A Proposed Framework for E-Readiness Assessment Model for University Libraries in Nigeria

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Abstract

The need for efficient information service delivery has pushed individuals, businesses, libraries and governments to deploy Information and Communications Technologies (ICTs). Such a need has contributed to the rise in the development of e-readiness frameworks in different organizations, including libraries. While the e-Readiness research is prominent in libraries in the developed world, its widespread has not yet occurred across many libraries in the developing world, particularly in Nigeria. This study aims to fill this knowledge gap by proposing a model for e-Readiness in Nigeria, with particular emphasis on university libraries. They were guided by the Network Readiness Framework, the Digital Media Readiness, the e-Readiness ranking, as well as some related empirical studies on e-readiness in libraries. The study prepossesses an e-readiness framework consisting of eight (8) variables, namely: ICTs infrastructure, Internet literacy, human resources, library ICT policy, affordability, access, education and usage. These variables will serve as measures and measuring tools for the proposed model. It is hoped that this proposed model will serve as a guiding principle for empirical studies on the assessment of e-Readiness in university libraries in Nigeria.

Introduction

The concept of *e-readiness* can be viewed from two perspectives: the macro-perspective, which assesses the international and national level, or country, government and policy level; and the micro-perspective, which assesses sector, community, public system, enterprise, organization, institution and individual level (Hanafizadeh, Hanafizadeh & Bohlen, 2013). Hoffmann, Lutz & Meckel (2014:3) define readiness as the "willingness, ability and preparation for a particular action". On an individual level, *e-Readiness* is often associated with users' skills and ability, and trust and technology acceptance. At an organizational level, *e-Readiness* applies to an organization's ability and preparedness to employ ICT innovations. This, according to Van Belle (2009), presupposes that the individual or organization is e-Ready. This study conceptualizes *e-Readiness* in University libraries as the extent to which the library institution is willing, able and prepared to utilize ICT to effectively enhance the quality and information service delivery and accessibility of information.

Presently, there are disparities across countries in terms of *Readiness*, but, the overall trend is positive across all regions of the world. Individuals, organizations, and government adoption have improved considerably globally. Despite this improvement, the gap between developed and

developing countries is still complete. The likelihood that Nigeria and most developing countries will exploit the opportunities offered by ICT remains comparatively low. The World Economic Forum's Global Information Technology Report (2016:30) talks about Nigeria in the following regard:

Although Nigeria did not move overall in the Network Readiness Index (NRI) rankings, staying in 119th position, this fact marks significant heterogeneity in terms of moves in individual dimensions of networked readiness—in particular, a six-spot move up in Readiness (to 117th) and a ten-spot move down in Impacts (to 114th). The improvement in Readiness is, to a large extent, thanks to Nigeria reaching full mobile coverage this year; broadband prices have also fallen slightly, although they remain high. The political and regulatory environment is perceived to be improving on several fronts, while at the same time, the business and innovation environment is perceived as deteriorating. Government usage and engagement is perceived to have dropped significantly over the last year, yet this may change under the new government that came to power in 2015. Overall, conditions for ICT impacts seem to have deteriorated: both economic and social impacts record a decline. A policy priority with far-reaching benefits in other areas should be to address the country's skills gap.

Several researchers have studied e-Readiness in developing countries from different lenses. These lenses include e-business, e-commerce, e-library, e-government, and e-governance (Chaputula & Mutula, 2018; Motahari-Nezhad, Shekofteh & Kazerani, 2018; Mpofu, Milne & Watkins-Mathys, 2009; Aghaunor & Fotoh, 2007; Obijiofor, Inayatullah & Stevenson, 2005). These studies established that *e-Readiness* is wrought with challenges that include lack of sound regulations, lack of ICT infrastructures, low bandwidth, and low proficiency in ICT among professionals and the general public. Other notable challenges include lack of access to essential ICT services, lack of operational ICT policies, funding constraints, and scarcity of knowledge and skills.

In the case of Nigeria, and University libraries specifically, *e-Readiness* is affected by factors such as poor telecommunication infrastructures, low level of ICT skills and computer culture by librarians and lack of awareness of ICTs (Kathryn, 2013). It has also been established that availability of computers, availability of trained users, access to internet infrastructure, and enabling policies and regulations are critical indicators for *e-Readiness* in a university(Olatokun & Opesade 2008).

Problem Statement

The proliferation of ICT in libraries has become rapid nowadays. These proliferations have made library operations feasible and services more accessible through supporting information service delivery that has broken down the barriers of time and distance. The implantations and use of ICT in University libraries in Nigeria have been extensively studied, well understood, and described in many pieces of literature. Besides, many studies have explored e-readiness among countries of the world using different models. These studies mainly focused on an 'entity' (in most cases, a country) (Tarvid, 2008). However, there are no studies that have examined how e-readiness university libraries in Nigeria are faring.

Similarly, there are no developed to assess e-Readiness in university libraries. The present study promotes the view is that the existing studies are not comprehensive, as none explored e-Readiness in University libraries in Nigeria using an e-Readiness model. This is a critical gap for several reasons. First, variables that could actually be tailored to the specific context of libraries and sufficiently represent the complexity of the phenomenon are not included. Second, drivers and indices used in measuring *e-Readiness* across countries are too broad and hence could not be applied to the specific context of libraries. Choucri, Maugis, Madnick & Siegel (2003) noted that e-readiness studies and attendant indices had assumed a fixed, "one-size-fits-all set of requirement", irrespective of the distinctiveness of individual countries or the demand for a specific application. Consequently, Marco, Scott & Mars (2018) draws attention to the importance of developing different assessment tools for various stakeholders. In response to these limitations, the present study is intended to contribute to bridging this gap by proposing to develop a model of *e-readiness* – that can be applied in university libraries in Nigeria.

Objectives
The objectives of this study are as follows:
1) To identify the indicators that will help assess *the e-Readiness* of university libraries in Nigeria; and
2) To propose a conceptual framework that will incorporate these indicators towards developing e-Readiness model for University libraries in Nigeria.

Methodology
This paper carried out a review of the literature on *e-Readiness* in order to identify the key drivers that could inform the building of a model of e-Readiness for University libraries in Nigeria. The databases used in carrying out the literature search areEmerald, Springer, Google Scholar, EbscoHost and JSTOR. The descriptors used to search relevant scholarly works include e-readiness, e-readiness framework, e-readiness in University libraries and *e-Readiness* in Nigeria. Unfortunately, in the Nigerian context, very few relevant articles were found, and this is primarily due to the lack of research in the area. Hence, this study extrapolates e-readiness factors from other domains that apply to e-readiness in libraries.

Theoretical Framework
Research on e-readiness vast because some many frameworks and models have addressed indices and measurements that influence *e-Readiness* at various levels. ICT literature has come a long way in analyzing the many drivers of *e-readiness* – but there are few ones on the drivers of *e-Readiness* in University libraries. A review of early studies on*e-Readiness*has shown that most of the studies derived from models such as the Readiness for the Network World (CID, 2000), the Digital Access Index (ITU, 2003), the ICT Diffusion Index (UNCTAD, 2005), the Digital Opportunity Index (ITU, 2007), the e-Readiness Ranking (Economist Intelligence Unit, 2007) and the Network Readiness Framework (World Economic Forum, INSEAD & InfoDev, 2016).

However, these models differ in terms of their indicators for measuring ICT readiness. A discussion of the models that are relevant to this study will be offered in the next section.

The Network Readiness Framework

The Network Readiness Index (NRI) by the World Economic Forum, INSEAD and infoDev (2016) were established on several fundamental assumptions. First, an excellent regulating environment is vital in order to leverage ICTs and generate impactfully. Second, e-Readiness is measured by ICTs availability, and so skills and infrastructure are a precondition to generate impact. Third, to wholly gain from the benefits of ICTs require a society-wide effort. This Implies that all stakeholders, the government, business sector, and the general population must partner. Lastly, all the set of drivers such as the environment indices (political and regulatory environment and the business and innovation environment), readiness indices (infrastructure, availability and skills), and the usage indices (individual, business and government usage) must interact, co-evolve, and strengthen each other in order to create more significant impact (World Economic Forum, 2016).

The Network Readiness Index (NRI) is defined as the degree of preparation of the community to participate in and benefit from ICT developments. In sum, NRI attempts to measure the relative development and use of ICT in a given country and show a nation's strengths and weaknesses concerning ICT. In terms of strengths, the NRI uses both quantitative and qualitative variables which allow better capture of reality. However, the qualitative variables make the assessment somewhat subjective (Tarvid, 2008). Furthermore, not many indices measured the actual usage of ICT infrastructure. Figure 1 below shows the network readiness framework.
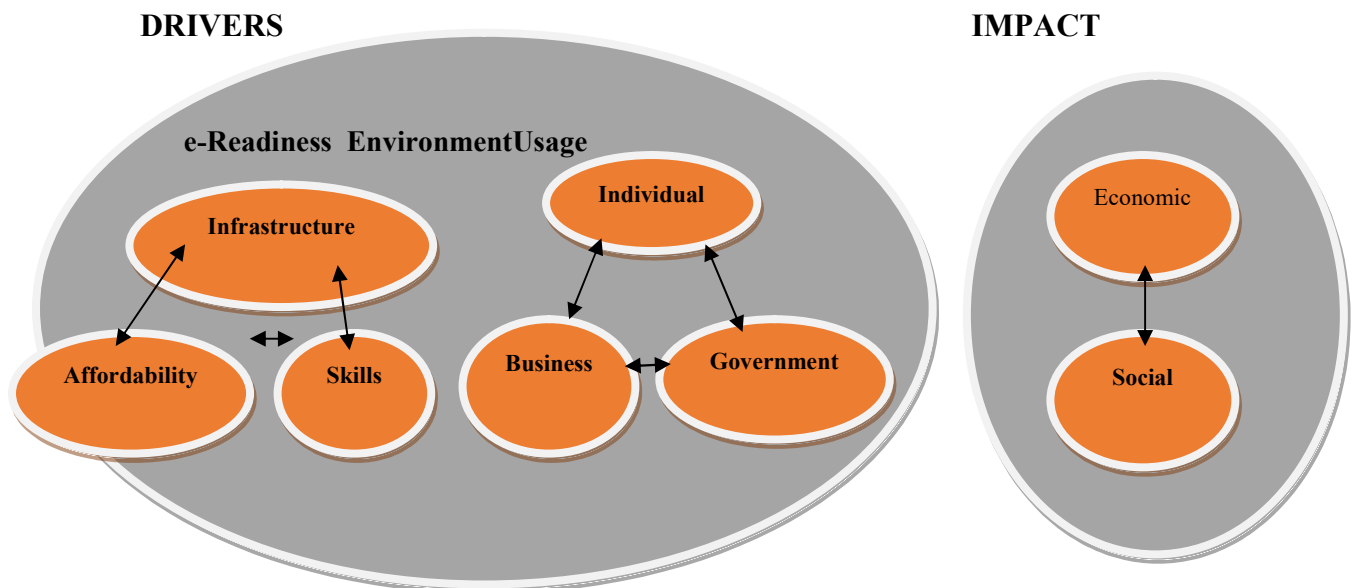

Figure 1: Network Readiness Index Frameworks (*Source*: WEF Global IT Report, 2016)

The Digital Media Readiness (DMR) Framework

Digital Media Readiness (DMR) index was designed as a tool to "assist in measuring a community's access to and use of media, entertainment and information products, services and content, referred to simply as digital media" (World Economic Forum, 2016: 4). In this regard, communities can include nations, cities or any other grove of citizens that can derive benefit from digital readiness—the DMR Frameworksact as an open-source tool for anyone to use. Ideally, the framework is to serve as an aid to facilitate investment, incentives, and programs that will lead to the MEI industry's sustainable development at a global level.

The DMR index organizes relevant indicators into three categories, whereby several variables measure each category. These main categories are environment (legal, business, education and culture), capacity (infrastructures, accessibility, affordability and skills), and usage (government and private sectors). The environment category assesses the extent to which a community's market conditions and regulatory framework supports innovation, the development of information and communication technology (ICT) and the use of digital media in general. The capacity category, on the other hand, measures the extent to which a community has infrastructures such as mobile network coverage, international internet bandwidth and electricity, and other facilities in place to support the production and use of digital media. It also considers other factors such as affordability, accessibility and the public's overall skill set. The usage category assesses the extent to which society's stakeholders adopted digital MEI, ICTs and new technologies (World Economic Forum, 2016).

E-Readiness Rankings

E-Readiness Rankings (ERR) by the Economic Intelligence Unit (2007) defines *e-Readiness* as the state of play of a country's ICT infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit. The ranking allows governments to gauge the success of their technology initiatives against those of other countries. Also, the ranking provides companies that wish to invest in online operation with an overview of the world's most promising investment locations. The Economic Intelligence Unit, in its previous release of ERR based its index on six categories. Each measured by a set of qualitative and quantitative variables (Tarvid, 2008).

The categories measured by the ERR include connectivity and technology infrastructure (broadband penetration, broadband affordability, Internet penetration, PC penetration, Wi-Fi hotspot penetration), business environment (overall political environment, tax regime, foreign investment policy, financing), social and cultural environment (level of education, level of internet literacy, degree of innovation, technical skills of the workforce), legal environment (adequate of the traditional legal framework, laws covering the internet, level of censorship) government policy vision (government spend on ICT as a proportion of GDP, digital development strategy, e-government strategy, online procurement) and consumer and business adoption (consumer spending on ICT per capita, level of e-business, level of online commerce, and availability of online public services for citizens and businesses).

Review of Empirical Studies on e-Readiness in Library

Although there have been increased in research on the drivers and indices that measure e-readiness in countries and business institutions, studies on e-readiness in University libraries in Nigeria are quite a few. Since ICT is essential for efficient library services, understanding the drivers and indices influencing e-readiness in libraries will help predict how e-ready libraries in Nigeria are. Equipped with this information, researchers can measure where the libraries are in the e-Readiness process and support them as they move from e-Readiness through to ICT usage. The existing dimensions used for measuring and assessing e-Readiness in countries, businesses, educational institutions and libraries are related to environmental, infrastructural, and utilization indices. For example, Motahari-Nezhad, Shekofteh & Kazerani (2018), assessed the e-readiness status of libraries in Shahid Beheshti University of Medical Sciences in terms of four dimensions, human resources, electronic infrastructure, network services, and programs and enhancers in the networked world. By using a self-prepared questionnaire for managers, staff, and information communication technology (ICT) officials, the study found that the libraries had an average to high status in terms of human resources, electronic infrastructure, network services, and programs and enhancers in the networked world. In total, all the libraries had an average of high status in terms of e-readiness.

Similarly, Kamau, Kipling' at & Odini (2015) appraised the e-readiness of university libraries for distance learners in Kenya using four indicators, namely ICT infrastructure, electronic communication system, electronic services, and information literacy. The study found that ICT infrastructure is inadequate, and that e-communication is low. It also discovered that there is lack of awareness of e-services offered by the libraries and that there is a poor use of e-resources—the findings indicate a low level of e-Readiness in the two case areas covered by the study. Similarly, Chaputula & Mutula (2018) in a study of e-Readiness of public university libraries in Malawi and the use of mobile phones in the provision of library and information services found that the institutions studied had the ICT infrastructure necessary for offering library and information services on the mobile phone platform. However, the finding revealed that these institutions did not have operational ICT policies to govern the operations of library and information services through mobile phones. The study further revealed that although the human resources required for managing the provision of library and information services through the mobile phone were available, they did not have the necessary skill to provide quality services. Chaputula & Mutula (2018) on their part incorporated a quantitative and qualitative strandusingin-depth semi-structured interview with a survey questionnaire to elicit responses from university/college librarians, Information and communication (ICT) directors and students.

Furthermore, Yaghoub & Ismaiel (2013) investigated the level of e-readiness of Tabriz University libraries in Iran using five dimensions: organization and management, human resources, Information, ICT, and communication with the external environment. The study developed a model for measuring the e-readiness of academic libraries based on IUP, which has been designed to measure the e-readiness of organizations dealing with information. The study used a survey method with a descriptive approach, and the data gathering tool is a questionnaire. Yaghoub & Ismaiel (2013) discovered that the University of Tabriz libraries had an overall e-

readiness with 2.44 points out of a maximum possible 5 points, which is lower and not desirable. In a related study, Kashorda & Waema (2011) evaluated e-readiness in higher education institutions in developing economics by coming up with a proposed e-readiness assessment model that contains 17 indicators. These indicators were grouped into five categories of network access, networked campus, networked learning, networked society, and institutional ICT strategy.

Furthermore, the model defined over 88 sub-sectors of the indicators based on hard facts and perception data. According to Kashorda & Waema (2018), the proposed model has a framework of a quantifiable target for staging each of the 17 indicators and sub-indicators on a scale of 1 to 4, where 1 is the lowest stage of preparedness and 4 is the highest stage of preparedness. This framework has since been tested in two separate e-readiness assessments of universities in East Africa.

Proposed Research Framework

Based on the reviewed literature and the analysis of published e-Readiness frameworks and models, this study identifies key variables that are appropriate for the development of e-readiness model in University libraries in Nigeria. The proposed model for this study consists of a total of 8 indicators, as discussed below (see Figure 2).

Infrastructure

Gade & Agarwal (2017) assert that ICT infrastructure is a crucial component and an influencing factor in assessing e-readiness. Without a sound ICT infrastructure in place, libraries cannot reap the possible computerization benefits. This framework allows the ICT Infrastructure variable to capture the state of university libraries' infrastructure. It also captures the needed infrastructure for developing ICT such as internet availability, internet bandwidth, network speed and quality, mobile network coverage, secure internet server, hardware and software, and production of electricity.

Internet Literacy

Specific skills and competence in using the internet and its applications can also serve as an essential component of determining e-Readiness. Internet literacy can be defined as one's ability to use Internet applications to investigate, create, and communicate in order to participate effectively at home, school, workplace, and society. Apart from possessing the required technical expertise in handling internet applications and relevant software, the concept of internet literacy also focuses on deliberate, conscious, and reflective usage of the internet and other applications (Stodt et al., 2018). This framework assesses the individual's expertise in handling computer hardware and software as well as internet applications. It also measures how and why an individual uses the internet to create their content and interact with others.
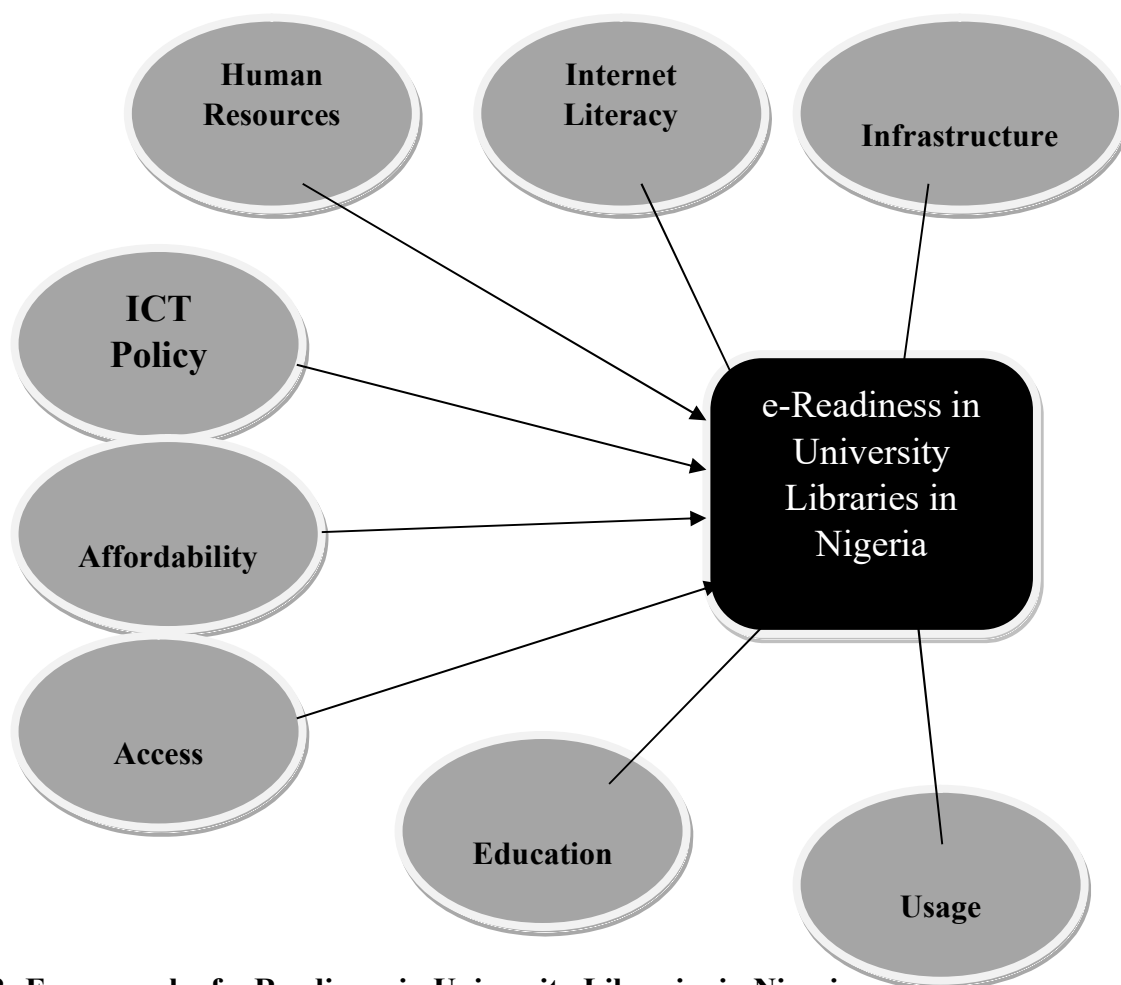
Figure 2: Framework of e-Readiness in University Libraries in Nigeria

Human Resources

Several scholars (Motahari-Nezhad, Shekofteh & Kazerani, 2018; Van Balle, 2009; Tarvid, 2008) have established that human resources are an essential factor in assessing e-readiness. For instance, Van Belle (2009:9) asserts that "the most expensive, up-to-date computers will stand ideal if staff do not want or know how to use them". However, Tarvid (2008) acknowledges that the human resource factor is one component that is less focused on the existing models. This is even though it is significant. This framework assesses the existence of skilled ICT staffs and measures how educated is the ICT departmental workforce.

Library ICT Policy

According to Gade & Agarwal (2017), policies, regulations, and guidelines are the bedrock for the standardized management and implementation of e-readiness. University libraries are supposed to have a library-based ICT policy plan where the library describes its expectations, goals, content, and actions related to the future of ICT in library services. Without having a sound ICT policy in place, it will be difficult for university libraries to compete in the knowledge-based global economy. This framework assesses the availability of a robust ICT policy plan (vision blueprint) for university libraries, technical inventory and a comprehensive

ICT policy plant that takes into account support for ICT training activities and monitoring activities.

Affordability

One of the most critical aspects of e-Readiness is the level of financial resources committed to deploying or using it. Affordability is not only limited to purchasing hardware; it also entails acquiring software, maintaining the system, paying for connectivity, and providing training to staffs (Van Belle, 2009). This framework assesses the ability of University libraries to pay for ICT and new emerging technologies in the library by measuring the cost of broadband internet subscription. It also assesses the workable ICT budget and ICT upgrade budget with planned upgrades.

Access

Access variable measures the extent to which University libraries have access to computers and the internet. It also assesses other deterrent factors such as equipment cost, access cost, countries logistic issues, and lack of perceived need.

Education

The education variable assesses whether substantial educational programs and professional training programs that are aimed at increasing knowledge about and usage of ICT are available. An excellent and sustained education system that focuses on computer application serves as a good indication of the library readiness to adopt ICT.

Usage

It is essential to measure how a university library is deploying or using ICT resources at its disposal. There are times that organizations have the ICT resources, but do not use them optimally or deploy them to the fullest extent (Van Belle, 2009). Van Belle further stresses that assessing the usage of ICT in an organization should be the primary concern since it is why it has such ICT resources. This framework measures the extent to which university libraries have used ICT.

Implications

This study has several implications for research. Since ICT and new emerging technologies are continually impacting on libraries' understanding, libraries readiness to adopt and use these technologies is an important issue. There are several issues as far as e-Readiness in university libraries is concerned. First, there is the need to develop a research model in order to identify the drivers and indices influencing e-Readiness in university libraries and their relationship. Although this research has reviewed different models and frameworks of e-Readiness, there is the need to develop a suitable model that will serve the interest of the library.

Conclusion

This paper defined *e-Readiness* of a University library (UL) and developed a proposed model called the e-readiness framework that can be used for measuring it. This proposed framework can be used to assess University Library *e-Readiness* using eight (8) indicators: infrastructure, internet literacy, human resources, library ICT policy, affordability, access, education, and usage. It is believed that the components of the framework are measurable and interpretable. Therefore, practitioners are urged to adopt the model and modify it where necessary. The opinions of experts who are familiar with policies and theoretical backgrounds would help in building a convenient e-readiness model that will fit the need of university libraries in Nigeria.

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