinearity problem. Similarly, the result of the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.837 which is above the recommended 0.6 and could be classified as great (Kaiser, 1974). In addition, Bartlett's Test of Sphericity was 664.139 significant at $P < 0.001$ which supports the factorability of correlation matrix. The initial PCA shows the presence of two components with Eigen values of 2 and explaining 31% and 26% of the variance respectively. The cumulative total variance explained by the components is 56% which is reasonable. With regards to commonality, all the items have satisfied the recommended threshold of 0.5. Table 6 presents the factor loadings and communalities for each item of the dependent variables.

Table. 6: *Factor Loadings and Communality for Dependent Variables*

Code	Factor Loading	Communality
BI1	0.821	0.717
BI2	0.833	0.732
BI3	0.769	0.610
BI4	0.784	0.675
A1	0.833	0.720
A2	0.872	0.798
A3	0.819	0.727
A4	0.684	0.533

The preliminary analysis of both independent and dependent variables has

shown that all the items are suitable for conducting the subsequent multivariate analysis. The next section discusses the measurement model assessment and confirmatory factor analysis (CFA).

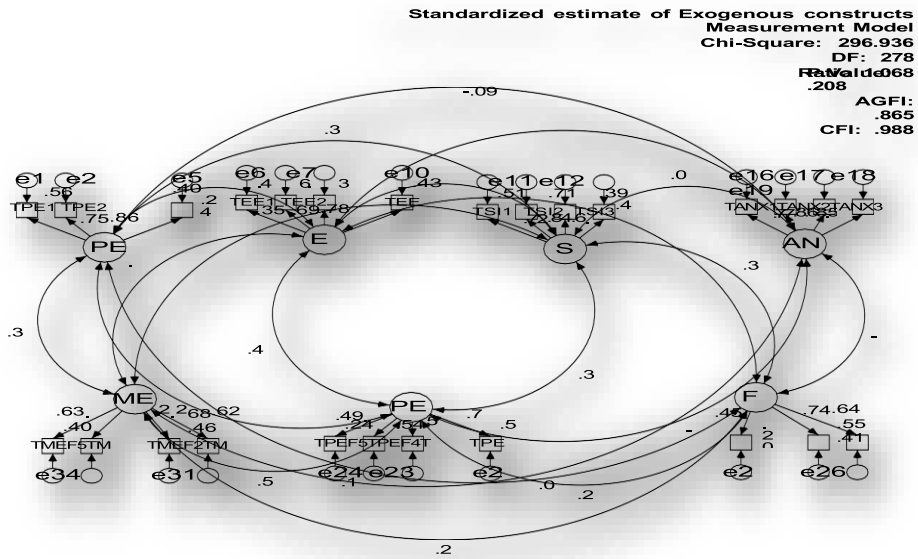
4.2.4 Confirmatory Factor Analysis (CFA) and the Measurement Model

The measurement model is estimated before the evaluation of the structural model using a two-step approach recommended by Hair *et al.* (2010). The measures were validated using confirmatory factor analysis (CFA). The CFA was performed in an attempt to establish the extent to which the proposed measurement model fit with the data set, though, some model fit indices as recommended by previous research (Hu, 1995). The five common goodness of fit (GOF) indices that cut across the three fit indices are: absolute, incremental and parsimony the following indices were adopted (CMIN/df, AGFI, CFI, TLI, and RMSEA). The thresholds of these fit indices are: The value of CMIN/df should be less than three (Bagozzi & Yi, 1988). CFI and TLI should be equal to or greater than 0.90 (Bagozzi & Yi, 1988; Bentler & Bonnet, 1980). The AGFI should be greater or equal to 0.80 (Chau & Hu, 2001). The root means square error of approximation (RMSEA) should be less than 0.08 (Brown & Cudeck, 1993). Model modification became crucial if the fit indices obtained from the implied theoretical model are within the recommended thresholds. Analyzing the measurement model is a necessary and sufficient condition before developing a structural model (Hair *et al.*, 2006; Byrne, 2010).

4.2.5 Independent Variables Constructs Measurement Model

The independent construct measurement model is used to assess the psychometric properties and unidimensionality of the measure (Byrne, 2010). The sufficiency of the measurement model can be examined subject to the fulfillment of requirements of convergent validity, discriminant validity, composite reliability and overall model fit of the data. In this study, the independent construct measurement model fit was achieved with 26 measures from 7 latent constructs, each construct was allowed to correlate with each other as in Figure 6.

Figure 6. CFA Measurement Model for Independent Variables



The procedure on model modification entails the identification of low standardized factor loadings, high standard residuals, and high modification indices. The abnormalities identified were deleted to build an acceptable measurement model. In view of these and to achieve a significant model fit, the following items were deleted based on low factor loadings (PE3, PE4, EE4, SI5, MEF3, PEF2, FC3, FC5, and FC6). Table 8, shows the goodness of fit indices (GOF) of the independent measurement model.

Table 8: Goodness of Fit (GOF) indices for the Independent Variables

GOF Indicators	Accepted Value	Results
Chi-square (χ^2) DF	-	296.936
Ratio	-	278
P Value AGFI CFI	< 3	1.068
TLI	P > .05	0.208
RMSEA	< 0.80	0.865
	0.900	0.988
	0.900	0.985
	0.080	0.019

The GOF of the overall model has shown that the indices (CMIN/df = 1.068,

P= 0. 208, CFI= 0. 998 and RMSEA= 0.019) of the measurement model is within the acceptable threshold, indicating the sound fit of the data to the model.

4.2.6 Dependent Variables Construct Measurement Model

Dependent variables construct measurement was built to assess the psychometric properties of the constructs. The measurement was conducted with the eight items to assess the Dependent constructs of behavioural intention and adoption. The measure yields a relatively good fit as shown by goodness of fit indices (CMIN/df = 1.205, p = 0. 268, CFI= 0. 995 and RMSEA= 0.033) as indicated in Figure 7.

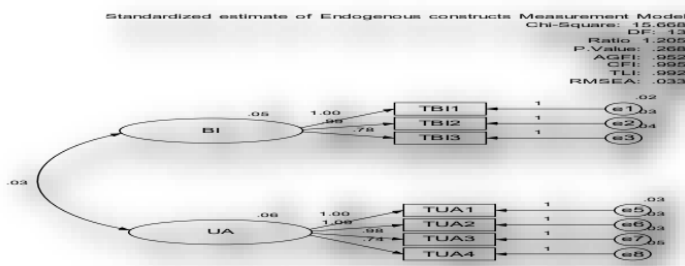


Figure 7. CFA Measurement Model for Dependent Variables

The model fit indices were achieved with the deletion of item TBI4 due to low factor loadings. The remaining items loadings fit perfectly, the (CMIN/df ratio < 3); p-value > 0.05; AGFI > 0.900 and Root mean square (RMSEA) of less than 0.08. The comprehensive model fit indices are shown in Table 8.

Table 8: Goodness of Fit (GOF) indices for the Dependent Variables

GOF Indicators	Accepted Value	Results
Chi-square(χ^2) df	-	15.668
Ratio	-	13
P Value AGFI CFI TLI	< 3.00	1.205
RMSEA	> 0.05	0.268
	> 0.8	0.952
	> 0.9	0.995
	> 0.9	0.992
	< 0.08	0.033

The Goodness of fit indices (GOF) of overall model (CMIN/df = 1.205, P = 0. 268, AGFI = 0.952 and RMSEA = 0.033) for the measurement model is within

the acceptable threshold. The dependent measurement model has a good fit with the data based on assessment criteria such as AGFI, CFI, TLI, and RMSEA as suggested by Bagozzi and Yi (1998) and Anderson and Gerbing (1988).

4.2.7 Combined Independent and Dependent Variables Measurement Model

Specifying the measurement based on the combination of independent and dependent models is a critical step in developing an acceptable structural model (Hair et al., 2010). Figure 8 appropriately depicts the measurement model.

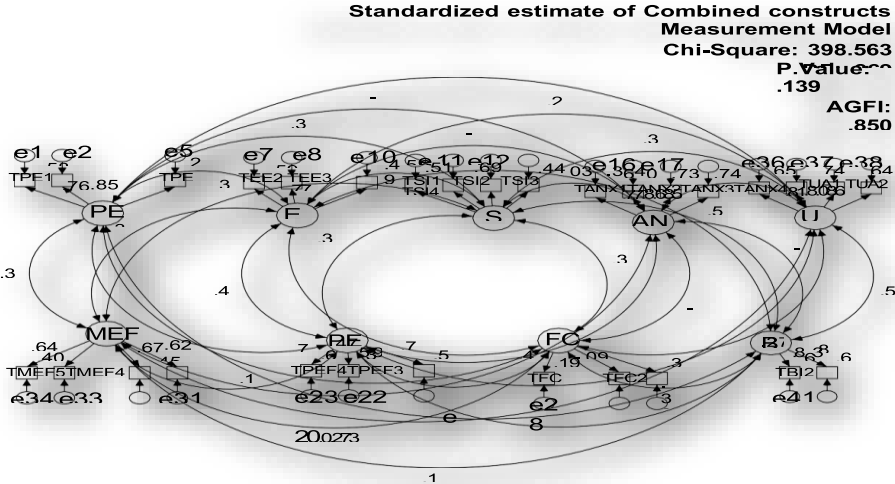


Figure 8: Combined CFA Measurement Models (generated by SEM)

Items deletions were effectively guided through appropriate suggestions on their loadings and modification indices (Hair et al., 2010). As observed from the Figure 4.3, the items (PE3, PE4, EE1, EE4, SI5, MEF3, PEF2, PEF5, FC3, FC5, FC6 BI3, BI4) were deleted due to either high modification indices of their covariance or their loading are less than the suggested 0.50 cut off criterion (Byrne, 2010; Hair et al., 2010). Initially, 43 items were conceptualized as the items measuring model of adoption of telecentre but only 30 were statistically reliable for constructing the structural model (Abdulwahab & Zulkhairi, 2011). The model fit statistics of the combined measurement model is shown in Table 9.

Table 9: *Goodness of Fit (GOF) indices for the (Independent and Dependent Variables)*

GOF Indicators	Accepted Value	Results
Chi-square (χ^2) df	-	398.563
Ratio	-	369
P Value	< 3.00	1.080
AGFI	> 0.05	0.139
CFI	> 0.8	0.850
TLI	> 0.9	0.985
RMSEA	> 0.9	0.932
	< 0.08	0.021

Thus, the GOF indices of overall model yields (CMIN/df = 1.080, AGFI = 0.850 and RMSEA= 0.021) of the measurement model is within the acceptable threshold. The measurement model has a good fit with the data based on assessment criteria such as CFI, TLI, and RMSEA as suggested by previous researches (Brown & Cudeck, 1993; Bagozzi & Yi, 1998). Table 10 shows the summary of Goodness of fit analysis of measurement models of Independent, Dependent and combination of the two.

Table 10: *Summary of Goodness of Fit (GOF) indices for Measurement Models (N=191)*

Indices	Recommended Value	Measurement Model (Independent)	Measurement Model (Dependent)	Measurement Model (Combined)
Initial Items	-	35	8	43
Items Remain	-	26	7	30
CMIN	-	296.936	15.668	398.563
Df	-	278	13	369
CMIN/df	< 3.00	1.068	1.205	1.080
P-Value	> 0.05	0.208	0.268	0.139
AGFI	> 0.80	0.865	0.952	0.850
CFI	> 0.90	0.988	0.995	0.985
TLI	> 0.90	0.985	0.992	0.982
RMSEA	< 0.08	0.019	0.033	0.021

4.2.8 Convergent Validity Result

In this research convergent validity was measured through the factor loading. Previous research has statistically recommended loading of above 0.50 as the

cut-off criterion (John & Reve, 1982; Hair et al., 2006; Byrne, 2010). Others are of the opinion that any item that is above 0.40 should be given a trial provided that they have been tested theoretically as a valid instrument for measuring the construct of interest (Kaiser, 1974; Hu & Bentler, 1995). A critical view of the result in Table 11 has shown that the larger percentages of items are above the 0.50 cutoff criteria, with the majority being above 0.60. This confirmed that the hypothesized items are truly having a strong relationship with the conceptualized model (Hair et al., 2006).

Table 11: Convergent Validity on Dimensions

Factors	Code	Items	Factor Loadings
Performance	PE1	Using telecentre enhances job performance	0.758
Expectancy	PE2	Using telecentre help in the accomplishment of the job more quickly	0.846
	PE5	My frequent use of a telecentre, will earn me valuable as being competent	0.500
Effort Expectancy	EE2	I find using the facilities in telecentre easy	0.768
	EE3	I find using the facilities in telecentre to be flexible	0.589
	EE5	Overall, I find the facilities in telecentre easy to use	0.702
Social influence	SI1	Important people in my community think I should use the telecentre	0.717
	SI2	People who are important to me will want me to use the telecentre	0.832
	SI3	People in my community that use the telecentre have more prestige	0.639
	SI4	Using telecentre has enhanced my knowledge about the environment	0.663
Anxiety	AX1	I feel nervous in using the facilities in telecentre	0.772
	AX2	It scares me to think I will make mistakes using Telecentre	0.852
	AX3	The facilities in telecentre are somehow intimidating to me	0.861
	AX4	It scares me to use in telecentre because I lack adequate skills	0.702
Management effectiveness	MEF1	I have confidence that this telecentre will be durable	0.625
	MEF2	The manager receives assistance to render efficient service	0.674
	MEF4	I observed team spirit and motivated staff within the telecentre staff	0.667
	MEF5	Capable hands are available to impart knowledge in the telecentre	0.636
	PEF1	Using telecentre help in socioeconomic development	0.725
Program Effectiveness	PEF3	Telecentre staffs are competent enough in discharging their work	0.589
	PEF4	There is mutual cooperation between telecentre staff and the users	0.774
	FC1	A specified person (or group) is available in case of difficulty	0.624
Facilitating Condition	FC2	I have the resources and knowledge to use <i>ICT facilities in telecentre</i>	0.768
	FC4	Sufficient Electricity and Internet service are available to use <i>ICT</i>	0.537
	Behavioural Intention	BI1	I intend to use the ICT facilities in Telecentre in the future.
BI2		I predict I would use the ICT facilities in Telecentre in the future	0.827

Consequently, the factor loadings of the survey results were all above the threshold of 0.40 (Kaiser, 1974; Anderson & Gerbing, 1988; Hu & Bentler, 1995).

4.2.9 Composite Reliability

This research has evaluated the construct reliability using Cronbach's alpha for each construct and their composite reliability score as suggested by Fornell and Larcker (1981) and Hair *et al.* (2010). The fundamental measure of construct reliability is the indices of composite reliability, which is reported as more robust than Cronbach's alpha (Fornell & Larcker, 1981). Composite reliability of a construct is argued at 0.70 or higher to show adequate convergence or internal consistency (Hair *et al.*, 2010; Gefen & Straub, 2005). To compute composite reliability this work has adopted the formula suggested by previous researches (Fornell & Larcker, 1981; Hair *et al.*, 2010).

$$\text{Composite reliability} = \frac{(\sum_{i=1}^n L_i)^2}{(\sum_{i=1}^n L_i)^2 + (\sum_{i=1}^n e_i^2)} \quad (1)$$

Computed from the square sum of factor loadings for each construct and sum of the error variance terms for a construct e_i^2 as in Table 12.

Table 12: Composite Reliability and Cronbach Alpha of Items Remaining

Factors	Code	Factor Loadings	Composite Reliability	Cronbach Alpha
Performance Expectancy	PE1	0.758	0.752	0.723
	PE2	0.846		
	PE5	0.500		
Effort Expectancy	EE2	0.768	0.730	0.730
	EE3	0.589		
	EE5	0.702		
Social Influence	SI1	0.717	0.807	0.803
	SI2	0.832		
	SI3	0.639		
	SI4	0.663		
Anxiety	AX1	0.772	0.876	0.874
	AX2	0.852		
	AX3	0.861		
	AX4	0.702		
Management Effectiveness	MEF1	0.625	0.746	0.745
	MEF2	0.674		

Factors	Code	Factor Loadings	Composite Reliability	Cronbach Alpha
	MEF4	0.667		
	MEF5	0.636		
Program Effectiveness	PEF1	0.725	0.740	0.733
	PEF3	0.589		
	PEF4	0.774		
	FC1	0.624		
Facilitating Condition	FC2	0.768	0.787	0.719
	FC4	0.537		
	BI1	0.801		
Behavioural Intention	BI2	0.827	0.747	0.796
	A1	0.827		
	A2	0.807	0.857	0.893
	A3	0.862		
	A4	0.802		

Composite reliability of the constructs ranges from 0.730 to 0.876. As in Table 13, the reliability obtained is above the recommended threshold of 0.70 (Fornell & Larcker, 1981).

4.2.10 Discriminant Validity

Discriminant validity is the degree by which a construct is established as truly being different from the other constructs in the model (Byrne, 2010). The review of extant literature has reported two main methods through which researchers can statistically measure the discriminant validity of their data sets these are: average variance extracted (AVE) as recommended by Fornell and Larcker (1981). The second method is through comparing the chi-square of a model through its nested model (Hair *et al.*, 2010). This study used AVE procedures to assess the discriminant validity of the data set as suggested by Fornell and Larcker (1981). The average variances extracted is calculated using standardized loadings by the formula:

$$AVE = \frac{\sum_{i=1}^n L_i^2}{n} \quad (2)$$

L_i - Represent standard factor loading

n - Number of items

Discriminant validity was measured by comparing the square root of AVE obtains for a given construct with the correlation among all other constructs. Table 13 shows the correlation matrix of the constructs. The diagonal elements have been replaced by the square root of the average variance extracted. For the discriminant validity to be confirmed sufficiently, the diagonal element should be greater than the off- diagonal element in the corresponding rows and columns (Fornell & Larcker, 1981; Chin, 2010). As shown in Table 13, Shows correlation matrix and square roots of the AVEs.

Table 13: *Correlation Matrix and Square Roots of the AVEs (shown in diagonal)*

Factors	BI	A	MEF	FC	PEF	AX	SI	EE	PE
Behavioural Intention (BI)	.814								
Adoption	.526	.777							
Management Effectiveness (MEF)	.152	.102	.651						
Facilitating Condition (FC)	.229	.267	.282	.624					
Program Effectiveness (PEF)	.312	.318	.504	.228	.701				
Anxiety (AX)	-.132	.034	.075	-.103	-.091	.799			
Social Influence (SI)	.553	.313	.355	.316	.311	.025	.717		
Effort Expectancy (EE)	.338	.206	.382	.471	.420	-.134	.562	.691	
Performance Expectancy (PE)	.436	.305	.307	.125	.225	-.092	.394	.376	.777

Discriminate validity appears to be adequate for all the constructs. The implication of which each construct shared more variances with each item than it does with other constructs (Fornell & Larcker, 1981; Chin, 2010). In summary, all the nine constructs that formed the model in this study passed the test of convergence validity and discriminant validity. The implication of this is that the final modified measurement model possessed constructs validity and reliability. A final step to be followed after measurement model testing and model modification is testing the hypothesized structural model with the entire group of samples (N = 191) as in Figure 9.

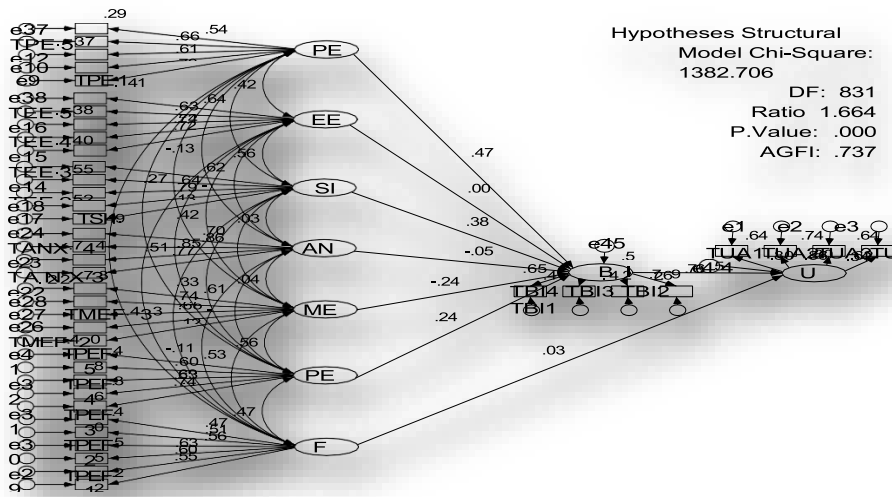


Figure 9: *The Hypothesized Structural Model with Path Analyses*

A clear inspection of the hypothesized structural model in Figure 9 has shown that the model is succinctly defiant in terms of acceptable goodness of fit indices (GOF). Hence the need for a model that meets the requirements of an acceptable fit base on items that depict the measurement model. The explanation of an acceptable model is based on the re-specified model (Figure 10). The validity of the measurement model has required the need to formulate the alternate model by first converting the items from the measurement model (Hair *et al.*, 2010).

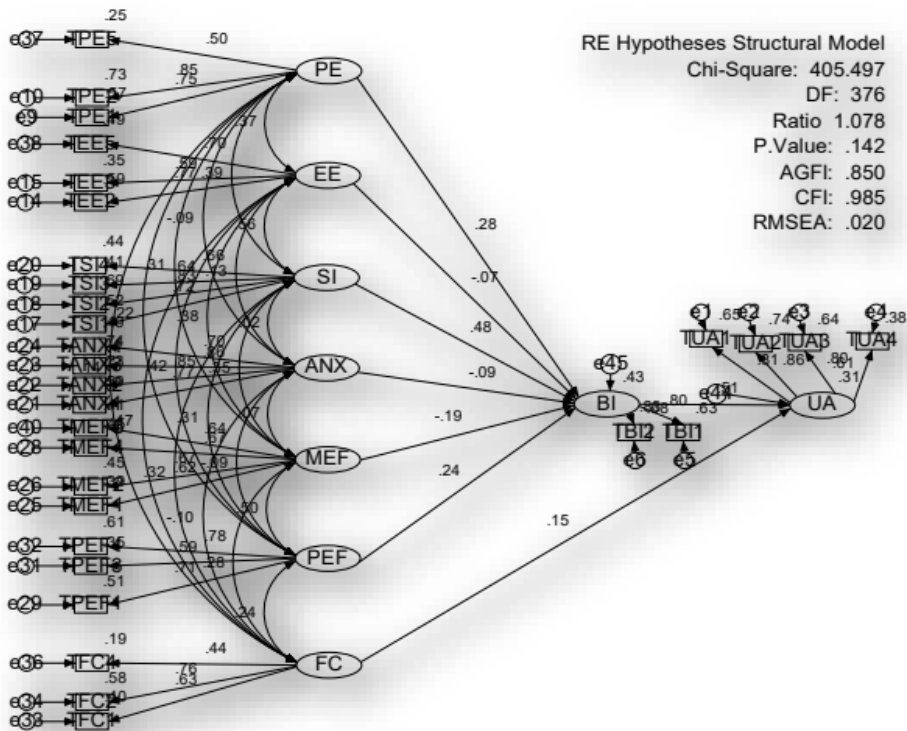


Figure 10: Model (Re-specified base on items from measurement specifications)

The re-specified *Alternate* model produced relatively better GOF indices: (CMIN/df < 3; p-value > 0.05 and RMSEA < 0.08). Thus, the model has a good fit with the data based on assessment criteria such as CFI, TLI, AGFI, and RMSEA (Anderson & Gerbing, 1988; Bagozzi & Yi, 1988). A summary of overall GOF statistics of measurement, hypothesized, alternate model and original UTAUT model with only four constructs are elaborated as presented in Table 14.

Table 14: Summary of GOF Indices for Hypothesized, Alternate and Original UTAUT

Indices	Recommended Value	Measurement Model	Hypothesized Model	Alternate Model	Original Model (UTAUT)
Items Remaining	-	30	43	30	15
CMIN/df	-	398.563	1382.706	405.497	153.330
df	-	369	831	376	141
CMIN/df	< 3.00	1.080	1.660	1.078	1.102
P-Value	> 0.05	0.139	0.000	0.142	0.193
AGFI	> 0.8	0.850	0.837	0.850	0.896
CFI	> 0.9	0.985	0.834	0.985	0.988
TLI	> 0.9	0.982	0.819	0.983	0.985
RMSEA	< 0.08	0.021	0.059	0.020	0.030

The alternate model yields a better fit compared to the other models. Brown and Cudeck (1993) recommended the CMIN/df value of less than 3. The CMIN/df obtained was 1.078, showing an acceptable fit. All other goodness of fit (GOF) indices is within an acceptable range. Overall, the model explained 43 % of the variance in behavioural intention and 32% variance in adoption compared to 37% variance in behavioural intention and 30% variance in adoption based on the original UTAUT as shown in Table 15.

Thus, the factors are sufficiently related to form a basis for the basic model of user acceptance of telecentre as shown in Table 15.

Table 15: Results of SMC² between Original UTAUT and Modified UTAUT Model

	Behavioural intention (SMC ²)	Adoption (SMC ²)
Original UTAUT model	37%	30%
Modified UTAUT model	43%	32%

4. Results of the Main Hypotheses

The structural equation modeling technique was used to test the eight main hypotheses among the latent variables identified from the two theories; path analysis and hypotheses testing are presented. The eight main hypotheses were tested to examine the hypothesized direct relationship using AMOS. The results of the hypotheses are shown in Table 16.

Table 16: Results of Main the Hypotheses

IV	DV	B	S. E	C.R	P	Status	Results
H _{A1} PE →	BI	.280	.100	2.981	.003	Sig	Supported
H _{A2} EE →	BI	-	.110	-0.608	.543	Not sig.	Not significant
		.073					
H _{A3} SI →	BI	.480	.117	4.184	.000	Sig	Supported
H _{A4} AX →	BI	-	.070	-1.070	.285	Not sig.	Not significant
		.085					
H _{A5} MEF →	BI	-	.130	-1.935	.043	Sig	Supported
		.191					
H _{A6} PEF →	BI	.240	.117	2.192	.028	Sig	Supported
H _{A7} FC	A	.154	.102	1.987	.047	Sig	Supported
H _{A8} BI	A	.505	.111	5.705	.000	Sig	Supported

Significant at < 0.05

The findings from the hypotheses are discussed below and the connecting relationship between the constructs are denoted by (β estimated path coefficient) and (C.R-values standard errors) (Hair *et al.*, 2010; Zainudin, 2010). The results of the eight main hypotheses based on significance (P-value < 0.05) or insignificant (P-value > 0.05) are presented. A null hypothesis H_0 is accepted when there is no significant influence between the variables in the stated hypotheses.

H_{A1}: Performance expectancy has a significant influence on behavioural intention.

The SEM analysis has shown that the estimated path coefficient from performance expectancy to behavioural intention (Performance expectancy → Behavioural intention) was statistically significant with a relation ($\beta = 0.280$, $t = 2.981$; $p = 0.003$). Since the P-value is lower than 0.05, the null hypothesis is rejected. Hence the hypothesis is supported. The study concludes that performance expectancy has a significant influence on behavioural intention.

H_{A2}: Effort Expectancy has a significant influence on Behavioural Intention.

The SEM analysis has revealed that the estimated path coefficient from Effort Expectancy to Behavioural Intention (Effort Expectancy → Behavioural Intention) was insignificant with a weak relation ($\beta = -0.073$,

$t = -0.608$; $p = 0.543$). Since the P-value is higher than 0.05, the null hypothesis is not rejected. Hence the above hypothesis is No significant. The study concludes that effort expectancy does not have a significant influence on behavioural intention.

H_{A3}: Social influence has a significant influence on behavioural intention.

The SEM analysis has shown that the estimated path coefficient from social influence to behavioural intention (Social Influence → Behavioural Intention) was statistically significant with a relation ($\beta = 0.480$, $t = 4.184$; $p = 0.000$). Since the P-value is lower than 0.05, the null hypothesis is rejected. Hence the hypothesis is supported. The study concludes that social influence has a significant effect on behavioural intention.

H_{A4}: Anxiety has a significant influence on behavioural intention.

The SEM analysis has shown that the estimated path coefficient from anxiety to behavioural intention (Anxiety → Behavioural Intention) was statistically insignificant with a weak relation ($\beta = -0.085$, $t = -1.07$; $p = 0.285$). Since the P-value is higher than 0.05, the null hypothesis is not rejected. Hence the above hypothesis is not significant. The study concludes that Anxiety does not have a significant influence on behavioural intention.

H_{A5}: Management effectiveness has a significant influence on behavioural intention.

The SEM analysis has shown that the estimated path coefficient from management effectiveness to behavioural intention (Management Effectiveness → Behavioural Intention) was statistically significant with a relation ($\beta = -0.191$, $t = -1.935$; $p = 0.043$). Since the P-value is lower than 0.05, the null hypothesis is rejected. Hence the above hypothesis is supported. The study concludes that management effectiveness has a significant effect on behavioural intention.

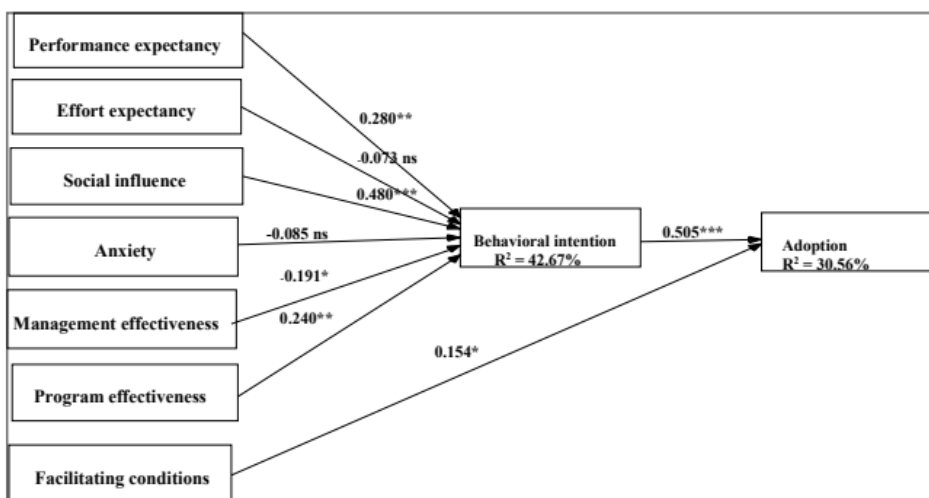
H_{A6}: Program effectiveness has a significant influence on behavioural intention.

The SEM analysis has shown that the estimated path coefficient from program effectiveness to behavioural intention (Program Effectiveness → Behavioural Intention) was statistically significant with a relation ($\beta = 0.240$, $t = 2.192$; $p = 0.028$). Since the P-value is lower than 0.05, the null hypothesis is rejected. Hence the above hypothesis is supported. The study concludes that program effectiveness has a significant effect on behavioural intention.

H_{A7}: Facilitating conditions has a significant influence on adoption. The SEM analysis has shown that the estimated path coefficient from Facilitating Conditions to adoption (Facilitating Conditions → Adoption) was statistically significant with a relation ($\beta = 0.154$, $t = 1.787$; $p = 0.047$). Since the P-value is lower than 0.05, the null hypothesis is rejected. Hence the above hypothesis is supported. The study concludes that facilitating conditions has a significant effect on adoption.

H_{A8}: Behavioural intention has a significant influence on adoption. The SEM analysis has shown that the estimated path coefficient from behavioural intention to adoption (Behavioural Intention → Adoption) was statistically significant with a relation ($\beta = 0.505$, $t = 1.787$; $p = 0.000$). Since the P-value is lower than 0.05, the null hypothesis is rejected. Hence the above hypothesis is supported. The study conclude that behavioural intention has a significant effect on Adoption (refer to section 5.3.8 for detailed discussion in the context of the study).

On the whole, of the eight main hypotheses proposed, six were supported with a positive or moderate relationship (most values $\beta \leq 0.505$). Except for the path coefficient of the relation between management effectiveness and behavioural intention yielding negative beta ($\beta = -0.191$). While the two hypotheses were rejected, the graphical representation of the path coefficients from the resulting structural model is represented in Figure 11.



* $P < 0.10$; ** $P < 0.05$; *** $P < 0.01$, ns = Not Significant

Figure 11: Analysis of estimated Structural Model

Prior to examining the impact of the four demographic moderators (gender, age, ethnicity, and location), suffice to briefly present the moderators, structural model. The data set for the moderating variables are divided into two groups using the split approach in order to accomplish the stipulated tasks (Hair *et al.*, 2010).

5.1 Gender Grouping Models

The gender group is distributed into 122 males and 69 females. This is in conformity with the suggestion by (Byrne, 2010; Hair *et al.*, 2010). The male GOF indices as obtained from the structural model are CMIN = 408.436 with df. = 376 and CMIN/df = 1.086; CFI = .974 and RMSEA = .027. The females' group GOF indices: CMIN = 473.4740 with df. = 376 and CMIN/df = 1.260; CFI = .877 and RMSEA = .062. The gender model shows good fits in terms of these aforementioned indicators. The study also investigates the gender variances for males; the model explained 34% of the variance in behavioural intention and 30% of the variance in adoption. While for the female, the model explained 69% of the variance in behavioural intention and 38% of the variance in adoption. Showing that the female model has better variance compared to the male model, the path coefficients for males and females' group are shown in Figure 11.

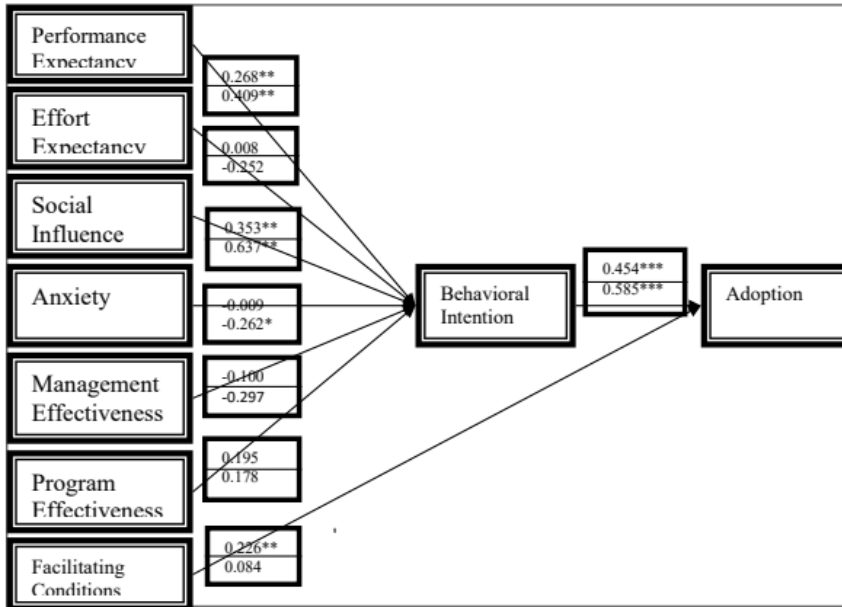
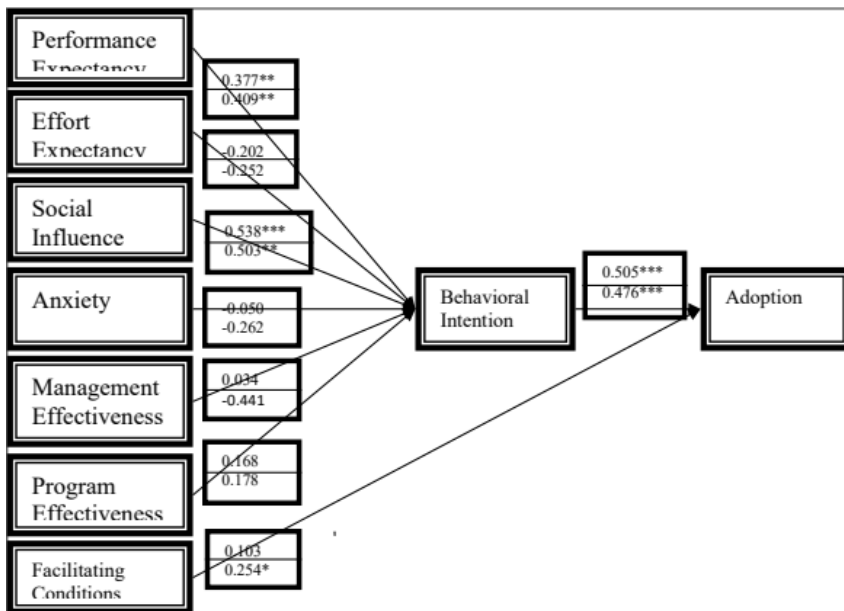


Figure 12: Gender Models with Path Coefficient (Male and Female)

5.2 Age Grouping Models

The age group model was classified into two; the younger group with ages less than or equal to 30 years and the older group with ages above 30 years. This classification is comparable with the suggestion by (Wang, Wu & Wang., 2009). Thus, 118 respondents were categorized as younger and 73 as older. The younger group GOF indices obtained from the structural model is: CMIN = 434.946 with df. = 376 and CMIN/df = 1.157; CFI = .950 and RMSEA = 0.037. The older group GOF is CMIN = 472.136 with df. = 376 and CMIN/DF = 1.256; CFI = .894 and RMSEA = .060. The age group model shows a good fit in terms of the above-mentioned indicators. The study also investigates the age variances for the younger group, the model explained 54% of the variance in behavioural intention and 29% of the variance in adoption. While for the older group, the model explained 43% of the variance in behavioural intention and 31% of the variance in adoption. The younger people model exhibit more explanatory power than the older people model. Path coefficients for the younger and older group are shown in Figure 12.

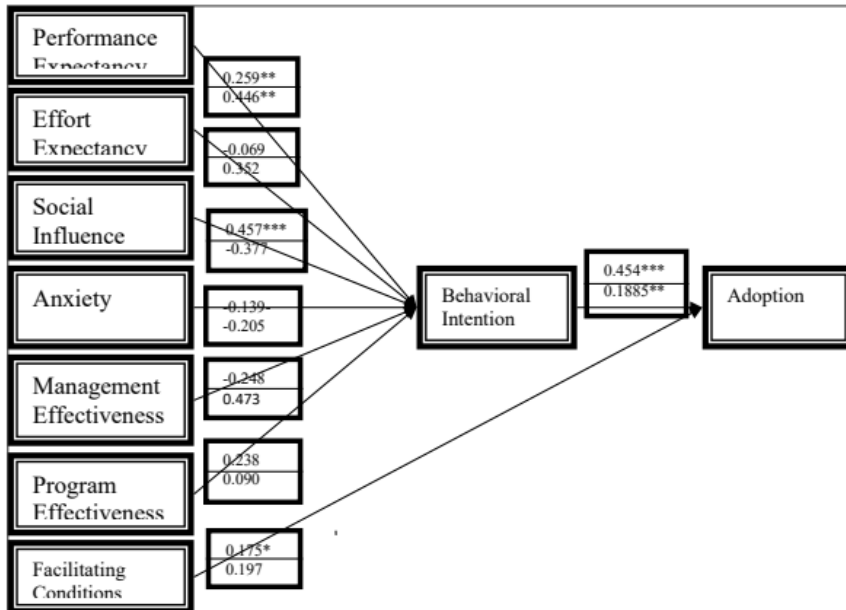


*P < 0.10; **P < 0.05; *** P < 0.01, Sig = Significant; ns = Not Significant

Figure 13: Age Group Models with Path coefficient (Younger and Older)

5.3 Ethnicity Grouping Models

The ethnicity grouping is distributed into 126 major and 65 minor tribe, this is in compliance with the suggestion by (Wang *et al.*, 2009; Hair *et al.*, 2010). The GOF indices for major ethnic groups obtained from the structural model: CMIN = 384.835 with df. = 376 and CMIN/df = 1.023; CFI = .993 and RMSEA = .014. The minority group GOF: CMIN = 533.442 with df. = 376 and CMIN/df = 1.419; CFI = .799 and RMSEA = .080. The ethnicity model shows a good fit in terms of the stated indicators. The study also investigated the variances for the two groups. The models explained 41% of the variance in behavioural intention and 39% of the variance in adoption for the majority, while for the minority, the model explained 50% of the variance in behavioural intention and 9% of the variance in adoption. Even though the minority group model SMC² has 50%, the majority group model is more sophisticated since the model has a relatively balanced SMC². The path coefficients between ethnics grouping are shown in Figure 14.

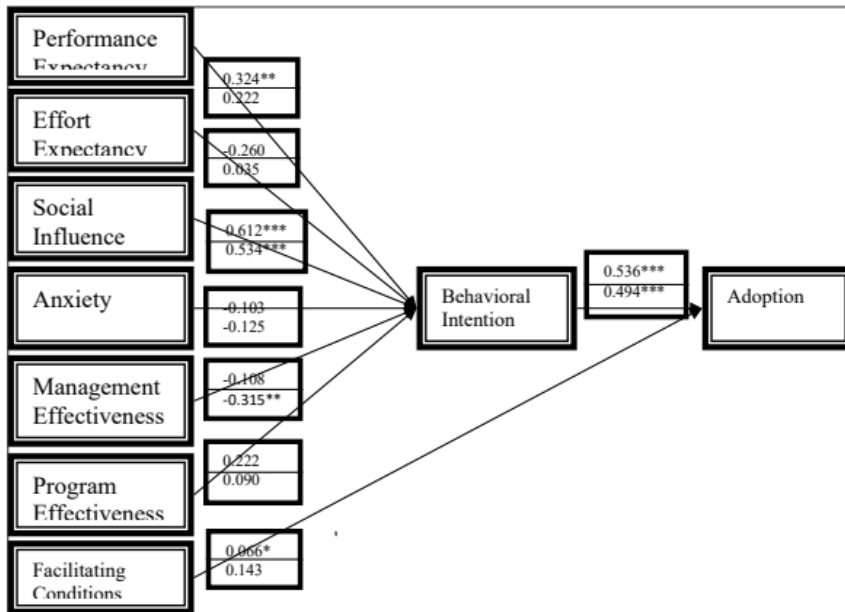


*P < 0.10; **P < 0.05; *** P < 0.01, Sig = Significant; ns = Not Significant

Figure 14: Ethnicity Models with Path Coefficient (Majority and Minority)

5.4 Location Grouping Models

The location grouping was distributed into convenience and non-convenience (location) respectively. Those respondents that agreed that telecentre location affects acceptance were 85 and location does not affect were 106. The convenience group GOF indices obtained from the structural model for the former are CMIN = 437.844 with df = 376 and CMIN/df = 1.164; CFI = .918 and RMSEA = .044. The non-convenient group sample GOF indices are CMIN = 539.752 with df = 376 and CMIN/df = 1.436; CFI = 0.883 and RMSEA = 0.064. The model shows a good fit in terms of these aforementioned indicators. The study also investigated the variances, for the two groups. The models explained 52% of the variance in behavioural intention and 32% of the variance in adoption for convenience, whereas for those that feel location is not convenient the model explained 50% of the variance in behavioural intention and 29% of the variance in adoption. The convenient model explained variance better than the not-convenient model. The path coefficients between locations grouping are in Figure 15.



*P < 0.10; **P < 0.05; *** P < 0.01, Sig = Significant; ns = Not Significant

Figure 15: Location Models with Path Coefficient (Conv. and Not Conv.)

5.5 Group Invariance

5.5.1 Multi Group Invariance

Having established satisfactory fit indices for the moderating variables, the next stage is to evaluate the measurement and structural model invariance through multi-group analysis. Measurement invariance analysis is meant to assess factor invariance of the measurement before proceeding to comparisons between the groups. Because there is reason to believe that the structure of the compared construct is not equal across groups (Hair *et al.*, 2010).

5.5.2 Gender Invariance

Multiple group analysis was used to evaluate the effect of moderating variables of gender, age, ethnicity, and location by comparing the two groups (such as male versus female, younger versus older etcetera). The examination of the moderating effect was conducted using a two-step approach suggested by Li (2006) and Lm *et al.* (2011). Two structural models for the group were created for comparison. The first model was an unconstrained model in which path coefficients were allowed to vary across two subgroups (such as, male versus female). The second model was a constrained model in which path coefficients were constraint to be equal across the two subgroups. The next step was to test the difference in terms of chi-square value (χ^2) and the degree of freedom between the unconstrained and constrained models. The unconstrained model

must have less degree of freedom than the constrained model. Also, the (χ^2) value should be lower for the unconstrained model than the constrained model. The significant increase of χ^2 from the unconstrained model to the constrained model signifies the testing of the moderating variable has a discrepancy result on the tested causal path and could be confirmed as a moderator. Thus, the criterion of establishing a moderating effect is given by these conditions: If the $\Delta \chi^2 > CR$ (CR- Table value at $\alpha=0.05$), then the moderating variable has statistical significance on the baseline model. Hence, the moderating effect is established. Otherwise, the moderating variable has no statistical significance on the baseline model if the $\Delta \chi^2 < CR$, at $\alpha=0.05$ (Byrne, 2010). The result of gender invariance is shown in Table 17.

Table 17: Results of Multiple Group Modeling (Gender)

	Unconstrained	Constrained	$\Delta \chi^2$	P _n	Moderating effect
	d	d			
χ^2	883.173	898.488	15.31	0.001	Supported
df	752	758	5		
CFI	0.936	0.939	6		
TLI	0.926	0.939			
RMS	0.030	0.029			
EA					

$$\chi^2 (df = 6) = 12.592, p < 0.05$$

The chi-square tests for differences reveal that the model was invariant between the two groups: male and female. The result obtained in Table 17 shows that $X^2(6) = 15.315$, $p < 0.05$. The corresponding df values between the unconstrained and constrained model vary. The differences obtained were 15.315 and 6; this value is significant at ($p < 0.05$). The result of the chi-square difference comparison between the pairs of specified models suggested evidence that there is a significant difference between the constrained and unconstrained models for both gender groups. Thus, the multi-group result shows that gender has moderating effects on the structural model. The next stage is to compare the path coefficient between the gender groups: as in Table 18.

Table 18: Results of Comparative Path Coefficient Gender (Male and Female)

	Path		Male		Female		Hypotheses
	IV.	DV.	Estimate(β)	CR (t)	Estimate(β)	CR (t)	
H1a	PE	BI	.195**	2.278	.409**	2.139	Male > Female
H2a	EE	BI	.268	.043	-.252	-1.495	Female > Male
H3a	SI	BI	.454**	2.337	.637**	3.036	Female > Male
H5a	MEF	BI	-.009	-.683	-.297*	-1.650	Female > Male
H6a	PEF	BI	-.100	1.249	.178	1.126	Male > Female

The result obtained shows that the effect of performance expectancy on behavioural intention was stronger in female group (β Female = 0.409, t-value=2.139) than male (β male = 0.195, t-value = 2.278), which is contrary to the hypothesized relationship. The effect of effort expectancy on behavioural intention is not significant for both genders, thus H1a and H2a are not significant. The Effect of Social Influence on behavioural intention was stronger for females than males (β Female = 0.637, t-value=3.036). Management effectiveness influence on behavioural intention is stronger for female than male (β = -0.297, t-value = - 1.650) affirming hypothesis H3a and H5a. Program effectiveness influence on behavioural intention is not significant for both genders, consequently H6a is rejected.

5.5.3 Age Multi Group Invariance

The same procedure was adopted to assess the moderating effect of age using χ^2 and df differences between the constrained and unconstrained structural model as in Table 19.

Table 19: Results of Multi Group Modeling (Age)

	Unconstrained	Constrained	$\Delta \chi^2$	P_n	Moderating effect
χ^2	907.752	929.424	21.672	0.001	Supported
Df	752	763	11		
CFI	0.925	0.925			
TLI	0.914	0.916			
RMSEA	0.033	0.033			

χ^2 (df = 11) = 19.675 significant at, $p < 0.05$

The chi-square tests for the differences revealed that the model was invariant between the two groups: younger and older groups. The result from Table 19 showed that $\Delta \chi^2 = 21.672$, $p < 0.05$. The corresponding df values between the unconstrained and constrained model showed a discrepancy. The differences obtained were 21.672 and 11; this value is significant at ($p < 0.05$). The result of the chi-square difference comparison between the pairs of specified models suggested n evidence that there is a significant difference between the constrained and unconstrained models for both age groups. Thus, the multi-group result indicates that age has moderating effects on the structural model. The next stage is to compare the path coefficient between the age group as in Table 20.

Table 20: Results of Comparative Path coefficient Age group (Younger and Older)

	Path		Younger	Older	Hypotheses		
		DV	Estimate(β)	CR (t)	Estimate(β)	CR (t)	
H1b	PE \Rightarrow	BI	.377**	3.129	.036	.181	Younger > Older
H2b	EE \Rightarrow	BI	-.202	-1.304	.039	.196	Older > Younger
H3b	SI \Rightarrow	BI	.538***	3.747	.503**	2.560	Younger > Older
H4b	AX \Rightarrow	BI	-.059	-0.617	-.063	-.507	Younger > Older
H5b	MEF \Rightarrow	BI	.034	0.248	-.441**	-2.377	Older > Younger
H6b	PEF \Rightarrow	BI	.168	1.285	.355	1.578	Younger > Older
H7b	FC \Rightarrow	A	.103	.908	.254**	1.887	Older > Younger

The result showed that the effect of performance expectancy on behavioural intention was stronger for younger than older; (β young = 0.377, t-value=-3.129) thus, H1b is supported. The effect of efforts expectancy on behavioural intention has no impact on both groups refuting H2b. The effect of social influence on behavioural intention was stronger in younger than older (β young = 0.538, t-value=3.747) hence, H3b is supported. Anxiety has no influence on behavioural Intention for both age groups. Management effectiveness influence on behavioural intention is found to be stronger on older than younger (β old = -441, t-value=-2.377), asserting H5b. Program effectiveness influence on behavioural intention is not significant for both age groups, consequently, H6a is rejected. The effect of age on facilitating conditions on adoption was stronger on older than younger (β old = 0.254, t-value=-1.887). Thus, H7b is supported.

5.5.4 Ethnicity Multi Group Invariance

The third moderating variable is ethnicity using the same procedure to assess the moderating effect of this variable χ^2 using and df differences between the constrained and unconstrained structural model as shown in Table 21.

Table 21: Results of Multi Group Modeling Ethnicity

	Unconstrained	Constrained	$\Delta \chi^2$	P_n	Moderating effect
χ^2	919.956	933.507	13.551	0.000	Supported
df	752	758	6		
CFI	0.920	0.923			
TLI	0.907	0.914			
RMSEA	0.034	0.033			

χ^2 (df = 6) 12.592, significant at, $p < 0.05$

The chi-square tests for differences disclose that the model was invariant between the two ethnic groups: Major and Minor ethnic groups. The corresponding df values between the unconstrained and constrained model shows a variation. The variation obtained was 13.551 and 6; this value is significant at ($p < 0.05$). The result of the chi-square difference comparison

between the pairs of specified models suggested evidence that there is a significant difference between the constrained and unconstrained models for both ethnic groups. Thus, the multi-group results suggested that ethnicity has moderating effects on the structural model. The next stage is to compare the path coefficient between the ethnicity groups.

Table 22: Results of Comparative Path Coefficient Ethnicity

	Path		Ethnicity (Major)	Ethnicity (Minor)		Hypothesis
	IV.	DV.	Estimate(β) CR (t)	Estimate(β)	CR (t)	
H3c	SI	BI	0.475*** 3.510	-0.377	-0.897	Major > Minor

The comparative results obtained have shown that Social Influence effects on Behavioural Intention are stronger on major ethnic groups than minority (β major = 0.475, t-value=3.510), consequently, H3c is supported.

5.5.5 Location Multi Group Invariance

The last moderating variable in the current study is location, to assess the moderating effect of this variable using χ^2 and df differences between the constrained and unconstrained structural models the result is shown in Table 23.

Table 23: Results of Multi group Modeling (Location)

	Unconstrained	Constrained	$\Delta \chi^2$	P_n	Moderating effect
χ^2	977.604	100.727	32.671	0.000	Not significant
df	752	773	21		
CFI	0.895	0.894			
TLI	0.879	0.881			
RMSEA	0.040	0.039			

χ^2 (df = 21) = 32.671 at $\alpha = 0.05$, $p < 0.05$

The chi-square tests for differences show that the model was not invariant between the Location group: Convenient and Not Convenient. The corresponding df values between the unconstrained and constrained model shows a variation. The variation obtained was 32,671 and 21; this value is not significant at ($p < 0.05$). The result of the chi-square difference comparison between the pairs of specified models suggested evidence that there is an insignificant difference between the constrained and unconstrained models for both location groups. Thus, the multi-group result indicates that location has no moderating effects on the structural model. The result obtained suggested that Location is not a moderator in the context of the study. The comparison between the path coefficients of location shows not significant effect for both locations

grouping as shown in Table 24.

Table 24: *Results of Comparative Path Analysis Location*

	Path		Location (Convenient)		(Not convenient)		Hypothesis
	IV.	DV	Estimate(β)	CR (t)	Estimate(β)	CR (t)	
H7c	FC	\Rightarrow A	.066	.451	.143	1.396	Conv.> Not Conv.

The moderating effect of location could not be established based on the multi-group analysis from Table 25, consequently, H7c is not significant. The hypotheses listed in the research model covered the theoretical relationships between the independent variables and Dependent variables. The effects of moderating variables on the relationship between dependent and independent variables were also examined.

5.6 Discussion of Results on Direct Relationship

5.6.1 Influence of Performance Expectancy on Behavioural Intention (H1A)

Hypothesis testing supports the relationship between performance expectancy and behavioural intention. Performance expectancy (PE) is defined as “the degrees an individual user believes that using the telecentre will help in enhancing his/her own performance” (Venkatesh *et al.*, 2011). In this model, the variables measuring performance expectancy in the context of telecentre acceptance yielded three measures. These measures are related to the enhancement of job performance, speed in the accomplishment of task and competency. Performance expectancy is a positive determinant of behavioural intention towards telecentre acceptance. The finding suggested that individual performances in terms of job and accomplishments of task can be improved when the individual use the telecentre. The implication of this is the more the telecentre is used the higher the performances of the users. This finding justified the implementation of telecentre as an effective means of bridging the digital divide in underserved and unserved areas in Nigeria. The result obtained on the positive relationship concurs with the findings of previous studies proposing a direct positive relationship between performance expectancy and behavioural intention (Al-Gahtani *et al.*, 2007; Wang & Shih, 2008; Wang *et al.*, 2009).

5.6.2 Influence of Effort Expectancy on Behavioural Intention (H2A)

Hypothesis testing did not support the relationship between effort expectancy and behavioural intention. Effort expectancy is defined as “the degree of ease users feels with respect to the use of facilities in telecentres” (Venkatesh *et al.*, 2011). The finding suggests that effort expectancy has a non- significant influence on behavioural intention in telecentre acceptance. The implication of

this result shows that ease of use becomes less important in predicting user's behavioural intention in the context of this research. Possibly, most of the respondents are youth, enlightened and comfortable with the interface used in the telecentre. Moreover, the younger users tend to have more confidence and well experienced in using the telecentres; consequently, effort expectancy does not influence their decision making in terms of telecentre acceptance. This finding is consistent with the results obtained by Venkatesh *et al.* (2011) and Al-Gahtani *et al.* (2007) who reported that ease of use ceases to be important in studies related to technology acceptance after just few months of IT implementation. In the context of this research, perhaps some users are well experienced in using the telecentre; this possible suggested the non-support of the relationship between effort expectancy and behavioural intention.

5.6.3 Influence of Social Influence on Behavioural Intention (H3A)

Hypothesis testing supports the relationship between social influence and behavioural intention. Social influence is defined as “the degree to which an individual user perceives that important others believe he or she should use facilities in telecentre” (Venkatesh *et al.*, 2011). Social influence was found to be the strongest predictor of behavioural intention in the context of this research. The study suggests that the telecentre users have strong influence from their pair group in influencing their intention towards its acceptance. The finding further validates the significance of maintaining social influence in assessing technology acceptance more so, in technologies that are prone to the public as revealed by Biljon and Kotze (2007). Thus, the implication of social influences as the most important determinant of behavioural Intention in the context of telecentre showed that the stakeholders should use the advantage of important others (peer groups) in propagating the acceptance and use of telecentre. This finding is consistent with most prior research in technology acceptance (Park *et al.*, 2007; Wang & Shih, 2008; Lm *et al.*, 2011).

5.6.4 Influence of Anxiety on Behavioural Intention (H4A)

Hypothesis testing did not support the relationship between anxiety and behavioural Intention. Anxiety is described as evolving anxious or emotional reactions when it comes to performing a behaviour (for example, using a computer). Venkatesh *et al.* (2003) defined “Anxiety as the apprehension or even the fear an individual has toward the possibility to use technology”. The finding suggests that anxiety had an insignificant influence on behavioural intention in telecentre acceptance. Alternatively, there is no evidence from the finding suggesting that anxiety can influence user behaviour towards telecentre acceptance. Possibly, most of the respondents are youth and comfortable having

the previous encounter with IT devices. Moreover, less anxiety towards interaction with technology could be attributed to familiarity with the technology. Confidence in the usage of telecentre could be attributed to the favorable environment surrounding the technology. This finding is consistent with the results obtained by Venkatesh *et al.* (2003) suggesting that anxiety influences IT acceptance with an insignificant relationship.

5.6.5 Influence of Management Effectiveness on Behavioural Intention (H5A)

Management effectiveness (MEF) is defined as the assessment of how well the non-profit organization (NPOs) is being managed – primarily as perceived by users in achieving the objectives by which NPOs are established (Balduck & Buelen, 2008). In connection with the results obtained from the study, the effect of management effectiveness on behavioural intention is significant. Hence, hypothesis testing supports relationship between management effectiveness and behavioural intention. Management effectiveness negatively affects the behavioural intention of user in the acceptance of telecentre. The finding shows that the more effective the management of the telecentre, the less the user intend to use the telecentre. Users would be encouraged to use the telecentre if less control from the management of the telecentre. This finding appears interesting in the sense that user perception of stringent rule and regulation at telecentre compared to cybercafé where there is a less stringent rule on surfacing Internet. This could be because only positive usage of telecentre is allowed. Compared to other public access platforms where most of the youth usually engaged in surfing phonographic sites. Surfing phonographic site is highly restricted in telecentre. This finding concurs with Ibrahim *et al.* (2010) who reported that without enough supervision and monitoring, youth can misuse the public IT platform thereby contributing to various ethical problems. Given that the use of telecentre is completely voluntary and the user comprises a number of people with a diverse background. Having a uniform representation of the management in telecentre would make it more attractive to the diverse ethnic groups.

5.6.6 Influence of Program Effectiveness on Behavioural Intention (H6A)

Program Effectiveness is defined as the “characteristics that deal with the services or programs provided by the telecentre as perceived by end-users (Balduck & Buelen, 2008)”. Hypothesis testing supports the relationship between program effectiveness and behavioural intention. Program effectiveness positively affects behavioural intention of adoption of telecentre. The finding suggests that user that is satisfied with the effectiveness of service rendered is more prone to accept telecentre due to the uniqueness of services

roll-out by the telecentre. Moreover, the significant influence of program effectiveness on the intention of users could be attributed to the perception that only motivated staff could translate organizational goals of the program into an important output. More so in a non-profit organization like telecentres where prior research has shown that it is facing sustainability challenges (Ibrahim *et al.*, 2010; Pade *et al.*, 2006; Pal, 2007). From the practical perspective, the findings suggested that positive perception towards users' intention to accept and use of telecentre could be sustained through the efficiency of service rendered by telecentre from all ramifications.

5.6.7 Influence of Facilitating Conditions on Adoption (H7A)

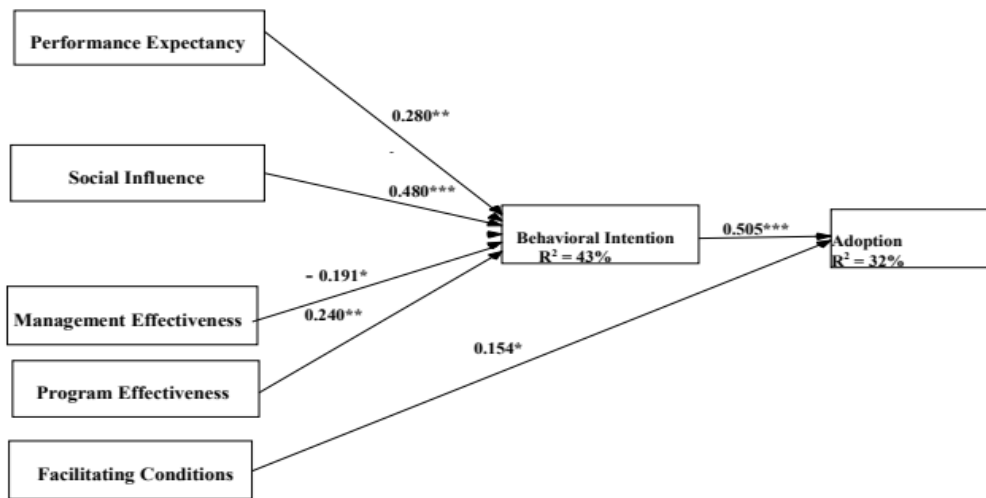
Hypothesis testing supports the relationship between facilitating conditions and adoption. Facilitating conditions is defined as “the degree in which a user believes that an organizational and technical infrastructure exists to support the use of telecentre” (Venkatesh *et al.*, 2011). Facilitating condition was observed to have a significant influence on adoption of telecentre. The difficulty of the technology could be curtailed if the user-perceived those sufficient arrangements in terms of technological and human resources necessary for the smooth running of the telecentre initiatives are in place for its successful implementation. This finding is consistent with most prior research in technology acceptance proposing a direct positive relationship between facilitating conditions and adoption (Wang & Shih, 2008; Park *et al.*, 2007; Lm *et al.*, 2011).

5.6.8 Influence of Behavioural Intention on Adoption (H8A)

Hypothesis testing supports the relationship between behavioural intention and adoption. Behavioural intention is defined as “a measure of the strength of one's intention to perform a specified behaviour” (Davis *et al.*, 1989). Previous research has shown that behavioural intention has a direct impact on the individuals' actual use of a given technology (Davis, 1989). In the context of this study, behavioural intention positively affects adoption of telecentre. Further, the finding shows that behavioural intention is the most important determinant of adoption of telecentre ($\beta = 0.505$, $t = 1.787$), suggesting that the higher the intention of an individual to use the telecentre the more he/she will be inclined to accept telecentre. This finding is consistent with the results of previous studies proposing a direct positive relationship between behavioural intention and Adoption (Al-Gahtani *et al.*, 2007; Wang & Shih, 2008). Also, the finding has empirically substantiated the arguments of Igbaria *et al.* (1997) and Jackson *et al.* (1997) that behavioural intention is the major determinant of technology acceptance. Due to its importance, it is referred to “as key criterion

in adoption research” (Venkatesh *et al.*, 2003, p 470). The factors that influence user acceptance of telecentre are shown in the revised model

In summary, the significant findings among the eight main research hypotheses showed that only six determinants supported the hypothesized structural relationships as enumerated: (BI \square PE, BI \square SI, BI \square MEF, BI \square PEF, A \square FC and A \square BI). (BI \square PE, BI \square SI, BI \square MEF, BI \square PEF, A FC and A \square BI). Consequently, Performance Expectancy, Social Influence, Management Effectiveness, Program Effectiveness, Facilitating Conditions and Intentions were key determinants of adoption of telecentre. Figure 16 shows the revised model of telecentre acceptance.



*P < 0.10; **P < 0.05; *** P < 0.01,

Figure 16: Revised Model of Adoption of Telecentre

The next section discusses on the significance of moderating effects of gender, age, ethnicity and location on the determinants of behavioural intention and adoption.

5.7 Implication of the Moderating Effects

The research examines the moderating effects of demographic variables of gender, age, ethnicity and location on the determinants of behavioural intention and adoption. The results obtained from the multi- group analysis suggested not only significant moderating effects of gender, age, and ethnicity but the moderating effect of location could not be supported. Fourteen hypotheses were proposed across different groupings (that is, male and female, younger and older etc.) but

only seven were significant in this study.

The finding has shown that effect performance expectancy on behavioural intention to telecentre acceptance is stronger for females than for a male. The result obtained is inconsistent with prior studies by Venkatesh *et al.* (2003) and Wang and Shih (2008) that found performance expectancy as a strong determinant on behavioural intention for males than for females. Showing that gender role in IT acceptance is dynamic and could change over time. The gender difference obtained from this finding could be attributed to females having higher motivation in their quest with interacting with the Information Technology initiative in the context of the study. Thus, their perceptions of the usefulness of telecentre strongly influence their intention of using telecentre. Another interesting finding from this study was that the effect of social influence on behavioural intention found to be stronger for females than males.

This finding is consistent with prior research which has found social influence as a stronger determinant of IT Usage intention for females than males (Venkatesh *et al.*, 2003; Park *et al.*, 2007; Wang & Shish, 2008). The effect of management effectiveness on behavioural intention was stronger for females than males. This may be due to the fact that females are more inclined to managers' decisions to provide the best possible services within available resources than males. The unexpected finding from this study was the effect of effort expectancy on behavioural Intention which is inconsequential for both gender groups. Though, the moderating variable does change the relationship between two variables in either way. The moderating effect of gender on the relationship between effort expectancy and behavioural intention could not be substantiated. This is not surprising as the effect of Effort Expectancy was not significant in the main hypothesis reported earlier.

Age groups have demonstrated significant moderating effects on the relationships between the main determinants of behavioural intention towards adoption of telecentre. For both age groups (that is, the younger group with ages ≤ 30 years and older group with age > 30), all the determinants of behavioural intention other than effort expectancy, anxiety, and program effectiveness were significant for the younger group. Specifically, performance expectancy and social influence was stronger for younger than older people. These findings are consistent with prior research (Wang & Shih, 2008; Wang *et al.*, 2009; Venkatesh *et al.*, 2011), which have found that performance expectancy and social influence as a stronger determinant on behavioural intention for younger people. Another interesting finding from this study was that the effect of facilitating conditions on adoption of

telecentre which was found to be stronger for older than the younger group. This finding also agrees to studies by Czaja and Sharit (1988) that found older groups perceived more comfort and efficacy over the computer than younger groups. Finally, the social Influence effect on behavioural intention is stronger on the major ethnic groups than the minority groups. The implication of which is that the minority group use telecentre less than the majority group the proposition that minority group would be least integrated into telecentre was confirmed.

Gender, age and ethnicity moderate relationship between the determinants of intention and user acceptance of telecentre. The summary of moderating effect findings is shown in Table 25.

Table 25: Summary of Moderating Effect Finding

	Hypothesized Paths	Hypotheses	Results
Gender difference			
H _{1a}	PE \Rightarrow BI	Male > Female	Not Supported
H _{2a}	EE \Rightarrow BI	Female > Male	Not Supported
H _{3a}	SI \Rightarrow BI	Female > Male	Supported
-	-	-	-
H _{5a}	MEF \Rightarrow BI	Female > Male	Supported
H _{6a}	PEF \Rightarrow BI	Male > Female	Not Supported
Age difference			
H _{1b}	PE \Rightarrow BI	Younger > Older	Supported
H _{2b}	EE \Rightarrow BI	Older > Younger	Not Supported
H _{3b}	SI \Rightarrow BI	Younger > Older	Supported
H _{4b}	ANX \Rightarrow BI	Younger > Older	Not Supported
H _{5b}	MEF \Rightarrow BI	Older > Younger	Supported
H _{6b}	PEF \Rightarrow BI	Younger > Older	Not Supported
H _{7b}	FC \Rightarrow UA	Older > Younger	Supported
Ethnicity difference			
H _{3c}	SI \Rightarrow BI	Major > Minor	Supported
Location difference			
H _{7c}	FC \Rightarrow UA	Conv. > Not Conv.	Not Supported

The finding has suggested that the underpinning theory of UTAUT can be used to explain telecentre acceptance in Nigeria.

6.0 Research Contributions

Based on the results obtained from the hypothesized relationships between exogenous and endogenous variables, including the effects of moderating relationships between those variables. The study has advanced some theoretical and empirical insights from the following perspectives:

6.1 Theoretical Contributions

The research has contributed to the technology acceptance and community informatics literature. Firstly, the study has successfully developed a modified unified theory of acceptance and use of technology (UTAUT). It shows that UTAUT model is strongly supported in context of telecentre. Being context driven it became appropriate to suggest that the modified model contribute to the body of knowledge. In particular, the research has modified and validated UTAUT model structure by incorporating new determinants of Behavioural Intention linkage with Management Effectiveness and Program Effectiveness. The inclusion of moderating effects of ethnicity and location supported the suggestion of Sun and Zhang (2006) and Srite and Karahanna (2006) with regards to understanding the effects of ethnic identity intensity as a moderator in the technology acceptance model.

6.2 Empirical Insights

The empirically validated model provides a framework for stakeholders to develop, implement and promote user acceptance of telecentre. The model could offer constructive support for government and other stakeholders to plan, implement and promote better user accepted telecentre in the context of the current research. The empirical evidence presented in the findings will no doubt assist in maintaining the Existing projects and as well as serving as a guiding principle for further implementation of telecentre throughout the un-served and underserved areas in Nigeria. The model could also be applied to other developing countries having similarities with Nigeria.

6.3 Conclusion

Empirical research was conducted based on prior studies to validate a modified UTAUT model, with the purpose of exploring the determinants of telecentre. The findings of the research had suggested that the determinants of telecentre adoption are performance expectancy; social influence, management effectiveness, program effectiveness, facilitating condition and behavioural intention. The results obtained from the relationship indicated those factors are sufficiently related, justifying a basis for the basic model of adoption of telecentre. Moreover, the findings from the multi-group analysis suggested significant moderating effects of gender, age, and ethnicity on the relationships between the latent variables. The moderating

effect of location could not be established. Consequently, based on these findings, the final model known as the modified UTAUT based telecentre model is proposed to explain and predict end-user intention in the adoption of telecentre. A comprehensive understanding of this model will assist government to identify the reason for the acceptance or rejection of telecentre among the users in the future and support them to enhance the telecentre adoption and usage. The fact that gender, age, and ethnicity are key moderating variables, attention should be accorded to the male, older people and the minority ethnic groups since the empirical results highlighted the disparity in those groups. This study has demonstrated that the modified UTAUT model could be successfully used in assessing the adoption of telecentre in Nigeria as an effective medium of providing cost effective mean of cushioning the effect of digital divide.

Current and Future Research Directions

The presenter is currently working on the following areas:

1. Telecentre sustainability is the major concern associated with its operation as such identifying the factors that influence the sustainability of these centres signifies a fundamental challenge to the successful implementation of telecentres as a tool in bridging the digital divide amongst underserved and unserved areas in developing countries.
2. Analyze the telecentres based on the major pillars of sustainability which include financial, social, operational, and to propose a model for the sustainability of telecentres in Nigeria.
3. Determinants of post-adoption of telecentre in Nigeria.

6.4 Recommendations

1. The USPF has subsidized a total of only 93 Community Resource Centres (CRCs) across the six geo- political zones of Nigeria. This number appeared to be grossly inadequate. Hence, the State Governments, Federal Agencies, NGOs and Corporate Bodies should complement USPF effort in the deployments of Digital Inclusion Centres (CRCs)in underserved and unserved areas.
2. The need for monitoring the existing CRCs became vital to ensure the realization of goals of their implementations.
3. Priority should be given to computer studies in both Junior and senior secondary schools and effective deployments and usage of School Access Program could help students to acquire digital skills.

4. The CRCs could be located near post office buildings. The idea behind the location is that the post office is an outreach to remote places and until now served as a secured place that is frequently visited by the members of the community.

5. Create a group of committee volunteers to support a sustainable ICT program whose responsibilities include:

- ❖ To promote CRCs services to local community
- ❖ Monitoring CRCs operation
- ❖ Helping CRCs to find extra funding
- ❖ Get involved in every CRCs activity

6. Digital infrastructure and Digital divide initiatives should be given priority by the Government and other stakeholders.

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APPENDIX
LIST OF INAUGURAL LECTURES TO DATE

S/N	NAME	DEPT	DATE	TOPIC
1 st	Emmanuel Ajayi Olofin	Geography	4 th March, 1992	The Gains and Pains of Putting a Water Lock on the Face of the Drylands of Nigeria
2 nd	Garba Dahuwa Azare	Education	24 th June, 2000	BASIC CONCERNS: Revitalizing Nigeria's Primary Education in the New Millennium
3 rd	Dajuma Abubakar Maiwada	Education	29 th July, 2000	Improving Teaching and Learning in University Education with Particular Reference to Bayero University, Kano
4 th	Majekodunmi Oladeji Fatope	Chemistry	7 th July, 2001	NATURAL PRODUCTS SCIENCE: Looking Back and Looking Forward
5 th	Muazu Alhaji Zaria Sani	Nigerian Languages	13 th October, 2001	A focus on Some Segmental and Suprasegmental Features in Hausa Phonology
6 th	Isa Hashim	Political Sciences	20 th March, 2004	Planning and Budget Implementation in the Health Sector
7 th	Abdulla Uba Adamu	Education	24 th April, 2004	SUNSET AT DAWN, DARKNESS AT NOON: Reconstructing the Mechanisms of Literacy in indigenous Communities
8 th	Auwalu Hamisu Yadudu	Private and Commercial Law	5 th June, 2004	LAW AS INTERPRETATION: An Exploratory inquiry from Islamic Law Jurisprudence
9 th	Mohammed Sanni Abdulkadir	History	31 st July, 2004	STRUCTURING, STRUGGLING AND SURVIVING ECONOMIC DEPRESSION IN NORTHERN NIGERIA: The 1930s As

S/N	NAME	DEPT	DATE	TOPIC
				Preview of the present
10 th	Muhammad Sani Sule	Bio-chemistry	23 rd March, 2013	Enzymology and Radiation Biology in the Understanding of Biochemistry
11 th	Essiet Unanaowo Essiet	Agriculture	22 nd May, 2013	AGRICULTURE SUSTAINABILITY IN THE DRYLAND OF NIGERIA: Realities and Prospects
12 th	Aliyu Kamal	English Studies	5 th March, 2014	The Islamic Novel Style and Structure
13 th	Abdu Ahmed Manga	Agriculture	9 th April, 2014	Horticulture as a Panacea for Food Insecurity and Unemployment
14 th	Sa'idu Muhammad Gusau	Nigerian Languages	26 th May, 2014	Wakar Baka Bahaushiya (The Hausa Oral Songs)
15 th	Abdallah Uba Adamu	Mass Communication	9 th July, 2014	IMPERIALISM FROM BELOW: Media Contra-Flows and Emergence of Metro-Sexual Hausa Visual Culture
16 th	Ghaji Abubakar Badawi	Library and Information Sciences	29 th July, 2015	THE ROLE OF PUBLIC LIBRARIES AS CENTERS OF INFORMATION TO DISADVANTAGED GROUPS: A 2004 - 2014 Study of the Information Needs of Gada Prostitutes in Dawakin Kudu Local Government Area of Kano State, Nigeria.
17 th	Mohammed Kabir	Community Medicine	16 th September, 2015	Public Health Concern for Chronic Non-Communicable Diseases Surpasses Anxiety Over

S/N	NAME	DEPT	DATE	TOPIC
				Most Infections
18 th	T.I. Oyeyi	Biological Sciences	30th March 2017	Linking Schistosomiasis and Water Resources Development in Kano State Nigeria: Public Health Impact and Mitigation
19 th	Abdulrazaq G. Habib	Medicine	27th April, 2017	Medicine, Science and Society – The Global Health Imperative
20 th	S. Y. Mudi	Chemistry	6th July, 2017	Natural Products: Plants as Potential Sources of Drugs
21 st	Sani Ibrahim	Biological Sciences	27th July, 2017	BETWEEN LIFE AND DEATH: Water Quality and Resource Evaluation - The Place of Hydrobiologists
22 nd	J. Afolabi Falola	Geography	26th October, 2017	The Poor We Have With Us Always
23 rd	Umar G. Danbatta	Electrical Engineering	2 nd November, 2017	GETTING OUT OF THE WOODS: Diversifying Nigeria's Economy Through the Telecommunications Sector
24 th	Adelani W. Tijani	Nursing	23rd November, 2017	Wholesome Alimentation: Path to Radiant Health
25 th	Juwayriya Badamasiyu	Private and Commercial Law	21st December, 2017	Uncovering Patriarchy in the Law: Feminist Movement for Re-Interpretation of Islamic Law in Focus.
26 th	Isa Mukhtar	Nigerian Language	25 th January, 2018	STYLISTIC THEORIES AND THE LINGUISTICS OF HAUSA PROSE TEXTS: the (SFL) approach.

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27 th	Ganiyu Sokunbi	Physiotherapy	29 th March, 2018	TODAY IT HURTS, TOMORROW IT WORKS: Complimentary and Alternative Therapy for Failed Back Syndrome
28 th	Aminu K. Kurfi	Business Admin. and Entrepreneurship	19 th April, 2018	Micro-finance as an Elixir for Poverty Alleviation and Wealth Creation in Nigeria
29 th	Muhammad S. Khamisu	Arabic	17 th May, 2018	Substitution in Arabic Languages Rules and Types
30 th	Habu Nuhu Aliyu	Pure and Industrial Chemistry	21 st June, 2018	SCHIFF BASES AND THEIR TRANSITION METAL COMPLEXES: The Drug for the Next Generation
31 st	Hashim M. Alhassan	Civil Engineering	19 th July, 2018	EASING THE BURDEN OF TRAVEL: Can Roadway Capacity Modeling Help?
32 nd	Habu Mohammed	Political Science	13 th September, 2018	TUG OF WAR OR ECHO IN THE DARK? Civil Society Organizations (CSOs) and the Fight Against Corruption in the Era of Change Mantra in Nigeria
33 rd	Bello Idrith Tijjani	Physics	20 th September, 2018	NAVIGATING THE DATA LABYRINTH: Application of Some Advanced Statistical Analysis in Atmospheric Physics
34 th	Mohammed Ajiya	Electrical Engineering	18 th October, 2018	SEAMLESS GLOBAL CONNECTIVITY AT THE SPEED OF LIGHT: Converting Intrinsic Phenomena in Optical Fibers to Capacity Increase.
35 th	Abdulrahman Abdul Audu	Pure and Industrial Chemistry	25 th October, 2018	MY ACADEMIC VOYAGE IN WATER INTO THE WORLD OF HEAVY METALS
36 th	Ibrahim Rakson Muhammad	Animal Science	21 st February, 2019	FORAGE AND FODDER PRODUCTION IN NIGERIA: Its Sensitivity in Sustainable Ranching.

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37 th	Muhammad Bashir Ibrahim	Department of Pure and Industrial Chemistry	14 th March, 2019	WATER POLLUTION AND THE QUEST FOR ITS REMEDIATION: The Natural Resource Option
38 th	Oyerinde O. Oyeseun	Department of Physical and Health Education,	4 th April, 2019	MAN DOES NOT DIE BUT KILLS HIMSELF: The Dilemma of the Health Educator and the Moderating Influence of Health Education
39 th	Danladi Ibrahim Musa	Department of Physical and Health Education	25 th April, 2019	WAGING WAR ON THE DEADLY QUARTET AND ITS CO-MORBIDITIES: A Physical Activity Panacea
40 th	Kabiru Isa Dandago	Department of Accounting	2 nd May, 2019	THE ACCOUNTING IN HUMANITY KNOWS NO BOUNDS
41 st	Mustapha Hassan Bichi	Department of Civil Engineering	20 th June, 2019	MAN, ENVIRONMENT AND WATER - The <i>Moringa oleifera</i> (Zogale) Intervention
42 nd	Mustapha Muktar	<i>Department of Economics</i>	27 th June, 2019	PEOPLE, PLANET AND PROFIT: Peaceful Bed Fellows at the Best of Times But Strange Roommates at Present - The Economist's Approach to a Peaceful and Sustainable Co-Existence
43 rd	Mohammed Atiku Kano	<i>Department of Biochemistry</i>	25 th July, 2019	Serum Lipids and Lipoproteins - A Curse or a Blessing?
44 th	Rabi'u Mohammed	<i>Department of Physical and Health Education</i>	8 th July, 2019	EXERCISE AND SPORTS FOR THE ATYPICAL PERSONS: A Multidimensional Analysis
45 th	Yahaya, D.B.	Department of Mechanical Engineering	12 th December 2019	GETTING OUT OF THE DARKNESS: The Solar Energy Solution
46 th	Shehu Alhaji Musa	<i>Department of Agricultural Economics & Extension</i>	22 nd April 2021	CROSSING THE CHASMS OF AGRICULTURAL DEVELOPMENT IN NIGERIA: Consumer Preference Studies: Market Integration Syntheses and Value Chain Diagnoses to the Rescue

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47 th	Shehu U.R. Aliyu	<i>Department of Economics</i>	24 th June, 2021	What Have We Learnt From Modelling Stock Returns In Nigeria: Higgledy-Piggledy?
48 th	Kamilu Sani Fage	<i>Department of Political Science</i>	8 th July, 2021	FROM DIVIDEND'S OPTIMISM TO DASHED HOPES: The Imperatives of Leadership Re-Engineering in Nigeria
49 th	Babatunde Olamide Bamgbose	<i>Department of Oral Diagnostic Sciences</i>	9 th Sept., 2021	MATRIX OF THE KNOWLEDGE OF LIGHT AND KNIFE: The Journey of a Maxillofacial Surgeon into Imaging
50 th	Umar Ibrahim Gaya	<i>Department of Pure and Industrial Chemistry</i>	4 th Nov., 2021	In Search of Catalysts...
51 st	Ahmad Muhammad Tsauni	Department of Economics	19 th December, 2024	Economic Progress on a Tightrope
52 nd	Bashir Muhammad Fagge	Department of Animal Science	30 th January 2025	An Odyssey into Foods of Animal Origin: Fortification and Modifications for Health and Sustainable National Development
53 rd	Mu utassim Ibrahim	Department of Pediatrics,	27 th February, 2025	Pathways to Progress: Pediatrics Care, Child Health and Medical Education in Nigeria.
54 th	Lawal Yazid Ibrahim	Department of Physical & Health Education	27 th March 2025	SPORT IS WAR; WAR IS SPORT: Ethical and Integrity Concerns
55 th	Mahmoud Ibrahim Daneji	Department of Agricultural Economics and Extension	7 th August, 2025	DIVERSIFYING THE NIGERIAN ECONOMY: Analysis of Extension Advisory Services as Critical Component of Sustainable Agricultural Development

S/N	NAME	DEPT	DATE	TOPIC
56 th	Abdulwahab Lawan	Department of Information Technology Faculty of Computing Bayero University, Kano	6th November 2025	BRIDGING THE DIGITAL DIVIDE: Using A Modified Unified Theory of Acceptance and Use of Technology to Predict the Determinants of Telecentre Adoption