AFRICAN JOURNAL OF LIBRARY, ARCHIVES AND INFORMATION SCIENCE

VOLUME 29 NUMBER 1 APRIL 2019

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Afr. J. Lib. Arch. & Inf. Sc. Vol. 29, No. 1 (April 2019) 1-16

Mapping Supervision Trends in Doctoral Research in Library and Information Science in Nigeria and South Africa: Implications for Collective Learning

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Abstract

Research supervisors are indispensable to the production of postgraduate research. Using the Activity Theory and the Scholarship of Integration Framework, this qualitative content analysis study investigated trends in supervision of doctoral research in library and information science at selected universities in Nigeria and South Africa between 2009 and 2015. A total of 108 doctoral theses from 10 selected universities in Nigeria and South Africa whose research outputs were deposited in the Directory of Open Access Repositories were used as the sample for this study. Sole supervision predominated the supervision trends. The main subject areas of research were information studies in both countries and knowledge management and records management in South Africa. It is recommended that supervisors and policymakers in the two countries consider other postgraduate supervision models including collaborative supervision. There is mounting evidence that collaborative supervision has superior benefits for both the supervisors and the students, compared to the dyadic supervision model. Collaborative supervision promotes quality scholarship and reasonable completion times. It also has implications for collective learning and building capacity of postgraduate supervisors.

Keywords: Research Supervision; Doctoral Research; Library Science Research; Collaborative Supervision; Research Output.

Introduction

Research supervisors play a crucial role in the support of research higher degree students. Aina (2017), Hodza (2011), Mouton (2011) and Oredein (2008) identify the supervisor as the single most important factor that influences the success or failure of a research higher degree and the quality of the product. Although it is debatable, the argument in some circles is that the quality of postgraduate outputs is as good as the supervisors who guide the students through the research process (Swart, 2018). This underscores the pivotal role that supervision plays in the successful conducting of postgraduate research.

This study examined supervision practices in library and information science (LIS) doctoral education in Nigeria and South Africa. The characteristics of doctoral supervision were examined in order to determine how knowledge is produced in support of the growth of the discipline and the innovation system of society. However, measuring completion rates was beyond the scope of the study reported on here as a result of the limitations imposed by the research methodology adopted in this inquiry and the availability of data. For instance, most of the research outputs do not indicate the date the study was commenced. The study used a single research

method which limited the ability of the researchers to explain some of the results.

Existing literature demonstrates that there is limited research on the development of higher degree students and research training in LIS in sub-Saharan Africa (SSA), based on research outputs and research outcomes (Mutula and Majinge, 2017). This study sought to bridge that gap and contribute to the understanding of supervision patterns in a specific context. Conducting studies to understand the pattern of research and scholarly communication needs to be done constantly to inform practice (Aina and Mooko, 1999). The current study has implications for supervision practices at doctoral level.

Using qualitative content analysis, doctoral supervision trends in LIS departments in selected universities in Nigeria and South Africa are discussed. This study used bibliographic records to determine the content of theses. Germane to this inquiry were 108 doctoral theses that were completed between 2009 and 2015 in LIS departments in selected universities in Nigeria and South Africa, which were available in the Directory of Open Access Repositories (n. d). This study answers the question: What are the supervision patterns in postgraduate LIS research in Nigeria and South Africa?

Conceptualising Supervision

Research is fundamental to the growth and development of any discipline and any country. It helps institutions to respond to global and national challenges (Academy of Science in South Africa, 2010). This partly explains why higher education research has been one of the sites of major policy interventions (Wisker and Robinson, 2016). Doctoral qualifications have the potential of producing skilled researchers that could contribute to the knowledge economy that is predominant nowadays (Fourie-Malherbe et al, 2016).

Research supervision has been in the spotlight, especially in South Africa, in recent times for various reasons (ASSAf, 2010; Mouton, 2011; Ngulube, 2017; Samuel and Vithal, 2011). Apart from concerns with matters such as completion rates and supervision relations, there has been concern over the quality of postgraduates produced by the higher education research systems, and the need has been identified to understand supervisory practices and address the inefficiencies in the systems (Ngulube, 2017). Supervisors are gatekeepers of rigour and quality in research and facilitate the brokering and breaking of boundaries in new knowledge (Wisker and Robinson, 2016). Sufficient and effective supervision is essential for successful postgraduate research.

Supervision has been identified as one of the challenges in postgraduate research, especially in Southern Africa in the LIS field (Mutula, 2011). However, research on LIS postgraduate supervision in SSA is far from extensive. A handful of studies have been carried out to understand LIS supervision in SSA. Mutula (2009) conducted a study to determine the relationship between postgraduate students and their supervisors. Aina (2015) surveyed 45 doctoral graduates in LIS of universities in Nigeria who completed their studies between 2009 and 2013 in order to determine the factors affecting the timely completion of their programmes. In a related study, Aina (2017) investigated the supervisors' perceptions of LIS doctoral degree programmes in Nigeria with a focus on the role that supervisors played in the completion of PhD studies. Using a sample of 38 supervisors from 11 universities, one of the specific objectives of the study was "to determine the profile of LIS supervisors of doctoral degree programmes in Nigerian universities with respect to academic qualifications, status and experience." The results from the study by Aina (2017) did not fully address the objective as it is evident from the four hypotheses and the results. Otubelu (2010) conducted a bibliometric analysis of 747 postgraduate research reports in LIS in Nigerian universities from 1993 to 2006. The scope of previous studies on research outputs differs significantly from the scope of the current study. The current study focused is on supervision trends in two countries and the differences in the patterns across the countries.

Supervision of doctoral graduates may be conducted by a single supervisor or multiple supervisors. Multiple supervision can take the form of co-supervision (joint supervision) or committee supervision, with the latter being common in North America and the former being prevalent in countries which have adopted the United Kingdom and European doctoral models (Spooner-Lane et al, 2007). Team supervision, which involves two or more

supervisors sharing the responsibility for a postgraduate student, has been offered as one of the strategies for dealing with some of the difficulties experienced by postgraduate students in the sole supervision model (Paul, Olson, and Gul, 2014; University of South Australia, 2016).

Multiple or team supervision may be ideal in cases where the problem under study is multidisciplinary or where novice supervisors are being mentored by experienced and senior faculty members. Consequently, many universities advocate multiple, team, or joint supervision (Lahenius and Ikävalko, 2014), which has been adjudged by some researchers as an effective and efficient supervision model (Coulton and Krimmer, 2005; Dysthe, Samara, and Westrheim, 2006). Multiple supervision is used in the context of the European and the United Kingdom doctoral model and excludes the United States advisory panels or committees approach because the two models are slightly different (King, 2016).

All these supervision arrangements have advantages and disadvantages. Being mentored by multiple supervisors may be detrimental to the experiences of postgraduate research students. For instance, it may expose students to conflicting perspectives of supervision owing to personality clashes, paradigm differences and differing supervision styles of the mentors. However, it provides better opportunities for critical thinking by students than individual supervision. Collective supervision has the added advantage of facilitating the convergence of a number of minds and leads to knowledge exchange among a wide variety of experts and, at times, novices (Ngulube, 2017).

Though co-supervision has a number of advantages, it is more prevalent in the natural sciences than social sciences (Fenge, 2012; Pole, 1998). Perhaps, it is incumbent upon social scientists to embrace multiple supervision models in the wake of the growth of interdisciplinarity in many academic spaces. Academic disciplines are transforming from the solo mode to working with other disciplines due to factors such as the need to understand the rising complexity of social phenomena and the tendency towards convergence.

The next section outlines the problem statement which provided the glue that holds together the presentation of argument, method and analysis of results in this study (Hernon and Metoyer-Duran, 1993; Hernon and Schwartz, 2007; Stansbury, 2002).

Problem Statement

Supervision has been identified as one of the key factors contributing to the success of postgraduate students. There are a number of supervision styles (Cullen et al, 1994). Three structures of supervision are the single supervisor, two supervisors, and a team of supervisors consisting of at least three members, with one acting as the chairperson or the main supervisor (Tahir et al, 2012). A study of the structure of supervision patterns may shed light on supervision practices in LIS in context. However, little is known about supervision patterns in South Africa and Nigeria. In order to address the problem statement, the following five research questions were formulated:

- What are the trends in doctoral supervision in each country?
- What are the main subject areas of supervision in each country?
- What are the main subject areas of supervision and status of leading supervisors in each country?
- How prevalent is team supervision in each country?
- What are the implications of the supervision culture for collective learning?

Conceptual Framework

Following Antonenko (2015) and Ngulube (2018), the conceptual framework that informed this study resulted from pulling together concepts from Activity Systems Theory, Boyer's model for scholarship (1990), and personal perspectives and experiences of the researchers as supervisors of postgraduate students. Activity Systems Theory supports the "development of the practices" being investigated (Blackler, Crump, and McDonald, 2000). The practice under the spotlight is graduate research supervision.

Although Activity System Theory has six constructs (Engestrom, 1987), this study employed only two that were considered relevant to the study. The understanding of the relationship between community of practice and division of labour

constructs assisted the researchers in exploring "the nature and dynamics of particular activity systems and the trajectory of their development" in context (Blackler et al, 2000).

Supervisors are involved in the activity of supervision. Producing X number of postgraduate students is linked to supervision practice as an activity system. The division of labour and working together leads to the emergence of a community of practice in the Wengerian sense (Lave and Wenger, 1991). Division of labour is apparent in sharing supervisory roles and knowledge to the benefit of the students and the academics (Lee, 2012). This construct in activity theory resonates with the scholarship of integration in Boyer's model for scholarship (1990). The model advocates the connection of peers with one another through practices and social relationships across disciplines. Connecting peers may create conditions for knowledge sharing and organisational learning, which are regarded as key to the performance of an organisation (Farooq, 2018). That may also provide an opportunity for postgraduate students to receive more efficient services than in an environment where there is no division of labour among supervisors, and there is a lack of scholarship of integration of diverse expertise and academic networks.

The selected universities in the two countries set the structural context in which the supervision took place. The concern in the structural context was with the number of outputs produced and how the supervisors went about the production of these outputs. Addressing these concerns was going to reveal the patterns of the supervision activity. Furthermore, Nigeria and South Africa are culturally different as a result of their history and other diverse structural factors emanating from the context and the available resources. It was of interest to find if the supervision culture in the two countries was different.

Methodology

Doctoral outputs from Nigeria and South Africa were pertinent to this study. Besides being the two economic powerhouses in SSA, the earliest LIS postgraduate programmes in Anglophone Africa were established in universities in Nigeria and South Africa (Ocholla, 2000). The year 2009 was arbitrarily chosen as a beginning point. The cut-off date for the analysis was 2015. This was longer than the five-year span that is recommended for determining changing patterns in research outputs (Stansbury, 2002). The assumption was that the chosen time span could be used to identify trends in the supervision of LIS research in context.

The Librarians' Registration Council of Nigeria (2018) lists 25 accredited LIS schools in Nigeria. However, the research outputs that were available in the Directory of Open Access Repositories (n.d.), which was the sample frame, included the University of Ilorin, Ahmadu Bello University, and the University of Nigeria, Nsukka. The study was confined to Ahmadu Bello University and the University of Nigeria because the University of Ilorin did not upload theses but only uploaded articles, and the Federal University of Technology, Minna, only uploaded abstracts of undergraduate theses at the time of the study (2018).

Only two Nigerian universities were included in this study because of the unavailability of data. Aina (2015) laments the difficulty of determining the number of LIS doctoral graduates produced by universities in Nigeria due to a lack of data. In the context of Australia, Macauley et al, (2005) underscore the importance of having a comprehensive database of PhD outputs in any country to understand doctoral education and the nature of scholarly communication in context.

There is no agreement as to the number of LIS schools in South Africa due to name changes and the change in the focus of the programmes. According to Ocholla and Bothma (2007), there are 12 LIS schools in South Africa hosted in various public universities. Hlongwane (2014) describes 10 LIS schools, excluding Stellenbosch University and the University of Johannesburg, which were on the list of Ocholla and Bothma (2007). Although Maluleka and Onyancha (2016) and Raju (2014) also exclude Stellenbosch University, they include the University of Johannesburg in their list of LIS schools in South Africa. Stellenbosch University was excluded from the sample of this study. The researchers were convinced that it was not LIS-centric. The 10 university repositories that were captured in the Directory of Open Access Repositories (n.d.) include the repositories of Durban University of Technology, the University of Cape

Town, the University of Fort Hare, the University of Johannesburg, the University of KwaZulu-Natal, the University of Limpopo, the University of Pretoria, the University of the Western Cape, the University of South Africa, and the University of Zululand. It is noteworthy that the University of the Western Cape and the University of Limpopo did not deposit any theses between 2009 and 2015. This means that a sample of eight universities from South Africa was considered for the study in contrast to two from Nigeria.

The research outputs were downloaded from the repositories of the Directory of Open Access Repositories. They were cleaned up by opening them one by one to ensure that the completion dates in the thesis were between 2009 and 2015. Those that were downloaded but were not within the study scope were deleted, leaving a total of 73 doctoral theses from 8 universities in South Africa and 35 theses from 2 universities in Nigeria, accounting for the 108 outputs that were studied. In a study of the shortcomings of LIS doctoral theses, Mutula and Majinge (2017) analysed 36 theses produced between 2008 and 2016 from 15 selected universities in Kenya, Uganda, Botswana, Ghana, and South Africa. This implies that our sample was within acceptable limits.

Data was triangulated through checking whether the number of records downloaded from the Directory of Open Access Repositories matched the records on the websites of universities and the NEXUS database, in the case of South Africa. The validation process identified many discrepancies. The researchers discovered a few errors or omissions in some instances. Strategies to ensure that bibliographic records in various databases match each other should be devised by database managers and administrators so that data mining yields comparable results. The implication is that the dataset is an underestimation of the real situation. However, the available data still shed light on the state of scholarly communication in LIS knowledge production in South Africa and Nigeria.

Traditional content analysis, which relies on human coders using a predefined coding scheme, was used (Gummer, Blumenberg, and Roßmann, 2018). The taxonomies used in the coding were those based on existing literature and previously determined themes (Pandita and Singh, 2017; Wilkinson, Van Jaarsveldt, Grimsley, and Seoka, 2016). The specified variables were "country", "university", "year of publication", "thesis title", "type of output" (whether master's or doctoral), "supervisor(s)" and "subject areas". The two researchers coded the data independently. A 99% coding agreement was achieved. This implies that the coding scheme was acceptable within reasonable limits. Descriptive statistical methods comprising frequency and percentage were used to present the results. The coded data was entered into Excel and analysed.

Findings of the Study

Based on activity theory and the integration of scholarship concept, this section outlines what supervisors did, how, and the implications for collective learning. Following on Pandita and Singh (2017), the names of the universities were not anonymised, as these names are already in the public domain.

Trends in Doctoral Supervision in Each Country

The findings reveal that 51 supervisors supervised 108 theses. The mean score is 2.12. Table 1 outlines the supervision patterns in the selected universities in Nigeria and South Africa. The supervision cultures in Nigeria and South Africa are varied, but sole supervision culture predominates. Sole supervision is above the mean (7.4) at all the universities under study, except at the University of Nigeria, the University of South Africa, and the University of KwaZulu-Natal. It is apparent that the cultural differences between the two countries did not lead to any significant differences in the supervision patterns.

In Nigeria, team supervision was prevalent at Ahmadu Bello University. In fact, only one out of the six research outputs produced by the university was supervised by a single supervisor, who was a doctoral holder. Other doctoral holders at the same institution practised team supervision. Not a single thesis was supervised collaboratively at the University of Nigeria. Four professors and three doctoral holders were involved in sole supervision at the university. On one hand, this may imply that the scholarship of integration was limited as supervisors

were not tapping into one another's expertise. On the other hand, it may be due to the fact that some of the areas of research may be outside the scope and expertise of the supervisors, among other reasons.

In South Africa, the University of South Africa was equal with Ahmadu Bello University in practising team supervision. The University of Zululand was in the lead when it came to team supervision in South Africa, with the University of KwaZulu-Natal at its heels. The researchers prefer using the term "team supervision" to using co-supervision because the results reveal instances where students were guided by more than two faculty members. For instance, there were two cases at the University of KwaZulu-Natal where the students were guided by three faculty members, and one case each at the Universities of Zululand and South Africa.

There were only two instances in South Africa (i.e. the University of Johannesburg and the University South Africa), where doctoral holders supervised students without formally tapping into the collective wisdom and experience of others. Doctoral holders co-supervised with professors at the Universities of KwaZulu-Natal and Zululand. As in Nigeria, some professors co-supervised among themselves in South Africa. According to Aina (2017), supervision is a critical process in postgraduate education, involving experienced senior academics. Doctoral holders can barely be regarded as senior academics. Professors and associate professors are generally regarded as senior academics. A study by Aina (2015) reveals that most of the PhDs surveyed in Nigeria were supervised by professors and associate professors. The use of non-professorial supervisors was limited to only two universities. The results of the current study paint a more or less similar picture.

Table 1: Trends of doctoral supervision (N = 108)

Country	Institution	Number of theses	Sole supervision	Team supervision
Nigeria	Ahmadu Bello University, Zaria	6 (5.56%)	1 (1.35%)	5 (14.7%)
	University of Nigeria, Nsukka	29 (26.85%)	29 (39.19%)	–
South Africa	Durban University of Technology	2 (1.85%)	1 (1.35%)	1 (2.94%)
	University of Cape Town	1 (0.93%)	1 (1.35%)	–
	University of Fort Hare	1 (0.93%)	1 (1.35%)	–
	University of Johannesburg	4 (3.7%)	2 (2.7%)	2 (5.88%)
	University of KwaZulu-Natal	24 (22.22%)	16 (21.62)	8 (23.53%)
	University of South Africa	17 (15.74%)	12 (16.21%)	5 (14.7%)
	University of Pretoria	13 (12.04%)	9 (12.16)	4 (11.76%)
	University of Zululand	11 (10.19%)	2 (2.7%)	9 (24.47%)
	Total	108	74	34 (31.48%)
	Mean	10.8	7.4	3.4

As shown in Table 1, only the Universities of Cape Town and Fort Hare practised sole supervision. More evidence is being produced to demonstrate that dyadic supervisory practices are gradually losing ground to collective or multiple supervision (Agné and Mörkenstam, 2018; Guerin, Green, and Bastalich, 2011). Zuber Skerritt (1992) states that most of the problems related to assisting postgraduate students in completing their studies successfully stem from the single supervisor model. Buttery et al, (2005) confirm that single supervisor arrangements are grossly unsatisfactory. One conclusion from the literature is that co-supervision is likely to be the norm as a result of a desire for interdisciplinary research, which has the potential to maximise innovation in knowledge-based economies (Grossman and Crowther, 2015) such as those of South Africa and Nigeria.

Main Subject Areas of Supervision in Each Country

A wide range of subject areas were supervised as shown in Table 2. Subject areas can be classified in various ways. The classification of the main subject areas used in this study was based mainly on Pandita and Singh (2017). While we concede that all classification devices reflect the explicit and the implicit biases of those who devise them, we found the classification of these two authors instructive.

Library management was not a popular research area as its incidence was not more than two in both countries. This was contrary to the findings of Otubelu (2010) which revealed that the subject area was dominant in Nigeria at doctoral level. The difference in the results may be partly explained by either differences in the classification schema or the periods that the studies cover. The knowledge management area and its various facets seem to be gaining ground in universities in South Africa, as shown in Table 2. No thesis of the knowledge management area was recorded in Nigeria. Studies on records and archives were also not recorded in Nigeria. Otubelu (2010) also found out that records and archives were rarely researched in Nigeria during this period. Table 2 shows that a number of records management studies were recorded in South Africa, with the University of South Africa leading.

The research sub-areas listed in Table 2 for South Africa partially resonate with the findings of Mutula and Majinge (2017). Mutula and Majinge (2017) identify information behaviour, artificial intelligence, library automation, technology acceptance and use, information management, knowledge management, information needs and information-seeking behaviour, small business enterprises, information literacy, digital libraries, institutional repositories, scholarly publishing, records management, ethics, collection development, e-learning, business intelligence, information needs of SMEs, electronic information resources, and LIS curriculum development as the topics covered by the doctoral research outputs that they analysed. As in Africa, information-seeking behaviour (information studies) was one of the three core research areas in LIS doctoral research in North America (Sugimoto et al, 2011).

Table 2: Main Subject Areas of Supervised Theses

Year	Main subject area	2009	2010	2011	2012	2013	2014	2015
Nigeria	Information technology	–	Use in scholarly communication (2)*	Digital preser-vation	–	–	–	Policy and acquisition
	Information studies	–	Information resources and services Information literacy	–	Information resources and services Information needs and information-seeking behaviour (2)	Information resources and services Information literacy Information needs and information-seeking behaviour (2)	Information resources and services (9)	Information resources and services
	Library studies	–	–	–	–	School libraries (2)	–	–
	Metric studies	–	Bibliometrics	–	–	–	–	–
	Resources and services studies	–	Grey literature	–	–	Reference services User satisfaction	–	–
	Library management	–	Marketing	–	–	–	–	–
	LIS profession and professionals	–	Job satisfaction	–	–	–	–	–
South Africa	Information technology	–	–	Data curation E-gover-nance	E-schools E-learning Diffusion	E-resources	Acceptance E-resources	Web technologies Mobile technologies Digital preservation
	Records and archives	–	–	Records manage-ment	Records manage-ment	Archives management Records management	–	Records management (2) Archives administration
	Information studies	–	–	Infor-mation literacy	Information literacy (2) Information system	Information system Information needs and information-seeking behaviour (2)	Information needs and information-seeking behaviour (3)	Information system Information needs and information-seeking behaviour (3)

Table 2: (Cont'd)

Year	Main subject area	2009	2010	2011	2012	2013	2014	2015
				Information needs and information-seeking behaviour (2)				Information literacy
	Knowledge management	Knowledge management	Knowledge manage-ment (2)	Knowledge manage-ment	Knowledge manage-ment (2)		Knowledge management	Knowledge management (5)
		Competitive intelligence	Business intelligence	Business intelligence	Indigenous knowledge systems		Business intelligence	Indigenous knowledge systems
	Library studies		–			University presses	Academic libraries	
							School libraries (2)	
							Public libraries	
	Metric studies		–	Informatics		Scientometrics		Scholarly content
	Resources and services studies	User satisfaction	–		Legal deposit	Branding of services		
	Library management		–	Quality management			Quality management	
	LIS profession and professionals		–					LIS curriculum
								Human resources development

* Indicates a frequency of more than one of the occurrence of the coverage, the frequency is 1 by default

Main Subject Areas Supervised and Status of Leading Supervisors

For a person to be recognised as a leading supervisor, they would have supervised more than two students either jointly or individually. The figure of two is based on the mean of the number of doctoral students supervised during the period under review. The subject areas varied as illustrated in Table 3. The leading supervisors seemed to prefer sole supervision to team supervision, except for supervisors from the University of Zululand and Ahmadu Bello University.

The h-index of the supervisors was between 1 and 27. This index shows the impact of an author in a particular field. The low h-index seems to suggest that most of the leading supervisors had not made a significant impact in the subject areas in which they supervised. However, Harzing (2007) warns that even if the h-index may be used as a measure of a person's impact in a certain field, it may not be accurate for a variety of reasons, including the avenues that the authors use to disseminate their research outputs. Google Scholar was used to identify the impact of each supervisor, and it is assumed that it gives a fair picture of this impact. Supervisors are expected to be leaders in their fields with a sound publication record. More research is needed to determine the correlation between the impact of a supervisor, their impact in a certain research field and their performance as supervisors.

Prevalence of Team Supervision in Each Country

The results in Table 4 show that the team supervision prevalence rate in Nigeria was 4.6% and 26.9% in South Africa was The supervision trends are skewed towards sole supervision.

Table 3: Leading supervisors in the sampled institutions

Country	Institution	Supervisor	Subject area	No of Students		H-index (Google Scholar)
				Sole	Team	
Nigeria	Ahmadu Bello University	A*	Information studies	0	4	2
		B	Information studies	0	3	1
	University of Nigeria	C	Information studies	18	0	6
			Resources and services studies			
			Metric studies			
			Information technology			
			Library management			
		D	Information studies	7	0	4
South Africa	University of Johannesburg	E	Information studies	1	1	10
			Information technology			
	University of KwaZulu-Natal	F	Information studies	8	3	26
			Knowledge management			
			Resources and services studies			
			Information technology			
		G	Information studies	5	4	6
			Resources and services studies			
	University of Pretoria	H	Library Studies	3	0	12
		I	Knowledge management	1	2	2
	University of South Africa	J	Resources and services studies	6	3	27
			Knowledge management			
			Records and archives			
			Information technology			
		K	Records and archives	4	1	6
	University of Zululand	L	Knowledge management	2	8	23
			Information studies			
			Information technology			
			Metric studies			
		M	Information studies	0	4	10

* Names were anonymised for ethical reasons

Table 4: Team supervision patterns in Nigeria and South Africa (N = 108) per year

Date	South Africa		Nigeria		Totals	
	Sole	Team	Sole	Team	Sole	Team
2009	2	3	1	0	3	3
2010	2	1	6	1	8	2
2011	7	3	0	1	7	4
2012	3	7	2	1	5	8
2013	3	7	7	1	10	8
2014	7	8	7	1	14	9
2015	20	0	7	0	27	0
Total	**44 (40.7%)**	**29 (26.7%)**	**30 (27.8%)**	**5 (4.6%)**	**74 (68.5%)**	**34 (31.5%)**

The overall team supervision prevalence rate was 31.5%. Although the sample was relatively low, the results are corroborated by previous research. In a related study in Nigeria, Aina (2015) reveals that 80% of the respondents had a sole supervisor. Only three universities employed co-supervision and accounted for the 13.3% co-supervision rate. This seems to confirm the fact that team supervision is low in the social sciences (King, 2016; Pole, 1998).

The implication of these results is that most research students were not provided with a "multi-faceted support network" (Guerin et al, 2011) during their studies, or exposed to "multivoiced" supervision (Dysthe et al, 2006). In essence, this deprives doctoral students of a diversity of perspectives and expertise (King, 2016). The low prevalence rates of co-supervision may also be inimical to completion rates of postgraduate students (Guerin et al, 2011; Wisker, 2012). Humphery (2011) and Ives and Rowley (2005) identify co-supervision as one of the factors that improve the chances of students completing their studies quickly. For instance, Humphery (2011) reveals that 54% of students who were guided by supervisory teams submitted within 4 years, compared to 32% of students with a sole supervisor. Also, a high number of students who were supervised by a sole mentor dropped out of their studies. On the other hand, Ives and Rowley (2005) found that students that were co-supervised were likely to progress well and be satisfied. However, team supervision on its own does not guarantee fast completion rates. There are other factors that may come into play such as mode of study, level of preparedness, and available resources (Aina, 2015; Mutula and Majinge, 2017; Ngulube, 2017).

In that regard, team supervision should be encouraged in LIS in Nigeria and South Africa in order to provide students with a broader range of networks and resources, expose them to a range of supervisory styles, and improve student completion rates as articulated in the literature (King, 2016).

A study conducted in LIS schools In East, Central and Southern Africa on the supervisor-supervisee relationship among postgraduate students revealed that 56% of the respondents preferred a single supervisor against 32% who favoured more than one supervisor (Mutula, 2009). The study gives credence to the need to consider alternative supervision models such as team supervision as suggested by this study.

Team supervision gives new supervisors an opportunity to be mentored in the practice of supervision and provide for the division of labour in supervision (see King, 2016) for the benefit of the students. The division of labour is in line with one of the constructs of Activity System Theory. For the division of labour in supervision implies that supervisors share the load of providing intellectual and administrative support, mentoring the student and ensuring continuity of supervision. Co-supervision will assist the beginner supervisors in becoming familiar with the pedagogy of graduate supervision and make the entrants productive and efficient supervisors. The interaction with other supervisors may also create

an opportunity to reflect upon and improve their practice. Ultimately, this will transform the practice of supervision from being a predominantly private activity between the sole supervisor and the student to being more of a professional activity (Manathunga, 2014).

There is evidence that even if the team supervision model is found to be less attractive; at least first-year doctoral students should be supervised collectively as that "creates a wider academic learning context, allows doctoral students to gradually acquire the values and behaviours of a research practice community, and reduces the risk of premature selection of permanent supervisors" (Agné and Mörkenstam, 2018). The fact that there is no consensus on the ideal supervision implies that more research is needed in this area. Lahenius and Ikävalko (2014) are of the opinion that although co-supervision has the potential of assuring quality in supervision, it has attracted inadequate attention.

Implications of the Supervision Patterns for Collective Learning

The supervision culture in the two countries has implications for Boyer's model for scholarship (1990) relating to the scholarship of integration. The scholarship of integration advocates the connection of peers with one another through practices and social relationships across disciplines. Team supervision as an activity creates a forum where "learning conversation about supervisory practices" may take place (Wisker, 2012). This enables supervisors to learn the art of supervision collectively. It also provides supervisors with an opportunity to share their vision of quality supervision and management practice. Collaborative inquiry and the solution of supervisory problems are highly likely where team supervision exists. The integration of scholarship is the ultimate result as peers connect through the activity of supervision.

Connecting peers may create conditions for learning through knowledge sharing. Accordingly, "better and purposeful sharing of useful knowledge translates into accelerated individual and organisational learning and innovation through the development of better products" that enhance performance (Reige, 2005). However, the organisational culture, interpersonal trust and reward system may affect knowledge sharing in an organisation (Farooq, 2018; Ngulube, 2005). Individuals might not share their knowledge unless opportunities are provided. Organisations must create conditions for knowledge sharing and transfer. Co-supervision may create such conditions. The low prevalence rates of co-supervision imply that LIS supervisors in Nigeria and South Africa have limited chances of sharing knowledge. Co-supervision may facilitate the sharing of the supervisors' collective experience, leading to effective quality in the delivery of education. Knowledge sharing may also result in innovation and sharing of best practices facilitating learning and enhancing the organisation's ability to achieve its mandate. The habit of knowledge sharing leads to successful scholarship and effective organisational learning.

Conclusions and Recommendations

This study investigated postgraduate supervision in LIS in South Africa and Nigeria. It adds to the existing understanding of supervision patterns and their implications for the innovation system. The results support the salience of Activity Theory and Boyer's model for scholarship in explaining research supervision trends in LIS education in South Africa and Nigeria. Although these are multiple case studies whose results may not be generalised to many contexts, the study illuminates postgraduate supervision in any context that has adopted the United Kingdom or European doctoral approach.

The findings show that sole supervision dominates doctoral research in LIS in Nigeria and South Africa. The main subject areas in which supervisors provided guidance were information studies in both countries, and knowledge management and records management in South Africa. Although the dyadic supervisory model remains common, alternative models such as team supervision should be considered. Team supervision is beneficial to both students and research supervisors. It also provides students with services of a high quality.

The leading supervisor seems to have a varied impact on their subject fields. Leading supervisors should live by example and mentor other supervisors by considering team supervision in contrast to sole supervision. This may lead to the integration of scholarship in the sphere of supervision and facilitate collective learning from each other.

Finally, the methodological limitations of this study necessitate further studies. The sample that was used was limited, especially in Nigeria. One methodology was used, which resulted in a limited explanation of the results. The use of multiple methods and diverse samples may help to unravel the complex phenomenon of research supervision.

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Afr. J. Lib. Arch. & Inf. Sc. Vol. 29, No. 1 (April 2019) 17-28

Skills and Competencies for Authenticating Digital Records to Support Audit Process in Botswana Public Sector

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Abstract

Authenticating digital records to support the audit process requires appropriate skills and competencies. The Government of Botswana implemented a government-wide enterprise resource planning (ERP) referred to as the Government Accounting and Budgeting System (GABS) in order to improve financial management in the public sector. However, records professionals and auditors are not trained on how to authenticate records stored in GABS. This qualitative study sought to establish the skills and competencies required to authenticate digital accounting records in GABS. Interviews were conducted with a purposively selected sample of records management professionals, information and communication technology (ICT) professionals, and auditors from the Department of Botswana National Archives and Records Services, Accountant General's Department, Department of Internal Audit, Office of the Auditor General of Botswana, Department of Corporate Services and the Department of Information Technology (DIT). The study established that digital forensic knowledge of the types of integrity, processes of access, reproduction, identification and extraction is needed in order to authenticate digital records. However, such skills are lacking in the public sector in Botswana among records professionals and auditors. The study recommends continuous capacity-building training for records management professionals and auditors to enable them to keep up with technological developments and to operate effectively in the face of the ever-changing ICTs.

Keywords: Auditing, Authentication, Botswana, Public Sector, Digital Records, Records Management, ERP.

Introduction

The adoption of ICTs in the delivery of public services in Botswana has been embraced by the political leadership and supported through the formulation and implementation of policies such as the National ICT Policy and the e-Government Strategy (Government of Botswana 2004; 2012). The adoption of ICTs was part of a wider agenda of public sector reforms among which were projects such as performance management system, annual performance plans and performance-based reward system, and work improvement teams had to assist ministries in improving service delivery and organisational performance, as well as human resource management capability enhancement through policies and procedures development and implementation (Wamukoya and Mutula 2005). Financial management has also been affected as the Government of Botswana implemented a government-wide enterprise resource planning (ERP)

referred to as the Government Accounting and Budgeting System (GABS).

GABS was implemented across central government departments in 2004. It is operational in most government offices across the country. The system was mainly implemented to improve financial management processes and reporting on expenditure. It is an ERP system. The custodian of the system is the Department of the Accountant General (AGD) in the Ministry of Finance and Economic Development (MFED). The Department of Information Technology (DIT) is entrusted with the coordination of government computerisation projects coordinated system implementation (Moloi, 2009; Mosweu, 2014). The endeavour to improve public sector financial management in terms of efficiency, effectiveness, accountability, transparency, security of data management, and comprehensive financial reporting (Hendricks, 2012) has seen other African countries such as Uganda, Kenya and Tanzania implementing computerised financial management systems for similar reasons to that of the Government of Botswana.

The use of GABS in financial management processes results in the generation of digital records that are required to support the audit process. The management of digital records is a challenging vocation due to shortage of skills and competencies (Bhebhe, 2015). Indeed, as several commentators have observed in the Eastern and Southern Africa Regional Branch of the International Council on Archives (ESARBICA) region, the absence of competencies in records and archives management and the lack of stewardship in the handling of digital records are recurring challenges (Wamukoya and Mutula, 2005; Ngulube and Tafor, 2006; Mosweu, Bwalya and Mutshewa, 2016; Ngoepe and Katuu, 2017; Mosweu and Kenosi, 2018).

Due to proliferation with technology, records professionals face the challenge of establishing digital records' accuracy, reliability and authenticity and maintaining it over time so that it can be proven. This is also applicable for records created in systems such as the Government Accounting and Budgeting System (GABS). Therefore, new skills and competencies are required to enable them to authenticate digital records created and stored in ERPs such as GABS. In this regard, records professionals are supposed to be equipped with the knowledge and skills necessary to fulfil their responsibilities, which should be acquired through formal education, and establish a trusted preservation system that is capable of ensuring that accurate and authentic copies of the creator's records are acquired and preserved. For records generated in GABS to support the audit process, they need to be authenticated by skilled professionals. Authentication refers to a declaration of a record's authenticity at a specific point in time by a juridical person entrusted with the authority to make such a declaration (e.g. public officer, notary, auditor, records manager, certification authority) (InterPARES, 2007). Duranti (2005) defines the concept 'authentication' as a declaration of authenticity that can be provided by any person responsible for keeping the original of a record or an official copy. In this regard, the process can be done by the records professionals who are supposed to be the custodians in most cases, although Ngoepe (2016) emphasises that in most African countries, records professionals are mainly involved with records in the last stages of its life cycle. According to Mason (2006), for a record or a document to be authenticated, it must have integrity, reliability and be usable. Without requisite skills and competencies, authenticating digital records in ERPs can be a daunting task. This study sought to establish the skills and competencies required to authenticate digital accounting records in GABS.

Literature Review

Knowledge and skills for every profession are vital in equipping human beings with informed planning and decision making (Segaetsho and Mnjama, 2017). The effective management of records is a requisite component of good service delivery but that does not occur naturally but requires, among other things, competent and skilled staff and an operational environment with clearly defined performance expectancies (Gebbie, Merrill, Hwang, Gupta, Btoush and Wagner, 2002). It is thus clear that in any corporate environment professionals need to have knowledge, skills and competencies about management functions and activities (Van Brakel, 2003).

The International Federation of Accountants indicates that auditors performing audits in a digital environment should possess knowledge content,

which include IT systems for financial accounting and reporting (including relevant current issues and developments), principles and practices for evaluating financial accounting and reporting systems (including evaluating controls and assessing risk) and computer-assisted auditing packages and techniques. According to Carroll (2006), auditing in a digital environment entails that auditors should select, gather, analyse and report, and thus assist in adding credibility to audit findings, conclusions and recommendations. For example, they can use audit tools and techniques such as Generalised Audit Software (e.g. ACL, IDEA, Microsoft Excel or SQL queries).

Records managers and ICT specialists also need to have the required competencies and skills to manage records in the digital age. Recognising that the digital age requires a skilled and knowledgeable workforce with capabilities needed for ensuring that digital information remains accessible and usable over time, the National Archives of Australia (NAA) (2015) developed a digital information and records management capability matrix for records managers and ICT specialists to enable them to cope with requirements for the management of digital records (National Archives of Australia, 2015).

NAA advises all Australian government agencies on ways of improving digital information management for business efficiency and effectiveness and to ensure transparency and accountability (NAA, 2015). This was in recognition that a skilled and knowledgeable workforce is crucial in managing digital information. The matrix presents the capabilities that agencies need for a changeover to a digital information management regime, which would make sure that information remains accessible and usable through the passage of time in the digital environment (NAA, 2015). It outlines generic capabilities for all staff, ICT and information, and records management specialists. The capabilities as presented in Table 1 are more or less the very skills and competencies required of ICT professionals and records management professionals in the era of digital continuity as set by NAA.

In the context of Botswana, available empirical studies have shown that archives and records management professionals lack skills and competencies to manage digital records (Tshotlo and Mnjama, 2010; Keakopa, 2010; Moatlhodi and Kalusopa, 2016; Mosweu, 2014). For example, in a study that assessed digital records readiness at Botswana's Ministry of Labour and Home Affairs, the majority of the records personnel had not been trained on digital records management. This was despite the fact that the study took place at the time when the ministry was about to implement the Botswana National Archives and Records-led project dubbed the National Archives and Records Management System (NARMS). The project was actually the implementation of a government-wide digital records management system. Elsewhere, at the Ministry of Trade and Industry where an EDRMS was implemented but poorly adopted and used, it emerged that it was due to poor capacity of records management staff (Mosweu, 2014).

Poor capacity to manage digital records is not peculiar to Botswana. It has also been reported in other ESARBICA countries (Wato, 2006; Kemoni, 2009; Marutha and Ngulube, 2012; Nengomasha, 2009; Chaterera, 2016; Issa and Wamukoya, 2018), other African countries (Asogwa, 2012; Adu and Ngulube, 2017; Ngoepe, 2018) and the globe as a whole (Saman and Haider, 2012; Wang, 2009).

Table 1: Capabilities and skills of ICT specialists and records management personnel (NAA, 2015)

ICT specialists	Records management specialists
Awareness of legislation, standards and policies affecting information management	Awareness of legislation, standards and policies affecting information management
Metadata	Information governance and business risk mitigation
Information risks and destruction	Metadata
Interoperability	Risks to information
Technologies and tools	Retention and destruction of information
Data architecture	Access to information
User experience	Standards and best practices
Technologies and tools	Specialist technologies
Information costs	Communication and leadership
	User experience

Research Problem

Auditors in many African countries have rejected digital records largely because their authenticity could not be established, and therefore they became unreliable in the audit process (InterPARES, 2018a). In most cases, auditors and records professionals lack skills and competencies to authenticate digital records to support the audit process. Records produced and stored in ERPs need to be kept authentic to support the audit process. This is because authentic and complete records serve as evidence required by auditors in their work (Bhana, 2008; Ngoepe and Ngulube, 2014; Mosweu, 2019). Simple as the audit process may seem in theory, a lack of adequate records or the challenges related to their retrieval lead to increased audit risks (Bhana, 2008; Nel, 2011). In the digital environment, records management has proven to be a complex and challenging task for those entrusted with their management due to a lack of requisite competencies and skills. This has been confirmed in several studies conducted in the ESARBICA region (Wamukoya and Mutula, 2005; Ngoepe and Keakopa, 2011; Muchaonyerwa and Khayundi, 2014; Katuu and Ngoepe, 2015; Moatlhodi and Kalusopa, 2016; Ngoepe and Katuu, 2016). In view of the aforementioned, this study sought to determine the skills and competencies required to authenticate digital accounting records in GABS among auditors, records management and ICT personnel in selected government ministries and departments in Botswana. The specific research objectives were to: (i)determine whether auditors, record managers and ICT professionals in the Botswana Government ministries have the required skills and competencies to authenticate digital accounting records generated and stored in GABS; and establish from participants opinions on the effects of inadequate skills and competencies in the authentication of digital records in the system.

Methodology

This study was qualitative and was situated within the interpretivist research paradigm (Creswell, 2014). Qualitative studies enable participants to answer questions about their experiences and meaning using their own perspective (Hammarberg, Kirkman and De Lacey, 2016). The study sample was selected from a population made up 25 ministries of the Government of Botswana and six quasi-government departments.

Participants were purposively selected from six Government of Botswana departments by virtue of their functions as mandated by the government. The departments were: Botswana National Archives and Records Services (BNARS; Department of the

Accountant General; Department of Information Technology; Office of the Auditor General of Botswana; Department of Corporate Services in the Ministry of Finance and Economic Development; and the Department of Internal Audit within the MFED.

Data were collected from auditors, records managers and ICT professionals from cited departments using interviews. Twenty-five participants took part in the study as reflected in Table 2. Data were analysed thematically using themes from the objectives of the study.

Table 2: Participants' work designations and their places of work

Department	Participant job designation	Number
Botswana National Archives and Records Services	Head: Archives Administration Head: Records Management Services Principal Records Managers II x 3	5
Department of Internal Audit	Principal Internal Auditor Senior Internal Auditor Internal Auditor x2	4
Department of Information Technology	Chief Systems Analyst Chief Programmer Systems Analyst	3
Office of Auditor General	Auditors x5 Senior Auditor	6
Accountant General's Department	Chief Accountant Senior Accountant Accountant Principal Finance Officer Principal Accounts Officer	7
Ministry of Finance and Economic Development HQ	Principal Records Manager Records Manager I	2
TOTAL		**25**

Source: Field data

Findings

The findings of the study are presented in accordance with the research questions. First, the skills and competencies of records managers, ICT professionals and auditors are presented, followed by the ones related to the impact of skills and competencies for authenticating digital accounting records in GABS. Lastly, recommendations are offered for the improvement of the authentication of digital records in the system.

The results for the first objective on skills and competencies are presented for each group.

Skills and Competencies

Records Managers

The records management professionals taking part in the study listed the following as skills and competencies needed to establish the authenticity of digital accounting records created and stored in GABS: knowledge of digital preservation and computing skills, electronic records management, enterprise content management, legal aspect of information, analytical and planning skills, metadata and auditing, effective communication and consensus building skills, appreciation of secure digital signatures platforms and security and privacy control.

The digital age poses a challenge in the skills set of archives and records management professionals, as they need to cope with the changes and the complexities associated with the records management digital environment. According to Eastwood (2006), archivists need to have a variety of skills, which comprise designing, implementing and managing record-keeping systems, especially in the digital environment. They need to be able to analyse business functions, activities, procedures and needs (Eastwood, 2006). Eastwood (2006) refers to these as "archival analysis". Equally important are metadata schema and the analysis of the impact of technology on records management.

ICT Specialists

This study found that in order for ICT specialists to establish the authenticity of digital accounting records created and stored in GABS, they need the following skills and competencies: system design, business process analysis, business rules, data analytics, computer forensics and security, database administration, IT certification (information systems auditor), IT security related technical competencies, implementation of user roles and individual logging credentials.

A secure network is essential for an operational information system. The following are the responsibilities of an information technology security professional: developing and designing security devices and software to ensure the safety of clients' information or internal products and information, managing security measures for information technology system within a networked system, operating regular inspections of systems and network processes for security updates, conducting audit process for initiating security and safety measures and strategies, customising access to information per rules and necessity and maintaining standard information security policy, procedure, and services (Easttom, 2018).

Auditors

The findings of this study revealed that for auditors to audit effectively in a digital environment and authenticate digital records created and stored within GABS, they need to possess the following skills and competencies: data analytics, business rules and business process analysis, knowledge of and the use of CAATs, an understanding of system design and development, information system audit expertise, monitoring and evaluation, training on GABS as a system and presentation and creative skills. In totality, the cited skills and competencies would enable auditors to do their work with little inhibition. Without adequate training and insufficient knowledge in the use of ICTs, auditors may not spot such accounting information system risks inherent in the audit process (Austen, Eilifsen and Messier, 2003).

The responses on the second objective of the study on effects of skills and competencies for establishing authenticity of digital records are presented.

Impact of Skills

Auditors

The study found out that a lack of skills and competencies of operating in the digital environment

by auditors will have negative consequences. It emerged that incapacitated auditors may find it difficult to establish the authenticity of evidence (records) used the audit process. One of the auditors (IA2) said:

***IA2**: It would not be easy to establish the authenticity of data and transactions in the system. Fraudulent activities on transaction and data manipulation would not be easily identified. Government would lose a lot of money and officers who process transactions would take advantage of that to misuse government funds.*

In an audit of public sector organisations in Botswana, the Auditor General found that records were unreliable and incomplete and were not used in the audit because their authenticity was suspect. They could not be used to inform audit opinions (Mosweu, 2011). Participants gave another impact of inadequate skills and competencies among auditors as compromised audit reports that do not improve the operations of government organisations. This could result in so many errors and even fraud being committed through the system and, without due care, such errors could go undetected. Furthermore, a lack of analytical skills was also cited as an impediment for the authentication which could result in the following as pointed out by the auditors:

Compromised quality reports that do not improve the operations of the organisations. This could result in so many errors and even fraud being committed in GABS going undetected for long. Delayed audit reports due to inadequate analytical skills.

IA3: Failure to capture correct information and interpret results

IA4: Unreliable audit findings with no value. Part of the definition of internal auditing is about adding value and improving the organisation's operation using systematic approaches to evaluate and improve effectiveness of risk management, controls and governance for decision-making. Using unreliable data is more like distorting the risk management process and accountability, especially if COSO is the selected risk management model.In our case, we use COSO for risk management, which means Control Activities and Risk Assessment components of COSO are not a true reflection of some of the business processes within the GABS environment. One evident deficiency can be realised in the segregation of duties where an authorising officer can authorise at all levels, enabling them to be able to complete a transaction with the aid of a preparing officer. The result of this was that one officer previously paid overtime more than basic salaries to some officers without detection for more than two years; a clear violation of remuneration policies. Inadequate analysis of the data that has been collected which can lead to wrong conclusions. Risk of issuing a contradictory audit opinion. There will be reports that are not communicating to stakeholders how government money was spent, and fraud can just happen in front of their eyes.

Records Professionals

When the question of what would be the impact of inadequate competencies and skills needed by records management professionals on their abilities to authenticate digital records, they tendered some of the following responses:

RM1: *Weakened capacity for ascertaining the authenticity of digital records. Compromised or intellectual control of ascertaining the authenticity of digital records. Public distrust is imminent from digital records loss. Inability to provide the necessary guidance and direction on digital records.*

RM2: *It would not be easy to identify and authenticate digital records.*

RM5: *Tempering with information or records is critical step towards committing fraud, so a lack of knowledge and skills about electronic systems results in mismanagement and leaves room for exploitation by fraudsters.*

RM6: *They will not be able to know the authenticity of the records if they lack the skills.*

RM7: *Lack of skills means one will not be able to use the systems in any way and authentication of records will not be ascertained.*

These findings collectively postulate that a lack of requisite skills and competencies by records management professionals has a negative impact on their ability to manage digital records, including their authentication.

ICT Professionals

When ICT specialists were asked about the impact of inadequate technical competencies and skills on their ability to authenticate digital records, they indicated that system security would be compromised. One participant, ICT2, asserted that:

> *There is likelihood of making mistakes or accidentally deleting data by overriding functions if one does not know the impact of such actions. This may cause data loss or corruption.*

Another, ICT 3, was of the view that:

> *Mistakes that can compromise data quality data in the system can happen. Information leakage, i.e. unauthorised personnel may have access to vital information.*

Clearly, ICT professionals are indispensable in the authentication of digital records in GABS. Several studies undertaken in Botswana (Moloi and Mutula, 2007; Mosweu, 2014; Moatlhodi and Kalusopa, 2016; InterPARES, 2016) and in the ESARBICA member countries (Wamukoya and Mutula, 2005; Muchaonyerwa and Khayundi, 2014; Malanga and Kamanga, 2018) have shown that records management personnel lack the capacity to manage digital records. Therefore, alone, they cannot hope to deal with issues pertaining to the management of digital records, including the maintenance of their authenticity. It is therefore crucial that they collaborate with ICT experts to address some issues related to the management of digital records. For example, ICT professionals are responsible for maintaining the infrastructure necessary for digital records management, including metadata management. They are also responsible for the administration, development, maintenance and implementation of policies and procedures necessary to ensure the security and integrity of databases holding records (Peshkar and Ghosekar, 2015).

Conclusion and Recommendations

The management of digital records, including the maintenance of their authenticity, requires personnel with the requisite skills and competencies. It has emerged from this study that the management of digital records is a complex vocation. Both records management professionals and auditors were found wanting with regard to their abilities to authenticate records generated and stored in GABS. Their skills and competencies are simply inadequate for the task. As for records managers, they are mandated to manage organisational records and their limitations where managing digital records means the proper management of records in the ERP (GABS) is beyond their capabilities. The same is true for auditors who audit financial statements in the digital environment. Their limitations in conducting audits through the ERP have led to their dependence on ICT professionals for assistance. This scenario does not augur well for their independence as auditors. It has been revealed in this study that although records management professionals, ICT professionals and auditors have been trained to perform their work functions, it is necessary to continue equipping them with skills and competencies in order for them to continue to operate effectively in the face of the ever-changing technologies. This would enable them to continue being in a position to authenticate records in digital systems, including for auditing purposes.

For proper skills and competencies to be acquired, proper education and training that recognise the complex digital space in which digital records are managed and the needs of stakeholders in the financial audit process are key both in the short and the long term. The recommendations of this study are segmented into two, that is, auditors and records managers.

This study has established that auditors, both from OAGB and DIA, should be trained more on internal audit processes and techniques, as they have accounting qualifications not internal audit ones, especially for auditing in the digital environment.

The records management professionals need to have capacity to manage records in digital formats. BNARS should promote deliberate and continuous

dialogue, engagement and empowerment of records managers on public sector digital records management issues through workshops, conferences, seminars, and best practice international benchmarking visits to those who have made strides on management of digital records. Also, it is ideal that records management professionals be trained on basic financial management so that they appreciate related financial records management issues, especially the management of computerised ones.

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Afr. J. Lib. Arch. & Inf. Sc. Vol. 29, No. 1 (April 2019) 29-44

Library Services for Students with Visual Impairment in Selected Universities in Nigeria

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Abstract

This study explored library services for students with visual impairment in Nigerian universities. The study had four objectives. Survey designs were employed on a census of 341 students from six federal universities. Data collection from students was through a questionnaire. Twenty-four librarians were purposively selected from the universities, and interviews were used for data collection. Data from the questionnaire were analysed using frequency counts and percentages while the data from the interviews were transcribed, coded, sorted, with relevant themes identified. The findings showed that library policy and technical and personnel factors affect library services delivery to students with visual impairment. The study recommended amongst others that university libraries should conduct user-satisfaction studies regularly to ensure that their services meet clients' expectations.

Keywords: Library services, Nigeria, Universities, Visually impaired students.

Introduction

The provision of library service for visually impaired students in tertiary institutions has been a pertinent issue in the field of special education, as well as library and information science. Library services can best be described as the services a library offers to its users. Majinje (2014) defined it as facilities provided by a library to all users including the visually impaired individuals, as well as those in wheel chairs. Studies have shown that students with visual impairment in tertiary institutions need as much access to information, ideas, theories, and facts as their abled counterparts to conduct meaningful research and do well in academics (Katz, 2013; Spungin, Ferrell and Monson, 2017).

The concept 'visual impairment' is used to define a wide range of vision loss, which includes those with total blindness and those whose levels of vision loss are less severe (Zimmerman and Zebehazy, 2011). Visual impairment affects the educational performance of a child to such an extent that he or she requires an adaptation in the teaching methods and the material needed for learning. Visually impaired students include those with low vision and those with no vision. Fakoya-Michael and Fakoya (2015) noted that these students experience varying degrees of sight loss that may necessitate diversity in the level of their information needs and type of library resources required.

Delivering appropriate library services could enhance the academic performance of these students (Wong and Webb, 2011), increase their reasoning skills (Megan, 2015; Kumar and Rajmma, 2016), and increase their thinking capacity to remember facts (Soria, Fransen and Nackerud, 2013). Studies also show that academic libraries support at-risk students through personalised instruction, provision of network services, and adaptive technology devices (New York Comprehensive Center, 2011; Gavigan and Kurtz, 2010). Specifically, providing library services to students with visual impairment in modes that are appropriate to them gives them convenient access to

books and other learning resources. Unfortunately, when the library system is put in place, little or no consideration is made for this group of students, especially in developing countries (Phukubje and Ngoepe, 2017). This widens the information gap between students with visual impairment and some of their sighted counterparts.

To bridge the gap, various international bodies have come to the aid of visually impaired students or individuals by developing policies on equal library services to all learners irrespective of their forms of disability (International Federation of Library Associations (IFLA), 2015). Hill (2013) observed that the Australian Library and Information Science Association has guidelines on library standards for individuals with disabilities. Hill further observed that there is a human rights law in Canada that prohibits discrimination of people with disabilities. The UNESCO Salamanca statement and framework for action on special needs education also advocates for the inclusion of learners into mainstream classrooms irrespective of their disabilities (Chireshe 2013; Samkange, 2013). In Nigeria, the National Policy on Education (Federal Republic of Nigeria, 2008) noted that students with disabilities (including the visually impaired) should be provided with equal access to educational opportunities in an inclusive setting. This policy was meant to bridge the gap in the educational experiences of students with disabilities and those without disabilities.

Nevertheless, studies have revealed that Nigerian university libraries, as well as those located in most developing countries, demonstrate disparity of library facilities provided for students with visual impairment and those without disabilities (Ekwelem, 2013, Eskay and Chima, 2013). Although research evidence shows the need to provide library services for students with visual impairment, only a few of these studies have attempted to confirm from the recipients that services are actually being provided, so as to identify gaps in the service provision. Studies, conducted in other countries (Heather, 2014; Kitchen, 2011), have documented the expectations of students with disabilities regarding library services. However, in Nigerian university libraries, there is still a lack of empirical studies on the expectations or the needs of visually impaired students. The recent rise in the number of students with visual impairment in Nigerian public universities (Eskay and Chima, 2013; Zaid, 2017) has made such a study necessary to provide proper guidance on the services to offer to these students.

Statement of the Problem

Students with visual impairment require access to university libraries for research, reference purposes, and completion of class assignments. Research evidence, however, showed that these students get restricted access to library services that meet their unique needs. Access to library resources available in Nigerian university libraries is not easy for these students because they are not in the right format. The necessary assistive technologies are not available, and library staff are not adequately trained to serve the students (Adetoro, 2011; Ekwelem, 2013). Moreover, the few library services provided to students with visual impairment are based on assumptions about their needs (Zaid, 2017), placing some doubts on the quality of services offered to these students. Providing services for visually impaired students based on assumptions may not entirely satisfy their needs. There is therefore need to ascertain from these students if the library services they are provided with are in line with their expectations and needs. Such an investigation will help to determine the needs of the students, and establish whether they are satisfied with the current services they are receiving. The findings of the study will also point out areas that may have been neglected, which require urgent attention in order to improve the students' access to learning material.

Research Questions

i. What are the services provided to visual impairment students in university libraries?

ii. What are the technological devices available to enable access to information for students with visual impairment in libraries?

iii. What are the expectations of the visually impaired students regarding library services in university libraries?

iv. What are the factors affecting provision of library services to visually impaired students?

Objectives of the Study

The objective of this study is to explore library services delivery to students with visual impairment in selected Nigerian universities.

Specifically, this study examined:

i. the services provided to visually impaired students in university libraries.

ii. technological devices available to enable students with visual impairment to access information in libraries.

iii. the expectations of students with visual impairment concerning library services in university libraries.

iv. factors affecting provision of library service to visually impaired students.

Literature Review

University libraries are designed to disseminate knowledge and information for scholarship and research purposes to all students, lecturers, and researchers, irrespective of any form of disability (Eze and Uzoigwe, 2013). To fulfil this purpose, there are essential services the libraries must provide for their patrons. General services that should be provided in a library include literacy instruction, book loan, internet services, provision of materials for research, and access to required knowledge (Umenwa, Agbo and Onyekweodiri, 2016). Not only should these services be provided to "normal" people, but also to those with visual challenges.

Essential services for students with visual impairment include large-print books, talking books, audio magazines and newspapers, large-print magazines and newspapers, computer files of text, braille books, audiobooks, and videos (Rayini, 2017, Ayiah, 2017). Abu-Doushi, Barry- Mohammed, Ali and Al-Betar (2013) included standard books, journals, and audio-visual collections as other essential services to be provided for students with visual impairment. In addition, university libraries should also provide visual impairment students with an easy way get familiar with the books, bibliographies, and other materials available in the library through printed catalogues and booklists which are either tape recorded or transcribed into Braille. Katz (2013) and Dewan (2013) also suggested competent readers' advisory services, which ensure that a librarian who is knowledgeable and qualified will be available to explain, discuss, and recommend books to the students. Zaid and Zaid (2017) added that university libraries should also provide these students with additional services such as extended loan periods, waive late return fines, extended reserve periods, library cards for proxies, books by mail, reference services by email, home delivery service, remote access to the Online Public Access Catalogue (OPAC), remote electronic access to library resources, volunteer readers, volunteer technology assistants, and radio reading services.

There are different types of technological equipment that libraries can provide to users who are visually impaired. Such equipment enable the students to have access to information in print using braille printers, braille embosser, tape duplicators, Kurzweil reader (a text-to speech reading machine with synthesised speech output), closed-circuit televisions for magnifying regular text, PCs with CD ROMS, Power Macs with CD ROMS, large print typewriters, special track tape recorders, and computers that have adaptable equipment such as voice eyes (Ayiah, 2017; IFLA, 2015).

Despite the catalogue of services and equipment available in libraries, students usually have an expectation of what they need from the library. A study by Heather (2014) conducted at the Manchester Institute of Technology shows that students would like large library spaces that will support a variety of activities such as group study rooms, spaces to learn and create, places to reflect and take a break, a café with coffee and snacks, and places to enjoy art exhibitions and collections, with an environment that is inviting, comfortable, and easy to navigate. The library space should also support technological equipment by integrating multi-media services and support media creation tools such as design software, video and recording capabilities, and printers. Beard and Dale, cited in McNamara (2011), further observed that in order to promote learning in libraries and accommodate the diverse needs of learners, library spaces need to be flexible.

Certain factors affect the delivery of expected services to visual impairment students. One such factor is that a lot of institutions do not see any reason to invest so much money on them because they are considered a minority group with high cost essential

resources required to meet their needs (Adetoro, 2011). Okewale and Adetimirin (2011) noted that some technological factors that hinder students from using the library include insufficient availability of information technology (IT) resources in the library, poor knowledge of how to use available IT resources, constant power outages, and cost of purchasing information and communication technology (ICT) resources in the library. The authors observed that inadequate orientation of students on the use of library systems and overpopulation of students at the OPAC section are some of the other factors that can create a barrier for visually impaired students to have easy access to library materials. Foley and Ferri (2012) also observed that a lack of accessibility to the Internet and other digital resources is a major barrier to accessing information by students who are dependent on adaptive technology.

The attitude of library staff can also affect the type of library service delivered to students with visual disability. Peter, Otike, and Rotich (2015) noted that one of the factors that affect the provision of good quality library service is staff attitude. Some library staff drive their users out of the library through poor human relations and excessive adherence to policies. Research has established that the hostile disposition of the staff is a strong factor that inhibits effective provision of service (Iwhiwhu, 2012). Eskay and Chima (2013) attributed the barriers to limited financial and human resources, lack of reading materials in the right format, lack of adequately trained staff, architectural barriers, and the feeling that people with visual impairment or disabilities are abnormal and have no need for information. Sequel to the above, the researchers' interest was roused to investigate the services that are provided to students with visual impairment in Nigerian universities, the factors that could affect delivering best service, and the expectations of the students from the libraries.

Methodology

This study employed a survey design with the triangulation method, which involves both qualitative and quantitative approaches. Ary, Jacobs, Sorensen, and Razavieh (2010) defined survey research as a research that describes the way things are. The six federal universities included in the study had a total of 341 visually impaired students among them. Due to the small number, the researchers decided to take a census, rather than a sample from the 341. Twenty-four (24) librarians were purposively sampled from the six federal universities. Thus, the study respondents totaled 365.

Each university selected represents a geopolitical zone. A geopolitical zone is a combination of geographical and political factors that contribute to the distribution of both power and resources in a nation. In Nigeria, there are six geopolitical zones (Sampson, 2014). The choice of one university from each of the geopolitical zones was purposively done by considering universities that had the highest number of visually impaired students as at the 2015/2016 academic session. Another factor used was availability of an Association of Students with Visual Impairment (National Association of Students with Disabilities, 2015).

Based on the geopolitical zones, the selected universities and the number of students with visual impairment in each university are as follows: South East - University of Nigeria, Nsukka (UNN, 76); South-West — University of Ibadan (UI, 80); South-South — University of Calabar (UNICAL, 6); North-West -- Bayero University Kano (BUK, 61); North-East –Tafawa Balewa University Bauchi (ATBU, 57); and North-Central — University of Jos (UNIJOS, 61) (Student Affairs Department of each of the Universities (2015) and National Association of Students with Disabilities). A questionnaire and interviews were used to generate data. Three hundred and forty-one copies of the questionnaire specifically meant for the students were mailed to three research assistants in each of the universities to administer to the students with visual impairment. The questionnaire had four clusters, which addressed the four research objectives of this study. The research assistants read the questionnaire items and ticked the answers based on the choices made by the students. Out of the 341 copies of the questionnaire administered, 293 (86%) were correctly filled and returned. The researchers were informed that some of the students were indisposed to complete the questionnaire due to examination pressures, illness and absence from the university campus. Data generated from the questionnaire were analysed using frequency counts and percentages.

An interview guide prepared by the researchers was used to elicit information from 24 librarians working in public services division of the university libraries. Four librarians were interviewed in each of the universities, and they include the public service librarian, circulation librarian, serials librarian, and reference librarian. These librarians were chosen because they work in direct contact with library users, including students with visual impairment. Interviews instead of questionnaires were adopted for the librarians since they are few and scattered in various universities. The interview questions addressed objectives one, two and four (library services provided to students with visual impairment, technological devices available to help the students access information from libraries and factors that affect library services to the students). The librarians were contacted through phone calls during which convenient days were arranged for the researchers to conduct the interview. Twenty-four interview sessions were conducted with the librarians between February 15 and April 28, 2015. They were interviewed in their offices during office hours. Each interview took about 30-40 minutes, and each interview session was taped and later transcribed verbatim, coded, and relevant themes were identified. Below is presented the demographic information of the students (Table 1) and the teachers (Table 2), as well as other pertinent information regarding data collection.

Table 1: Demographic information of the students (students with visual impairment)

Univer-sity	No of Std	Gender		Degree of VI		Age				Mode of study		Faculty				Questionnaire		
		M	F	PS	B	20-24	25-29	30-34	35-39	FT	PT	Arts	Soc Sc.	Edu	Law	QD	QR	%
UNIJOS	61	43	18	21	40	23	29	7	2 .	61	-	7	39	11	4	61	53	87
UNN	76	57	19	34	42	36	25	11	4	76	-	17	29	25	5	76	66	87
UI	80	65	15	30	50	30	42	6	2	80	-	22	43	10	5	80	68	85
ATBU	57	55	2	13	44	19	26	9	3	57	-	10	36	10	1	57	49	86
BUK	61	59	2	14	47	21	30	3	7	61	-	19	33	7	2	61	51	84
UNICAL	6	5	1	0	6	3	2	1	0	6	-	1	3	2	-	6	6	86
TOTAL	341	284	57	112	229	132	154	37	18	341	0	76	183	65	17	341	293	86

Note: Std= student, LV = Low vision, B=Blind, FT= Full Time, PT= Part Time, Soc. Sc. = Social -Science, Edu. = Education, QD= Questionnaires Distributed, QR= Questionnaires Retrieved

Table 2: Demographic information of the librarians

University	Librarians					Highest Qualification		
	No	Prin. Lib	Snr.Lib.	Lib. 1	Lib. 11 .	PhD.	MLS	BLS
UNIJOS	4	1	1	1	1	1	2	1
UI	4	1	1	1	1	2	1	1
ATBU	4	1	1	1	1	1	2	1
BUK	4	1	1	1	1	1	2	1
UNI. CAL	4	1	1	1	1	1	1	2

The Findings of the Study

Table 3: Library services provided for students with visual impairment in selected Nigerian universities

Library services	UNIJOS (53)		UNN (66)		UI (68)		ATBU (49)		BUK (51)		UNICAL (6)	
	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%
Online literature search	48	91	54	82	61	90	42	86	32	63	5	83
Online reference	49	92	51	77	37	54	38	78	47	92	4	67
Lending service	48	91	62	94	49	72	31	63	42	82	3	50
Current content	0	0	2	3	1	1	0	0	0	0	0	0
Content page service	0	0	7	11	0	0	0	0	0	0	0	0
Scribe services	49	92	65	98	0	0	0	0	0	0	0	0
Waiver for late return fines	51	96	0	0	0	0	6	12	37	73	0	0
Information literacy education	42	79	47	71	51	75	41	84	49	96	6	100
Extended loan periods	0	0	0	0	0	0	49	100	0	0	4	67
Home delivery	0	0	0	0	0	0	0	0	0	0	0	0
Reader service	45	85	65	98	68	100	49	100	28	55	4	67
Inter-library loan	2	4	0	0	0	0	0	0	0	0	0	0
Face-to-face reference service	53	100	58	88	68	100	49	100	46	90	6	100
Library card proxies	37	69	42	64	0	0	32	65	31	61	6	100
Electronic access to library resources	53	100	53	80	68	100	38	78	43	84	5	83
Braille book	48	91	0	0	0	0	0	0	0	0	0	0
Large print books	0	0	0	0	0	0	0	0	0	0	0	0
Audio books	0	0	0	0	0	0	0	0	0	0	0	0
Large print newspapers	0	0	0	0	0	0	0	0	0	0	0	0
Large print magazines	0	0	0	0	0	0	0	0	0	0	0	0

Table 3 shows that some of the provided services are common to all the universities while some services are peculiar to some universities. Among the library services that exist in all the universities are online literature searches, online reference services, lending, information literacy education, reader services, face-to-face reference and electronic access to library resources. Conversely, content page service, current contents, home delivery and inter-library loan services are not provided for students with visual impairment in any of the universities.

So, it means that specialised information sources such asprovision of large print books, large print newspapers, audiobooks, and magazines cannot be accessed. Braille books exist only in UNIJOS (91%). Scribe service exists in UNIJOS (92%) and UNN (98%). Waiver for late returns exists in UNIJOS (96%) and BUK (73%) while extended loan periods exist in ATBU (100%) and UNICAL (67%). UNN and UI do not extend loan period for students with visual impairment neither do they waive late return fines. Library card proxy exists in every other library except UI. Interviews from the librarians to some extent confirmed the information collected from the questionnaires. Interviews with librarians from UNN and UI show that current content and content page services are available to students and staff who apply for them in writing and are willing to pay for the administrative cost of such services. Librarians from UNICAL also mentioned that extended loan periods are available on request.

One librarian from ATBU said, "*If a student with visual impairment requests an extended loan period, we extend the loan period but if they don't, we assume that the time given to them was enough*."

One other librarian from UNN asked, "*Which one is home delivery service? We do not provide home delivery service. Any library service the students require must be in this library not at their homes*."

Table 4: Technological devices to help students with visual impairment to access information in Nigerian academic libraries

Technological devices to access information from the library	UNIJOS (53)		UNN (66)		UI (68)		ATBU (49)		BUK (51)		UNICAL (6)	
	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%
Braille embosser	51	96	0	0	0	0	0	0	0	0	0	0
Tape duplicator	0	0	0	0	0	0	0	0	0	0	0	0
Screen reader	0	0	0	0	0	0	0	0	0	0	0	0
Closed circuit television	0	0	0	0	0	0	0	0	0	0	0	0
Large print typewriters	0	0	0	0	0	0	0	0	0	0	0	0
Accessible computer	0	0	0	0	0	0	0	0	0	0	0	0
Books in CD	0	0	0	0	0	0	0	0	0	0	0	0
Optical scanner	0	0	0	0	0	0	0	0	0	0	0	0

Table 4 shows that the only technological device that is available to help students' access information from UNIJOS is a Braille Embosser. None of the other universities has any technological equipment to help students with visual impairment to access information. Interviews with librarians from all the universities show that students with visual impairment provide themselves with magnifying glasses, computers, and reading software such as Jaws. Interviews with librarians further indicated that some books procured in libraries have CD copies which are made available to users on demand. However, at UNN, a librarian raised this concern, "*We have books in CDs, but we cannot make them available to students for fear that they might misplace them [the CDs]*."

Data on Table 5 indicate that the students expected libraries to have a clean environment, space for individual study, comfortable seating arrangements, e-books, screen readers, e-journals, books in CD format, restrooms, walkways free from bumps, knowledgeable staff and a separate section for students with visual impairment.

Table 5: Visually impaired students' expectations from university libraries

	UNIJOS (53)		UNN (66)		UI (68)		ATBU (49)		BUK (51)		UNICAL (6)	
The students expect the library to have:	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%
Clean environment	53	100	62	94	62	91	44	90	49	96	6	100
Space for group study	33	62	51	77	43	65	41	84	42	82	1	17
Space for individual study	53	100	60	91	66	97	36	73	5	100	5	83
Relaxation space	46	87	32	48	64	94	33	67	36	71	4	66
Comfortable seating arrangement Technology	51	96	62	94	61	90	42	86	47	92	6	100
compliant												
environment	52	98	64	97	65	96	49	100	50	98	6	100
Rest room	51	96	56	85	64	94	47	94	51	100	5	83
Walk ways free from bumps	53	100	66	100	68	100	46	94	51	100	6	100
Good lighting	31	58	52	79	45	66	36	73	46	90	2	33
Friendly staff	52	98	58	88	62	91	42	86	'48	94	6	100
Knowledgeable staff	53	100	46	70	62	91	49	100	46	90	6	100
Separate section in the library for students with visual impairment	34	64	60	91	55	81	46	94	41	80	4	66
Good signage	36	68	15	23	28	41	28	57	7	14	2	33
Volunteer readers	14	26	11	17	16	24	18	37	23	45	2	33
Separate section in the library for special convenient access to reading materials	40	75	37	56	40	59	40	82	41	80	4	66
Enter the library with their bags to enable them carry their reading aids	49	92	51	77	37	54	38	78	47	92	4	67
Media creation tools like:												
Design software	26	49	13	20	8	12	4	8	6	12	1	17
Recorders	44	83	18	27	62	91	49	100	24	47	3	50
Printers	2 1	40	13	20	9	13	17	35	18	35	1	17
E-books	43	81	64	97	43	65	46	94	48	94	5	83
Screen readers	41	77	56	85	52	76	48	98	48	94	5	83
Large monitors	32	60	49	74	64	94	42	86	45	88	5	83
E- journals	37	70	52	79	64	94	46	94	49	96	5	83
Books in CD	51	96	48	73	59	87	42	86	47	92	5	83
Braille books	9	17	21	32	21	31	18	37	9	18	2	33
Computers	38	72	24	36	64	94	42	86	43	84	4	66
Scanners	17	32	43	65	13	19	27	55	18	35	2	33

The students further expected that they should be permitted to enter the library with their bags. In all the libraries, the students did not expect the library to have media creation tools such as printers, design software, braille books and volunteer readers. Specifically, students of UNICAL did not expect the library to have good lighting, as well as space for group study. The students of UNN did not expect the library to have space for relaxation and computers. Recorders were not expected in the library by students of UNN and BUK while students of UNIJOS and ATBU expected good signage. Only students of UNN and ATBU expected scanners.

Table 6: Factors affecting the delivery of library services to students with visual impairment

Factors affecting Library services delivery	UNIJOS(53) Yes	%	UNN (66) Yes	%	UI (68) Yes	%	ATBU(49) Yes	%	BUK(51) Yes	%	UNI CAL (6) Yes	%
Negative attitude of staff	30	57	6	9	35	51	29	59	37	73	2	33
Lack of staff knowledgeable in disability issues	39	74	11	17	38	56	32	65	43	84	3	50
Lack of electric outlets	38	72	47	71	46	68	28	57	39	76	4	66
Inaccessible university websites	40	75	44	66	53	78	37	76	40	78	3	50
Power outage	51	96	56	85	48	71	40	82	39	76	5	83
Too few IT equipment/resources	47	89	60	91	37	54	45	92	46	90	6	100
Fluctuating internet connectivity lack of materials	50	94	47	71	49	72	42	86	50	98	5	83
in required format	47	89	52	79	43	63	47	96	47	92	5	83
Inability to operate available library IT equipment	40	75	37	56	40	59	40	82	41	80	4	66
High cost of the equipment	27	51	35	53	38	59	23	47	21	41	1	17
No separate library section for students with disabilities	43	81	1	01	44	65	38	78	43	84	4	66
Irregular time of accessing the library	50	94	46	70	38	56	42	86	40	78	4	66

Table 6 shows that lack of staff knowledgeable in disability issues, lack of electricity outlets, inaccessible university websites, power outages, too few IT resources, fluctuating internet connectivity, lack of materials in required format, and inability of students with visual impairment to operate library IT equipment and irregular time of accessing the library are some of the factors affecting library services to students. The absence of a separate library section for visually impaired students is a problem in all the universities except UNN. Negative attitudes of staff are also part of the factors affecting library services to these students in the six universities except at UNN. Students from UNICAL (17%), BUK (41%) and ATBU (47%) did not consider the high cost of equipment as a factor that affected library services. Their colleagues from UNIJOS (51%), UNN (53%) and UI (59%) agreed that the high cost of equipment was a factor that affects providing them with the best library services.

Interviews with the public services, circulation, reference and serials librarians were very revealing. At the University of Nigeria, Nsukka (UNN), responses to interview questions show that lack of materials in required format, lack of budget for the special needs section, and nonchalant attitude of the university administration towards the plight of students with visual impairment were some of the factors affecting provision of library services to students. The conclusion from the UI, UNIJOS and UNICAL responses shows that lack of a separate library section for students with visual impairment, inability of the students to operate available library IT equipment and high cost of equipment needed for delivering library services to students were some of the factors that affected library services for the students with visual impairment. At ATBU and BUK, responses show that the factors affecting library services include inaccessible library catalogues, insufficient staff to cope with the demands of the students, and the inability of the students to operate available library IT equipment. In none of the universities did the librarians agree that poor attitude of staff affected library services to the students. Instead, their responses dwelt on lack of materials in an accessible format and the high cost of equipment needed for service delivery to students with visual impairment. One librarian from UNN raised this concern: "*We do not have enough library staff that can work with the students from 8:00 am to 10:00 pm when the library usually closes, so we close by 4:00 pm.*"

Another librarian from BUK said, "*A major factor that affects our delivery of appropriate library service is lack of assistive technology devices. It is difficult for us to provide appropriate library services for these visually challenged students as we do not have scanners, Braille embossers, screen readers and other technological devices they require.*"

Discussion

Many services that are common to the university libraries were used in this study. Among them were online literature search, online reference, information literacy education, lending, reader services, face-to-face reference, and electronic access to library services. It should be noted that these are general services that can be found in any library. There are also other important services that Rayini (2017) opined should be provided for students with visual impairment in an appropriate mode to facilitate their access to information. The results show no evidence of uniformity in essential services for students with visual impairment. Each university offers services that are convenient to them. Special services such as a waiver for late return fines exists in UNIJOS and BUK, while extended loan periods exist only in ATBU and UNICAL. Library card by proxy exists in every other university except UI. Unfortunately, UNN with the highest number of student respondents did not offer any special service such as information repackaging, extended loan periods and home delivery services.

The findings also show total negligence of the guideline provided by IFLA (2015) and Hill (2013) on essential library services for users with visual impairment in all the universities that were used for this study. These services include the provision of large print books, talking books, audio magazines and newspapers, large print magazines, large print newspapers, braille books, and audio books. The availability of e-books, journals and newspapers made possible by campus-wide networks may explain the reason for the negligence. Other services such as home delivery service, current content and content

page services did not exist in almost all the university libraries. In UNN, there was a variation in the responses of the students and the library staff on the availability of extended loan period, current content and content page services. While the staff agreed that these services were available on request, the students, on the other hand, who are the recipients of the services, were not aware that such services existed or were available to them. Furthermore, asking students to pay for the use of scanners may stop students from using the facilities considering that many of them may not be able to afford it.

Technological equipment is very vital in delivering information to visually impaired students. Unfortunately, the only technological equipment that students had access to is a braille embosser at UNIJOS. Clearly, university libraries in the study are not going beyond expectations to provide what is an essential technology. Ayiah (2017) and Majinge and Stilwell (2013) maintain that libraries should provide technological equipment such as braille printers, tape duplicators, Kurzweil reader, closed-circuit televisions for magnifying regular text, PCs with CD ROMS, power macs with CD ROMS, large print typewriters, special track tape recorders and computers that have adaptable equipment such as Voice eye to enable the students to have access to information in the library.

From the interviews conducted, the librarians attributed the non-existence of these important equipment to high cost of equipment and lack of budgets for the provision of the services needed by students with disabilities. The researchers were of the view that cost of equipment was used as a camouflage for marginalising the students. This is because other library equipment, which are also costly, are provided for sighted students. This is in line with the assertion by Adetoro (2011) and Zaid and Zaid (2017) who pointed out that one of the factors that could affect the delivery of library services to students with visual impairment is the fact that a lot of institutions consider them as a minority group.

Students with visual impairment have some expectations from the university libraries. Responses from the students in all the universities in the study show that they expect the university libraries to have a clean environment, scanners, space for individual study, e-books, screen readers, large monitors, books in CD, walk-ways free from bumps, staff knowledgeable in the use of computers and other assistive technology, and a separate section in the library. This finding is a bit similar to that of Heather (2014) who found that students need libraries that are well lit, have reading tables and chairs, as well as places for art exhibitions and collections. The results also show that there are few similarities in the expectations of the sighted and the students with visual impairment. However, students with visual impairment have more expectations. They expect equipment and facilities that will enable them to have equal access to information like their sighted counterparts.

It is not surprising that students in UNN and BUK no longer expected the provision of recorders which used to be a specialised service sought after in libraries. Likewise, books in braille format and volunteer readers were not expected by students of any university. This may not be unconnected with the abundance of e-resources in libraries, which have made access to information much easier and richer. It is also probable that the availability of screen reader software, which the students provided for themselves, has made the services of volunteer readers obsolete. The students in all the universities expected the libraries to possess computers for clients' use except UNN. This may be as a result of the university policy that each new student must possess a laptop. Students of UNICAL did not expect the library to have good lighting since all six students from the university were totally blind.

The students also expected to have a separate section in the library. This will enable them to study without earphones since they complain that earphones destroy eardrums. It will also lessen much of the noise in libraries generated by screen readers. They expected that the separate section of the library would have a technology-compliant environment with the necessary assistive technologies such as braille embosser, tape duplicators, text-to-speech reading machines with synthesized speech output, closed-circuit televisions for magnifying regulartext, large print typewriters, and computers. This finding, to a large extent, is consistent with the findings of Beard and Dale cited in McNamara (2011) who observed that to promote learning in libraries and accommodate the diverse needs of learners,library space needs to be flexible.

The results show that technological factors and personnel and policy issues affected the delivery of library services to visually impaired students in Nigerian universities. Among the technological issues raised by the students were lack of electrical outlets to plug in assistive technologies, inaccessible university websites, power outage, limited ICT equipment, fluctuating Internet connectivity, and a lack of materials in accessible format. It should be noted that a lack of an electrical outlet to plug learning equipment is a major challenge in many academic libraries, as some of the libraries were built long before the Internet revolution. These challenges agree with the technological challenges which Okewale and Adetimirin (2011) observed as hindering students with visual impairment from accessing the library resources.

It is also important to note that low Internet bandwidth in Nigeria has resulted in poor internet connectivity in many Nigerian universities, and this has affected learning for all students. It is not a surprise that the students mentioned inaccessible university websites as one of the technological factors hindering their access to library services, as almost all university websites in Nigeria were constructed without considering accessibility principles or the interest of students with disabilities (Zaid and Zaid, 2017). Adetoro (2011) noted that students with disabilities were a marginalized group within the university community, and their interests were most often not considered in making policies.

The responses of the students imply that library staff who have little or no knowledge of what visual impairment entails may not appreciate the challenges the students go through and may treat them like sighted students without considering their peculiar needs. This is consistent with the findings of Eskay and Chima (2015) who identified a lack of appropriate staff training and negative attitudes of staff as part of the issues encountered by students with visual impairment in accessing library services. Iwhiwhu (2012) also noted that staff that went through traditional and non-digital training hid their weaknesses through hostility and unfriendly behaviour. For UNN, where there is an exception in the attitudes of staff, it could be that staff in separate sections of the library for students with disabilities had received some training on disability issues. Furthermore, some of the staff who worked in the special section of the library in UNN were also visually impaired, and these staff were more likely to understand the unique needs of the students.

Contrary to students' view that the attitudes of staff and lack of specialised skills impeded students' use of the library, the results show that the librarians attributed students' inability to use the library to non-availability of required materials in the library and lack of understanding by these students that librarians have no capacity to change library rules to suit them. This view is consistent with that of Peter, Otike and Rotich (2015) who opined that one of the hardest barriers to break in library use was the human attitudes and bureaucratic inertia.

Policy issues such as not permitting the students to take bags into the library were affirmed by students from all the universities used in the study.This is a serious issue in Nigerian university libraries, and the policy could be as a result of the many incidents of suicide bombing and terrorism in Nigeria over the past ten years. This is likely to deter many students with visual impairment from using the library, as they may find it difficult to carry all the materials they may need into the library with one hand and then use the other hand to hold their canes. They may also fear that if they drop their bags outside the library, some of their valuable materials could get lost. Another policy issue that affects delivery of library service delivery to visually impaired students is the irregular time of accessing the library. An interview with one of the librarians shows that on weekends, the library operates for nine hours on Saturdays (9:00am -- 6:00pm) and four hours on Sundays (2:00pm — 6:00 pm) and does not open at all on public holidays. They equally noted that when there is a power outage, the library will be shut down before closing time. Hence, students cannot access the library at any time they wish to. The implication is that the library services may not be available to students every time they have the need.

Conclusion

This study on library services delivery to students with visual impairment in selected Nigerian universities revealed that small services such as online reference services, face-to-face services, online literature search, lending services, and information literacy education are available to the

students. The findings show that the services provided did not meet the expectations of students with visual impairment in Nigerian universities, as there were some essential services which were not provided to the students such as home delivery service, book loan by mail, inter-library loan, and large print books.

The study also showed that certain factors such as personnel, technological and policy issues affected the delivery of library services to students with visual impairment. Specifically, the service delivery was affected by the unavailability of materials in accessible formats and lack of electrical outlets to plug in assistive technologies, amongst others. Despite the challenges encountered by students with visual impairment in accessing library resources, the library is still very crucial to their educational attainment. University libraries, therefore, should make every effort necessary to make information available to students with visual impairment. In the light of these, the researchers made some recommendations.

Recommendations

Based on the findings of the study, the researchers recommend the following:

1. The National Universities Commission should develop a policy statement or guideline, which will stipulate the services that must be provided for students with visual impairment in Nigerian universities. This will enable university libraries to integrate more essential services for students with visual impairment such as information repackaging, extended loan periods and home delivery services.
2. Each university should make special budgetary allocation for the provision of services to students with visual impairment. This will ensure that the libraries procure state-of- the-art assistive technology devices so that students with visual impairment can access information in a mode that is appropriate to them.
3. There is a need to conduct user satisfaction studies in academic libraries to ensure that the services delivered meet the needs of clients. They should also devise means of marketing their services to ensure that the university community is aware of the services that are available.
4. University librarians should form advocacy groups to pressurise the government to make it compulsory that every published book in Nigeria should have a CD copy. This is to ensure that books published locally are accessible to users with visual impairment.
5. A reading section should be created for visually impaired students in libraries. This will enable them to feel free to use their screen readers in the library without feeling guilty that they may be disturbing other users.

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Afr. J. Lib. Arch. & Inf. Sc. Vol. 29, No. 1 (April 2019) 45-62

Citizens' Acceptance of E-Government Service: Examining E-Tax Filing and Payment System (ETFPS) in Tanzania

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Abstract

Electronic tax filing and payments system (ETFPS) is a kind of foundational information technology application in the initial stage of E-government in developing countries. By introducing variables like system quality and perceived security, as well as decomposing important variables like social influence and perceived behaviour control, this study integrates Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB) to explain the factors motivating the acceptance of ETFPS in Tanzania. Empirical outcomes demonstrate that system quality significantly influences perceived usefulness and perceived ease of use of ETFPS. Perceived usefulness and perceived ease of use significantly influence the users' attitude towards accepting ETFPS, which further affects their behavioural intention. Moreover, perceived security, mass media influence, and external facilitating condition have a significant impact on the users' behavioural intention. The user's intention determines their actual use of ETFPS. This study further provides some managerial implications for policymakers to design and promote further acceptance and use of ETFPS.

Keywords: E-Government Acceptance, E-Tax Filing and Payments System (ETFPS), Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Tanzania

Introduction

Electronic government (E-government) implies the use of information communication technology, such as wide area network, mobile computing, and the Internet to transform government functionalities and access to services by citizens (Nengomasha et al., 2010). E-government is popular in developed countries and is gradually finding its way into some emerging economies. However, the use of E-government in some developing countries, such as in the African continent, is still at initial stages (Nengomasha et al., 2010). For example, in Tanzania, tax filing and payment are implemented in two ways: physical tax filing and payment and electronic tax filing and payment. The physical tax filing and payment method is time-consuming, exhausting, and at risk for errors. It involves much paperwork and has limited transparency. By contrast, the electronic tax filing and payment method has made it possible for Tanzanian government through its tax agency to advance its operations in a digitised manner, which has ensured the provision of high-quality services at lower cost. Besides, electronic tax filing and payments can assist not only in monitoring business and individuals transactions, but are also capable of tracking and recording financial transactions of

businesses and individuals for tax collection purposes to combat noncompliance (Kira, 2016). Despite the benefits of electronic tax filing and payments, some citizens show unwillingness to accept this new way, and are still using traditional methods. The percentages of tax income returns being filed and paid by individuals in Tanzania gradually increased from 68% in 2013 to 73% in 2017 (Tax Agency Department, 2017). Consequently, the goal of government to reach 90% of all citizens and business tax income return being filed and paid electronic is not yet reached (Tax Agency Department, 2017). Moreover, the Tanzania revenue authority board reported that the filing of income tax was conducted more manually than through the online method (Tanzania Revenue Report, 2017). A study on the adoption of e-tax system in Tanzania showed that people were more satisfied with manual methods when dealing with the government agency (Sichone et al, 2018). Additionally, that study also found that the users use e-tax system to check fine information, but not to make electronic filing. As a result, even with the introduction of electronic tax filing and payments system (ETFPS) in Tanzania, the acceptance and use of e-tax system is moving very slowly. The challenge of lower utilization remains and has overwhelmed government (Sichone et al, 2018). To a certain extent, the success of e-tax system implementation depends largely on identifying what factors influence citizens' acceptance and use of this system, and addressing them.

Problem Statement

Many studies have been conducted on e-government services adoption and have made enormous contribution to increasing the understanding of e-government services use (Bhuasiri et al., 2016; Chen et al., 2015; Dwivedi et al., 2017). In those studies, a number of theories such as Diffusion of Innovation Theory (DIT) (Rogers, 1962), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Technology Acceptance Model (TAM) (Davis, 1989) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) have been used to explain the acceptance of e-government systems. Further, the scholars have integrated these theories to deepen understanding of e-government acceptance and use (Azmi and Bee, 2010; Sichone et al, 2018; Stafford and Turan, 2011). Among these theories, TAM generally is viewed as the main theory and many scholars integrate TAM with other related theories. For instance, some studies integrate TAM with TPB, UTAUT, IS Success model, and so on (Nasri and Charfeddine, 2012; Sichone et al, 2018; Veeramootoo et al, 2018).

In general, e-tax systems are usually the first e-government services to be adopted in many countries and regions. Most of the studies investigate e-tax systems in developed countries like U.S.A. (Carter et al., 2011), emerging economies like Taiwan, China (Bhuasiri et al., 2016), Hongkong, China (Venkatesh, Thong, Chan, Hu, Brown, 2011), and developing countries like Malaysia (Azmi and Bee, 2010). Although all of these investigations have given precious insights into e-tax system acceptance, gaps still exist as most of them have overlooked some aspects of e-tax system acceptance. First, some additional variables are required to strengthen the integration of TAM and TPB that is viewed as the primary theoretic basis to explore e-tax systems by many studies. Second, although TAM and TPB are important theories in acceptance behaviour understanding (Susanto and Goodwin, 2013), there is still need to decompose these theories' variables to increase the understanding of acceptance behaviour of IS use. Based on the study by Nasri and Charfeddine (2012), TPB originally developed to explain users' acceptance behaviour of IS fails to predict acceptance behaviour indeed. Therefore, decomposition of the theories' variables is very important rather than depending on their traditional variables. Third, some developing counties in Africa and Latin America have been overlooked by researchers (Bhuasiri et al, 2016; Carter et al. 2011). Previous studies primarily focused on the contexts of emerging economies or developing countries in East Asia or East-south Asia (Azmi and Bee, 2010; Bhuasiri et al., 2016; Venkatesh et al, 2011), ignoring other developing countries such as those in Africa and Latin America. There is a lot of heterogeneity among different developing countries because of geographic and cultural differences. More important, with the rapid development of ICT devices and systems, previous studies focus on IS use in the latter years of the 1990s to the beginning of 2000 or even recently (Nasri and Charfeddine, 2012; Stafford and Turan, 2011; Veeramootoo et al., 2018), whose

conclusions may not be applied to developing countries like Tanzania.

The primary objective of this study was to explain the factors that influence ETFPS acceptance in Tanzania. First, this study put forward an integrated model based on TAM and TPB as a theoretic framework for investigating citizens' acceptance and use of ETFPS. Such understanding is required to determine whether the concerns raised about poor acceptance and use of ETFPS are correct; and if so, to understand why these occur and how to remedy them. Second, there is still need to extend and decompose some variables of these theories (Stafford and Turan, 2011; Veeramootoo et al., 2018). Third, there is a scarcity of quantitative research into the acceptance of IS in African environments (Chaouali et al., 2016; Veeramootoo et al., 2018), specifically in Tanzania (Sichone et al, 2018).

Theoretical Background and Research Model

Several prior studies applied TAM and TPB as a framework to explain and predict a diversity of human behaviours in e-government acceptance perspective (Shyu and Huang, 2011; Sichone et al, 2018; Stafford and Turan, 2011). TAM and TPB can be used in many e-government perspectives and produce higher explanatory power relative to other acceptance models (Nasri and Charfeddine, 2012; Sichone et al, 2018; Susanto and Goodwin, 2013). For instance, some studies investigate various e-government acceptance factors by applying TAM and TPB and find out the acceptance is mainly determined by psychosocial factors (Okyere-Kwakye et al, 2016; Sichone et al, 2018). Although TAM and TPB receive a lot of support, numerous studies recommend the extension of these theories to explore e-government acceptance (Nasri and Charfeddine, 2012; Okyere-Kwakye et al, 2016; Sichone et al, 2018). For instance, studies conducted by Sichone et al, (2018) and Susanto and Goodwin (2013) support adding other relevant constructs to investigate particular information systems. In this study, system quality and perceived security were added to investigate the acceptance and use of ETFPS, and social influence and perceived behavioural control are decomposed to deepen understanding on the acceptance and use of ETFPS.

The Technology Acceptance Model (TAM)

In order to enlarge understanding of TRA, Davis (1989) developed TAM which was later found to be better in clarifying individual acceptance of ICT. According to TAM, the individual would accept a specific information system if he/she believes certain things about this system. These beliefs are "perceived ease of use (PEOU) and perceived usefulness (PU)", which are used to explain the individual's acceptance of information system (Davis, 1989; Hamutumwa et al, 2017; Okyere-Kwakye et al, 2016). As a result, Stafford and Turan (2011) recommend that TAM is an essential model to be integrated into some larger theories such as theory of planned behaviour which can take into account related human and social factors.

Theory of Planned Behaviour (TPB)

TPB is an extension of the TRA, which is applied to deal with behaviour over which the individual has incomplete volition control (Ajzen, 1991). According to TPB, the individual's actual behaviours are determined by his/her intention, which is influenced by his/her perceived behavioural control and social norms (Ajzen, 1991). A decade later, in response to changes in the IS environment, various researchers updated the TPB model by decomposing its constructs (Nasri and Charfeddine, 2012; Stafford and Turan, 2011). Decomposed constructs of TPB have been effectively implemented in understanding the individual's use of different technologies (Nasri and Charfeddine, 2012; Sichone et al, 2018; Stafford and Turan, 2011). There have been called to extend TAM and TPB to examine the acceptance of e-government system (Carter et al, 2011; Stafford and Turan, 2011).

Research Hypotheses and Model

The integrated model is composed of major constructs from both TAM and TPB together with system quality and perceived security constructs as indicated

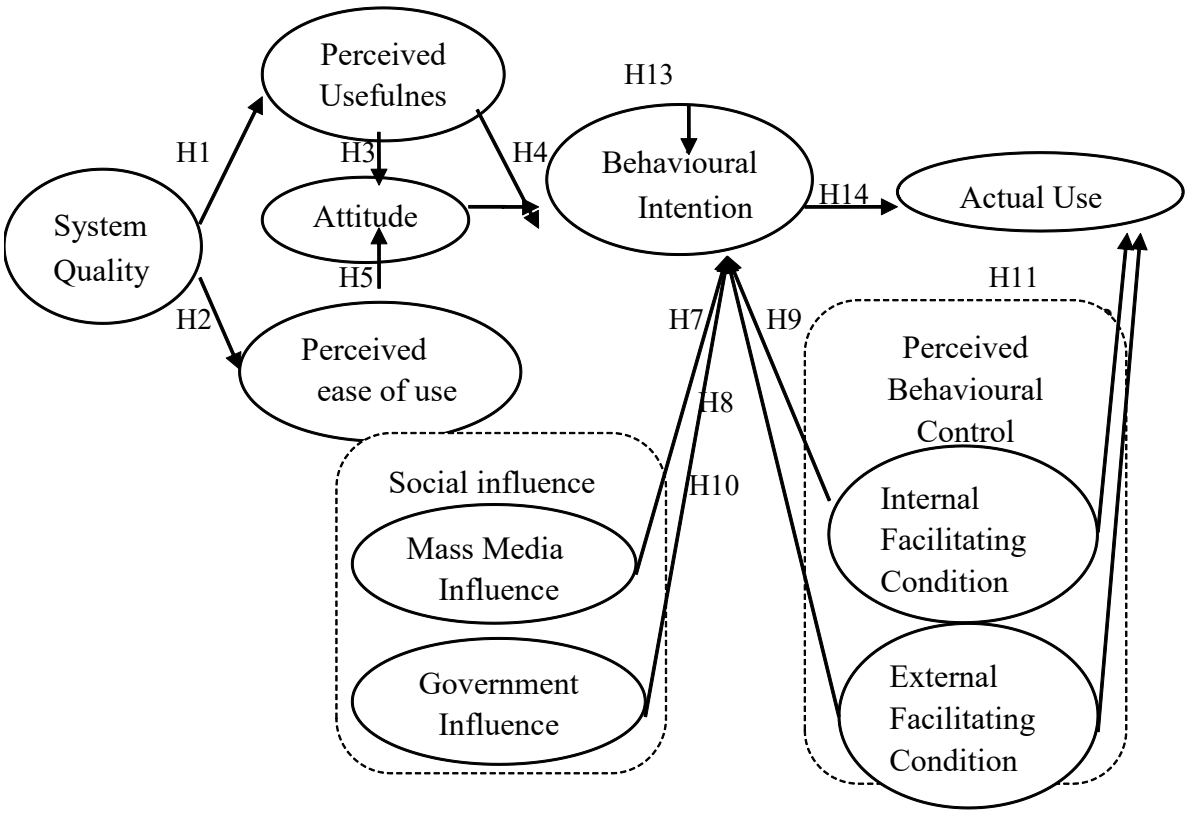

Figure 1: Research model

in Figure. 1. The 14 hypotheses that originate from the model are clarified in the following subsections.

System Quality

System quality is referred to as the extent to which the results of an innovation are fully accessible and able to be communicated to others, as well as the selection of information channels (Delone and McLean, 2003). Prior studies on IS have proven that system quality positively affects the perceived usefulness and perceived ease of use of e-government system (Chen et al, 2015). Specifically, during the initial stage of ICT infrastructure construct in developing countries, ETFPS is expected to be fully accessible, not complex, and be compatible to tax filing and payment for the users to accept this information system. Thus, the suggested hypotheses are stated as:

[H1]. *System quality has a positive significant influence on perceived usefulness on taxpayers' ETFPS use.*

[H2]. *System quality has a positive significant influence on perceived ease of use on taxpayers' ETFPS use.*

Perceived Usefulness

Perceived usefulness (PU) is referred to as the extent to which the individual believes in using a certain system to facilitate job performance and increase output (Davis, 1989). PU has been proven to be an antecedent of attitudes and behavioural intention (Nasri and Charfeddine, 2012; Stafford andTuran, 2011). For instance, studies find that perceived usefulness has a great influence on the individual's attitude and intention on e-government use (Al-Hujran et al, 2015; Okyere-Kwakye et al, 2016). Therefore, this study hypothesizes that:

[H3]. *Perceived usefulness has a positive significant influence on taxpayers' attitude to use ETFPS.*

[H4]. *Perceived usefulness has a positive significant influence on taxpayers' behavioural intention to use ETFPS.*

Perceived Ease of Use

Perceived ease of use (PEU) has been explained as the level of the individual's believing that using a certain information system cannot be very difficult (Davis, 1989). Several prior studies have proven that perceived ease of use has a direct relationship towards attitude (Al-Hujran et al, 2015; Sichone et al, 2018). Hence, the next hypothesis is stated as:

[H5]. *Perceived ease of use has a positive significant influence of taxpayer's attitude to use ETFPS.*

Attitude

Attitude is defined as a degree of the individual's positive or negative feeling towards the particular object or the intention of performing particular behaviour (Ajzen, 1991; Davis, 1989). In the domain of e-tax system, the more favourable attitude towards ETFPS (attitude toward the object), the more favorable the attitude will be towards performing online filing and payment (attitudes towards behavior), and the more likely is the behavioural intention and thus the performance of the behaviour. Also, several recent studies in e-government have supported the relationship between attitude and behavioral intention (Dwivedi et al, 2017; Okyere-Kwakye et al, 2016; Susanto and Goodwin, 2013). The suggested hypothesis is:

[H6]. *Attitude has a positive significant influence on taxpayers' intention to use ETFPS.*

Social Influence

According to TPB, subjective norms refer to the perceived social forces to perform or not to perform a particular behaviour (Ajzen, 1991). Hung (2013) viewed subjective norms as two forms of influence: interpersonal influence and external influence. In the context of developing countries like Tanzania, the investigation of social norms should pay more attention on external influences. Because e-government in those countries is in its initial stage, there are a few people who are familiar with IS, and it is difficult for people to know about IS application from closer social relationships like family members, relatives, friends, and colleagues. By contrast, external relationships may provide them more opportunities to learn about ICT application. For instance, government may train them to use IS device, and mass media also introduce ICT knowledge by public mass. Therefore, this study decomposes social influence into two lower order components: mass media influence and government influence.

Mass media influence refers to local media such as radio, televisions and newspapers influences on behavioural intention towards IS use. Government influence refers to direct and indirect efforts of government sectors that motivate and promote citizen's willingness to use IS. Therefore, the proposed hypotheses are:

[H7]. *Mass media influence has a positive significant influence on taxpayers' intention to use ETFPS.*

[H8]. *Government influence has a positive significant influence on taxpayers' intention to use ETFPS.*

Perceived Behavioural Control

Based on TPB, perceived behavioural control (PBC) explains the individual's perceptions of ease or difficulty of performing the behaviour of interest, and it is assumed to reflect past experience together with possessed resource (such as money, time, skill and opportunities) (Ajzen, 1991). Stafford and Turan (2011) recommended a two-level hierarchical model in which PBC includes two components: self-efficacy and facilitating conditions. In support of Stafford and Turan (2011), Chaouali et al, (2016) decomposed PBC into self-efficacy, resources and technology facilitating condition. But Chaouali et al, (2016) found that decomposing PBC showed weak significant influence towards behavioral intention.

Because of the above findings, this study decomposed PBC into two components: internal facilitating condition and external facilitating condition. Internal facilitating condition refers to ability and knowledge of IS use that can enhance or prohibit intention and use of ETFPS. The more knowledge and experience of ICT, the stronger willing the individual has to use e-government.

External facilitating condition is defined as the level to which the individual believes that an organisation and technical infrastructure is available to support the use of the system. When the individual has access easily to available computer, Internet and expert assistance, he or she will prefer to use IS. From the above discussion, this study hypothesizes that:

[H9]. *Internal facilitating condition has a positive significant influence on taxpayers' intention to use ETFPS.*

[H10]. *External facilitating condition has a positive significant influence on taxpayers' intention to use ETFPS.*

[H11]. *Internal facilitating condition has a positive significant influence on taxpayers' actual use of ETFPS.*

[H12]. *External facilitating condition has a positive significant influence on taxpayers' actual use of ETFPS.*

Perceived Security

Perceived security refers to the individual's perception of the extent of protection against the threats on IS use that pressure individual acceptance of e-government (Carter et al, 2011). Perceived security can be online security which is more about the protection of the individual's transacting information and Internet security. Therefore, the decision to accept ETFPS or not is based on the belief regarding the security of transacting information and reliable Internet infrastructure. Hence, the suggested hypothesis is stated as:

[H13]. *Perceived security has a positive significant influence on taxpayer's intention to use ETFPS.*

Behavioral Intention

Behavioural intention is defined as the individual's willingness to use or not use a particular information system (Ajzen, 1991; Davis, 1989). The literature also recognises intention as an important determinant of actual behaviour in IS use (Shyu and Huang, 2011). Prior studies also find that the actual behavior is significantly affected by behavioural intention (Shyu and Huang, 2011; Wang and Shih, 2009). Therefore, the last hypothesis is proposed as follows:

[H14]. *Behavioural intention has a positive significant influence on taxpayers' actual use of ETFPS.*

Methodology

Due to the absence of sampling frame, simple random sampling method was utilized to select the sample. The tax agency helped the researchers by randomly selecting participants from its database and sending invitation letters and questionnaires by e-mail. The researchers also visited some entities and randomly distributed the invitation letter and the survey questionnaires. In this study, 447 copies of the questionnaire designed were randomly distributed. Thirty-nine questionnaires were discarded due to incompleteness. Overall 408 questionnaires were completed, making a response rate of 78%.

Data collection lasted two months (June and July) at the cities of Dar es Salaam and Morogoro. The first city is the hub of business and is the first city to introduce ETFPS. The second city is located closer to the first city; therefore, it also has a high rate of business participation. The questionnaire was initially prepared in English and then translated into Swahili because Swahili is the main language used in the country. After that, translation back into English was done to ensure the validity, and attention was paid to detect any misinterpretation due to the translation. The questionnaire was pretested with 39 taxpayers from another city (Dodoma), which was not a survey area of this study. The items that were recognised as being problematic were modified before the formal survey. Two methods were used to collect the completed copies of the questionnaire. The taxpayers who received the surveys at their business entities were instructed to complete the survey and return it to the survey collector at the same place. Those who had received the e-mail survey returned their completed copies by e-mail back to the Tax Agency, and the survey collector got them from the agency department of ETFPS. The confidentiality of survey responses was put into consideration for all taxpayers.

The questionnaire consisted of sections A and B. Section A addressed the demographic characteristics of the participants such as age, gender and education. Section B consisted of questions related to the variables of the study. A five point likert scale (1 = strongly disagree and 5 = strongly agree) was employed to obtain participants' professional views on IS use. The study standardised the items to generate the scores for the constructs. *System quality (SQ)* was designed to measure the accessibility of the system and the system fit with the taxpayers' way of working with four items adopted from Chen et al. (2015). *Perceived usefulness (PU)* was composed of perceived usefulness strength, based on the extent of users' believing in ETFPS facilitating job performance and increasing output, with four items adopted from (Davis, 1989; Nasri and Charfeddine, 2012). To measure *perceived ease of use (PEOU)*, four items from (Davis, 1989; Nasri and Charfeddine, 2012) were adopted. This scale assesses the extent to which taxpayers perceive ease of use, ease to learn and operate, ease to get access to do what they want to do, and clear and understandable interaction with ETFPS. A*ttitude (AT)* was composed of attitude strength (e.g., the feeling or emotions generated during the ETFPS use influences the intention keep on using it) with five items from (Ajzen, 1991; Dwivedi et al, 2017). *Mass media influence (MMI)* was composed of mass media influence strength with three items (e.g., whether they hear, watch and read ETFPS information, and whether advertisement influences their intention towards ETFPS use). *Government influence (GVMI)* assessed the extent to which government motives and incentives influence user's intention of using ETFPS with four items. Four items were used to measure *internal facilitating condition (INTFC)*; the participants were asked to rate the extent to which availability of skill, knowledge, control and ability influence their intention and actual use of ETFPS. To measure *external facilitating condition (EXTFC)*, three items were used to ask participants to rate the extent to which external facilitating condition influences their intention and actual use of ETFPS. *Perceived security (PS)* was measured with three items from Carter et al, (2011). *Behaviour intention (BI)* was measured as self-reported behaviour with four items from Shyu and Huang (2011). *Actual use (AU)* was lastly measured as how frequently taxpayers' actual behaviour of using ETFPS with three items from Shyu and Huang (2011), as well as Wang and Shih (2009).

Data Analysis and Research Result

The demographic characteristics of participants are shown in Table 1, which indicates that about 58.8 % were male. The majority of participants were aged between 41 and 50. Furthermore, for the participants' education level, 22.7% were at primary level; 30.9% were at secondary level; 21.1% were at undergraduate level; 15.2% were at graduate level; and 10.1% at postgraduate level. The participants' occupations comprised 72.8% (self-employed) and 27.2% private organisation employees (NGOs and MNEs). The participant's reported the following amount of monthly income: 22.8% received less than 1,000,000 Tshs; 21.3% received 5,000,000-10,000,000 Tshs; 41.0% received 20,000,000-30,000,000 Tshs;

Table 1: Demographic characteristics of the participants (N=408)

Demography	Category	Frequency	Percentage (%)
Gender	Male	240	58.8
	Female	168	41.2
Age	20-30	61	14.9
	31-40	108	26.4
	41-50	184	45.1
	51-60	55	13.6
Education	Primary	93	22.7
	Secondary	126	30.9
	Undergraduate	86	21.1
	Graduate	62	15.2
	Postgraduate	41	10.1
Occupation	Business (Self-employed)	297	72.8
	Private sector (NGOs and MNEs)	111	27.2
Monthly Income	< 1,000,000 Tshs	93	22.8
	5,000,000-10,000,000 Tshs	87	21.3
	20,000,000-30,000,000 Tshs	167	41.0
	40,000,000-50,000,000 Tshs	61	14.9
Network channels	Dial up	64	15.7
	LAN (Local area network)	58	14.2
	Broadband (ADSL, Cable modem)	286	70.1

and 14.9% received 40,000,000-50,000,000 Tshs. The participants' network channels for accessing ETFPS were 15.7% dial up, 14.2% LAN (Local area network), and 70.1% broadband (ADSL, Cable modem).

Reliability and Validity

There are several methods, e.g. regression modeling and analytical hierarchy processing, to analyse the factors influencing the individual's acceptance behaviour of e-government (Dwivedi et al, 2017; Veeramootoo et al, 2018).

Reliability and validity assessment ensures that the multiple indication of each latent variable in the model converge to measure a single construct. Internal consistency, convergent and discriminant validity are assessed by using the composite reliability index and the average variance extracted (AVE) (Hair et al, 2006). According to Hair et al, (2006), a reliability score of Cronbach's Alpha coefficient 0.60 is considered as acceptable range, with 0.70 chosen (explained variance of the 50%); indicators below 0.40 were removed from the model. The square root of AVE of a particular construct must be higher than its correlation with other constructs. Commonly, the AVE should be greater than 0.50. This study started with performing principle axis factoring analysis on 41 observed items to analyse the factors structure. The coefficient value of KMO (Kaiser–Meyer–Olkin) Measure of Sampling Adequacy is 0.91 and Bartlett's Test of Sphericity is significant ($P = 0.001$), which suggests that the data were adequate for factor analysis (Kaiser, 1974). Table 2 shows internal consistency of each construct. In this study, the standardised factor loadings are above the level of 0.50, and most of them are greater than 0.70. The value of Cronbach's Alpha coefficient and composite reliability (CR) for all constructs is greater than 0.70, and the AVE is greater than suggested level of 0.50.

Table 2: Results of confirmatory factor analysis

Items	Loading	Cronbach's α	CR	AVE
System Quality (SQ)		0.92	0.93	0.76
SQ1. ETFPS is available 24 hour	0.90			
SQ2. ETFPS fit well with my style of work	0.91			
SQ3. ETFPS fit well with the way I work	0.87			
SQ4. ETFPS is ease to access	0.79			
Perceived usefulness (PU)		0.90	0.90	0.86
PU1. ETFPS is useful to my filing and payment	0.86			
PU2. ETFPS is conveniently in filing and payment	0.87			
PU3. ETFPS enhances the efficiency of filing and payment	0.81			
PU4. ETFPS simplify filing and payment process	0.80			
Perceived ease of use (PEOU)		0.85	0.85	0.59
PEOU1. It is easy to use the ETFPS	0.80			
PEOU2. Learning to operate ETFPS is easy	0.88			
PEOU3. It is easy to do what I want with ETFPS	0.71			
PEOU4.Interaction with the ETFPS is clear and understandable	0.65			
Attitude (AT)		0.97	0.97	0.86
AT1. Using ETFPS is good idea	0.90			
AT2. Using ETFPS is a wise idea	0.90			
AT3. I feel more comfortable using ETFPS	0.94			
AT4. I like the idea of using ETFPS	0.91			
AT5. It is pleasure to use ETFPS	0.93			
Mass Media Influence (MMI)		0.89	0.89	0.72
MMI1. Advertising from TV, Radio and newspaper every time recommended using ETFPS	0.85			
MMI2. Full reports from mass media and advertisement insisted using ETFPS to be significant	0.87			
MMI3. Reviews, news articles and advertising suggesting ETFPS use is a better choice	0.82			
Government Influence (GVMI)		0.92	0.92	0.75
GVMI1. Government sanctioned ETFPS use in Tanzania	0.86			
GVMI2. The Tanzania government is vigorous in campaigning ETFPS use	0.84			
GVMI3. Government of Tanzania stimulates the ETFPS use	0.86			
GVMI4.The Tanzania Government educates users of ETFPS	0.89			
Internal Facilitating Condition (INTFC)		0.79	0.84	0.57
INTFC1. I have knowledge to use ETFPS	0.67			
INTFC2. I am skilfully able to use ETFPS	0.69			

INTFC3. I have control to use ETFPS	0.76			
INTFC4. I have ability to use ETFPS	0.65			
External Facilitating Condition (EXTFC)		0.87	0.87	0.86
EXTFC1. There is a group of people/person to help me when I have problem with the system	0.89			
EXTFC2. Internet is available when am using ETFPS	0.80			
EXTFC3. Accessing EFDs machines is cheaper and easy for me	0.77			
Perceive Security (PS)		0.91	0.91	0.77
PS1. I feel protected using ETFPS for my personal transaction information	0.88			
PS2. I have confidence with the ETFPS internet secured in my filing and payment	0.89			
PS3. Using ETFPS for income tax filing and payment is safer	0.84			
Behavioural Intention (BI)		0.92	0.92	0.73
BI1. Frequently, I will use ETFPS	0.90			
BI2. I will keep on using ETFPS in the future	0.86			
BI3. I will choose ETFPS as my first priority in filing and payment	0.89			
BI4. I want to use ETFPS as much as possible	0.76			
Actual Use (AU)		0.93	0.93	0.81
AU1. Every month I use ETFPS	0.89			
AU2. Every 2 to 6 months, I use ETFPS	0.91			
AU3. I use ETFPS once in a year	0.88			

Table 3 indicates that the square root of the Average Variance Extracted (AVE) of each construct is higher than its correlation value with another construct, which demonstrates perfect discriminant validity in this study. The results indicated that all measures had adequate and strong reliability.

Table 3: Results of discriminant validity test

Factors	Mean	S.D	1	2	3	4	5	6	7	8	9	10	11
Attitude	4.48	1.09	0.92**a**										
Perceived Usefulness	4.81	1.14	.525	0.84**a**									
System Quality	3.71	1.39	.303	.194	0.86**a**								
Government Influence	4.02	1.12	.337	.275	.635	0.87**a**							
Perceived Ease of Use	4.43	0.89	.349	.286	.313	.316	0.77**a**						
Behavioural Intention	4.55	0.98	.583	.581	.081	.193	.295	0.85**a**					
Actual Use	4.65	1.01	.502	.433	.108	.265	.377	.606	0.90**a**				
Mass Media Influence	4.59	1.12	.587	.525	.324	.405	.422	.478	.570	0.84**a**			
External Facilitating Condition	4.67	1.07	.026	.122	-.079	-.047	-.099	.193	-.068	-.044	0.82**a**		
Perceived Security	4.65	0.99	.601	.578	.181	.285	.276	.561	.442	.581	.047	0.87**a**	
Internal Facilitating Condition	3.73	0.67	.042	.086	.124	.085	.020	.008	.022	.050	.031	-.013	0.75**a**

Note: a is square roots of AVE indicated on the diagonal.

Structural Equation Modeling Analysis

Structural equation modeling (SEM) is applied to determine which extent the model fits the relationships with the hypotheses (Veeramootoo et al, 2018). The study reported the model fit first, which is shown in Table 4. The test of overall model fit results reported a probability value of p 0.001, the significant p value indicated that the absolute fit of the model was less than desirable. However, although the ÷2 test of absolute model fit was sensitive to sample size and non-normality, a better measure of fit was chi-square (÷2) over degrees of freedom. This ratio for the proposed model was 2.96, which was within the recommended 1-3 bracket (Hair et al, 2010).

This study also reported some fit indicators. The study reported goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI) and normed fit index (NFI). Hair et al. (2006) found CFI was one of the most stable and strongest fit indices. Also, this study reported root mean square error of approximation (RMSEA) which measures the discrepancy per degree of freedom (Hair et al, 2006). GFI must be at or above 0.90; CFI must be or above 0.90; NFI must be at or above 0.90; while AGFI must be at or above 0.80 (Hair et al, 2006). Finally, RMSEA must be below 0.10, but it has also been recommended to represent a reasonable error of approximation if it is low than more restrictive threshold of 0.08 (Hair et al, 2006). Table 4 indicates these statistics results are consist with recommended levels.

Table 4: Measurement model fit indices for the research model

Fit Index	Structure Model	Recommended values
P	0.001	> 0.05
Chi-square/DF	2.96	< 3.00
CFI	0.93	≥ 0.90
NFI	0.92	≥ 0.90
GFI	0.90	≥ 0.90
AGFI	0.81	≥ 0.80
RMSEA	0.07	≤ 0.08

Hypotheses Test

After the establishment of model fit in the above section, structural equation modeling test continues to estimate path coefficients and other model parameters to maximise explained variances of dependent constructs. R square (*R2*) provided an indication of the predictive power of the independent variables to determine which extent the model fits the relationships with the hypotheses. By calculating path coefficients, the structure model was tested to validate supported or unsupported hypotheses. It was considered that *R2* values of 41%, 38%, 31%, 10% and 3%, are substantial, moderate and weak correspondingly. The model was explained with 63% of the variance in actual use of ETFPS, which was shown in Figure 2.

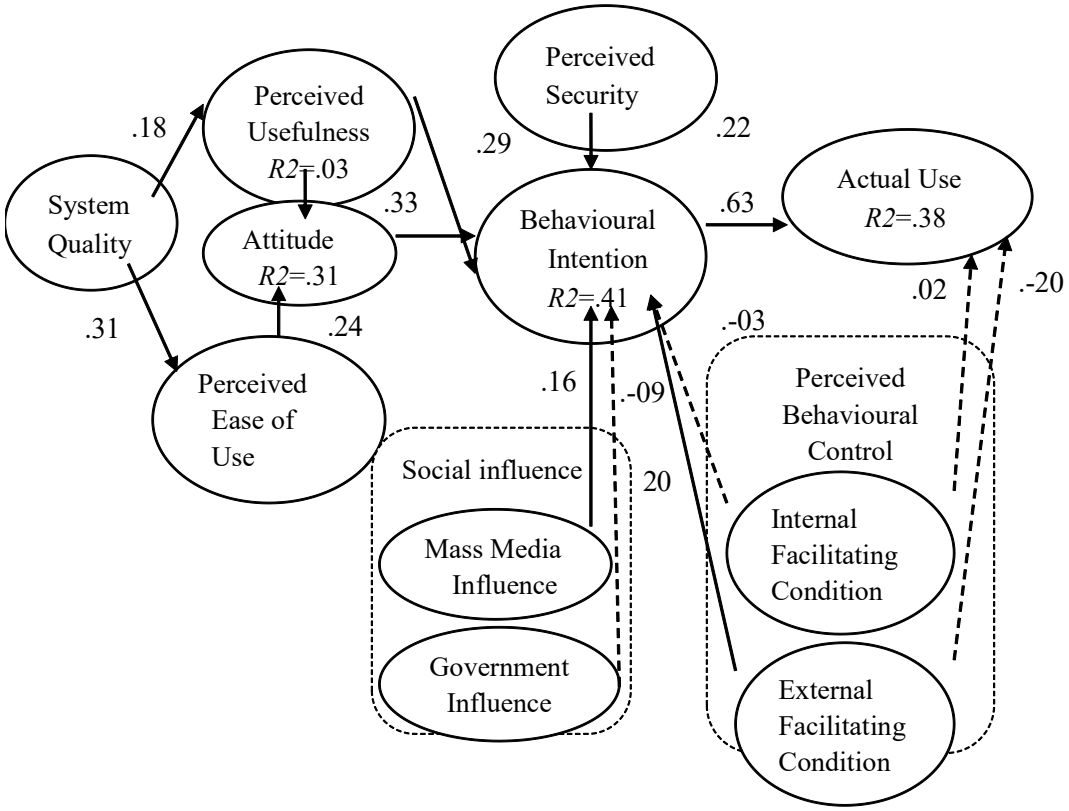

Figure 2: Test results of validated research model

Table 5 indicated that 10 hypotheses were significantly supported and 4 hypotheses were unsupported hypotheses. First, system quality positively influenced perceived usefulness at significant level of (β=0.18, $p < 0.001$) and perceived ease of use at significant level of (β=0.31, $p < 0.001$), thus supporting H1 and H2. Then, perceived usefulness positively influenced attitude at significant level of (β=0.48, $p < 0.001$) and behavioural intention at significant level of (β=0.29, $p < 0.001$), therefore supporting H3 and H4. Moreover, perceived ease of use positively influenced attitude at significant level of (β=0.24, $p < 0.001$) hence supporting H5. Furthermore, both attitude (β=0.33, $p < 0.001$) and mass media influence (β=0.16, $p < 0.001$) were found to significantly influence behavioural intention to use ETFPS, therefore supporting H6 and H7. Also, both external facilitating conditions (β=0.20, $p < 0.001$) and perceived security (β=0.22, $p < 0.001$) positively and significantly influenced behavioural intention to use ETFPS, hence supporting H10 and H13. Behavioural intention positively and significantly influenced actual use of ETFPS at significant level of (β=0.63, $p < 0.001$), consequently supporting H14. However, government influence negatively influenced behavioural intention and external facilitating condition negatively influenced actual use, which demonstrated H8 and H12 were not supported in this study. In addition, internal facilitating conditions had no significant influence on both behavioural intention and actual use, which means H9 and H11 were not supported.

Table 5: Path coefficient of the research model

Description of Hypothesis	Coefficients	CR	Sig.	Results
System Quality—->Perceived Usefulness (H1)	0.18	3.46	***	Supported
System Quality —->Perceived Ease of Use (H2)	0.31	5.79	***	Supported
Perceived Usefulness—->Attitude (H3)	0.48	10.92	***	Supported
Perceived Usefulness—->Behavioural Intention (H4)	0.29	5.90	***	Supported
Perceived Ease of Use—->Attitude (H5)	0.24	5.14	***	Supported
Attitude—-> Behavioural Intention (H6)	0.33	6.53	***	Supported
Mass Media Influence—->Behavioural Intention (H7)	0.16	3.68	***	Supported
Government Influence—-> Behavioural Intention (H8)	-0.09	-2.45	*	Not Supported
Internal Facilitating Condition—->Behavioural Intention (H9)	-0.03	-.61		Not Supported
External Facilitating Condition—->Behavioural Intention (H10)	0.20	4.35	***	Supported
Internal Facilitating Condition—->Actual use (H11)	0.02	.44		Not Supported
External Facilitating Condition—->Actual use (H12)	-0.20	-4.23	**	Not supported
Perceived Security—->Behavioural Intention (H13)	0.22	5.06	***	Supported
Behavioral Intention—->Actual use (H14)	0.63	11.96	***	Supported

Note: ***significant level and CR: critical ratio,* $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Discussion and Implications

This study presented a theoretical model to explore the factors that influence affective and cognitive perception of the citizens in the use of ETFPS. By integrating TAM with TPB, this study investigated the effect of some important factors such as system quality, perceived security, mass media influence, government influence, and internal and external facilitating conditions. Empirical test was applied to test the effect of the above factors on ETFPS, based on Tanzania's environment.

This study suggested that system quality had a positive and significant influence on perceived usefulness and perceived ease of use on ETFPS use. The finding was in line with previous study of e-filing and payment adoption (Chen et al, 2015). It means the efficiency of e-filing and payment tasks promoted perceived usefulness and perceived ease of use. Therefore, government policymakers are encouraged to keep on updating and advancing the e-tax system by making it easier to access so as to increase its acceptance. Also, government should invest extra resources in improving technical infrastructure to ensure the e-tax system performs efficiently.

The positive significant effects of perceived usefulness on attitude and behavioural intention on ETFPS use were found in this study. It implied that taxpayers perceived ETFPS to be useful for their job performance. Some prior studies also support the positive significant relationship between similar set of determinants (Al-Hujran et al, 2015; Okyere-Kwakye et al, 2016). Perceived ease of use has also been found to have a positive significant relationship with attitude towards ETFPS use. It implies that taxpayers believe that the system is very easy to use.

Furthermore, this study has revealed the significant effects of attitude on behavioural intention, which is consistent with other studies (Dwivedi et al, 2017, Okyere-Kwakye et al, 2016). Mass media influence has a positive and significant influence on behavioural intention on ETFPS use. Therefore, it is recommended that policymakers should take into account marketing ETFPS on radio, television and specific press so as to increase the citizens' awareness of ETFPS. Also, an intensive campaign about ETFPS use might be launched to reach the majority of people through accessible news networks, television, radio programmes, outlets and banners. The citizens' intention towards acceptance and use of ETFPS will increase greatly.

External facilitating conditions were found to significantly influence behavioral intention. This significant influence implies that the intention to use ETFPS depends on quick assistance from the tax agency when citizens encounter system problem. Therefore, this study recommends that government policy-makers should strengthen the system quality. The Tax agency might create a team of technician to provide close assistance for any technical problem during the use of ETFPS. Also, the equipment used for the e-tax system should be kept affordable for users. Consequently, government policymakers might negotiate with telecommunication companies to provide low-cost or even free Internet for the citizens to access ETFPS.

In this study, a strong positive and significant influence between perceived security and behavioral intention indicated that, when the citizens have confidence in the system and feel secure in using ETFPS, the favorable intention towards system use would be enhanced. This argument is consistent with previous studies (Carter et al, 2011). It is recommended that government strengthen ETFPS security so as to protect the citizens' information security and privacy.

Moreover, this study found that behavioural intention had a direct significant effect on actual use of the system. This finding is in line with previous studies (Shyu and Huang, 2011; Wang and Shih, 2009). It implies that the stronger the citizens' intentions to engage in ETFPS use, the more successful they are in the use of ETFPS.

Even though most hypotheses are supported, four of the suggested relationships were not supported in this study. First, government influence was found to have a negligible significant effect on behavioural intention. One possible reason is that ETFPS use is a newly introduced system, so government may have paid more attention on the implementation in different parts of Tanzania and not much effort expended on fostering its acceptance and use by the citizens through change management initiatives. Second, the study found out that internal facilitating conditions have a negative influence on the citizens' intention and actual use of ETFPS. This

implies that certain obstacles such as lack of control, skill and knowledge on ETFPS use prevented them from using ETFPS. Therefore, government policymakers should offer training and education to the citizens so as to enhance their skills in the use of ETFPS. Third, empirical results showed that external facilitating condition was not significant in influencing the citizens' actual use of ETFPS. It assumed that the assistance provided by the tax agency is not as high-quality or quick as the citizens' expectation. Therefore, this study suggests that government policymakers need to improve external assistance for ETFPS use.

This study made three contributions to previous studies. First, it extended previous studies by introducing system quality and perceived security, both of which are seldom emphasised in the integration model of TAM and TPB. Empirical evidence supported that system quality and perceived security significantly affected the citizens' use of ETFPS. Second, this study decomposed two important variables, i.e., social influence and perceived behavioural control, to deepen understanding of the acceptance and use of ETFPS. Specifically, social influence consisted of mass media influence and government influence, and perceived behavioural control consisted of internal and external facilitation conditions. It demonstrated that the effect of mass media influence on the citizens' behavioural intention to ETFPS use is significant. Moreover, external facilitation conditions had a significant effect on the citizens' behavioural intention. Third, this study reexamined empirically the effect of important factors from the integration model of TAM and TPB in developing countries like Tanzania and promoted the explanation ability of TAM and/or TPB that usually was applied into developed counties and emerging economies.

Conclusion

This study investigated the factors that influence acceptance of electronic tax filing and payment system in Tanzania. This was done by integrating TAM and TPB, adding two factors — system quality and perceived security and decomposed TPB variables. Fourteen hypotheses were put forward based on ETFPS context. A structural equation modeling approach was used to test the model. System quality, perceived usefulness, perceived ease of use, attitude, mass media influence, internal facilitating conditions, perceived security and behavioural intention were found to be significant predictors of ETFPS use, while government influences, internal facilitating condition and external facilitating condition were found not to predict actual use. The higher predictive power of the structural model shows that the TAM and the TPB are effective theoretical bases for investigating acceptance behaviour of e-government services such as ETFPS. The model can be applied by other researchers to understand acceptance behaviour in other e-government services. However, because each e-government service has its own idiosyncratic characteristics, researchers must add to the model specific constructs to advance its predictive power (Ranaweera, 2016).

Limitations and Future Research Directions

Although this study has theoretically established and validated the integrated models of TAM and TPB for e-government system acceptance, it had some limitations. The integrated model of TAM and TPB has been validated through consideration of users of the ETFPS. Therefore, future work may show light on other information systems such as government information system, based on social media. Also, some constructs do not show any significance, e.g., the effect of government influence and internal facilitating condition on behavioural intentions and actual use, as well as that of external facilitating condition on actual use; future research may more critically reexamine those constructs.

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Acknowledgements

The authors thank Professor Xuefeng Zhao for his enthusiastic comments on this manuscript. Constructive comments and suggestions from anonymous reviewers and the editor are appreciated as well.

Funding

This work was supported by the National Natural Science Foundation of China (NSFC) (71573096), the Hubei Province Outstanding Young and Middle-Aged Team of Innovative Projects (T201622), and the Fundamental Research Funds for the Central Universities (2017WKZDJC005).

Afr. J. Lib. Arch. & Inf. Sc. Vol. 29, No. 1 (April 2019) 45-62

Citizens' Acceptance of E-Government Service: Examining E-Tax Filing and Payment System (ETFPS) in Tanzania

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Abstract

Electronic tax filing and payments system (ETFPS) is a kind of foundational information technology application in the initial stage of E-government in developing countries. By introducing variables like system quality and perceived security, as well as decomposing important variables like social influence and perceived behaviour control, this study integrates Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB) to explain the factors motivating the acceptance of ETFPS in Tanzania. Empirical outcomes demonstrate that system quality significantly influences perceived usefulness and perceived ease of use of ETFPS. Perceived usefulness and perceived ease of use significantly influence the users' attitude towards accepting ETFPS, which further affects their behavioural intention. Moreover, perceived security, mass media influence, and external facilitating condition have a significant impact on the users' behavioural intention. The user's intention determines their actual use of ETFPS. This study further provides some managerial implications for policymakers to design and promote further acceptance and use of ETFPS.

Keywords: E-Government Acceptance, E-Tax Filing and Payments System (ETFPS), Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Tanzania

Introduction

Electronic government (E-government) implies the use of information communication technology, such as wide area network, mobile computing, and the Internet to transform government functionalities and access to services by citizens (Nengomasha et al., 2010). E-government is popular in developed countries and is gradually finding its way into some emerging economies. However, the use of E-government in some developing countries, such as in the African continent, is still at initial stages (Nengomasha et al., 2010). For example, in Tanzania, tax filing and payment are implemented in two ways: physical tax filing and payment and electronic tax filing and payment. The physical tax filing and payment method is time-consuming, exhausting, and at risk for errors. It involves much paperwork and has limited transparency. By contrast, the electronic tax filing and payment method has made it possible for Tanzanian government through its tax agency to advance its operations in a digitised manner, which has ensured the provision of high-quality services at lower cost. Besides, electronic tax filing and payments can assist not only in monitoring business and individuals transactions, but are also capable of tracking and recording financial transactions of

businesses and individuals for tax collection purposes to combat noncompliance (Kira, 2016). Despite the benefits of electronic tax filing and payments, some citizens show unwillingness to accept this new way, and are still using traditional methods. The percentages of tax income returns being filed and paid by individuals in Tanzania gradually increased from 68% in 2013 to 73% in 2017 (Tax Agency Department, 2017). Consequently, the goal of government to reach 90% of all citizens and business tax income return being filed and paid electronic is not yet reached (Tax Agency Department, 2017). Moreover, the Tanzania revenue authority board reported that the filing of income tax was conducted more manually than through the online method (Tanzania Revenue Report, 2017). A study on the adoption of e-tax system in Tanzania showed that people were more satisfied with manual methods when dealing with the government agency (Sichone et al, 2018). Additionally, that study also found that the users use e-tax system to check fine information, but not to make electronic filing. As a result, even with the introduction of electronic tax filing and payments system (ETFPS) in Tanzania, the acceptance and use of e-tax system is moving very slowly. The challenge of lower utilization remains and has overwhelmed government (Sichone et al, 2018). To a certain extent, the success of e-tax system implementation depends largely on identifying what factors influence citizens' acceptance and use of this system, and addressing them.

Problem Statement

Many studies have been conducted on e-government services adoption and have made enormous contribution to increasing the understanding of e-government services use (Bhuasiri et al., 2016; Chen et al., 2015; Dwivedi et al., 2017). In those studies, a number of theories such as Diffusion of Innovation Theory (DIT) (Rogers, 1962), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Technology Acceptance Model (TAM) (Davis, 1989) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) have been used to explain the acceptance of e-government systems. Further, the scholars have integrated these theories to deepen understanding of e-government acceptance and use (Azmi and Bee, 2010; Sichone et al, 2018; Stafford and Turan, 2011). Among these theories, TAM generally is viewed as the main theory and many scholars integrate TAM with other related theories. For instance, some studies integrate TAM with TPB, UTAUT, IS Success model, and so on (Nasri and Charfeddine, 2012; Sichone et al, 2018; Veeramootoo et al, 2018).

In general, e-tax systems are usually the first e-government services to be adopted in many countries and regions. Most of the studies investigate e-tax systems in developed countries like U.S.A. (Carter et al., 2011), emerging economies like Taiwan, China (Bhuasiri et al., 2016), Hongkong, China (Venkatesh, Thong, Chan, Hu, Brown, 2011), and developing countries like Malaysia (Azmi and Bee, 2010). Although all of these investigations have given precious insights into e-tax system acceptance, gaps still exist as most of them have overlooked some aspects of e-tax system acceptance. First, some additional variables are required to strengthen the integration of TAM and TPB that is viewed as the primary theoretic basis to explore e-tax systems by many studies. Second, although TAM and TPB are important theories in acceptance behaviour understanding (Susanto and Goodwin, 2013), there is still need to decompose these theories' variables to increase the understanding of acceptance behaviour of IS use. Based on the study by Nasri and Charfeddine (2012), TPB originally developed to explain users' acceptance behaviour of IS fails to predict acceptance behaviour indeed. Therefore, decomposition of the theories' variables is very important rather than depending on their traditional variables. Third, some developing counties in Africa and Latin America have been overlooked by researchers (Bhuasiri et al, 2016; Carter et al. 2011). Previous studies primarily focused on the contexts of emerging economies or developing countries in East Asia or East-south Asia (Azmi and Bee, 2010; Bhuasiri et al., 2016; Venkatesh et al, 2011), ignoring other developing countries such as those in Africa and Latin America. There is a lot of heterogeneity among different developing countries because of geographic and cultural differences. More important, with the rapid development of ICT devices and systems, previous studies focus on IS use in the latter years of the 1990s to the beginning of 2000 or even recently (Nasri and Charfeddine, 2012; Stafford and Turan, 2011; Veeramootoo et al., 2018), whose

conclusions may not be applied to developing countries like Tanzania.

The primary objective of this study was to explain the factors that influence ETFPS acceptance in Tanzania. First, this study put forward an integrated model based on TAM and TPB as a theoretic framework for investigating citizens' acceptance and use of ETFPS. Such understanding is required to determine whether the concerns raised about poor acceptance and use of ETFPS are correct; and if so, to understand why these occur and how to remedy them. Second, there is still need to extend and decompose some variables of these theories (Stafford and Turan, 2011; Veeramootoo et al., 2018). Third, there is a scarcity of quantitative research into the acceptance of IS in African environments (Chaouali et al., 2016; Veeramootoo et al., 2018), specifically in Tanzania (Sichone et al, 2018).

Theoretical Background and Research Model

Several prior studies applied TAM and TPB as a framework to explain and predict a diversity of human behaviours in e-government acceptance perspective (Shyu and Huang, 2011; Sichone et al, 2018; Stafford and Turan, 2011). TAM and TPB can be used in many e-government perspectives and produce higher explanatory power relative to other acceptance models (Nasri and Charfeddine, 2012; Sichone et al, 2018; Susanto and Goodwin, 2013). For instance, some studies investigate various e-government acceptance factors by applying TAM and TPB and find out the acceptance is mainly determined by psychosocial factors (Okyere-Kwakye et al, 2016; Sichone et al, 2018). Although TAM and TPB receive a lot of support, numerous studies recommend the extension of these theories to explore e-government acceptance (Nasri and Charfeddine, 2012; Okyere-Kwakye et al, 2016; Sichone et al, 2018). For instance, studies conducted by Sichone et al, (2018) and Susanto and Goodwin (2013) support adding other relevant constructs to investigate particular information systems. In this study, system quality and perceived security were added to investigate the acceptance and use of ETFPS, and social influence and perceived behavioural control are decomposed to deepen understanding on the acceptance and use of ETFPS.

The Technology Acceptance Model (TAM)

In order to enlarge understanding of TRA, Davis (1989) developed TAM which was later found to be better in clarifying individual acceptance of ICT. According to TAM, the individual would accept a specific information system if he/she believes certain things about this system. These beliefs are "perceived ease of use (PEOU) and perceived usefulness (PU)", which are used to explain the individual's acceptance of information system (Davis, 1989; Hamutumwa et al, 2017; Okyere-Kwakye et al, 2016). As a result, Stafford and Turan (2011) recommend that TAM is an essential model to be integrated into some larger theories such as theory of planned behaviour which can take into account related human and social factors.

Theory of Planned Behaviour (TPB)

TPB is an extension of the TRA, which is applied to deal with behaviour over which the individual has incomplete volition control (Ajzen, 1991). According to TPB, the individual's actual behaviours are determined by his/her intention, which is influenced by his/her perceived behavioural control and social norms (Ajzen, 1991). A decade later, in response to changes in the IS environment, various researchers updated the TPB model by decomposing its constructs (Nasri and Charfeddine, 2012; Stafford and Turan, 2011). Decomposed constructs of TPB have been effectively implemented in understanding the individual's use of different technologies (Nasri and Charfeddine, 2012; Sichone et al, 2018; Stafford and Turan, 2011). There have been called to extend TAM and TPB to examine the acceptance of e-government system (Carter et al, 2011; Stafford and Turan, 2011).

Research Hypotheses and Model

The integrated model is composed of major constructs from both TAM and TPB together with system quality and perceived security constructs as indicated

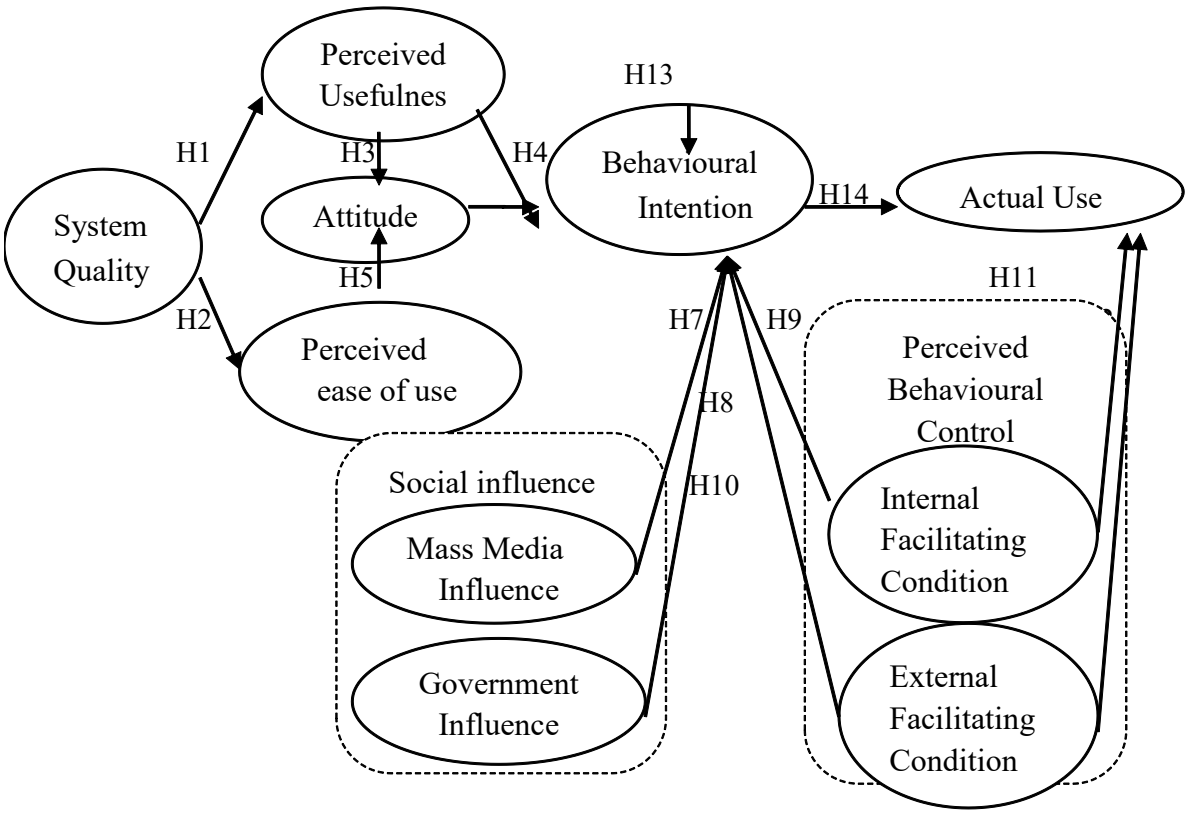

Figure 1: Research model

in Figure. 1. The 14 hypotheses that originate from the model are clarified in the following subsections.

System Quality

System quality is referred to as the extent to which the results of an innovation are fully accessible and able to be communicated to others, as well as the selection of information channels (Delone and McLean, 2003). Prior studies on IS have proven that system quality positively affects the perceived usefulness and perceived ease of use of e-government system (Chen et al, 2015). Specifically, during the initial stage of ICT infrastructure construct in developing countries, ETFPS is expected to be fully accessible, not complex, and be compatible to tax filing and payment for the users to accept this information system. Thus, the suggested hypotheses are stated as:

[H1]. *System quality has a positive significant influence on perceived usefulness on taxpayers' ETFPS use.*

[H2]. *System quality has a positive significant influence on perceived ease of use on taxpayers' ETFPS use.*

Perceived Usefulness

Perceived usefulness (PU) is referred to as the extent to which the individual believes in using a certain system to facilitate job performance and increase output (Davis, 1989). PU has been proven to be an antecedent of attitudes and behavioural intention (Nasri and Charfeddine, 2012; Stafford andTuran, 2011). For instance, studies find that perceived usefulness has a great influence on the individual's attitude and intention on e-government use (Al-Hujran et al, 2015; Okyere-Kwakye et al, 2016). Therefore, this study hypothesizes that:

[H3]. *Perceived usefulness has a positive significant influence on taxpayers' attitude to use ETFPS.*

[H4]. *Perceived usefulness has a positive significant influence on taxpayers' behavioural intention to use ETFPS.*

Perceived Ease of Use

Perceived ease of use (PEU) has been explained as the level of the individual's believing that using a certain information system cannot be very difficult (Davis, 1989). Several prior studies have proven that perceived ease of use has a direct relationship towards attitude (Al-Hujran et al, 2015; Sichone et al, 2018). Hence, the next hypothesis is stated as:

[H5]. *Perceived ease of use has a positive significant influence of taxpayer's attitude to use ETFPS.*

Attitude

Attitude is defined as a degree of the individual's positive or negative feeling towards the particular object or the intention of performing particular behaviour (Ajzen, 1991; Davis, 1989). In the domain of e-tax system, the more favourable attitude towards ETFPS (attitude toward the object), the more favorable the attitude will be towards performing online filing and payment (attitudes towards behavior), and the more likely is the behavioural intention and thus the performance of the behaviour. Also, several recent studies in e-government have supported the relationship between attitude and behavioral intention (Dwivedi et al, 2017; Okyere-Kwakye et al, 2016; Susanto and Goodwin, 2013). The suggested hypothesis is:

[H6]. *Attitude has a positive significant influence on taxpayers' intention to use ETFPS.*

Social Influence

According to TPB, subjective norms refer to the perceived social forces to perform or not to perform a particular behaviour (Ajzen, 1991). Hung (2013) viewed subjective norms as two forms of influence: interpersonal influence and external influence. In the context of developing countries like Tanzania, the investigation of social norms should pay more attention on external influences. Because e-government in those countries is in its initial stage, there are a few people who are familiar with IS, and it is difficult for people to know about IS application from closer social relationships like family members, relatives, friends, and colleagues. By contrast, external relationships may provide them more opportunities to learn about ICT application. For instance, government may train them to use IS device, and mass media also introduce ICT knowledge by public mass. Therefore, this study decomposes social influence into two lower order components: mass media influence and government influence.

Mass media influence refers to local media such as radio, televisions and newspapers influences on behavioural intention towards IS use. Government influence refers to direct and indirect efforts of government sectors that motivate and promote citizen's willingness to use IS. Therefore, the proposed hypotheses are:

[H7]. *Mass media influence has a positive significant influence on taxpayers' intention to use ETFPS.*

[H8]. *Government influence has a positive significant influence on taxpayers' intention to use ETFPS.*

Perceived Behavioural Control

Based on TPB, perceived behavioural control (PBC) explains the individual's perceptions of ease or difficulty of performing the behaviour of interest, and it is assumed to reflect past experience together with possessed resource (such as money, time, skill and opportunities) (Ajzen, 1991). Stafford and Turan (2011) recommended a two-level hierarchical model in which PBC includes two components: self-efficacy and facilitating conditions. In support of Stafford and Turan (2011), Chaouali et al, (2016) decomposed PBC into self-efficacy, resources and technology facilitating condition. But Chaouali et al, (2016) found that decomposing PBC showed weak significant influence towards behavioral intention.

Because of the above findings, this study decomposed PBC into two components: internal facilitating condition and external facilitating condition. Internal facilitating condition refers to ability and knowledge of IS use that can enhance or prohibit intention and use of ETFPS. The more knowledge and experience of ICT, the stronger willing the individual has to use e-government.

External facilitating condition is defined as the level to which the individual believes that an organisation and technical infrastructure is available to support the use of the system. When the individual has access easily to available computer, Internet and expert assistance, he or she will prefer to use IS. From the above discussion, this study hypothesizes that:

[H9]. *Internal facilitating condition has a positive significant influence on taxpayers' intention to use ETFPS.*

[H10]. *External facilitating condition has a positive significant influence on taxpayers' intention to use ETFPS.*

[H11]. *Internal facilitating condition has a positive significant influence on taxpayers' actual use of ETFPS.*

[H12]. *External facilitating condition has a positive significant influence on taxpayers' actual use of ETFPS.*

Perceived Security

Perceived security refers to the individual's perception of the extent of protection against the threats on IS use that pressure individual acceptance of e-government (Carter et al, 2011). Perceived security can be online security which is more about the protection of the individual's transacting information and Internet security. Therefore, the decision to accept ETFPS or not is based on the belief regarding the security of transacting information and reliable Internet infrastructure. Hence, the suggested hypothesis is stated as:

[H13]. *Perceived security has a positive significant influence on taxpayer's intention to use ETFPS.*

Behavioral Intention

Behavioural intention is defined as the individual's willingness to use or not use a particular information system (Ajzen, 1991; Davis, 1989). The literature also recognises intention as an important determinant of actual behaviour in IS use (Shyu and Huang, 2011). Prior studies also find that the actual behavior is significantly affected by behavioural intention (Shyu and Huang, 2011; Wang and Shih, 2009). Therefore, the last hypothesis is proposed as follows:

[H14]. *Behavioural intention has a positive significant influence on taxpayers' actual use of ETFPS.*

Methodology

Due to the absence of sampling frame, simple random sampling method was utilized to select the sample. The tax agency helped the researchers by randomly selecting participants from its database and sending invitation letters and questionnaires by e-mail. The researchers also visited some entities and randomly distributed the invitation letter and the survey questionnaires. In this study, 447 copies of the questionnaire designed were randomly distributed. Thirty-nine questionnaires were discarded due to incompleteness. Overall 408 questionnaires were completed, making a response rate of 78%.

Data collection lasted two months (June and July) at the cities of Dar es Salaam and Morogoro. The first city is the hub of business and is the first city to introduce ETFPS. The second city is located closer to the first city; therefore, it also has a high rate of business participation. The questionnaire was initially prepared in English and then translated into Swahili because Swahili is the main language used in the country. After that, translation back into English was done to ensure the validity, and attention was paid to detect any misinterpretation due to the translation. The questionnaire was pretested with 39 taxpayers from another city (Dodoma), which was not a survey area of this study. The items that were recognised as being problematic were modified before the formal survey. Two methods were used to collect the completed copies of the questionnaire. The taxpayers who received the surveys at their business entities were instructed to complete the survey and return it to the survey collector at the same place. Those who had received the e-mail survey returned their completed copies by e-mail back to the Tax Agency, and the survey collector got them from the agency department of ETFPS. The confidentiality of survey responses was put into consideration for all taxpayers.

The questionnaire consisted of sections A and B. Section A addressed the demographic characteristics of the participants such as age, gender and education. Section B consisted of questions related to the variables of the study. A five point likert scale (1 = strongly disagree and 5 = strongly agree) was employed to obtain participants' professional views on IS use. The study standardised the items to generate the scores for the constructs. *System quality (SQ)* was designed to measure the accessibility of the system and the system fit with the taxpayers' way of working with four items adopted from Chen et al. (2015). *Perceived usefulness (PU)* was composed of perceived usefulness strength, based on the extent of users' believing in ETFPS facilitating job performance and increasing output, with four items adopted from (Davis, 1989; Nasri and Charfeddine, 2012). To measure *perceived ease of use (PEOU)*, four items from (Davis, 1989; Nasri and Charfeddine, 2012) were adopted. This scale assesses the extent to which taxpayers perceive ease of use, ease to learn and operate, ease to get access to do what they want to do, and clear and understandable interaction with ETFPS. A*ttitude (AT)* was composed of attitude strength (e.g., the feeling or emotions generated during the ETFPS use influences the intention keep on using it) with five items from (Ajzen, 1991; Dwivedi et al, 2017). *Mass media influence (MMI)* was composed of mass media influence strength with three items (e.g., whether they hear, watch and read ETFPS information, and whether advertisement influences their intention towards ETFPS use). *Government influence (GVMI)* assessed the extent to which government motives and incentives influence user's intention of using ETFPS with four items. Four items were used to measure *internal facilitating condition (INTFC)*; the participants were asked to rate the extent to which availability of skill, knowledge, control and ability influence their intention and actual use of ETFPS. To measure *external facilitating condition (EXTFC)*, three items were used to ask participants to rate the extent to which external facilitating condition influences their intention and actual use of ETFPS. *Perceived security (PS)* was measured with three items from Carter et al, (2011). *Behaviour intention (BI)* was measured as self-reported behaviour with four items from Shyu and Huang (2011). *Actual use (AU)* was lastly measured as how frequently taxpayers' actual behaviour of using ETFPS with three items from Shyu and Huang (2011), as well as Wang and Shih (2009).

Data Analysis and Research Result

The demographic characteristics of participants are shown in Table 1, which indicates that about 58.8 % were male. The majority of participants were aged between 41 and 50. Furthermore, for the participants' education level, 22.7% were at primary level; 30.9% were at secondary level; 21.1% were at undergraduate level; 15.2% were at graduate level; and 10.1% at postgraduate level. The participants' occupations comprised 72.8% (self-employed) and 27.2% private organisation employees (NGOs and MNEs). The participant's reported the following amount of monthly income: 22.8% received less than 1,000,000 Tshs; 21.3% received 5,000,000-10,000,000 Tshs; 41.0% received 20,000,000-30,000,000 Tshs;

Table 1: Demographic characteristics of the participants (N=408)

Demography	Category	Frequency	Percentage (%)
Gender	Male	240	58.8
	Female	168	41.2
Age	20-30	61	14.9
	31-40	108	26.4
	41-50	184	45.1
	51-60	55	13.6
Education	Primary	93	22.7
	Secondary	126	30.9
	Undergraduate	86	21.1
	Graduate	62	15.2
	Postgraduate	41	10.1
Occupation	Business (Self-employed)	297	72.8
	Private sector (NGOs and MNEs)	111	27.2
Monthly Income	< 1,000,000 Tshs	93	22.8
	5,000,000-10,000,000 Tshs	87	21.3
	20,000,000-30,000,000 Tshs	167	41.0
	40,000,000-50,000,000 Tshs	61	14.9
Network channels	Dial up	64	15.7
	LAN (Local area network)	58	14.2
	Broadband (ADSL, Cable modem)	286	70.1

and 14.9% received 40,000,000-50,000,000 Tshs. The participants' network channels for accessing ETFPS were 15.7% dial up, 14.2% LAN (Local area network), and 70.1% broadband (ADSL, Cable modem).

Reliability and Validity

There are several methods, e.g. regression modeling and analytical hierarchy processing, to analyse the factors influencing the individual's acceptance behaviour of e-government (Dwivedi et al, 2017; Veeramootoo et al, 2018).

Reliability and validity assessment ensures that the multiple indication of each latent variable in the model converge to measure a single construct. Internal consistency, convergent and discriminant validity are assessed by using the composite reliability index and the average variance extracted (AVE) (Hair et al, 2006). According to Hair et al, (2006), a reliability score of Cronbach's Alpha coefficient 0.60 is considered as acceptable range, with 0.70 chosen (explained variance of the 50%); indicators below 0.40 were removed from the model. The square root of AVE of a particular construct must be higher than its correlation with other constructs. Commonly, the AVE should be greater than 0.50. This study started with performing principle axis factoring analysis on 41 observed items to analyse the factors structure. The coefficient value of KMO (Kaiser–Meyer–Olkin) Measure of Sampling Adequacy is 0.91 and Bartlett's Test of Sphericity is significant ($P = 0.001$), which suggests that the data were adequate for factor analysis (Kaiser, 1974). Table 2 shows internal consistency of each construct. In this study, the standardised factor loadings are above the level of 0.50, and most of them are greater than 0.70. The value of Cronbach's Alpha coefficient and composite reliability (CR) for all constructs is greater than 0.70, and the AVE is greater than suggested level of 0.50.

Table 2: Results of confirmatory factor analysis

Items	Loading	Cronbach's α	CR	AVE
System Quality (SQ)		0.92	0.93	0.76
SQ1. ETFPS is available 24 hour	0.90			
SQ2. ETFPS fit well with my style of work	0.91			
SQ3. ETFPS fit well with the way I work	0.87			
SQ4. ETFPS is ease to access	0.79			
Perceived usefulness (PU)		0.90	0.90	0.86
PU1. ETFPS is useful to my filing and payment	0.86			
PU2. ETFPS is conveniently in filing and payment	0.87			
PU3. ETFPS enhances the efficiency of filing and payment	0.81			
PU4. ETFPS simplify filing and payment process	0.80			
Perceived ease of use (PEOU)		0.85	0.85	0.59
PEOU1. It is easy to use the ETFPS	0.80			
PEOU2. Learning to operate ETFPS is easy	0.88			
PEOU3. It is easy to do what I want with ETFPS	0.71			
PEOU4.Interaction with the ETFPS is clear and understandable	0.65			
Attitude (AT)		0.97	0.97	0.86
AT1. Using ETFPS is good idea	0.90			
AT2. Using ETFPS is a wise idea	0.90			
AT3. I feel more comfortable using ETFPS	0.94			
AT4. I like the idea of using ETFPS	0.91			
AT5. It is pleasure to use ETFPS	0.93			
Mass Media Influence (MMI)		0.89	0.89	0.72
MMI1. Advertising from TV, Radio and newspaper every time recommended using ETFPS	0.85			
MMI2. Full reports from mass media and advertisement insisted using ETFPS to be significant	0.87			
MMI3. Reviews, news articles and advertising suggesting ETFPS use is a better choice	0.82			
Government Influence (GVMI)		0.92	0.92	0.75
GVMI1. Government sanctioned ETFPS use in Tanzania	0.86			
GVMI2. The Tanzania government is vigorous in campaigning ETFPS use	0.84			
GVMI3. Government of Tanzania stimulates the ETFPS use	0.86			
GVMI4.The Tanzania Government educates users of ETFPS	0.89			
Internal Facilitating Condition (INTFC)		0.79	0.84	0.57
INTFC1. I have knowledge to use ETFPS	0.67			
INTFC2. I am skilfully able to use ETFPS	0.69			

INTFC3. I have control to use ETFPS	0.76			
INTFC4. I have ability to use ETFPS	0.65			
External Facilitating Condition (EXTFC)		0.87	0.87	0.86
EXTFC1. There is a group of people/person to help me when I have problem with the system	0.89			
EXTFC2. Internet is available when am using ETFPS	0.80			
EXTFC3. Accessing EFDs machines is cheaper and easy for me	0.77			
Perceive Security (PS)		0.91	0.91	0.77
PS1. I feel protected using ETFPS for my personal transaction information	0.88			
PS2. I have confidence with the ETFPS internet secured in my filing and payment	0.89			
PS3. Using ETFPS for income tax filing and payment is safer	0.84			
Behavioural Intention (BI)		0.92	0.92	0.73
BI1. Frequently, I will use ETFPS	0.90			
BI2. I will keep on using ETFPS in the future	0.86			
BI3. I will choose ETFPS as my first priority in filing and payment	0.89			
BI4. I want to use ETFPS as much as possible	0.76			
Actual Use (AU)		0.93	0.93	0.81
AU1. Every month I use ETFPS	0.89			
AU2. Every 2 to 6 months, I use ETFPS	0.91			
AU3. I use ETFPS once in a year	0.88			

Table 3 indicates that the square root of the Average Variance Extracted (AVE) of each construct is higher than its correlation value with another construct, which demonstrates perfect discriminant validity in this study. The results indicated that all measures had adequate and strong reliability.

Table 3: Results of discriminant validity test

Factors	Mean	S.D	1	2	3	4	5	6	7	8	9	10	11
Attitude	4.48	1.09	0.92**a**										
Perceived Usefulness	4.81	1.14	.525	0.84**a**									
System Quality	3.71	1.39	.303	.194	0.86**a**								
Government Influence	4.02	1.12	.337	.275	.635	0.87**a**							
Perceived Ease of Use	4.43	0.89	.349	.286	.313	.316	0.77**a**						
Behavioural Intention	4.55	0.98	.583	.581	.081	.193	.295	0.85**a**					
Actual Use	4.65	1.01	.502	.433	.108	.265	.377	.606	0.90**a**				
Mass Media Influence	4.59	1.12	.587	.525	.324	.405	.422	.478	.570	0.84**a**			
External Facilitating Condition	4.67	1.07	.026	.122	-.079	-.047	-.099	.193	-.068	-.044	0.82**a**		
Perceived Security	4.65	0.99	.601	.578	.181	.285	.276	.561	.442	.581	.047	0.87**a**	
Internal Facilitating Condition	3.73	0.67	.042	.086	.124	.085	.020	.008	.022	.050	.031	-.013	0.75**a**

Note: a is square roots of AVE indicated on the diagonal.

Structural Equation Modeling Analysis

Structural equation modeling (SEM) is applied to determine which extent the model fits the relationships with the hypotheses (Veeramootoo et al, 2018). The study reported the model fit first, which is shown in Table 4. The test of overall model fit results reported a probability value of p 0.001, the significant p value indicated that the absolute fit of the model was less than desirable. However, although the ÷2 test of absolute model fit was sensitive to sample size and non-normality, a better measure of fit was chi-square (÷2) over degrees of freedom. This ratio for the proposed model was 2.96, which was within the recommended 1-3 bracket (Hair et al, 2010).

This study also reported some fit indicators. The study reported goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI) and normed fit index (NFI). Hair et al. (2006) found CFI was one of the most stable and strongest fit indices. Also, this study reported root mean square error of approximation (RMSEA) which measures the discrepancy per degree of freedom (Hair et al, 2006). GFI must be at or above 0.90; CFI must be or above 0.90; NFI must be at or above 0.90; while AGFI must be at or above 0.80 (Hair et al, 2006). Finally, RMSEA must be below 0.10, but it has also been recommended to represent a reasonable error of approximation if it is low than more restrictive threshold of 0.08 (Hair et al, 2006). Table 4 indicates these statistics results are consist with recommended levels.

Table 4: Measurement model fit indices for the research model

Fit Index	Structure Model	Recommended values
P	0.001	> 0.05
Chi-square/DF	2.96	< 3.00
CFI	0.93	≥ 0.90
NFI	0.92	≥ 0.90
GFI	0.90	≥ 0.90
AGFI	0.81	≥ 0.80
RMSEA	0.07	≤ 0.08

Hypotheses Test

After the establishment of model fit in the above section, structural equation modeling test continues to estimate path coefficients and other model parameters to maximise explained variances of dependent constructs. R square (*R2*) provided an indication of the predictive power of the independent variables to determine which extent the model fits the relationships with the hypotheses. By calculating path coefficients, the structure model was tested to validate supported or unsupported hypotheses. It was considered that *R2* values of 41%, 38%, 31%, 10% and 3%, are substantial, moderate and weak correspondingly. The model was explained with 63% of the variance in actual use of ETFPS, which was shown in Figure 2.

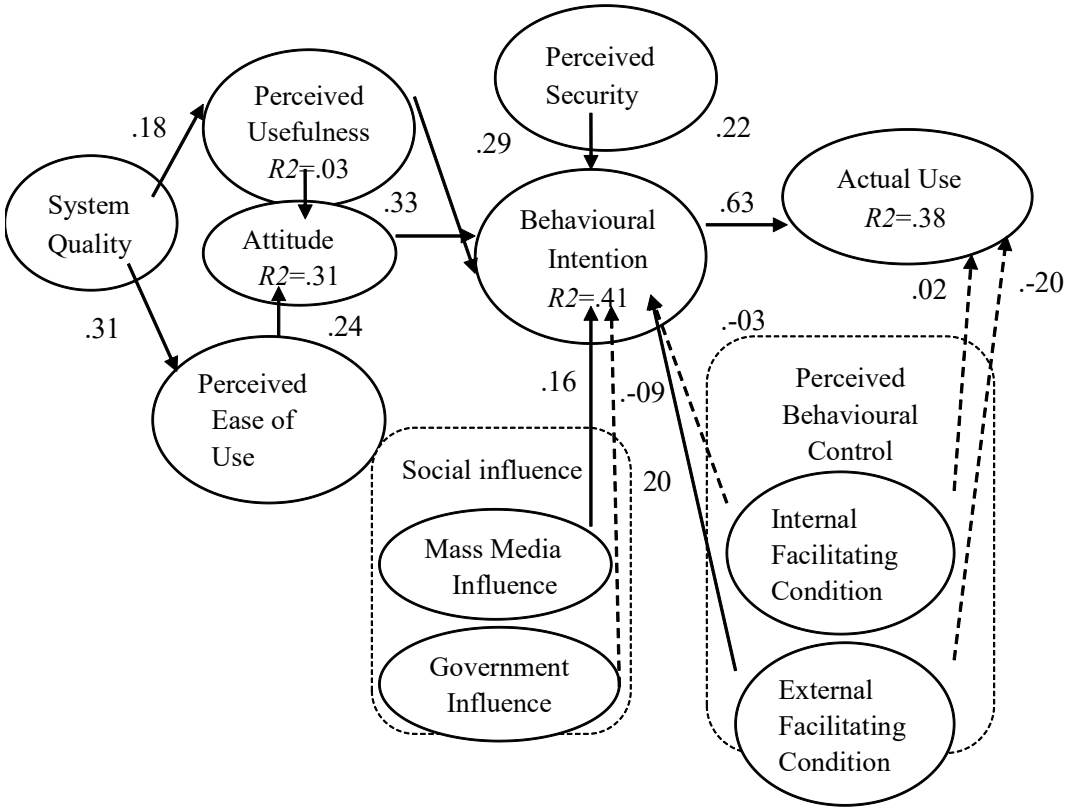

Figure 2: Test results of validated research model

Table 5 indicated that 10 hypotheses were significantly supported and 4 hypotheses were unsupported hypotheses. First, system quality positively influenced perceived usefulness at significant level of (β=0.18, $p < 0.001$) and perceived ease of use at significant level of (β=0.31, $p < 0.001$), thus supporting H1 and H2. Then, perceived usefulness positively influenced attitude at significant level of (β=0.48, $p < 0.001$) and behavioural intention at significant level of (β=0.29, $p < 0.001$), therefore supporting H3 and H4. Moreover, perceived ease of use positively influenced attitude at significant level of (β=0.24, $p < 0.001$) hence supporting H5. Furthermore, both attitude (β=0.33, $p < 0.001$) and mass media influence (β=0.16, $p < 0.001$) were found to significantly influence behavioural intention to use ETFPS, therefore supporting H6 and H7. Also, both external facilitating conditions (β=0.20, $p < 0.001$) and perceived security (β=0.22, $p < 0.001$) positively and significantly influenced behavioural intention to use ETFPS, hence supporting H10 and H13. Behavioural intention positively and significantly influenced actual use of ETFPS at significant level of (β=0.63, $p < 0.001$), consequently supporting H14. However, government influence negatively influenced behavioural intention and external facilitating condition negatively influenced actual use, which demonstrated H8 and H12 were not supported in this study. In addition, internal facilitating conditions had no significant influence on both behavioural intention and actual use, which means H9 and H11 were not supported.

Table 5: Path coefficient of the research model

Description of Hypothesis	Coefficients	CR	Sig.	Results
System Quality—->Perceived Usefulness (H1)	0.18	3.46	***	Supported
System Quality —->Perceived Ease of Use (H2)	0.31	5.79	***	Supported
Perceived Usefulness—->Attitude (H3)	0.48	10.92	***	Supported
Perceived Usefulness—->Behavioural Intention (H4)	0.29	5.90	***	Supported
Perceived Ease of Use—->Attitude (H5)	0.24	5.14	***	Supported
Attitude—-> Behavioural Intention (H6)	0.33	6.53	***	Supported
Mass Media Influence—->Behavioural Intention (H7)	0.16	3.68	***	Supported
Government Influence—-> Behavioural Intention (H8)	-0.09	-2.45	*	Not Supported
Internal Facilitating Condition—->Behavioural Intention (H9)	-0.03	-.61		Not Supported
External Facilitating Condition—->Behavioural Intention (H10)	0.20	4.35	***	Supported
Internal Facilitating Condition—->Actual use (H11)	0.02	.44		Not Supported
External Facilitating Condition—->Actual use (H12)	-0.20	-4.23	**	Not supported
Perceived Security—->Behavioural Intention (H13)	0.22	5.06	***	Supported
Behavioral Intention—->Actual use (H14)	0.63	11.96	***	Supported

Note: ***significant level and CR: critical ratio,* $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Discussion and Implications

This study presented a theoretical model to explore the factors that influence affective and cognitive perception of the citizens in the use of ETFPS. By integrating TAM with TPB, this study investigated the effect of some important factors such as system quality, perceived security, mass media influence, government influence, and internal and external facilitating conditions. Empirical test was applied to test the effect of the above factors on ETFPS, based on Tanzania's environment.

This study suggested that system quality had a positive and significant influence on perceived usefulness and perceived ease of use on ETFPS use. The finding was in line with previous study of e-filing and payment adoption (Chen et al, 2015). It means the efficiency of e-filing and payment tasks promoted perceived usefulness and perceived ease of use. Therefore, government policymakers are encouraged to keep on updating and advancing the e-tax system by making it easier to access so as to increase its acceptance. Also, government should invest extra resources in improving technical infrastructure to ensure the e-tax system performs efficiently.

The positive significant effects of perceived usefulness on attitude and behavioural intention on ETFPS use were found in this study. It implied that taxpayers perceived ETFPS to be useful for their job performance. Some prior studies also support the positive significant relationship between similar set of determinants (Al-Hujran et al, 2015; Okyere-Kwakye et al, 2016). Perceived ease of use has also been found to have a positive significant relationship with attitude towards ETFPS use. It implies that taxpayers believe that the system is very easy to use.

Furthermore, this study has revealed the significant effects of attitude on behavioural intention, which is consistent with other studies (Dwivedi et al, 2017, Okyere-Kwakye et al, 2016). Mass media influence has a positive and significant influence on behavioural intention on ETFPS use. Therefore, it is recommended that policymakers should take into account marketing ETFPS on radio, television and specific press so as to increase the citizens' awareness of ETFPS. Also, an intensive campaign about ETFPS use might be launched to reach the majority of people through accessible news networks, television, radio programmes, outlets and banners. The citizens' intention towards acceptance and use of ETFPS will increase greatly.

External facilitating conditions were found to significantly influence behavioral intention. This significant influence implies that the intention to use ETFPS depends on quick assistance from the tax agency when citizens encounter system problem. Therefore, this study recommends that government policy-makers should strengthen the system quality. The Tax agency might create a team of technician to provide close assistance for any technical problem during the use of ETFPS. Also, the equipment used for the e-tax system should be kept affordable for users. Consequently, government policymakers might negotiate with telecommunication companies to provide low-cost or even free Internet for the citizens to access ETFPS.

In this study, a strong positive and significant influence between perceived security and behavioral intention indicated that, when the citizens have confidence in the system and feel secure in using ETFPS, the favorable intention towards system use would be enhanced. This argument is consistent with previous studies (Carter et al, 2011). It is recommended that government strengthen ETFPS security so as to protect the citizens' information security and privacy.

Moreover, this study found that behavioural intention had a direct significant effect on actual use of the system. This finding is in line with previous studies (Shyu and Huang, 2011; Wang and Shih, 2009). It implies that the stronger the citizens' intentions to engage in ETFPS use, the more successful they are in the use of ETFPS.

Even though most hypotheses are supported, four of the suggested relationships were not supported in this study. First, government influence was found to have a negligible significant effect on behavioural intention. One possible reason is that ETFPS use is a newly introduced system, so government may have paid more attention on the implementation in different parts of Tanzania and not much effort expended on fostering its acceptance and use by the citizens through change management initiatives. Second, the study found out that internal facilitating conditions have a negative influence on the citizens' intention and actual use of ETFPS. This

implies that certain obstacles such as lack of control, skill and knowledge on ETFPS use prevented them from using ETFPS. Therefore, government policymakers should offer training and education to the citizens so as to enhance their skills in the use of ETFPS. Third, empirical results showed that external facilitating condition was not significant in influencing the citizens' actual use of ETFPS. It assumed that the assistance provided by the tax agency is not as high-quality or quick as the citizens' expectation. Therefore, this study suggests that government policymakers need to improve external assistance for ETFPS use.

This study made three contributions to previous studies. First, it extended previous studies by introducing system quality and perceived security, both of which are seldom emphasised in the integration model of TAM and TPB. Empirical evidence supported that system quality and perceived security significantly affected the citizens' use of ETFPS. Second, this study decomposed two important variables, i.e., social influence and perceived behavioural control, to deepen understanding of the acceptance and use of ETFPS. Specifically, social influence consisted of mass media influence and government influence, and perceived behavioural control consisted of internal and external facilitation conditions. It demonstrated that the effect of mass media influence on the citizens' behavioural intention to ETFPS use is significant. Moreover, external facilitation conditions had a significant effect on the citizens' behavioural intention. Third, this study reexamined empirically the effect of important factors from the integration model of TAM and TPB in developing countries like Tanzania and promoted the explanation ability of TAM and/or TPB that usually was applied into developed counties and emerging economies.

Conclusion

This study investigated the factors that influence acceptance of electronic tax filing and payment system in Tanzania. This was done by integrating TAM and TPB, adding two factors — system quality and perceived security and decomposed TPB variables. Fourteen hypotheses were put forward based on ETFPS context. A structural equation modeling approach was used to test the model. System quality, perceived usefulness, perceived ease of use, attitude, mass media influence, internal facilitating conditions, perceived security and behavioural intention were found to be significant predictors of ETFPS use, while government influences, internal facilitating condition and external facilitating condition were found not to predict actual use. The higher predictive power of the structural model shows that the TAM and the TPB are effective theoretical bases for investigating acceptance behaviour of e-government services such as ETFPS. The model can be applied by other researchers to understand acceptance behaviour in other e-government services. However, because each e-government service has its own idiosyncratic characteristics, researchers must add to the model specific constructs to advance its predictive power (Ranaweera, 2016).

Limitations and Future Research Directions

Although this study has theoretically established and validated the integrated models of TAM and TPB for e-government system acceptance, it had some limitations. The integrated model of TAM and TPB has been validated through consideration of users of the ETFPS. Therefore, future work may show light on other information systems such as government information system, based on social media. Also, some constructs do not show any significance, e.g., the effect of government influence and internal facilitating condition on behavioural intentions and actual use, as well as that of external facilitating condition on actual use; future research may more critically reexamine those constructs.

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Acknowledgements

The authors thank Professor Xuefeng Zhao for his enthusiastic comments on this manuscript. Constructive comments and suggestions from anonymous reviewers and the editor are appreciated as well.

Funding

This work was supported by the National Natural Science Foundation of China (NSFC) (71573096), the Hubei Province Outstanding Young and Middle-Aged Team of Innovative Projects (T201622), and the Fundamental Research Funds for the Central Universities (2017WKZDJC005).

Afr. J. Lib. Arch. & Inf. Sc. Vol. 29, No. 1 (April 2019) 79-91

Ethical Issues in the Access and Use of Information Sources in Public Libraries and Publishing Houses in Nigeria: A PAPA Model Analysis

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Abstract

Several ethical issues can impact the process of providing access to information materials for utilisation by the public. This study used the Privacy, Accuracy, Property and Accessibility (PAPA) model to investigate these ethical issues as they pertain to Nigeria. A survey research design using qualitative research method was employed through using interviews to collect data. Public library directors and publishers were targeted, and their responses were thematically analysed. Findings showed that publishing houses adhere to privacy requirements of authors and strive to ensure accuracy of information. Accessibility is provided for by libraries, though specific permissions are sometimes required to use information. Several challenges, such as plagiarism and piracy, were identified. Recommendations include the implementation of legal frameworks regulating the publishing process and the introduction of ethical course in the library school curricula.

Keywords: Ethical Issues; Information Sources; Information Access and Use; Publishers; Public Library Directors; Nigeria

Introduction

Ethics is multidisciplinary; therefore, it is applicable in virtually all the disciplines of human endeavour, including publishing, library and information organisations. Most definitions of ethics concur that it is a field of study dealing with the principles of morality, right and wrong behaviour in relation to self, others and the environment. For example, Britz (n.d.) defines ethics to be a 'branch of philosophy that studies human behaviour in terms of what is good or bad regarding relationship with themselves, others and their environment.' STANDS4 LLC (2013) posits ethics as the science which distinguishes between right and wrong doings and the moral sense by which they are discriminated. Thus, it is the philosophy or the code of conduct pertaining to what is ideal in human character and conduct, a situation where general activities of human beings are guided by what is perceived as best practices. Viewed from prescriptive ethics viewpoint, ethics provides a standard which governs the conduct of any person. Invariably, one can argue that it is the philosophical study of moral values and rules and about what is morally right and wrong. The role or purpose of ethics in the society is to promote the ideals and eliminate irregularities by providing norms and standards of

behaviour, based on human morals and values that are inclusive as opposed to exclusive by creating better moral agents (Ocholla, 2009).

Information ethics, according to the Institute for Information Ethics and Policy (2013), is the totality of issues that involves an individual's privacy and the public's "right to know". Broadly, information ethics (IE) is defined as a field of applied ethics that "provides a critical framework for considering moral issues concerning informational privacy, moral agency (e.g. whether artificial agents may be moral), new environmental issues (especially how agents should behave in the infosphere), problems arising from the life cycle (creation, collection, recording, distribution, processing, etc.) of information (especially ownership and copyright, digital divide)" (Information Ethics, n.d.). Capurro (2013) views information ethics from a narrow sense and a broader sense and largely from a technocentric viewpoint. From a narrower sense, he defines information ethics as dealing with the impact of digital ICTs on society and the environment, as well as with ethical questions dealing with the Internet, digital information and communication media (media ethics) in particular (Capurro, 2013). Broadly, he considers information ethics to be dealing with information and communication, including, but not limited to, digital media (Capurro 2013). Citing Ess, Himma and Tavani, Capurro categorises the main topics of information ethics to include: intellectual property, privacy, security and information overload, digital divide, gender discrimination and censorship. Information ethics also involves the access and use of the employee's documented information, email, personnel files, and other confidential information.

This study was aimed at identifying the issues associated with access and use of information resources by publishers and public library directors, using the PAPA (Privacy, Accuracy, Property, and Accessibility) model as a gauge.

Theoretical Background

Ethical issues relating to access and use of information sources in general and as applicable to publishers and public library directors in particular can be informed by at least three pillars. First is the United Nations Declaration of Human Rights (UDHR) (1948) which is informed by duty- based ethical theories which view information access and use from a human rights perspective. Ocholla (2009) notes that right-based theories work according to the premise that ''the right thing to do is determined by the rights that human beings have'' as for example stated in the UDHR Article 19 which stipulates that: ''everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions free from interference and to seek and receive information and ideas through any media and regardless of frontiers'' (United Nations, 1948). Second is the UNESCO/IFLA Public Library Manifesto (1994) which expounds that the fundamental human values of development, freedom and prosperity for all is tantamount to access to satisfactory education as well as "free and unlimited access to knowledge, thought, culture and information".

To further these ideals, public libraries are seen as local gateways providing access to knowledge and serving as promoters of lifelong learning and the development of independent decision-making among individuals or groups. Publishing firms as the main suppliers of information materials to libraries therefore play an important role in providing access to information materials that can be used by the general public, regardless of age, race, sex, religion, nationality, language, and social status. This includes providing access to particularised materials to users, such as linguistic minorities and people with disabilities who cannot use regular information materials (UNESCO Public Library Manifesto, 1994). The third pillar is viewed from an ethics prescriptive focusing on professional ethics as expressed in the IFLA code of ethics for librarians, publishers and other information workers (2016). This code functions as a tool which librarians and other information workers can utilise in order to form policies, address dilemmas they experience, to improve professional self-awareness and to ensure that their conduct towards their users and society in general is transparent. The code of ethics focuses on six issues: access to information; responsibilities towards individuals and society; privacy, secrecy and transparency; Open access and intellectual property; neutrality, personal integrity and professional skills; and colleague and employer/employee relationship. Mason's (1986) Privacy, Accuracy, Property, and Accessibility (PAPA) model is echoed in these six

principles. Using four variables, this model illustrates the impairment that can befall an individual as a result of the unethical or misuse of information or information technology (UKEssays, 2017). According to Mason (1986), privacy explains the nature and the type of information that people can keep to themselves and which they may not be forced to reveal to others except if directed by the court of law. Accuracy, he notes, refers to the person(s) liability to be held responsible for errors, authenticity and fidelity of the information, while property deals with ownership issues, the fair prices for the exchange of information and access to the resource. Accessibility, in the author's view, describes the right or privilege of an individual or an organisation to obtain information and under what conditions. Thus, the PAPA model conceptualises what type of information a person must reveal and with what kind of safeguards, the nature and the type of information one can keep to oneself, and who is responsible for errors, authenticity, fidelity and accuracy of information. It also addresses the issue of property ownership in terms of who has the copyright to the channels through which information is transmitted and accessed. Lastly, the type, the nature and the amount of information a person or an organisation has the right or privilege to access and use under what safeguards.

Context of the Study

In Nigeria, the public library system functions at three levels: Federal, State, and Local. At the Federal level, the National Library of Nigeria is categorised as a public library because it is serving all categories of users at the national level (Ogbonna, 2010). At the state level, all public libraries are generally under the umbrella of the State Ministry of Education; in some cases, it could be under the Ministry of Information or the Ministry of Science and Technology. Whichever ministry that supervises public libraries in the state, they are administrated by library boards. The Library Board is responsible for budgetary and all administrative responsibilities, while selection and acquisition of information materials are the responsibilities of the professional librarians. By 2015, there were 316 public libraries in Nigeria (Librarians' Registration Council of Nigeria, 2015), including the 36 public library boards in all of the six geopolitical zones headed by a director. At the local level, the majority of public libraries are either affiliated or supervised by local governments, communities or individual proprietors; in some cases they serve as branches of state library boards. Provision of information sources, service delivery and all administrative activities are channelled through the State Library Board. In line with the recommendations of the IFLA Public Library Service Guidelines, the public libraries provide access to information materials regardless of any discrimination to all community members (Koontz and Gubbin, 2010). Though mainly concentrating on providing print materials, provision of e-books and the Internet is becoming more and more a feature in public libraries (Salman, 2016).

Publishing firms in Nigeria are fast growing in number. Olaniyi (2012) identified ten major publishing firms in Nigeria, out of which five were adjudged and rated top, based on their prominence, experience, reputation, and integrity. These firms are: University Press PLC, Literamed Publication, Kachifo Limited, Evans Publishers Limited, and Cassava Republic Press. Others include: Onibonoje Publishers, Havilah Books, Heinemann Publishers, Oxford Press, and Gaskiya Press. All these publishing firms have their head offices located in Ibadan in the south west geopolitical zone of Nigeria. These publishing firms publish both print and non-print information materials. Common materials published are academic textbooks, fiction, monographs, grey literature, biographical works, among others. They either solicit manuscripts from reputable authors who have made a mark in their areas of specialisations or accept unsolicited manuscripts from authors, which are then subjected to the normal editing processes before publication.

Within the recent social history of Nigeria, unethical behaviour seems to have become entrenched among members of society. Ogundele et al, (2010) identified these as a breakdown in morals, work ethics, discipline, social responsibilities and general civility. According to Ezendu (2010), for the Nigerian society to re-develop an ethical culture, conflict of interests need to be eliminated; in addition, the following need to be in place: equitable action towards all stakeholders, the appropriate application of technology for development and full acceptance of responsibility for actions or in-actions. Ezendu (2010) partly blames some of the problems on poor

organisational culture, lack of integrity and educational deficiency by Nigerian citizens. From this background, it is clear that access to information and the effective utilization thereof as espoused by the PAPA model and the IFLA code of ethics for librarians and other information workers can play a major role in enhancing society's understanding of their human rights and roles in creating a society that is just and fair to all citizens in the country.

According to Britz (n.d.), there are quite a number of positive ethical opportunities in the access and use of information by publishers and public library directors such as electronic monitoring of workers in their respective places of work with the use of electronic means which has been proved to increase productivity of the employees. The digital revolution also averts the trouble of physically carrying large volumes of conventional information around. Apart from the electronic information access and use, a lot of ethical opportunities can also be derived from the access and use of conventional information services. In Nigeria, most academic and school libraries are not normally open during the holidays and weekends.

A public library serves as the only major alternative for students to carry out assignments, read and organise themselves in order to support their academic activities (Salman 2016). Civil servants, artisans, politicians, clergy, retired persons, businessmen and businesswomen, and children can all benefit from these numerous information opportunities which in most cases should be free of charge. Abubakar (2013) posits that one of the opportunities in the access and use of public library information services in Nigeria is the alleviation of poverty. Public library services in Nigeria can go a long way in poverty alleviation if full access and use of their services is guaranteed. Users can entertain, inform and educate themselves in the public library. They could get employment opportunities, information on management of small scale industries, personal information for development, on-line publishing, social interaction, and any other business opportunities.

Problem and Purpose of the Study

As indicated above, the unethical use or misuse of information often results in the impairment of an individual or, as in the case of Nigeria, a society. Libraries and publishers, as the primary sources for the production and dissemination of information materials to libraries, could play an important role in the development and strengthening of a society's core values and understanding of human rights by making accessible information materials to all without any discrimination. Through the accessibility and the utilisation of these materials, the social, cultural and economic well-being of a society can be sustained, improved and further developed. However, Fairbairn (2012) found that despite the availability of more than two hundred and thirty thousand public libraries in the developing countries of the world, their services are largely untapped to reach people with vital information in areas such as agriculture, health, employment, education, and poverty reduction. In contrast, Aina (2012) established that countries that have a well-developed public library system perform better in all areas of human development.

Though a number of articles have been written on the ethical issues in information access and use (Mason, 1986; Focht and Thomas, 1994; ALA, 2009; ALA, 2010; Parrish, 2010; Taherdoost et al, 2011; and Britz, n.d.), they are limited in scope, not addressing ethical issues in the access and use of information resources as applicable to publishers and public library directors in developing countries, and modeling PAPA. Nigeria shares a lot with the world in relation to information ethics issues such as dealing with copyright, plagiarism, usage, social media, ownership, digital divide, privacy, accuracy, property and accessibility, which is likely to be affecting the professional activities of publishers and directors of public libraries in carrying out their daily activities. It is against this backdrop that this study seeks to investigate ethical issues in the access and use of information resources as it affects publishers and public library directors in Nigeria, adopting the PAPA model analysis.

The following research questions were considered:

- What are the nature and type of information being acquired/published in relation to privacy? **(Privacy)**
- Who is held responsible for errors associated with the access and use of information? **(Accuracy)**

- How is the issue of copyright managed in accessing and using information?
- How is licensing and industrial property managed/adhered to in accessing and using information?
- How is plagiarism managed in accessing and using information? **(Property)**
- What are the procedures and processes involved in accessing and using information? **(Accessibility)**
- What are ethical challenges in the access and use of information resources by publishers and directors of public libraries?

Research Methodology

A survey research design was adopted for this study, while interpretivism research paradigm was deployed. The qualitative research method was selected as the researchers wanted to gain a deeper understanding of the ethical issues experienced in information provision to their identified clients or user base, by both the groups identified for the study. Interviews, done in 2014, were used as the data gathering instruments. The population of the study consisted of thirty-six (36) public library directors representing each federal state in the 6 geopolitical zones, and the publishers from the 10 Nigerian publishing firms identified by Olaniyi (2012). Six (6) public library directors, each representing one geopolitical zone, and five (5) senior staff members from the 5 top-rated publishing firms were purposively selected based on the researchers' judgment of their expertise to provide meaningful answers to the questions. Appointments to conduct the interviews were made before it was physically conducted to the eleven (11) respondents. The data gathered were thematically analysed and discussed.

Findings and Discussion

The findings of the study are discussed in the following sections. Demographic data captures the demographic characteristics of the respondents in terms of their designation, organisation, years of experience, and qualifications. The second part of the analysis is the application of PAPA model concept and the responses from the two categories of the respondents.

Demographic Characteristics of the Respondents

The demographic information of respondents is presented in table 1 below.

Table 1: Demographic information of the respondents

Respondent	Designation	Organisation	Years of Experience	Highest Qualification
Directors of Public Libraries				
R 1	Director	Public Library	28	Master in Library and Information Science (MLIS)
R 2	Director	Public Library	32	Master in Library and Information Science (MLIS)
R 3	Executive Director	Public Library	23	Bachelor of Library and Information Science (BLIS)
R 4	Deputy Director	Public Library	34	Bachelor of Library and Information Science (BLIS)
R 5	State Librarian/ Director	Public Library	24	Master in Library and Information Science (MLIS)
R 6	Executive Director	Public Library	31	Bachelor of Library and Information Science (BLIS)
Publishers				
R 7	Senior Editor	Publishing Company	16	Master of Arts (English) (MA)
R 8	Senior Manager Production	Publishing Company	12	Postgraduate Diploma (Graphic) (PGDG)
R 9	Acting General Manager (Publishing)	Publishing Company	21	Master of Arts (English) (MA)
R 10	Senior Editor Company	Publishing	17	Master of Communication Arts (MCA)
R 11	Senior Manager Production	Publishing Company	14	Master of Communication Arts (MCA)

Table 1 above indicates that though there is a variance in title description, all of the library respondents were senior managers in the libraries; and as such, they have the same responsibilities and roles in the provision and dissemination of public library services. The respondents from the publishing houses were also mainly senior staff responsible for either the production or the publishing of materials.

Though the findings showed that the respondents from the public libraries had more years of work experience than the publishers, the respondents from the publishing houses were also highly experienced individuals as the least experienced has 12 years of service. All the respondents were also found to be educationally well qualified for their positions, as there were seven (7) respondents with master's degrees, one (1) with a postgraduate diploma in graphic, and three (3) with bachelor's degrees. Thus, all the respondents possess a first degree and above in their various disciplines.

PAPA Model Concept and Applications

Privacy

In the first question, the respondents were asked to describe the nature and type of information acquired or published and how issues of privacy are addressed.

With respect to both the libraries and the publishing houses, the respondents revealed that educational books for schools and colleges were mostly acquired or published. Respondent 5 stated that "materials such as fiction, reference, serial publications and recreation are the type of information we acquire in this library." Respondents 2 and 8 also revealed that relatively few digital information sources were either acquired by the libraries or produced by the publishing houses. Within the libraries, the respondents indicated that privacy issues were addressed by complying with the Nigerian Copyright Act of 2004, while respondent 7 from a publishing house indicated that "they ensure that the content of the information materials is not revealed until it is officially launched". The publishing house respondents also indicated that they adhere strictly to the author's wish or instructions in respect of privacy issues in order not to violate his or her right over the publication. In this regard, Britz (n.d) warns that the right of the author to control certain personal and private information must be acknowledged and adhered to by information professionals, while Luk (2012) points out the necessity to deal with cases of misconduct against information privacy with a well-defined disciplinary mechanism so as to curb unethical acts. However, depending on the policy of each specific journal/ publishing house, authors can be expected to supply certain information such as a declaration of author contributions, conflict of interest statement and a declaration that the work has not previously been published either as a whole or in part. (Elsevier, 2019; NISC, 2019). Isaacs (2015) clearly points out the pitfalls that can befall a publisher who is not vigilant in doing careful checks before accepting materials for publication.

Accuracy

Other than the issue of who is responsible for the accuracy of information published or acquired, the Mason's (1986) variable "accuracy" also concerns who will be held accountable for the accuracy of the information. The second question therefore wanted to establish who is responsible to ensure authenticity and that errors are traced before making available for access and use.

The responses from the publishing houses revealed that in the publishing industry all stakeholders such as publishers, authors, readers/ assessors, and printers could be held responsible for errors, authenticity and fidelity of information when it is either published or made accessible to the public. The respondents indicated that errors can occur at any stage of information creation, processing and dissemination process, but that they strive to ensure that before any information is published, the reliability and the authenticity of the contents are authenticated. One of the respondents indicated that a workshop was organised involving five African countries with the aim of identifying the challenges concerning errors, finding lasting solutions to these challenges, and looking for ways to handle the errors and to establish who should be responsible for such errors in the process of information processing and communication. This was acknowledgement that errors can and, sometimes, do occur in the provision of access to information to the public. These errors can be committed by any of the stakeholders in the information provision sector. The respondents also indicated that proper management of errors is important in addressing ethical issues. These findings are supported by Enago academy (2019) who indicated that ethical challenges such as errors could occur at any stage of the publication process and could range from simple typographic errors to the wilful manipulation of a study's results or its findings. Jain (2010) confirms that falsification or fabrication of results can occur from time to time especially in the medical field, which erodes the confidence in the results of some publication in this field, thus affecting the utilization of the information materials. Respondents 9 and 11 alluded to the fact that before any information is acquired and published by their publishing houses, the reliability and the authenticity of the contents are ensured whereby the information is assessed by a competent person(s) before a final decision is taken. There is no mention of peer review of papers before publication which is an important tool for accuracy monitoring

Among the library respondents, respondents 1 and 6 indicated that before acquiring any materials for their libraries they try to establish the authority of the author and the reliability of the content during the collection development process by way of checking the credentials of the authors

Property

The aim of the question was to establish how are the issues of copyright (moral and material), plagiarism, and licensing managed in the process of providing access to materials and the use thereof.

On the issue of property, respondents 7, 9 and 11 from the publishing houses revealed that copyright belongs to the publisher of such manuscript if it has been bought. This implies that property rights become that of the publisher when the information is bought from the author, though the author's name still appears on the information material. The respondents from the public libraries indicated that according to them the property rights always belong to the author or originator of such information. The respondents also indicated that any information materials published based on author-publisher's relationship attracts both moral and material rights for the two parties, i.e., the author keeps the original copyright of his work, while the librarian or the publisher helps to protect these rights. Hansen (n.d.) explains that while respecting the rights of the author, copyright laws provide libraries the right to collect and make accessible copyrighted materials; and that based on the principle of fair use, certain amounts of copyrighted materials can be made available to users without having to obtain the permission of the copyright holder. Mason (1986:9) points out that despite continued efforts to safeguard the intellectual property rights of authors by way of copyright, patents, encryption and oaths of confidentiality, problems in this regard are still very common, and they are becoming more so with the continued digitisation of information.

Plagiarism is increasingly considered to be a major blow to intellectual property with arguments whether open access increases or decreases plagiarism or both (Ocholla and Ocholla 2016). The respondents from both the libraries and the publishing houses revealed that plagiarism is handled through appropriate legal actions. Jain (2010) points out that plagiarism is but one of the forms of misconduct experienced by publishers and needs to be addressed using appropriate measures. According to the author, once a document is presented to an editor, it goes through a chain of events between the author and the editor in order to prevent misconduct. Proper attribution of sources of information or content is quite essential -for preventing plagiarism

The respondents from the publishing houses indicated that the user of the information is expected to pay the price for exchange of the information. Respondent 9 indicated that this was because the user of the information is benefitting from the intellectual property of the author, while respondent 10 indicated that the price for exchange of the information is a win-win situation for both the author and the publisher, because the author receives royalty, while the public receive value for their money. Millcity Press (2017) advocates that in setting a price for information materials, it should be taken into account that the retail price should befit that of similar materials in the author's genre, especially as prospective buyers are spoiled for choice. . Unfortunately authors of scholarly publications such journal articles, monographs and book chapters hardly or never receive royalty at all. Publishers still enjoy the material benefit of publications while authors largely enjoy the moral benefit by the virtue of retaining their names in publications.

Accessibility

Access information is a human right that should not be taken for granted as highlighted in the theoretical background of this paper. The respondents were asked to identify the processes involved in accessing and using information. The purpose of a public library - as also articulated in UNESCO public library Manifesto is to provide access to information sources and services to the general public and the ability to utilise these sources either in the library or at home. The library respondents indicated that the target audience was provided with adequate and effective access to the information once such information is acquired and made available in the library. This viewpoint was also voiced by respondents 10 and 11 from the publishing houses. According to the library respondents, once a source was made available, the libraries provide access to it and with it the possibility to use it. According to Kibugi (2014), the Tshwane Declaration on Information Ethics (a first African contribution to addressing ethical issues) declared the right of all people to have access to information, and that they should have the ability to benefit from it. This should be made available, accessible and affordable in an equitable manner to the benefit of the community as a whole. This is in line with the

ethical principles as espoused by IFLA to guide the ethical behaviour of library and information professionals (IFLA 2007). These principles state that libraries are responsible for providing their users with access to the library's holdings and access to any other publicly accessible information materials. In addition, barrier- free access should be ensured.

However, respondent 3 indicated that access to and utilisation of information is not always automatic because in some cases permission must be sought by individuals or organisations from the author or the originator of the information to use some of the information, for example, to use the lyrics of songs or to reproduce sections of a published work.

Ethical Challenges in the Access and Use of Information by Publishers and Public Library Directors

The fifth question wanted to establish what challenges are faced by publishers and libraries regarding privacy, accuracy, property and accessibility in providing access and the ability to use information.

The respondents revealed that a number of factors were responsible for the challenges experienced in providing access and use of information resources and services. Challenges identified were the following: lack of sufficient competent professionals responsible for the publication of information, lack of respect for legal frameworks that protect access and use of information, a depressed economic situation, insufficient information materials, high cost of acquiring information, and prevalent piracy and plagiarism activities. Among all the respondents, but more specifically the library respondents, lack of skills in digital information management was mentioned as an issue. The librarians mentioned that they lacked the technical skills to create, maintain and curate collections in a digital format. Some of these challenges were also mentioned in a study by Mbofung and Popoola (2014) among Nigerian university librarians who indicated low awareness and endorsement of legal and ethical issues such as privacy, confidentiality, equal access to information, accuracy and copyright of information. This also seems to be the case in public libraries. According to Hoq (2012), the extreme proliferation of information materials and the explosion of ICT tools providing access to information bring to the fore issues such as privacy, piracy, the right to access to information, and freedom of expression. These issues require the information professional to be skilled and experienced enough to find solutions to these ethical dilemmas in order to keep providing equitable and just access to information.

The last question wanted to find out from the respondents how these challenges can be overcome.

The general consensus among the library respondents was that improving the educational level of the populace and awareness of information and knowledge accessibility and use will go a long way in overcoming some of the challenges identified. Among the respondents from the publishing houses, respondents 7 and 10 suggested ensuring that information resources were error- free through the process of editing and re-editing; engagement of external assessors (peer review) - as also articulated in UNESCO public library Manifes to for manuscript review; and the implementation of the legal deposit law by encouraging authors to make deposits of the prescribed number of copies of their publications with the National Library of Nigeria or the public library. They also suggested that government should intensify its efforts in the war against piracy and empower the appropriate bodies with adequate financial and material resources to deliver information sources to their users. Both groups of respondents mentioned that digital skills are important for both publishers and public library directors so that they can be well acquitted with how digital information are managed, accessed and use.

Conclusion and Recommendations

Ethical principles and issues as modelled by Mason's (1968) PAPA model seem to be adhered to in part by most of the library directors and the publishers. For instance ethical issues in the access and use of information sources and services such as privacy, accuracy of information services, property and accessibility are to some extent respected. It was however not clear from their answers how private information as pertaining to the authors and library users are safeguarded against misuse. It can therefore be speculated that strong legal frameworks or ethical guidelines for the ethical behaviour of

both publishers and library managers were not in existence; and if available, it was not strongly enforced. Several challenges identified such as lack of sufficiently competent professionals, lack of respect for intellectual property high- acquisition cost leading to insufficient information materials, piracy and plagiarism impact on the provision of services of a high ethical standard. The kinds of responses received from the respondents also beg the question whether the concept of information ethics and the ethical issues involved in the provision of access to information materials for utilization by the public are clearly understood by these information professionals. It is on this premise that this study is suggesting the following recommendations:

1. That information ethics as a course should be included in the academic curriculum of Nigerian library schools or be part of continuous professional development (CPD) activity.

   This will clarify the ethical issues concerned with the whole process of the provision and dissemination of information. Gaining this knowledge will assist these future information professionals in their efforts to implement properly the legal and the moral frameworks governing the publication and making accessible information materials to the public in Nigeria.

2. Practising information professionals should be sensitized about ethical issues as espoused by the PAPA-model by way of attending seminars and other similar trainings or workshops.

3. The Federal Government of Nigeria should as a matter of urgency set up an information ethics committee whose members consist of information professionals, legal practitioners and IT experts to address issues concerning ethics in the information sector.

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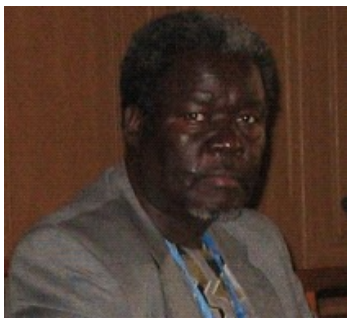

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Afr. J. Lib. Arch. & Inf. Sc. Vol. 29, No. 1 (April 2019) 93-101

Utilisation of Mobile Phones in Accessing Agricultural Information by Smallholder Farmers in Dzindi Irrigation Scheme in South Africa

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Abstract

ICTs have revolutionised agricultural information services at every level in the agricultural sector, thus impacting rural development and catalysing poverty alleviation strategies. This has largely been the case with small-scale farmers in rural areas in developing countries where mobile technologies have penetrated more than most other ICT tools. However, in some of the farming environments, mobile phone use is largely driven by agricultural extension workers. This paper seeks to examine the way mobile phones are used for information access in situations where agricultural extension workers are a critical intermediary in the agricultural information services. Interviews were conducted with 10 randomly selected farmers who were part of the Dzindi irrigation scheme. The findings were that from the variety of information available to the farmers the most important source was the extension officer. The extension officer and the radio were indicated to be the most reliable independent sources of information. The other sources, such as the radio, family members, and friends, suppliers of chemicals, books and magazines, were only considered reliable if the information could be verified or vouched for by the extension officer. Increasing the information handling skills of extension officers, training of farmers to use smart features of their phones and promoting the usual face-to-face communication and use of conventional methods, which is what usually gives rise to the mediation of mobile phones, were recommended.

Keywords: Mobile phone, Agricultural extension, Agricultural information

Introduction

Information Communication Technologies (ICTs) pervade all areas of life with different ICT tools and technologies being used in a variety of ways across the globe. The impact of ICTs on socioeconomic development, particularly in the developing world, has led to the ICTs for development (ICT4D) concept. Agriculture is the mainstay of most African economies (Ponelis and Holmner, 2015); and as such, the role of ICTs in improving agricultural productivity is of concern to the majority of development agencies working on the continent as part of their ICT4D agenda. Etzo and Collender (2010) stressed this critical role of ICTs in development, citing the informed observation of a renowned economist Jeffrey Sachs who had stated that "mobile phones are the single most transformative technology for development". With a current mobile subscription rate of over 960 million in Africa, a penetration rate of over 80%, and more than 216 million people using the Internet (Business Day, 2017) , this observation

is even more insightful today than it was back then. This is huge in comparison to the traditional information sources that rural people, in particular farmers, have had access to such as neighbours, friends and relatives, radio, public extension officers, to a lesser extent – television (TV), newspapers, agro-input suppliers and even their buyers (Mittal et al, 2010). Mobile technologies have helped close the digital divide turning a continent once famed for being the black hole of information capitalism (Carmody, 2013) into a well-connected physical terrain.

In the face of all this advancement, there are still areas in South Africa, mostly poor rural communities, where lack of information still happens. Dzindi Village in Thohoyandou in the Vhembe District of Limpopo Province is one such rural area, and was the location of this study. The Dzindi Village falls under the Thulamela Municipality in the Vhembe District of Limpopo. The area has 659 households and a population of 2787 people (Statistics South Africa, 2011). The village is categorised as 100% traditional or tribal, and most of the people there earn their livelihood from subsistence farming, with 85.5 % of the population earning less than R38 200 per year. Mobile phone ownership is at 93%, and Internet access through the mobile phone is at 32% (Statistics South Africa, 2011).

The biggest producer of locally relevant agricultural information in the area is the University of Venda through its Faculty of Agriculture. The researchers surmised that if the university library could help in providing this information to farmers as part of its community engagement beyond the university walls, that would address the gap in the researcher-extension officer-farmer information provision chain. The key, however, would be to find a sustainable way of providing the information, hence the investigation into mobile phones use under extension services. Dzindi irrigation scheme was chosen because almost all its members are full-time farmers, and the extension officer who services them is a government employee whose major role is to service the farmers under the irrigation scheme.

This paper seeks to examine the way mobile phones are used for information access in situations where agricultural extension workers are a critical intermediary in the agricultural information services. This paper argues that the information intermediary role of extension workers is not diminished by the adoption of mobile technologies but rather better enabled through bringing in efficiencies that may be difficult to achieve in the traditional format of this role. Given that background, the study's objectives were to: i) find out what are the preferred sources of information by the Dzindi Irrigation Scheme small-scale farmers and the extension officer; ii) find out how both parties use mobile phones to access farming related information; iii) investigate how the farmers perceive the importance of mobile phones to their farming practice; and iv) to find out how extension services available to the farmers are enhanced by the use of mobile phones.

Literature Review

Role of mobile phones in agriculture

Mugwisi et al, (2015), citing studies in India, China and Uganda, argue for the importance of mobile phones in agriculture that can help reduce information asymmetry, increase prices and improve extension services. Mobile phones are important in helping to provide information on appropriate seed varieties, weather patterns, dealing with pests and diseases (Mabe and Oladele, 2015 and Das, 2013). Further to this, Das (2013) indicates that information on land claims, resource rights and rural infrastructural projects is also obtained through mobile devices. Through the whole agricultural cycle – from crop planning, buying seeds, planting, growing, harvesting and packing, and through to selling – extension workers can leverage ICTs such as mobile phones to provide the needed information (Asad, 2014).

Masuka et al (2016) state that both private and public agricultural information provision has enabled mobile phones to become a key tool in the communication of this kind of information. The tool has brought some advantages that include access to information on the supplies markets and prices, knowing where to sell products and applicable prices, as well as accessing data from weather advisory services and consulting with extension workers. In their study of how mobile phones are used by farmers in India to access information and their impact on farm income and cost of production, Mittal and Mehar (2012) found out that they were key to seed variety selection, best cultivation practices, protection from weather-related damage, and handling plant disease. Compared to traditional ICTs such as radio,

TV and newspapers, farmers are just passive recipients who can't interact with and assess the value and relevance of information as it is the case with mobile phone based information access. As a communication tool, then the mobile phone provides for both forward linkages to the food industry, which provides the market for the products and backward linkages to the suppliers of inputs needed.

There are, however, challenges that mobile technologies are not able to deal with that part of the environment in which farming is taking place in Africa. Such challenges include that of poor interconnectivity, power outages, poor ICT infrastructure, lack of computer literacy skills, provider-driven rather than user-driven information and so forth (Akpabio, 2007). Carmody (2013) argues that this poor enabling environment results in what he terms "thintegration", implying a surface or superficial and regressive incorporation of ICT tools that have a negative rather than a positive effect on the adopting communities. He contends that there are hierarchically structured social and economic networks that perpetuate the types and levels of power in existence both at an international and at a local level. To that extent, the mobile phone as a tool entrenches such power relations as they flow from such social networks. Carmody (2013), unlike what the economist Sachs argues above, believes that mobile phones actually entrench the continent's technological dependency and underdevelopment. Although this may be a valid argument, it does not negate the fact that mobile technologies have and continue to play a critical role in helping many get information that is critical to their livelihoods and therefore key to the development of their communities.

Despite the huge penetration of mobile phones in Africa, Aker (2011), Oladele (2011) and Mittal and Mehar (2016) indicate that government extension services are still the major source of agricultural information in developing countries, and this is supported by Benson and Jafry (2013) who put the number of extension workers in developing countries at 800 000.

Challenges of Extension Services as a Source of Information

Whereas Benson and Jafry (2013) state authoritatively that the demand-driven or participatory model is very effective, Gido et al (2014) advocates for a balanced combination of supply and demand-driven extension as informed by the unique agro-ecological and socioeconomic characteristics of the farmers concerned. Gido et al (2015) further gives the example of the Strategy for the Revitalization of Agriculture in Kenya as being an extension-driven project that is based on the generally agreed perception that extension is critical to agricultural productivity and poverty reduction. Nevertheless extension workers are also deemed not to be the best providers of agricultural information as they are likely to be prejudiced by their personal views and those of their preferred sources and the infrastructure and network support biases thereof (Wheeler et al, 2016). Issues of physical availability of extension workers is a challenge with a study by Chellapan, Swaminathan and Thiagarajan (2014) in India indicating a high extension staff to farmer ratio of 1:2000 in some areas. This also brings in implications of the timeliness of the information that farmers get as they may get information when they no longer need it, and this is a big disadvantage because, in farming, timeliness in getting the right information can mean a high rate of post-harvest wastage and famers receiving poor prices for their crops. Wheeler et al, (2016) thus advise a 'multiple sources of information' model facilitated by many channels that speak to the unique needs of different farming communities. Wheeler et al (2016) criticizes the traditional extension for being too focused on raising yields instead of aiming for sustainability.

A major critique, especially in the context of Africa, is that not only is the method too costly and ineffective but also that it can only work if the institutional frameworks that form the environment in which farming takes place are well developed and effectively operational (Wheeler, 2008). The same sentiment is shared by Ponelis and Holmner (2015) who argue that there is a threshold outside of which any form of development assistance may not be as effective without requiring that institutional quality be improved first. While acknowledging the challenges that extension has, Benson and Jafry (2013) point out that a multiplicity of factors affect agricultural production in varied and complex ways such that it is difficult to isolate one variable only, such as extension, and quantify it. Davies (2008) indicates that though studies on the rates of return of

extension to agriculture in Southern Africa are usually accepted with skepticism, there is a general agreement that extension has a generally positive impact on agricultural productivity.

Use of Mobile Phones in Extension Work

The information intermediary role of extension workers is not diminished by the adoption of mobile phones but rather better enabled through bringing in efficiencies that may be difficult to achieve in the traditional format of this role. The common error of being technocentric in many ICTD4 projects (Mamba and Isabriye, 2015) has seen many well-meaning projects, meant to improve the lives of the poor, fail as the social context of the implementation environment is ignored. An example is that made by Anastasios, Koutsouris, and Konstadinos (2010) of developed world farmers who are sophisticated ICT wise and have access to ICT tools such as farm computers and Internet access, yet they still prefer the traditional personalised communication of the extension worker and varied sources of information with a bias towards printed sources. The general bias towards face-to-face communication, as a means of getting information, that is displayed by farmers (Akpabio, Okon and Inyang, 2007, Anastasios, Koutsouris, and Konstadinos, 2010 and Mittal and Mehar, 2016) means that extension services are still a critical component of the agricultural productivity equation.

The adoption of ICTs, such as mobile phones, should thus not be erroneously perceived to mean a movement away from face-to-face communication but rather the opposite, which is leveraging ICT tools to enhance face to face communication. This means that the two aspects, mobile technologies and traditional extension services, do not have to conflict or be mutually exclusive.

In a study on mobile phone use by farmers in Pakistan, Salman (2014) indicates how their use has allowed farmers to transition to cash crops and set themselves on a path for poverty reduction and economic development. He states that access to mobile cell coverage enabled the farmers to improve farmer-to-trader coordination and reduce post-harvest losses for perishable crops, improve farmers' knowledge of the planting date and increase price of crops received by farmers. Cole (2013) evaluates a mobile phone based extension service in India where farmers phone to get help from extension officers and other agricultural experts. Similarly, the results showed that the use of the service got farmers to adopt high-value crops and gain more knowledge of their crops. Compared to the traditional or the conventional methods, the service enabled timely access to relevant and highly practical information and advice to farmers at relatively lower cost.

Focusing on the smart aspects of mobile phones, Drill (2012) speaks of the apps that are being developed for extension use in information delivery, where information originating from local research institutions is cascaded to farmers; collaborative research, where mobile phone apps are used to collect data to be shared by researchers and other participants; and self-assessment, which focuses on use of apps for collecting data for personal decision-making. Farmers, on their part, acknowledge the importance of ICT tools in enhancing their service delivery abilities (Mabe & Oladele, 2015), though there is a general sentiment that they lack the skills to use such tools and need to be trained on them (Arokoyo, 2010; Ajayi, Alabi and Akinsola, 2013; and Mabe and Oladele, 2015).

Methodology

The approach that was chosen was that of a single case study of Dzindi Irrigation Scheme whose farmers largely survive on accessing the services of an extension worker. A comprehensive interview was conducted with the extension officer who services the 110 small-scale farmers who form the Dzindi Irrigation Scheme. The interview questions for him focused on (i) the agricultural information needs of farmers he was aware of; ii) his preferred sources of agricultural information and those of farmers and ii) his usage of mobile phones as an information access and communication tool.

Both Creswell (1988) and Green and Thorogood (2009) offer a minimum of 20 respondents as a sample size when conducting interviews for an accurate picture of the sample. However, because there is not enough consensus on the issue, Guest et al (2006), as cited in Mason (2010), recommends six as a minimum. Interviews were done with ten (10) randomly selected farmers from the 110 who were part of the irrigation scheme. The researcher had

been introduced to the famers beforehand during the farmers' weekly meeting with the extension officer. On that same day, two respondents were interviewed; and thereafter, random visits were made to the farmers twice, with four farmers being interviewed in each case. Any of the farmers belonging to the irrigation scheme who was found working on his field was interviewed. The farmers were questioned on their information needs, preferred sources of information, and use of mobile phones to communicate with the extension officer and among themselves on farming issues. Thematic analysis was applied on the data, and this was done as per the various steps provided as guidance by Braun and Clarke (2006).

Findings

From the interview transcripts, a number of issues emerged both from the farmers and the extension officer. The findings are as follows:

Farmers Preferred Sources of Information

Nine (9) of the 10 respondent farmers were males who had never lived anywhere else except Dzindi village. Only one of the respondents had only been staying in the area for just over 40 years. Eight of these men were the sole decision makers on farming issues and the other two respondents had shared decision-making powers, one with his wife and the other with his brother whom he co-shared the farm with. All the respondents were fluent in speaking, reading and writing in Venda and spoke at least Tsonga or Sepedi as a second vernacular language. On a scale of poor, fair and good in reading and writing English, nine of the interviewees indicated they were fair on speaking and reading. One (1) farmer indicated he had never been to school and was poor on all the three aspects. Household sizes ranged between three and six people. The plants that are largely planted are cabbage, maize, spinach, sweet potatoes, mustard, carrot, beetroot, and butternut.

The results from the interviews of the farmers revealed the importance of the extension officer to agricultural productivity and sustainability and the critical importance of mobile technologies in enhancing that role. The extension officer was indicated as the most important source of information by all respondents with emphasis being expressed on this point by both voice intonation and body language. Responses such as *"our Extension Officer help us a lot. He tells us what and when to plant and what fertilizers to use…we get much advice from him. He also helps us to get quality seed"* expressed such sentiments. Radio, family members, friends, suppliers of chemicals, books, magazines such as Farmers Weekly and neighbours were the other sources that farmers used. Of all these sources, the extension officer and the radio were the two sources that were deemed most reliable. One farmer even indicated that he would prefer whatever information he obtained from any other source to pass through the extension officer first to be verified to receiving it directly, say from a library such as the University of Venda Library. He implied this, stating that "*the information that I will need is when it's being brought by the extension officer*."

Extension Officer's Preferred Source of Information

Only one agricultural extension officer was attached to service the Dzindi Irrigation Scheme where he had been deployed to work by the Vhembe District Department of Agriculture for the past 20 years. Permission had to be sought from the department as part of the study's ethical clearance. Though they appreciated the interest in having a study done in their area, they lamented the lack of capacity to implement a lot of the recommendations that come from many such studies. They then indicated that theirs was just an administration role from their offices and that the extension worker would be the best person to talk, lest they speak out of turn as to what was really happening on the ground.

The extension officer also serviced other farmers in the area who were not part of the irrigation scheme. He has a diploma in Agriculture. The irrigation scheme has a physical satellite office from which the extension officer operated, and it is also the place for farmers' meetings and training. The office, however, was lacking in much of the equipment needed to service the farmers effectively. The fact that it only had a desk and some filing folders is quite telling. Even a landline telephone was not available, let alone a computer. For any ICT-related access to

dissemination or general communication, the extension officer almost entirely relied on going to the main office which is 20 km away, or using the Internet cafes in town about 10 km away, or just using his mobile device.

The extension officer indicated that he was most reliant on the Internet and the refresher courses as the major sources of information for his practice. Although not explicitly stated, he felt he had sole responsibility for finding information that met the needs of his clients with very little or no help at all from his employer. The electronic database called Extension Suite that was provided through the department's Intranet had only old materials that he already knew and so was of little use to him. The Internet was usually accessed at the Department of Agriculture main office about 20 km away, or through Internet cafes – about 10 km away in Thohoyandou town or through the use of his mobile phone if and when he had data. The challenge, however, was that at the office the connectivity was usually poor except outside office hours when there were no people. With Internet cafes, the connectivity was good but he had to bear the costs personally, and the same applied for his mobile device where connectivity was even poor at times. This he alluded to saying "*…and even on your phone if you don't have enough data bundles you have to check for whatever you're looking for fast and then you switch off."*

Mobile Phone Usage by Farmers

All the farmers indicated that they use mobile phones to communicate agriculturally related information. Only three out of the ten farmers had smartphones with the other seven having feature phones. Only one farmer indicated he used WhatsApp, and the majority used voice calling and SMS functionalities the most. The functionalities of the owned smartphones were those such as Internet, WhatsApp, Facebook, camera and Email. However, these were mostly not used with one farmer stating that "*eeh it does have them but some of these features I am not using them, I just leave them...these things of WhatsApp I feel like they waste my time…they are difficult for us"* while the other one also similarly said *"I don't use those things, I'm an old person. I don't know those things."* This reflected a challenge of lack of digital literacy skills and some type of technophobia that, in some cases, deceptively manifests itself as a mere logical, and yet misinformed perception that paying attention to the smart aspects of smartphones is a waste of time. The issue of language also came up because looking for information on the Internet meant that farmers had to have good English language skills. And this is problematic because only one out of ten respondents indicated that he had good English language skills. This was in a way confirmed by the extension officer who indicated that his other challenge with communicating latest agricultural developments to farmers was that the technical language may be too difficult to rephrase for the farmers and communicate the ideas without risking losing the original meaning.

Perceived Importance of Mobile Phones to Farming by Farmers

Mobile phones are perceived as very beneficial by farmers because of the convenience they give in terms of timely and effortless communication or acquisition of needed information. One farmer eloquently articulated the critical importance of having a mobile phone to his whole farming, stating: *"it will be affected a lot, especially with customers. Because customers call and if my phone is off... just like now, I'm going to start harvesting and selling cabbages on the 20th, my phone must always be on. There are people who just have my phone numbers even the tenderpreneurs, they call and say they want cabbage or they are at the farm gate, and if I'm not on the farm, they have a problem. They even call me when I'm at home, then I will rush to the farm. Even waking up early in the morning because others come to buy early in the morning. Even the hawkers, those selling on the streets and in spaza shops, I always have their numbers. I can't afford to put my phone down. I must always have it in the pocket. If I just miss… it's not possible that the day can end without it working.*"

Mobile Phone Usage by the Extension Officer

Asked if he found a mobile phone useful in conducting his duties of facilitating access to information by farmers, the extension officer

indicated that it was key to him being effective in servicing the farmers. He explained that he spent a lot of time talking to farmers who called him on the phone asking for advice on various farming issues. He particularly believed that when connected to the Internet, a mobile phone could make a huge difference in accessing information on assisting in diagnosing problems in real time out in the field. To this effect, he stated: "*So basically that's the way I think we should do…when you're in the field if you could see some of the symptoms that you're not sure of you have got to get through the Internet very fast and then check is it what I'm seeing is it …err… do they correlate to what the information [from the internet] is telling me about and then you could really come with the answer on the spot. .."* This was more so in the case of identifying pests and knowing what pesticides to buy. The extension officer indicated that one such case had occurred in the previous year where there was an outbreak of a pest called the whitefly. Encountering this pest for the first time, the majority of farmers confused this with the earthling fly and applied the same pesticide for the white fly. This was problematic because only the nymph of the white fly was exterminated and not the adult whitefly. He surmised that if the farmers had taken photos of the pest and sent to him on the phone, then he would have been better able to advise.

Conclusion and Recommendations

The study explored how mobile technologies are being used by farmers within an extension services environment in an irrigation scheme in South Africa. Literature analysis proved that the traditional face-to-face extension, notwithstanding all its inefficiencies and other shortcomings, was largely still the major source of agricultural information for farmers in the developing economies. The interviews done by the farmers supported these observations. The farmers expressed how both the extension officers and the mobile technologies are critical to them by finding and using information throughout the farming cycle. The extension officer acknowledged the importance of access to information and how much the Internet has the potential to help him and his work constituency. His biggest challenge, same as the farmers, was that of high connectivity costs.

The lack of usage, and even anxiety, indicated by farmers in using the mobile phones independently to find information was a bit surprising. They instead showed a preference for using their mobile phones to call or sent text to the extension worker or other people for information. The study highlighted the need for the strengthening of the extension services through retraining and retooling the extension officers with ICT tools such as mobile technologies for them to be effective. The same also applied to the farmers who need to be encouraged to invest in smartphones that have better information handling capabilities and also to be trained in digital literacy. Having thus demystified the presumption that access to mobile phones means easy access to information, the study recommended that holistic interventions be developed that seek to integrate mobile technologies into extension services rather than usurp this key service. Going forward, future research could look into developing a framework of integrating ICTs or mobile technologies into the agricultural information advisory services within the same or other community in any resource scarce environment.

It is deduced from the study that there is need to improve the information handling skills of extension officers using digital tools such as mobile phones and leveraging their use as communication tools with the farmers. In terms of self-directed searching and finding of information there maybe need to train farmers in the use of the smart features of their phones such as web browsers and social media applications. The extension officers are ably positioned to offer such kinds of trainings during the farmer field days or weekly meetings.

The promotion of the use of conventional face-to-face meetings between the extension officer and the farmers needs to be pursued because it is still a highly preferred method of accessing information. The same goes for other ICTs such as radios with local community radios being the most appropriate to reach out in the language of the area. This is critical since the use of mobile phones by the farmers above was largely built on interactions originating from these other ways of communicating agricultural information. Another key recommendation is that since most farmers are more comfortable with using

information in their home language there is need for translating of information into the local language so that it's optimally used by those it matters most to.

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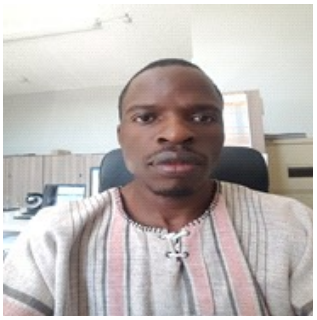

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AFRICAN JOURNAL OF LIBRARY, ARCHIVES AND INFORMATION SCIENCE

VOLUME 29 NUMBER 1 APRIL 2019

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