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# eReadiness of Public University Libraries in Malawi to Use Mobile Phones in the Provision of Library and Information Services

## Introduction

Lou (2010) defines eReadiness as the ability of a country, enterprise or organisational unit to be prepared, willing to adopt, use and benefit from e-innovations such as e-business, e-procurement, and e-learning, among others. In other words, eReadiness refers to the extent to which a society, country or an organisation is prepared to partake competitively in the digital age. Such an eReady society, country or organisation will have in place an enabling ICT infrastructure (mobile, WiFi and broadband Internet connectivity), human capacity, relevant policy and regulatory framework, and a conducive business environment (Mutula and van Brakel, 2006). The proliferation of mobile phones the world over, has particularly made these tools important determinants of eReadiness of societies, countries or organisations in the digital dispensation. A country, society or organisation that is e-ready is bound to register greater usage of ICTs. On the contrary, uptake of ICTs would diminish in an environment in which these indicators are lacking.

University libraries are increasingly offering their services through a number of mobile phone applications (Luo, 2014) and also creating webpages that are accessed through mobile phones (Bridges et al., 2010; Wilson and McCarthy, 2010). In the context of Malawi, no studies on the use of mobile phone to provide library and information services are available. From the broader African perspective, a few university libraries have adopted the use of mobile phones in libraries, and libraries that are using mobile phones use them mainly for SMS text messaging (Anbu and Mavuso, 2012; Sekyere, 2011). A study conducted by Sekyere (2011) involving 79 academic libraries in ten West African countries found that none of the libraries surveyed used mobile phones in service delivery. However, a recent study conducted by Baro et al. (2014) covering 36 Nigerian University libraries found that less than half of the libraries used mobile phone SMS for reference services. A pilot SMS project conducted by Anbu and Mavuso (2012) at the University of Swaziland revealed that SMS was used successfully to market library services.

Public university libraries in Malawi are under-resourced especially with regard to ICT infrastructure such as computers (Chaputula, 2012; Bates et al., 2011). In addition, libraries open for limited hours most of the days because of limited human capacity. Moreover, most

students stay off-campus (Official student enrolment statistics, February, 2015) and have limited access to the library most of the time. This is exacerbated by the fact that the library collections are in limited supply (Mapulanga, 2011).

The use of mobile phones to provide library and information services in Malawi has the potential to enhance access to library resources beyond the normal opening hours hence can assist to overcome the obstacles of time and space (Malik and Mahmood, 2013), and bring convenience to library users (Ballard and Blaine, 2013). This would also help provide access to e-resources by those who do not have access to institutional computer facilities thereby assist to erase the challenge of PC shortage which is common in many libraries of developing countries (Palumbo, 2014).

This study, therefore, investigated the eReadiness of public university libraries in Malawi to use mobile phones to provide library and information services. The study specifically addressed the following resarch questions: (1) What is the e-readiness status of public university libraries in Malawi in relation to ICT infrastructure to deliver library and information services through mobile phones? (2) To what extent do public university libraries in Malawi have the requisite human resources to enable them deliver library and information services through mobile phones? (3) How well are public university libraries in Malawi e-ready in terms of policy to deliver library and information services through mobile phones? (4) What are the attitudes of library staff and students towards the potential use of mobile phones in providing and accessing library and information services? (5) Which possible factors influence the adoption and use of mobile phones by library staff and students respectively in providing and accessing library and information services? It is expected that the outcome from the study would pave the way for policy, practical and managerial interventions in areas of infrastructure development, capacity building, awareness creation, institutional framework and budgetary support to prepare the ground for using mobile phones to provide library and information services in public university libraries in Malawi.

**Literature Review**

Literature reviewed in this section focusses on the level of preparedness of public university libraries in Malawi in terms of ICT infrastructure, policy framework and human capacity for the adoption and use of mobile phones in providing library and information services. These

issues deal with the eReadiness status of the libraries. Literature relating to attitudes of library staff and students to the use of mobile phones in the delivery of library services is also reviewed.

*E-readiness Status of Public University Libraries in Relation to ICT Infrastructure*

ICT infrastructure is vital in determining the e-readiness status of a library with regard to the offering of library and information services. A number of studies (Li, 2013; Wang et al., 2012; Bridges et al., 2010) have shown that libraries are making use of mobile internet, SMS and MMS in the delivery of both user and reference services. The successful implementation of such services require computer hardware and software, campus networking equipment, and a robust mobile telecommunications network. Whilst students may use service provider mobile network service to access SMS and Internet-based services on their mobile devices, other services such as video streaming as provided at the Oriental Institute of Technology (OIT) Library in Taiwan (Wang et al., 2012) may prove very costly on this platform. University provided WiFi connection, which can be accessed whilst students are on campus, may help to overcome this challenge. A university may, therefore, have to invest in such type of infrastructure to promote mobile phone access to such services. Although the university managed ICT infrastructure is of primary importance in deciding whether a library is ready or not to offer library services through use of mobile phones, the external or national mobile telecommunications infrastructure is equally important. This is because in deciding whether or not to commence offering of such services, a library would be interested to know whether its clients (in this case students) would be able to access the services offered. A mobile telecommunications network that has broader coverage, performs reliably, is easy to connect to, offers high speed internet access, and has broader service offering is, therefore, desirable. A library will also be interested to know if its clients have the requisite skills to access the services on offer before making a decision on whether or not to offer its services through the use of mobile phones.

*E-readiness Status of Public University Libraries in Relation to Human Resources*

Human resource is another important element for determining the e-readiness status of libraries with respect to the delivery of services through the use of mobile phones. Lessons learnt from projects aimed at offering library and information services through mobile phone undertaken at both Ryerson University Library (Wilson and McCarthy, 2010) and Oregon

State University Library (Bridges et al., 2010) indicate that joint teams of experts that included professional librarians and ICT personnel worked together in overseeing the successful implementation of such projects. The role of librarians was to plan and oversee the implementation of the whole project in terms of determining the content to be displayed on the mobile websites, soliciting views of users in terms of content and services to include on mobile website, and assessment of use after project implementation. The role of the ICT team was to offer technical support in terms of building the website and managing it. It can, therefore, be seen that the presence of various individuals with different types of expertise played a critical role in the successful implementation of such projects.

A preliminary study done in the institutions surveyed revealed that they possess the requisite human resource complement both in the library and the ICT departments. However, it is not known whether the staff is adequate to enable them succesfully manage the provision of library and information services through mobile phones. It is also feared that the available staff may lack the necessary skills to enable them succesfully manage the delivery of library and information services through mobile phones. This study will, therefore, help expose the magnitude of the existing challenges, and offer possible solutions to those challenges.

*E-readiness Status of Public University Libraries in Relation to Availability of Policy*

Policy is equally important in project implementation. Evans et al. (2000) define policy as a statement intended to guide and channel staff thinking in making decisions. Policies may also be looked at as rules or instructions that are intended to facilitate decision making (Stueart and Moran, 2002). Policies are advantageous in that they help in ensuring consistency in decision making, particularly in an environment whereby several decision makers exist. However, the downside of policies is that they are limiting in that they do not give much room for the decision maker to operate in as the decision making process is bound by the policy.

Several types of policies exist. These include originated, appealed, implied and imposed policies (Stueart and Moran, 2002; Evans et al., 2000). An originated policy is one that is developed to guide the general operations of an organisation. This sort of policy is internally influenced as it is initiated by top management, and is meant to guide the operations of the organisation as it strives to achieve its objectives. An appealed policy is another kind of policy that mainly arises from a situation where there is no policy. This sort of policy is,

therefore, formulated in response to appeals from those affected by the lack of policy to sort out challenges that may have come about due to the absence of the policy. Implied policy is yet another type of policy that exists in an organisation. This type of policy is mainly unwritten hence informal, and arises from the actions that people see about them hence believe to constitute policy. The final type of existing policy is what is called an imposed policy which normally comes from outside entities which an organisation must work with. These entities include companies, donor agencies, and government, among others.

Policies, as already discussed, play a crucial role in the operations and activities of a library organisation and are important in determining the e-readiness status of a library with regard to the offering of library and information services through the use of mobile phones. For instance, policies that govern the allocation of financial resources could positively impact on the a library's ability to offer services through mobile phones if such policies favour allocation of adequate resources to the library to enable it carry out its activities. On the other hand, such activities could be negatively affected if resources are inadequate. Similarly, policies on human resource recruitment and training could either negatively or positively impact on the e-readiness status of the library to offer services through mobile phones as this could affect the availability of well-trained human resources to manage the project. Policies pursued by external entities such as publishers, donor agencies and government could equally have both a positive and negative impact on a library's ability to offer services through the use of mobile phones. For instance, a library's ability to offer services though mobile phones could be affected if publishers formulated policies that restricted access to e-resources. This could particularly be a major limiting factor if e-resources were the main resource users wished to access on the mobile phone platform. Furthermore, favourable or unfavourable government policies on mobile telecommunications, recruitment and training, particularly to subvented organisations or even funding could also greatly affect a library's ability to offer services through mobile phones.

Malawi launched the national ICT policy in 2013. This development would likely assist in the implementation of ICT projects including library and information services through mobile phones. However, most of the institutions surveyed seem not to have operational ICT policies a development that could negatively impact the management of library and information services through mobile phones as the service may lack a framework for regulation.

**Theoretical framework**

This study was underpinned by two main theories: The Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology-Organisation-Environment (TOE) framework.

*The Unified Theory of Acceptance and Use of Technology (UTAUT)*

UTAUT is a model that is often used in Information and Communications Technologies (ICT) related studies. The model was developed and validated by venkatesh et al. (2003) through the review, mapping and integration of eight dominant theories and models that originated from different theoretical disciplines such as psychology, sociology and information systems (Williams et al., 2012; Kijsanayotin et al., 2009).

UTAUT was developed on the basis that constructs of existing theories were similar in nature, therefore, it was logical to map and integrate them to create a unified theoretical basis (Venkatesh et al. 2003). The model identifies four key drivers of the adoption of information systems: performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC) (Martin and Herrero, 2012). The model centres on two key issues namely behavioural intention (BI) and actual usage (AU). PE, EE and SI influence BI which in turn influences AU. Empirical studies have shown that FC, on the other hand, does not have any influences on BI but directly influences AU (Venkatesh et al. 2003). Besides the four main constructs of the model (PE, EE, SI and FC), UTAUT identifies the moderating effect of four other factors such as gender, age, experience and voluntariness of usage (Keong et al., 2012).

The strength of the UTAUT model lies in the fact that it was founded on so many models and thus providing the researcher with a broader view of all existing models. Moreover, UTAUT is a much stronger model as it accounts for an explanatory power of up to 70% unlike the other previous models that account for only between 17 and 53% of the variance in use intentions (Venkatesh et al., 2003). UTAUT has its own weaknesses too. Scholars such as Straub and Burton-Jones (2007) have claimed that the ten constructs of UTAUT are not parsimonious. In spite of this weakness, use of UTAUT in this study is justified on the basis that its strengths far outweigh its weaknesses. Besides, the model has been used in other related studies such as the study of the adoption of mobile devices (Carlsson et al., 2006), the

use of 'near field communication' (NFC) adoption of mobile phone service (Chen and Chang, 2013), and the use of mobile internet (Wang and Wang, 2010).

**Technology-Organisation-Environment (TOE) framework**

TOE is an organisational level theory that was introduced by Tornatzky and Fleischer in 1990 (Baker, 2012; Oliveira and Martins, 2011). TOE framework posits that technological adoption in an organisation is mainly driven by technological, organisational and environmental factors. Some scholars (Yang et al., 2015; Hsu et al., 2014; Ramdani et al., 2013) postulate that the TOE framework is grounded in Rogers' DOI theory. Hsu et al. (2014), specifically, argue that both the technological and organisational factors in the TOE framework are similar to other factors in the DOI theory such as innovation, communication channels and social system, and that Tornatzky and Fleischer only added the new component of the environmental context. This argument is made on the basis that most of the elements that make up the technological and organisational factors are largely drawn from the DOI theory.

*The Technological Context*

The technological context includes all of the technologies that are relevant to the firm (Baker, 2012). They include technologies that are already in use at the firm as well as those not currently deployed but are available in the marketplace hence capable of being used in future. According to Collins et al. (1988), a firm's existing technologies are important in that they set a broad limit on the scope and pace of technological change that a firm can undertake. On the other hand, innovations that exist but are not yet in use at the firm are equally important because they influence innovation in two main ways. Firstly, they demarcate the limits of what is possible; and secondly, they show firms ways or means through which technology can enable them to evolve and or indeed adapt to changes taking place. Some of the notable elements that comprise the technological context include compatibility, relative advantage, ease of use, cost and trialability (Al-Somali, 2015). All these elements are derived from the component of innovation of the DOI theory.

*Organisational Context*

Organisational context addresses the traits and characteristics of the organisation that influences innovation adoption decisions (Hsu et al., 2014). Ramdani et al. (2013) have identified top management support, organisational readiness, experience and size as some of the critical organisational factors that influence technological adoption. Baker (2012), whilst highlighting the same issues raised by Ramdani et al, has added intra-firm communication processes and the amount of slack resources available to the firm as being equally important.

*The Environmental Context*

Baker (2012) defines environmental context as the structure of the industry, the presence or absence of technology service providers, and the regulatory environment. All of these factors affect technology adoption in various ways. With regard to the structure of the industry, two main players that include business partners and clients tend to have a great influence in terms of what type of technologies an organisation adopts. In case of the library and information field, a library could be forced to adopt technologies such as the use of mobile phones in providing library and information services to properly serve the information needs of its clients. This could be done either in response to the changing information seeking patterns of its clients or based on demand. Again, a library could be forced to adopt certain technologies with the aim of keeping pace with other players in the same field. This is what DiMaggio and Powel (1983) have described as mimetic pressure, which is defined as the influences of structurally equivalent organisations that have initiated an innovation successfully.

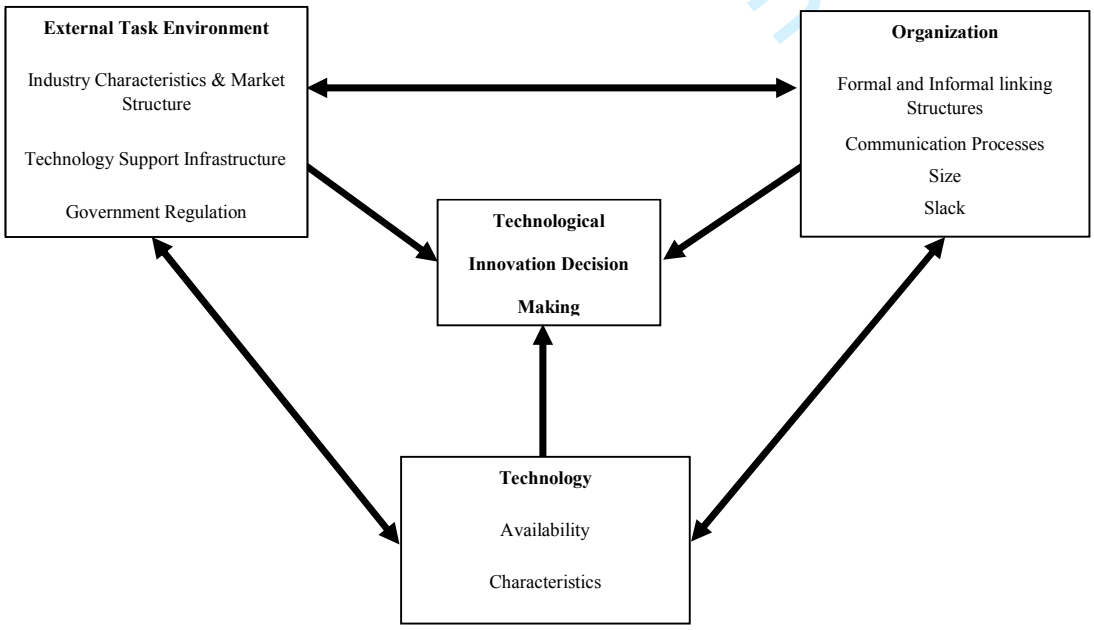

**Figure 1: The Technology – Organisation – Environment (TOE) Framework (Source: Baker, 2012)**

*Justification for use of the TOE framework in this study*

The TOE framework was chosen for use in this study for two main reasons. Firstly, it is flexible and adaptable in various contexts. Zhu & Kraemer (2005) observe that the TOE framework is a generic theory that only suggests different sources of influence without specifying the variables in each context unlike most of the other theories and models. This enables researchers to choose different technological, organisational and environmental factors for different innovations. Secondly, the model has been used in other related studies such as the study of e-business/e-commerce adoption (Awiagah et al., 2016); adoption of cloud computing (Hsu et al., 2014); and e-readiness at firm level (Aboelmaged, 2014).

**Methodology**

This study made use of a multi-case study design. Malawi has four public universities. They include University of Malawi (UNIMA), Mzuzu University (MZUNI), Lilongwe University of Agriculture and Natural Resources (LUANAR), and the Malawi University of Science and Technology (MUST). UNIMA has four constituent colleges namely Chancellor College (CHANCO), Kamuzu College of Nursing (KCN), The Polytechnic, and College of Medicine (COM) whilst the other universities only have one campus. Although potentially seven study institutions existed, this research covered only five of them: MZUNI, LUANAR, The Polytechnic, COM and KCN. Libraries selected for this study are affiliated to older and well-established institutions except MUST which was established in 2013, and did not have students in third, fourth and fifth years at the time of data collection. CHANCO was not included in the study despite being older and well established because permission was not secured to access the respondents. The combined student population in the institutions studied exceed 10,000. The case study was deemed appropriate for this study because it enabled the researcher to examine the phenomena under investigation in-depth individually in the five institutions, and also draw conclusions collectively across the study sites.

Self-completed questionnaires were administered to a sample of 370 students in years 3, 4, 5 and postgraduates drawn using a sampling table provided by Israel (2013). A decision to limit the study to these categories of students was made because they are involved in more intensive research activities hence capable of using their mobile phones for a wider range of

academic related purposes including library use. The researcher also conducted semi-structured interviews with a purposefully drawn out sample of five (5) university/college librarians. The university/college librarians were seen as the most appropriate sample for this study because they were in a position to provide information that helped to answer most of the study questions as heads of their institutional libraries (Sekaran and Bougie, 2010). Interview guides that contained open-ended questions were used in conducting semi-structured interviews whilst tape recorders and notebooks were used to capture and record proceedings of the interviews respectively. The researcher personally conducted these interviews. This was done because the number of interviewees was small hence manageable, and also to maintain consistency in coding. Conversely, quantitative data for this study was collected by a team of five research assistants (one research assistant for each study site). The research data was collected between November 2015 to March 2016.

A number of methods were used to validate the data collection instruments. The interview guides were given out to some experienced researchers who commented on their appropriateness. Comments received from such experts together with observations and feedback received during pitot-testing was used in amending the instruments to enhance their effectiveness. The researcher also used another technique called member checking to validate the research findings. This is a commonly used technique in qualitative studies, and has been described by Lincoln and Guba (1985, p.314) as "the most critical technique for establishing credibility". Member checking involves taking data, analyses, interpretations and conclusions back to the participants so that they can judge the accuracy of the account (Creswell, 2013). The aim is to enable participants check not only the accuracy of the findings but even the language used. In practice, the researcher sent the university/college librarians findings drawn from the interviews through email so that they could verify its accuracy. Reliability of some of the questionnaire items in this study were determined by calculating the Cronbach's Alpha values of the variables in the questions. The Cronbach's Alpha values were over 0.7 which shows that the items in the questionnaires used had high levels of internal consistency (Nunnally, 1978).

Research ethics was accomplished by, among others, getting gate keepers' permission before entering the study sites, and soliciting the informed consent of the participants before administering the questionnaires and conducting the interviews. Results of the study are known only when the data is analysed. Being a mixed methods study, both qualitative and

quantitative data were collected that necessitated use of different methods of analysis. Data analysis in qualitative studies involves preparing and organising the data for analysis, then reducing the data into themes through a process of coding and condensing the codes, and finally representing the data in figures, tables or a discussion (Creswell, 2013). The qualitative data collected from this study was firstly transcribed into MS Word and cleaned. After transcription, the data was subjected to codification. The researcher personally undertook both exercises although the latter was accomplished with the aid of NVivo software. Use of NVivo did not only simplify the process of codification as large volumes of data were collected in the five interviews conducted but also assisted in achieving consistency. Codification assisted in deducing themes from the data. Conversely, quantitative data was analysed using SPSS Version 23 to generate tables and graphs. SPSS was chosen over other comparable softwares such as QDAP and QDA Miner because it accommodates a wide range of research methods including mixed methods research which was being deployed in this study. Moreover, SPSS is a widely used program for statistical analysis in the Social Sciences (Neuman, 2011).

*Research delimitations and limitations*

Although Malawi has four public universities, this study only focused on three of them. Moreover, academic staff are another important user group of academic libraries. Much this is the case, findings reported in this article only focuses on students. This implies that library's readiness to offer services through mobile phones to this group remains unknown hence may have to be covered by future studies. Much as the study incorporated a quantitative strand in addition to the qualitative one, it did not involve theory testing nor confirmation as is the case with other related studies. This implies that the two theories used in this study (UTAUT and TOE) were not used in the strict sense, which is empirical at the core, but rather to put the problem studied in the context of other related studies.

## Findings and discussion

### *E-readiness of Public University Libraries in Malawi in Terms of ICT Infrastructure for the Adoption and Use of Mobile Phones in Providing Library and Information Services*

#### *(a) Availability of ICT Infrastructure at Institutional Level*

ICT infrastructure plays a very important role both in the delivery and access to library and information services through mobile phones. Therefore, the study sought to find out the availability of ICT infrastructure at institutional level which is critical for the offering of library and information services through mobile phones by the libraries, and access to library and information services through mobile phones by students. Findings indicated that all the libraries studied had most of the requisite ICT infrastructure to facilitate the offering of library and information services through mobile phones save for bandwidth which was inadequate in all the institutions. The available ICT infrastructural resources available were mainly Internet infrastructure and ICT systems such as Library Management System (LMS), servers, tablet computers, desktop computers, and fibre-optic backbone that facilitated access to both wired and Wi-Fi Internet access. Furthermore, the Polytechnic had an E2 Proxy Server which could facilitate remote access to e-resources.

Besides the ICT infrastructure, institutions studied had plans to acquire and install other ICT-related infrastructure to facilitate the offering of library and information services through mobile phones. The Polytechnic, for instance, was planning to install the Unstructured Supplementary Service Data (USSD) SMS gateway to assist in the offering of the SMS reference service. Conversely, MZUNI was hoping to acquire an electronic library and e-granary which could potentially be offered on the mobile phone platform. LUANAR was also exploring the possibility of using cloud infrastructure to support ICT projects including the offering of library and information services through mobile phone. Moreover, most of the ICT equipment which the institutions needed, save for cloud infrastructure, was available on the local market. This implies that the institutions in the current study could easily acquire such type of infrastructure if they had financial resources.

Findings further revealed that although much of the required ICT infrastructure was available, libraries in the institutions surveyed faced some challenges which could negatively affect the offering of library and information services through mobile phones. Most notably, MZUNI indicated that it needed more desktop and tablet computers, and servers with bigger capacity. KCN acknowledged using cheaper ICT equipment due to cost considerations whilst COM conceded that some of the servers in use were old hence needed to be replaced with more modern servers. Besides, all the institutions faced the challenge of limited Internet bandwidth in spite of various initiatives undertaken aimed at increasing their bandwidth.

A number of case studies undertaken to probe projects aimed at delivering library and information services through mobile phones (Li, 2013; Wang et al., 2012; Bridges et al., 2010) have shown that libraries that were making use of mobile internet, SMS and MMS among others in the delivery of both user and reference services needed a robust network infrastructure, desktop and laptop computers, tablet PCs, and more. Similarly, the technological context of the TOE framework identifies all of the technologies that are relevant to the firm (both at firm level and outside the firm) as critical to technological adoption (Baker, 2012). Furthermore, facilitating conditions of the UTAUT model state that existence of the technical infrastructure to support the use of a particular system aids in technology adoption and use (Venkatesh et al., 2003). The fact that most of the required ICT infrastructure was available in the study institutions suggests that they had built the capacity necessary to support the offering of library and information services using the mobile phone platform.

The availability, quality and affordability of the mobile telecommunications infrastructure was investigated in the current study. This was deemed necessary because mobile telecommunications network acts as a conduit for the offering of library and information services on the mobile phone platform by public university libraries on one hand, and access to the service offering by students on the other. Findings showed that places where the study institutions were located, had overall good mobile telecommunications network coverage. There were reported incidents of erratic coverage for some buildings in certain institutions but most reported having good coverage. Some of the respondents attributed this to the setting indicating that urban areas where most of the study institutions were located normally had good network coverage. However, LUANAR which was situated in a rural area also reported having good mobile telecommunications network coverage which means that most of the areas in the country could have good network coverage. These findings reflect those of a study conducted by Nyirenda (2012) who found that Malawi had achieved a 99.55% land coverage of mobile cellular network by 2012. The implications of these findings are that students in public universities in Malawi could use their mobile phones from almost any part of the country. Facilitating conditions of the UTAUT model states that existence of the technical infrastructure to support the use of a particular system facilitates technology adoption and use (Venkatesh et al., 2003). Availability of the mobile telecommunications infrastructure in the country implies that public university libraries in Malawi were in a

position to provide library and information services through mobile phones as users (students) could easily access such services using the mobile telecommunications network.

Although mobile telecommunications network coverage was good, findings of this study found that the network performance was far from being efficient. Most of the university/college librarians and ICT directors rated the network performance between 80-90%. Some of the areas of concern to the respondents were mobile Internet, SMS and even voice calls. The technological context of the TOE framework states that technology or an innovation is easily adopted if it is perceived to be better than the idea that it supersedes (Rogers, 2003). Therefore, issues affecting the performance of the mobile telecommunications network could negatively impact the offering of library and information services through mobile phones if they are not adequately addressed. Findings made in relation to the mobile telecommunications network reflect those obtained in the MACRA quality of service report for the fourth quarter covering October to December 2015. The report, whilst applauding operators for making progress in achieving network quality, pointed out that challenges in relation to call setup success rate, call drop rate, SMS success rate, GPRS content activation success rate, and others still remained (MACRA, 2015).

*(b) Mobile Phone ownership and Use Amongst Students*

The research findings show that mobile phone ownership amongst students was very high with many of them owning one or more devices. Findings shown in Figure 2 indicate that 315 (99.7%) students owned a mobile phone whilst only 1 (0.3%) indicated that he or she did not own a mobile phone. Whereas 215 (68.5%) students indicated that they owned only one mobile phone, a significant part of the student body 90 (28.7%) indicated that they owned two mobile phones. Still more, 7 (2.2%) students indicated that they owned three mobile phones and only 2 (0.6%) students pointed out that they owned more than three mobile phones. These findings imply that much as single ownership of mobile phone was prevalent, dual and multiple ownership was increasingly becoming a trend.

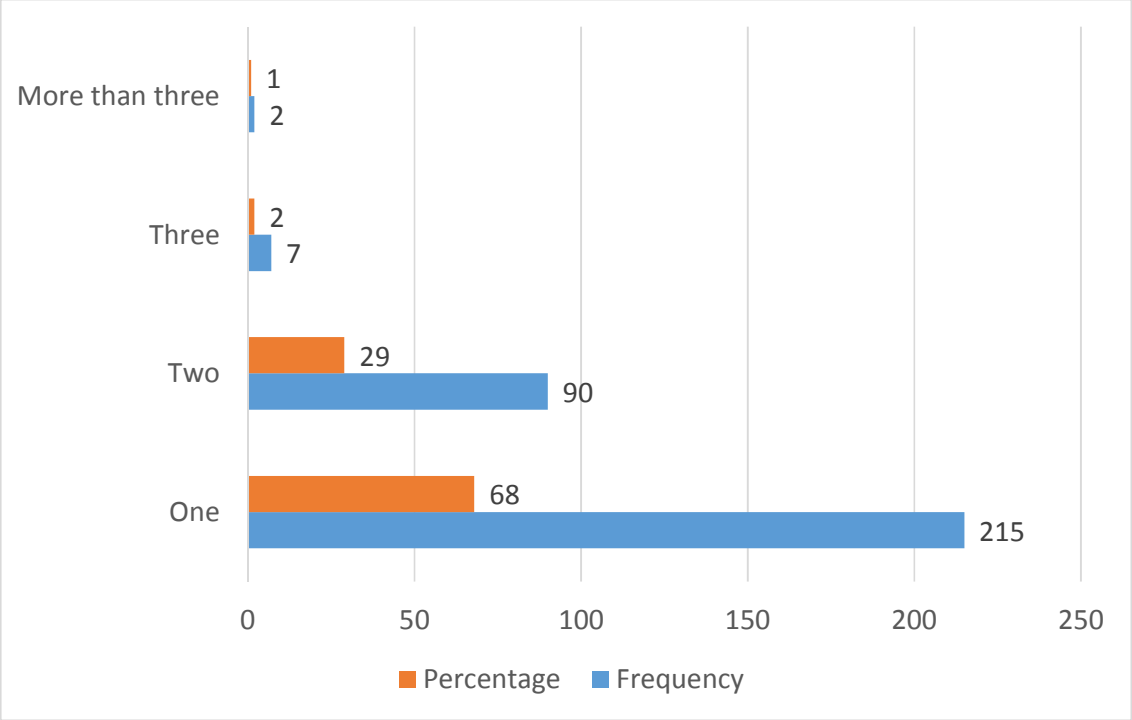


**Figure 2: Mobile Phone Ownership among Students (N=314)**

Source: Survey data, 2016

This study has further revealed that 299 (94.9%) students owned mobile phones with Internet capabilities whilst 16 (5.1%) owned mobile phones without this capability. Students who owned more than one mobile phone were asked to indicate how many of them had Internet capabilities. Forty-eight 48 (49%) students stated that two of their mobile phones had this capability whilst 46 (46.9%) indicated that only one of their phones had Internet capabilities. Only 4 (4.1%) had three or more mobile phones that had Internet capabilities.

The technological context of the TOE Framework identifies technologies available both to the firm and the market place as critical to technological adoption. The fact that students owned mobile phones, most of which had Internet capabilities, implies that libraries in this study could easily adopt the use of mobile phones in providing library and information

services. This is because students who are the primary consumers of the service offering have the means of accessing the services offered.

*E-readiness of Public University Libraries in Malawi in Terms of Policy Framework for the Adoption and Use of Mobile Phones in Providing Library and Information Services*

The findings of the present study indicated that all the five institutions surveyed did not have operational ICT policies to govern the operations of library and information services currently on offer and those to be potentially offered through mobile phones. However, all the institutions had draft ICT policies that were being refined in readiness for adoption and implementation. KCN, COM and The Polytechnic are part of the federal system of the University of Malawi. Consequently, the process of developing and implementing this policy was done centrally with the involvement of stakeholders from all these institutions. Surprisingly, MZUNI and LUANAR seemed to have been moving at a correspondingly slow pace in the development of the ICT policy in spite of them being autonomous public institutions. The environmental context of the TOE framework identifies the regulatory environment as one of the factors that could impact technology adoption both negatively or positively (Baker, 2012). The absence of the institutional ICT policies would likely have a detrimental effect on the offering of library and information services through mobile phones as there would be no unified approach to decision making in this regard.

The slow pace observed in the development of the ICT policies in the institutions in this study are not isolated cases but symptomatic of the challenges that exist at national level. Malawi adopted the National ICT Policy in the last quarter of 2013. The researcher from experience working in university library environment in Malawi observed that most of the public university libraries operate without other relevant policy documents such as selection and collection development policies which are necessary for providing an effective library and information service.

Besides ICT policy, respondents indicated that their institutions were planning or had developed other policies to promote access to library and information services. For example, the UL for MZUNI indicated that the library had already developed an institutional repository policy which they were hoping to implement alongside the ICT policy. The ICT Manager for

LUANAR noted that though their draft ICT policy had some statements that guided provision of library services, there was none to guide implementation of library and information service offering through mobile phone platforms. The findings of the current study also revealed that the majority of the respondents feared that the absence of the ICT policy could have an adverse impact on the implementation of library and information services offered through mobile phones. However, the CL for COM and ICT Director for LUANAR, were of the opinion that absence of the policy would not have much impact on the provision of library and information services offered through mobile phone platform as this would be guided by their strategic plans.

Stueart and Moran (2002) point out that the advantage of a policy is that it helps in ensuring consistency in decision making, particularly in an environment whereby several decision makers exist. Considering that libraries have become complex organisational structures with several layers of decision making at both managerial and operational levels, as revealed in the libraries studied, it is important that policies be formulated to provide a unified approach to decision making. The absence of ICT policies in the institutions may lead to lack of consistency in decision making that may affect the overall quality of library and information services delivered through mobile phones. However, the availability of draft ICT policies in all the institutions surveyed gives hope that the final policy framework would be completed in the near future to facilitate the implementation of library and information services through mobile phones.

*E-readiness of Public University Libraries in Malawi in Terms of Human Capacity for the Adoption and Use of Mobile Phones in Providing Library and Information Services*

Library and ICT staff collaborate in the offering of library and information services through mobile phone. However, findings obtained in the present study revealed a mixed picture in relation to the human resource base available in public universities in Malawi to manage the provision of library and information services through mobile phones. Most of the libraries were adequately staffed but much of the staff lacked knowledge, skills and even experience in the delivery of library and information services on the mobile phone platform. The organisational component of the TOE framework recognises human resources as being crucial for IT doption. Therefore, absence of skilled human resources could affect the quality of library and information services offered through mobile phones if not addressed. However,

most of the ICT departments were not adequately staffed. Although some of the ICT directors openly acknowledged the existence of the staff shortages, others downplayed the issues of staffing. The problem of staff shortages meant that the ICT departments were struggling to service departments that required their services including the library. The implementation of library and information services through mobile phones might pile more pressure on the ICT existing staff. Nonetheless, most of the ICT staff had the requisite skills to enable them support the provision of library and information services through mobile phones as only minor cases of skill gaps were reported.

Human resource capacity is an important element for determining the preparedness of a library with respect to the delivery of services through mobile phones. Projects undertaken at the Kimbel Library of the Coastal Carolina University (CCU) (Felts Jr. 2014) Ryerson University Library (Wilson and McCarthy, 2010) and Oregon State University Library (Bridges et al., 2010) on offering library services through mobile phone show that joint teams of experts that include professional librarians and ICT personnel are needed to work together in overseeing the successful implementation of such projects. As overall managers of the whole project, the role of librarians was to determine the services and content to be displayed on the mobile websites after soliciting views of users, and assess the use of the project after implementation. The role of the ICT team was to offer technical support in terms of building the website and managing it. Likewise, the presence of librarians and technical staff in the study institutions, many of whom were conversant with the offering of library and information services on the mobile phone platform, denotes that the various institutions in the current study had the necessary human resources to enable them offer library and information services through mobile phones. Barnhart and Pierce (2011) in their thematic paper titled "Becoming Mobile: Reference in the Ubiquitous Library" identifies staffing for offering services 24–7 as one of the challenges libraries face in their bid to offer library services through mobile phone. Institutions in this study would similarly face this challenge as they offer library and information services on the mobile phone platform hence more staff need to be recruited both in the library and ICT departments to ensure that they cope with the added workload that may come with the introduction of these services.

**Attitudes of Library Staff and Students towards the Potential Use of Mobile Phones in Providing and Accessing Library and Information Services**

The study findings based on the interviews conducted with university/college librarians show that the attitudes of library staff and students towards the potential use of mobile phones in providing and accessing library and information services were largely positive. The only exception was the KCN whereby findings showed that students did not show greater willingness to use their mobile phones to access library services when the library piloted the SMS project in 2014. However, even non-use of the service is not enough to interpret their attitudes as being negative as no studies were done to ascertain reasons for the failure of the students to use the service. The findings of this study indicated that the poor response of students to the pilot SMS project had not deterred the KCN Library from proceeding with its plans of offering library services through mobile phones.

Findings based on the survey presented in Figure 3 show that the majority of the students either strongly agreed 143 (45%) or agreed 144 (46%) that the library should formalise the provision of services through the use of mobile phones. On the contrary, 20 (6%) students neither agreed nor disagreed, 5 (2%) disagreed whilst 3 (1%) strongly disagreed that the library should formalise the provision of services through the use of mobile phones. This shows that majority of the students 287 (91%) were in favour of the library adopting the provision of services through mobile phones.

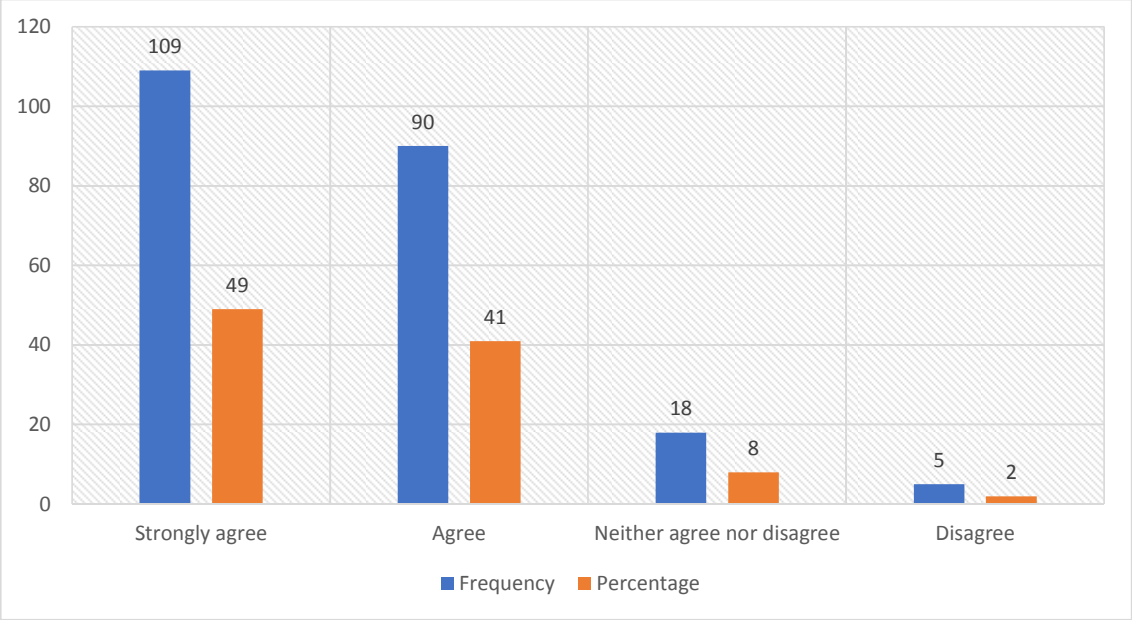


**Figure 3: Responses of Students on Whether the Library Should Adopt the Provision of Services through the Use of Mobile Phones (Students N=315)**

Source: Survey data, 2016

Student respondents who were in favour of the library formalising the provision of library and information services through mobile phones were asked to indicate the services they wished to be prioritised. An analysis of their responses shown in Table 1 indicate that 175 (57.9%) students strongly wanted to access e-books, 172 (57.0%) e-journals, 151 (50.0%) OPAC, 139 (46.0%) reference services, 124 (41.1%) lending services (Overdue reminders, book renewals, among others), 121 (40.1%) information services (Notification of recent acquisitions, change of opening hours, and news). Slightly fewer students 119 (39.4%) wanted to be able to check availability of short loan items and make reservations/bookings and 105 (34.8%) wanted user awareness or information literacy offerings. Very few 65 (21.5%) wanted to be able to carry out inter-library loan transactions.

***Table 1: Services Students wanted Libraries to Prioritise after Adopting the Use of Library and Information Services through Mobile Phones (N=302)***

| Service offering | Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree | Total |
|---|---|---|---|---|---|---|
| Online Public Access Catalogue (OPAC) | 151 | 100 | 47 | 4 | 0 | 302 |
| | 50.0% | 33.1% | 15.6% | 1.3% | 0.0% | 100.0% |
| E-journals | 172 | 91 | 37 | 1 | 1 | 302 |
| | 57.0% | 30.1% | 12.3% | 0.3% | 0.3% | 100.0% |
| E-books | 175 | 89 | 37 | 1 | 0 | 302 |
| | 57.9% | 29.5% | 12.3% | 0.3% | 0.0% | 100.0% |
| Reference services | 139 | 100 | 57 | 6 | 0 | 302 |
| | 46.0% | 33.1% | 18.9% | 2.0% | 0.0% | 100.0% |
| Lending services (Overdue reminders, book renewals, among others) | 124 | 105 | 56 | 16 | 1 | 302 |
| | 41.1% | 34.8% | 18.5% | 5.3% | 0.3% | 100.0% |
| Information services | 121 | 116 | 57 | 8 | 0 | 302 |

| | | | | | | |
|---|---|---|---|---|---|---|
| (Notification of recent acquisitions, change of opening hours, and news) | 40.1% | 38.4% | 18.9% | 2.6% | 0.0% | 100.0% |
| Inter-library loans | 65 | 96 | 120 | 18 | 3 | 302 |
| | 21.5% | 31.8% | 39.7% | 6.0% | 1.0% | 100.0% |
| Checking availability of short loan items and making reservations/bookings | 119 | 113 | 59 | 10 | 1 | 302 |
| | 39.4% | 37.4% | 19.5% | 3.3% | 0.3% | 100.0% |
| User awareness or information literacy offerings | 105 | 115 | 77 | 5 | 0 | 302 |
| | 34.8% | 38.1% | 25.5% | 1.7% | 0.0% | 100.0% |

Average Cronbach's Alpha value of the items in Table 1 was 0.859

Source: Survey data, 2016

Findings of a number of other studies have similarly shown students to exhibit positive attitudes about the use of mobile phones in the delivery and access to library and information services through mobile phones. Kumar (2014), for instance, conducted a study that involved 180 students at Jawaharlal Nehru University (JNU) in India. Findings of the study revealed that 89.44% of the respondents did not have problems if the library reached out to them through mobile phone. This figure was slightly higher than that recorded in the current study (87%). In yet another study, Walsh (2010) conducted a series of focus groups in 2009 at the University of Huddersfield to study student attitudes about the use of mobile phones in libraries. Findings indicated that student attitudes towards text messaging from the library were overwhelmingly positive.

**Factors that Influence the Adoption and Use of Mobile Phones by Library Staff and Students Respectively in Providing and Accessing Library and Information Services**

Findings resulting from data collected from university/college librarians and ICT directors indicated that there were some factors that could have a bearing on the offering of library and information services on the mobile phone platform. These include: Periodic disruption of

Internet services due to vandalism of fibre-optic cables experienced by the service providers; the network may get congested due to increased usage brought about by the introduction of library and information services through mobile phones; the hustle of registering clients' mobile phone numbers into the database; and high cost of accessing services through mobile phone for students accessing the services through the mobile telecommunication service providers. The high cost mobile phone services made most of the institutions to focus on investing in Wi-Fi infrastructure to enable students connect their mobile phones to the campus network so that they can access library and information services through mobile phones. MZUNI was also planning to preload information in tablets that it was planning to acquire as a means of overcoming the high cost of accessing the planned library and information services through mobile phones.

Findings of the current study further indicated that the majority of the students 255 (80.9%) either strongly agreed 128 (40.6%) or agreed 127 (40.3%) that poor network quality is a factor they would face in using mobile phones in accessing library and information services through the use of mobile phones. The rest of the students 60 (19%) neither agreed nor disagreed 35 (11.1%), disagreed 23 (7.3%) or strongly disagreed 2 (0.6%) that poor network quality was a factor they would face in using mobile phones to access library and information services through mobile phone. High service costs, delayed response, and query not adequately addressed are some of the notable factors which students identified as likely to impact their use of mobile phones in accessing library services. These findings are presented in Table 2.

**Table 2: Factors that Would Impact Students' Access to Library and Information Services Offered through Mobile Phones (N=315)**

| Factors | Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree | Total |
|---|---|---|---|---|---|---|
| High service costs | 118 | 97 | 62 | 34 | 4 | 315 |
| | 37.5% | 30.8% | 19.7% | 10.8% | 1.3% | 100.0% |
| Poor network quality | 128 | 127 | 35 | 23 | 2 | 315 |
| | 40.6% | 40.3% | 11.1% | 7.3% | 0.6% | 100.0% |
| Mobile phones (mobile | 35 | 51 | 129 | 88 | 12 | 315 |

| | | | | | | |
|---|---|---|---|---|---|---|
| devices) quickly get outdated | 11.1% | 16.2% | 41.0% | 27.9% | 3.8% | 100.0% |
| Lack of knowledge on usage | 30 | 91 | 81 | 92 | 21 | 315 |
| | 9.5% | 28.9% | 25.7% | 29.2% | 6.7% | 100.0% |
| Received no response to queries | 33 | 81 | 148 | 49 | 4 | 315 |
| | 10.5% | 25.7% | 47.0% | 15.6% | 1.3% | 100.0% |
| Library policies that prohibit use of mobile phones in the library | 70 | 77 | 96 | 56 | 16 | 315 |
| | 22.2% | 24.4% | 30.5% | 17.8% | 5.1% | 100.0% |
| Delayed response | 60 | 117 | 102 | 32 | 4 | 315 |
| | 19.0% | 37.1% | 32.4% | 10.2% | 1.3% | 100.0% |
| Reference query not adequately addressed | 52 | 121 | 104 | 36 | 2 | 315 |
| | 16.5% | 38.4% | 33.0% | 11.4% | 0.6% | 100.0% |
| Messages not delivered | 45 | 91 | 123 | 50 | 6 | 315 |
| | 14.3% | 28.9% | 39.0% | 15.9% | 1.9% | 100.0% |

Average Cronbach's Alpha value of the items in Table 2 was 0.762

Source: Survey data, 2016

The ECAR (2015) study of undergraduate students' ownership and use of mobile devices in the USA indicated that students living on campus rated their network experiences considerably lower than students living off-campus whereby only three in five students stated that they had reliable access to Wi-Fi throughout their campus (58%) or in classrooms/instructional spaces (63%) (Dahlstrom et al., 2015). This challenge came about mainly because of a large number of mobile devices which students connected to the campus network as 61% of students connected at least two devices to the campus network at the same time. Likewise, a study conducted by Research ICT Solutions (2015) found that call tariffs were still higher in Malawi compared to neighbouring countries although they had gone down over the years. The technological context of the TOE framework also identifies cost as a factor in technology adoption and use (Baker, 2012). The high cost of mobile phone services in Malawi and poor network quality could impact negatively the offering library and information services through mobile phones.

## Conclusions and recommendations

Findings indicated that public university libraries in Malawi possesed the Library Management System (LMS), servers, tablet computers, desktop computers, and Wi-Fi. Moreover, students had mobile phones many of which had Internet capabilities. It is, therefore, concluded that the institutions studied had the ICT infrastructure necessary for offering and accessing library and information services on the mobile phone platform.

The findings indicated that all the five institutions covered by this study did not have operational ICT policies to govern the operations of library and information services offered via the mobile phone platform. However, all the institutions had draft ICT policies that were being refined in readiness for adoption and implementation. It is, therefore, concluded that the absence of ICT policies in the institutions in this study may affect the overall quality of library and information services delivered through mobile phones.

The study findings revealed a mixed picture in relation to the human resources available to manage the provision of library and information services through mobile phones in the institutions in this study. Whilst the libraries were adequately staffed, the ICT departments were not. Additionally, most of the library staff lacked knowledge, skills and even experience in the delivery of library and information services through mobile phones. In light of these findings, it is concluded that though the human resource required to manage the provision of library and information services through mobile phones in the institutions studied was available, they did not have the necessary skills and numbers to provide quality library and information services through mobile phones.

Findings revealed that the attitudes of library staff and students towards the potential use of mobile phones in providing and accessing library and information services were largely positive. The perceived positive attitudes of library staff and students towards the use of mobile phones in the delivery of library and information services could lead to the success of the service offering on this platform.

High service costs and poor network quality were identified as the main factors that could affect the offering of library and information services through mobile phones. Public university libraries in Malawi need to find ways of overcoming these challenges if they were to successfully offer services using mobile phones.

The overall conclusion from this study, therefore, is that public university libraries in Malawi were generally e-ready to offer library and information services through mobile phones notwithstanding certain infrastructure, policy and skills issues that must be addressed. In light of these findings, university/college librarians are urged to take steps to address issues that may negatively impact the delivery of library and information services through mobile phones. Specifically, action needs to be taken to ensure that draft ICT policies are finalised and adopted for use. Human resources and skills gaps observed should equally be addressed. Issues observed in relation to ICT infrastructure such as network performance also need to be addressed to ensure efficiency and effectiveness of service delivery.

**References**

Aboelmaged, M.G. (2014), "Predicting e-readiness at firm-level: An analysis of technological, organizational and environmental (TOE) effects on e-maintenance readiness in manufacturing firms", *International Journal of Information Management,* Vol. 34, pp. 639 - 651.

Al-Somali, S.A., Gholami, R. and Clegg, B. (2015), "A stage-oriented model (SOM) for ecommerce adoption: a study of Saudi Arabian organisations", *Journal of Manufacturing Technology Management*, Vol. 26 No. 1, pp. 2 – 35.

Awiagah, R., Kang, J. and Lim, J.I. (2016), "Factors affecting e-commerce adoption among SMEs in Ghana", *Information Development*, Vol. 32 No. 4, pp. 815–836.

Baker, J. (2012) The Technology-Organization-Environment Framework. In Dwivedi, Y.K., Wade, M.R. and Schneberger, S.L. (Eds.) *Information Systems Theory: Explaining and Predicting Our Digital Society, Vol. 1*, London: Springer, pp. 231-245.

Ballard, T.L. and Blaine, A. (2013), "A library in the palm of your hand", *New Library World*, Vol. 114 No. 5/6, pp. 251 – 258.

Barnhart, F. and Pierce, J. (2011), "Becoming mobile: reference in the ubiquitous library", *Journal of Library Administration*, Vol. 51 No. 3, pp. 279-290.

Bates, I, Phillips, R., Martin-Peprah, R., Kibiki, G., Gaye, O., Phiri, K., Tagbor, H., and Purnell, S. (2011), "Assessing and Strengthening African Universities' Capacity for Doctoral Programmes", *PLOS Medicine*. Available at: http://journals.plos.org/plosmedicine/article/file?id=10.1371/journal.pmed.1001068&type=printable (Accessed on 09 March 2017).

Bridges, L., Gascho, H. and Griggs, R.K. (2010), "Making the case for a fully mobile library web site: from floor maps to the catalog", *Reference Services Review*, Vol. 38 No. 2, pp. 309 – 320.

Carlsson, C., Carlsson, J., Hyvönen, K., Puhakainen, J. and Walden, P. (2006), *"Adoption of Mobile Devices/Services – Searching for Answers with the UTAUT"*. Proceedings of the 39th Hawaii International Conference on System Sciences, 4-7 January, 2006. Available: http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=1579556&tag=1 (Accessed 09 August 2015)

Chaputula, A.H. (2012), "State, adoption and use of ICTs by students and academic staff at Mzuzu University, Malawi", *Program*, Vol. 46 No. 4, pp.364 - 382.

Chen, K. and Chang, M. (2013), "User acceptance of 'near field communication' mobile phone service: an investigation based on the 'unified theory of acceptance and use of technology' model", *The Service Industries Journal*, Vol. 33 No. 6, pp. 609 - 623.

Collins, P. D., Hage, J. and Hull, F. M. (1988), "Organizational and technological predictors of change in automaticity", *Academy of Management Journal,* Vol. 31 No. 3, pp. 512 - 543.

Creswell, J.W. (2003) *Research design: Qualitative, quantitative, and mixed methods approaches*, 2nd edition, Thousand Oaks, California: Sage.

Dahlstrom, E., Brooks, D.C., Grajek, S. and Reeves, J. (2015) *ECAR Study of Students and Information Technology, 2015,* (Research report). Louisville, CO: ECAR.

DiMaggio, P.J. and Powel, W.W. (1983), "The iron cage revisited: institutional isomorphism and collective rationality in organisational fields", *American Sociological Review*, Vol. 48 No. 2, pp. 147–160.

Evans, G.E., Ward, P.L. and Rugaas, B. (2000) *Management basics for information professionals*, New York: Neal-Schuman Publishers.

Felts, J.W. Jr. (2014), "Enhancing Mobility: Integrating New Services into Your Library's Mobile Platform to Increase Traffic", *Journal of Library & Information Services in Distance Learning*, Vol. 8 No. 3 - 4, pp. 263 - 274.

Hsu, P., Ray, S. and Li-Hsieh, Y. (2014), "Examining cloud computing adoption intention, pricing mechanism, and deployment model", *International Journal of Information Management,* Vol. 34, pp. 474 - 488.

Israel, G.D. (2013), "Determining Sample Size", *University of Florida Fact Sheet PEOD-6*. Available at: http://edis.ifas.ufl.edu/pdffiles/PD/PD00600.pdf (Accessed 04/05/15).

Keong, M.L., Ramayah, T., Kurnia, S. and Chiun, L.M. (2012), "Explaining intention to use an enterprise resource planning (ERP) system: an extension of the UTAUT model", *Business Strategy Series*, Vol. 13 No. 4, pp. 173 - 180.

Kijsanayotin, B., Pannarunothai, S. and Speedie, S.M. (2009), "Factors influencing health information technology adoption in Thailand's community health centers: Applying the UTAUT model", *International Journal of Medical Informatics*, Vol. 78, pp. 404 - 416.

Li, A. (2013), "PERSPECTIVES ON ... Mobile Library Service in Key Chinese Academic Libraries", *The Journal of Academic Librarianship*, Vol. 39, pp. 223 - 226.

Lincoln, Y. S. and Guba, E. (1985) *Naturalistic enquiry*, Beverly Hills, CA: Sage.

Lou, E. (2010) E-readiness: How ready are UK construction organizations to adopt IT. In Egbu, C. (Ed.) *Proceedings of 26th annual ARCOM conference 6–8 September*, Leeds, UK, pp. 947 - 956.

MACRA (2015) *Fourth Quarter Quality of Service Report (October to December, 2015)*, Blantyre: MACRA.

MACRA (2013) National ICT Policy. Available: http://www.macra.org.mw/wp-content/uploads/2014/07/Malawi-ICT-Policy-2013.pdf (Accessed 28 April, 2017)

Malik, A. and Mahmood, K. (2013), "Infrastructure needed for digital reference service (DRS) in university libraries: An exploratory survey in the Punjab, Pakistan", *Library Review*, Vol. 62 No. 6/7, pp. 420 - 428.

Mapulanga, (2011), "Effects of budgeting and funding on the provision of library and information services in the University of Malawi Libraries", *Performance Measurement and Metrics*, Vol. 12 No. 3, pp. 172 - 182.

Martin, H.S. and Herrero, A. (2012), "Influence of the users' psychological factors on the online purchase intention in rural tourism: Integrating innovativeness of the UTAUT framework", *Tourism Management,* Vol. 33, pp. 341 - 350.

Mutula, S.M. and van Brakel, P. (2006a), "An evaluation of e-readiness assessment tools with respect to information access: Towards an integrated information rich tool", *International Journal of Information Management,* Vol. 26, pp. 212 - 223.

Neuman, W.L. (2011) *Social research methods: qualitative and quantitative approaches*, 7th edition, Boston: Allyn & Bacon.

Nunnally, J. C. (1978) Psychometric theory, 2nd ed., New York: McGraw-Hill.

Nyirenda, P. (2012) *Report #1 on Malawi ICT sector key ICT indicators on infrastructure and access.* Blantyre, Malawi: Regional Communications Infrastructure Programme Malawi Programme (RCIPMW).

Oliveira, T and Martins, M, F. (2011), "Literature Review of Information Technology Adoption Models at Firm Level", *The Electronic Journal Information Systems Evaluation,* Vol. 14 No. 1, pp.110 - 121.

Palumbo, L.B. (2014), "Mobile phones in Africa: opportunities and challenges for academic librarians", *New Library World*, Vol. 115 No. 3/4, pp. 179 - 192.

Ramdani, B., Chevers, D. and Williams, D.A. (2013),"SMEs' adoption of enterprise applications". *Journal of Small Business and Enterprise Development*, Vol. 20 No. 4, pp. 735 - 753.

Research ICT Solutions (2015), "Malawi's phone tariffs among highest in Africa". *Daily Times*, January 16, Blantyre: BNL Times.

Rogers, E.M. (2003) *Diffusion of Innovations*. 5th ed., New York: Free Press.

Sekaram, U. and Bougie, R. (2010) *Research methods for business: A skill building approach*, 5th edition, Chichester, U.K.: John Wiley and Sons.

Stueart, R.D. and Moran, B.B. (2002) *Library and information center management*, Greenwood Village, Colorado: Libraries Unlimited.

Straub, D. W. and Burton-Jones, A. (2007), "Veni, vedi, vici: Breaking the TAM logjam", *Journal of the Association for Information Systems*, Vol. 8 No. 4, pp. 223 - 229.

Wang, C., Ke, H. and Lu, W. (2012), "Design and performance evaluation of mobile web services in libraries: A case study of the Oriental Institute of Technology Library", *The Electronic Library*, Vol. 30 No. 1, pp. 33 - 50.

Wang, H. and Wang, S. (2010), "User Acceptance of mobile internet-based on the Unified Theory of Acceptance and Use of technology: investigating the determinants and gender differences", *Social Behavior and Personality*, Vol. 38 No. 3, pp. 415 - 426.

Williams, M.D., Rana, N.P. and Dwivedi, Y.K. (2012) A Bibliometric Analysis of Articles Citing the Unified Theory of Acceptance and Use of Technology. In: Dwivedi, Y.K., Wade, M.R. and Schneberger, S.L. (Eds.) *Information Systems Theory: Explaining and Predicting Our Digital Society, Vol. 1*, Springer: London, pp. 37 - 62.

Wilson, S. and McCarthy, G. (2010),"The mobile university: from the library to the campus", *Reference Services Review*, Vol. 38 No. 2, pp. 214 - 232.

Yang, Z., Sun, J., Zhang, Y. and Wang, Y. (2015), "Understanding SaaS adoption from the perspective of organizational users: A tripod readiness model", *Computers in Human Behavior*, Vol. 45, pp. 254 - 264.

Zhu, K. and Kraemer, K. L. (2005), "Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry", *Information Systems Research,* Vol. 16 No. 1, pp. 61 - 84.