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# **DIGITIZATION OF INFORMATION RESOURCES IN UNIVERSITY LIBRARIES IN NIGERIA: CHALLENGES AND THE WAY FORWARD**

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## **Abstract**

*Libraries all over the world are embracing the digitization of information resources to increase their relevance in this era of information explosion and knowledge management. This paper discussed the concept of digitization, digital library technology for digitization projects, and overview of digital efforts in Nigerian university libraries. Challenges to the digitization of information resources in Nigerian university libraries were highlighted. These include insufficient funding and a lack of acquisition of metadata skills by the librarians. Recommendations made include improved funding for Nigerian university libraries and constant training and retraining of librarians to acquire metadata and other digitization skills.*

**Keywords:** *Information Resources, Digitization, Digital Library, University Libraries, Metadata Skills, Nigeria.*

## **Introduction**

Many libraries are now digitizing their printed information resources making them available in various electronic media. Digitization is a concept that embraces electronic collection, management and access to information resources in the knowledge society. Adesode (2016) defined digitization as the process of transforming already published documents into electronic format or by straight electronic process into born-digital for online access. According to Kawasaki (2018) digitization is the conversion of analogue media into digital form. The Library and Archives, Canada, in Akintude (2007), also defined digitization as applying modern technologies in

translating a piece of information such as sound recording, picture or video into bits. In an academic digital library, digitization may involve direct digital processes of original information material or converting the already printed materials into digital formats using hardware and software technology together with network facilities where the librarians have the knowledge and skills to do so to enable online access.

Generally, digitization exercise is expensive and time-consuming. In the academic library environment, the success of a digitization project depends on the librarians' capacity to organize and execute a hitch-free exercise. Omigie (2019)

believes that librarians' digitization capacity depends on their ability to use various hardware and software technology, including the Internet, metadata and copyright skills. In this regard, the librarians' capacity building on digitization technologies is central to ensuring effective and efficient application of the various technology components required for a successful project exercise. Oyomah (2019) noted that the knowledge of digitization infrastructure is an integral part of the librarian's effectiveness in digital library service delivery. The author identified some technology components and skills for digitization processes including:

- digital image software is used to save images in proper file formats once the images are scanned,
- the Optical Character Recognition (OCR) for downloading large online resources and for converting scanned documents to soft print,
- Image editing software for bookmarking,
- Acrobat reader for converting image files to Portable document format (PDF), etc.

### **Digital library**

Digitization technology is imperative in digital library operations. A digital library is a library where all the information resources, management and access are computer technology-based. Sreenivasulu (2012) stated that the library is an electronic library in which large number of geographically distributed users can access the contents of large and diverse repositories of electronic objects. Similarly, Omigie (2019) affirmed that a digital library is a library of large databases employed in a hypertext environment. The environment supports the complete life creation, storage, preservation, dissemination and use of data and information made complete by the process of digitization. In this sense, the digital library operates on the platform of digitized information resources and is made available online for access at anytime and anywhere.

### **Technology Infrastructure for Digitization**

The infrastructure needed for digitization projects in libraries includes the hardware and software technology, network facilities and other related drives used for digital library services. The extent librarians acquire and apply their ICT knowledge

and skills, determine their extent of readiness for digitization project. The technology facilities for digitization include:

### **The Hardware**

These are the various creative and useful ICT infrastructural facilities emerging in the digital library environment. Kude (2013) identified such hardware as servers, nodes, printers, scanners, digital cameras, sound recorders, etc. Akens (2017) identified some tools and or equipment used for digitization to include computer systems, scanners which could be flatbed, hand-held or sophisticated scanning machines like SMA21 and Kirats, digital cameras, CD or DVD writers, and printers and so on. Similarly, Pandey (2003) identified various versions of hardware servers like Rack Servers, Blade servers, Tower Servers, and Mainframes, among others. Other hardware are: PCs (clients), modems, storage devices like USB flash drives, Compact Discs (CDs), Digital Video Discs (DVDs), book scanners like Czur ET16, Fujitsu Scansnap SV600, SMS ScanMaster 2, etc., CD/DVD writers and digital cameras like Sony Alpha a7R11 mirrorless, Canon 5Ds digital single-lens (DSLR), video digitizer such as supper U-Matic3/4, Hi8, Super VHS, Betamax, Micromv, MiniDV, DVCPRO, DVCam, video8, etc., UPS backup like online double conversion, line-interactive, offline (also called standby and battery backup) among others. Technology hardware enables the assimilation of software and other systems that run computer programs for a usable computer system.

### **The Software**

Essentially, these are three types:

- i. Application Software: This is a Software program that instructs the computer to execute a command given to it by a user. It is an end-user package that includes: word processors, spreadsheets, inventory, payroll programs, etc.
- ii. System software: This software is an inbuilt internal control functioning that controls the computer. It operates in the computer background and runs the computer peripherals like the computer monitors, printers and storage memory devices.
- iii. Network operating System: This is the network system that matches up

communication between computers that are linked up in a network. Pathak (2018) defines Operating System (OS) as a collection of software resources providing important functionalities and a graphic user interface. Examples include: Linux, Android, MS Windows, macOS, Ubuntu, etc.

The software is database management systems (DBMS) package designed for the digital library to carry out its functional activities such as resource creation, storage, retrieval, manipulation and use of the resources, etc. Specifically, the DBMS is designed to define, manipulate, retrieve and manage data in a database. Examples include MySQL, Microsoft Access, Oracle, PostgreSQL, dBASE, FoxPro, SQLite, IBM DB2, LibreOffice Base, Microsoft SQL Server, etc. Kude (2013) listed the system Software as application software, OCR software, file formats converter, web server, Database software vizDspace, E-Print, Greenstone, Fedora, Academic Research in the Netherlands Online (ARNO), CERN Document Server Software (CDSware), I-TOR, MyCoRe, Archimede, etc. as open software.

### **The Internet**

This is a global gigantic network of computer systems that allow vast access to information resources on the web. Adesode (2015) affirmed that the Internet is the first skill competency a digital librarian should develop for managing digital knowledge and ability to access, gather and publish information on the web. Digital library management involves robust Internet skill applications, and computer literacy competencies of the librarian to be able to navigate and browse the web, search databases, select documents, filter, retrieve and store digital documents for digitization projects in a library. Internet skills enhance librarians' ability to create home pages, carry out the content conversion, download and upload documents, publish on the web, carry out archiving work, perform electronic messaging and web authoring, preservation and storage. Other knowledge and skills include the working of computer networking devices such as routers with a common set of protocols that enable the transmission of data called Transmission Control Protocol/Internet Protocol (TCP/IP), etc.

The primary purpose of the Internet is to facilitate information sharing using different tools such as the World Wide Web (WWW), Telnet and Gopher etc. of which the WWW site is the most general and extensively used of all. The site is accessed through a hypertext interface to link to documents located anywhere on the web. Clicking on a link opens a file or site to the right entry to relevant materials or related ones situated on another computer elsewhere across the globe. Other indispensable components of the Internet include the Uniform Resource Locator (URL) which allows a link between documents using an address bar to locate items, the Hypertext Transport Protocol (HTTP) which is the protocol used to transfer hypertext or hypermedia documents, the Home Page which is the starting point for locating information on the web, etc.

### **The Metadata**

Metadata is a tool in the digitization process to decide semantic and syntax resource creation about titles, authors, publishers, dates, names, etc. It is used to enhance the identification of resources, discovery of resources, and web page relevance and is a key factor in determining position in a search (Berson & Dubor, 2018). It is a tool used to describe the content and attributes of data in the electronic arrangement. It is a kind of summary of basic facts about data to make finding and working with specific data easier. In a digital library environment, metadata skills provide the librarians with the ability to select and modify metadata schema that best fit the library needs because according to Koma (2014), there is no one-size-fits-for-all metadata schema that can satisfy different library materials and users' communities. Metadata skills involve the librarians' abilities to select and use other appropriate metadata schemas like Dublin Core, Greenstone, MARC, METS, LOM, PREMIS, etc. as it is suitable for their libraries. Metadata skills enable the building of basic descriptive metadata elements such as title, author, publisher, place of publication and date given to each item and encode the information in a standard data structure for the digital library.

### **The Copyright**

These are the intellectual property rights ascribed by law to owners of intellectual works which

Moahi (2013) identified as including literary works, musical works, artistic works, cinematographic films, sound recordings and broadcasts. In Nigeria, the Copyright Commission is the regulatory body for the protection of intellectual works. The law forbids a library or a person to digitize, photocopy or copy an information resource, without the permission of the owner obtained. The "fair use" of the material allows content users to use copyrighted work for educational purposes. Materials that fall under "public domain" means that the author holds no right. Licensing agreement stipulates the rights and obligations of who has access to information, how long the user can use the information and whether information can be translated or repackaged. A violation of the copyright is known as copyright infringement and is punishable by law. It is on the basis of this that it is highly inevitable for librarians to be equipped with copyright knowledge. The copyright knowledge provides the librarians with the general nature of copyright, the copyright domain, exceptions and limitations of copyright permits, negotiation and management of intellectual property rights issues in the digital environment, handling of licensing agreements, copyright deposits and purchases.

### **Overview of Digitization Efforts in Nigerian University Libraries**

Digitization is not new in Nigerian university libraries. Adeleke (2012) studied the digitization capacity and skills of academic librarians in 11 selected public and private university libraries in Nigeria and found that though digitization was still in its infancy in the libraries studied, some of the librarians had acquired some forms of digitization skills and were involved in the digitization process. In a related development, Ibinaie (2012) also studied the *Digitization of Library Resources in Nigerian Universities: The Experience of Kashim Ibrahim Library at the Ahmadu Bello University, Zaria*. The study reported that theses, dissertations and seminar papers were the library resources digitized using D-Space and Abby-Fine Reader software. Similarly, Mohammed (2014) studied the *Management of Digitization Projects in Two University Libraries in North-Eastern Nigeria* and found that majority of the staff involved in the digitization project management used software

packages like Abbyfine reader, Omnipage and PDF with emphasis on the PhD dissertations, MSc theses and the university journal articles whose copyrights have been obtained. Adaze (2016) studied the *Extent of Availability of Digitization Facilities and the Level of the Librarians' Applications in Four University Libraries in South-West Nigeria* and found that three of the libraries had all the necessary technology infrastructure for digitization and that many of the librarians had received adequate training and were applying the skills they had acquired in their libraries. Similarly, Omomah and Daudi (2018) examined the 'Use of Library' as a course to teach copyright law and photocopying practice by librarians in two public university libraries in Edo and Delta State. They used a descriptive survey, questionnaire and simple percentage for data analysis. The findings revealed that 42 respondents (58%) were unaware of the copyright law on photocopying as copyright infringement.

Many other university libraries in the country have their own experiences and strategic plans for future project execution. Digitization is complex and the extent a digital library builds its digitization project depends on the librarians' skill and competence. Wilson (2009) posited that since the beginning of the web and the automation processes, many institutions in Europe such as university libraries, research institutes, museums and others have been digitizing their information resources where the librarians have the digitization capacity to do so. Librarians in Nigeria are hardworking and always eager to acquire new knowledge and skills on new library trends to build their capacity for effective, efficient and sustainable digital library service delivery. Specifically, the university libraries in Nigeria are keen to digitize their resources to enable them contribute to the global library information network domain, to increase their global visibility and web ranking of their libraries.

### **Challenges of Digitization in Nigerian Universities and The Way Forward**

There are various challenges to the digitization of information resources in Nigerian university libraries. They include:

**The slow pace of automation:** Generally, this is the springboard for digital library development

and the platform for digitization project initiatives. Presently, many university libraries in Nigeria are still slow to attain full library automation. Thelma (2018) in a study titled: Problems and issues of automation in public libraries in North-Eastern Nigeria revealed the state of six public university libraries in North-Eastern Nigeria and found that the central components required to operate full automation were not available in four of the libraries studied. Although private university libraries were better in automation, all of the libraries prefer subscription to external databases for their information resource needs and therefore have no digitization initiatives. In this information society, library automation is the strength of effective and efficient sustainable modern library service delivery. In this regard, the Librarian Registration Council of Nigeria (LRCN), the Nigerian Library Association (NLA) and the National University Commission (NUC) must work together and prevail on university management to fully automate their library services or deny them participation in any form of the accreditation program.

**Interoperability:** This is the ability of a digital library to exchange standard quality information resources in conjunction with another digital library system technically different from each other. Hafezi et al. (2010) noted that systems used for interoperability in the digital library are enhanced in accordance with technological developments and digital libraries validate their services in a virtual platform in the worldwide web environment which imposes its provisions and specifications. Essentially, the speed of advances in virtual technologies is now so rapid that the time between the old and the new technology devices and protocols for digital libraries is very small for many university libraries in Nigeria to be able to catch up in acquiring and upgrading to the new system. Digital libraries are still young in Nigeria and require time to be able to conform to the rapid technological advances and upgrades in the digital library environment. In addition, librarians should form a consortium with other digital libraries to secure access to their users' information resources needs.

**Lack of Metadata Skills:** This is an electronic cataloguing system that summarizes the basic information about data to make finding stress-free. Omigie (2019) in a study on the acquisition and application of digitization skills by librarians in public and private university libraries in South-South Nigeria, found that librarians lacked training in the acquisition and application of metadata skills. According to the study, many of the librarians scored themselves very low on how to filter through schemas for standards work, use schemas to identify the relationship between metadata elements as regards the semantics, the syntax and other options for resource identification, use application profile for resource discovery, use crosswalk tool for mapping standard with another schema and application profile, harmonize sets of metadata to facilitate access, among others. Metadata is an inevitable component of the digitization exercise. Librarians must be trained to acquire and apply metadata skills. The knowledge will enhance their ability to face digitization projects at any time in their library or even as consultants to other libraries planning to embark on digitization project.

**Copyright Issues:** These are the intellectual property rights ascribed by law to owners of intellectual works such as musical works, artistic works, cinematographic films, sound recordings, etc. (Moahi, 2013). In Nigeria, outsized scale piracy of software and plagiarism are critical issues in providing digital devices for digitization projects and other information service delivery in the university libraries. Yakubu (2014) lamented that these problems always lead to the acquisition of substandard software resources that do not stand the taste of the time in digitization exercises and other digital library service functions. Digitization projects are expensive and Nigerian university libraries need standard equipment and facilities to enhance their digitization initiatives. Relevant government agencies must work harder to wipe out piracy and substandard materials in the country.

**Insufficient Technical Infrastructure:** These are the hardware, software, Internet facilities and other equipment required for a faster and more comprehensive digitization project. In a digitization project, the absence of a stable

network, and technical infrastructures such as servers, routers, cables and wireless access point resources are issues that can mar a beautiful digitization plan. Digitization equipment must come with a warranty period from vendors to secure the equipment and for a possible replacement in case of any damage during installation or any malfunctioning that is beyond repair. Such issues are hardly addressed in the libraries and the consequences usually lead to the abandonment of lofty ideas.

**Cyber Attack:** This is an Internet-based uncoordinated attack which involves the use of malicious software programs to attack computers and information network systems causing significant damage and setback to the victims (Omigie & Nwadioha, 2017). Cyber-attack is old, but today, the frequency of attack and harm to information systems across the world is alarming and frightening. Attacks vary from installing spyware even on new computer equipment in a smart way, using a computer network device to bring down critical computer operations or using malicious code or professional hackers to tracing systems with vulnerabilities, etc. Shanmugama (2017) posits that to overcome this issue, compulsory virus-proof procedures are adopted while downloading e-information from any system. This includes modifying databases by hacker-proof procedures using proprietary login and password systems or any other security software or firewall technologies and acquiring computer equipment from standard vendors with guarantee periods.

**Insufficient Funding:** This is the financial allocation for library development by the university management. Okiy cited in Omigie and Bosah (2019) laments the generally poor state of funding public libraries in Nigeria, a situation the authors affirmed, has forced heads libraries to downsize their library staff through rationalization or redeployment and reduction in book budgets, reduction in several programs and services rendered to the clientele as a result of the dearth in library equipment and facilities. These problems are bound to affect the librarians' morale and attitude towards work, hinder users' access to quality resources and reduce library patronage. Parent bodies of university libraries should

provide adequate funds to their libraries as they are the heart of their university programs of learning, research and development. The LRCN, NLA and other stakeholders should compel the university management to raise the library budget to about 30% of their annual budget, equip the libraries and enhance their resources, activities and programs.

### **Inadequate Library Professionals:**

Librarianship is a highly technical profession for trained and inducted specialists. Unlike other professions where anyone can trade in, librarianship requires specialized knowledge and skills for one to carry out such technical tasks as cataloguing and classification, data mining and storage, digitization projects, metadata creation, applying digital library software, assisting resource users in learning and research, assisting researchers in collaborative works, etc. Unfortunately, such technical professionals are hardly adequate in university libraries. As a result, there is usually job overload, stress, job indifference, reduced attitude to work, ineffective services, etc. among the few practising librarians. These issues require proper and urgent handling. More library schools should be established and the curriculum of the existing ones should be adequately revised to suit modern day realities that will produce professionals that can work effectively in digital libraries. Also, university management should take special interest in employing the young professionals coming out from library schools and build them up into the library and information service system.

**Apathy for library development:** This is the general government's indifference to library development in the country. Clearly, the library is a service industry that always consumes finances with seemingly no physical funds to return on investment. Thus every government in the country is usually not interested in giving attention to library development whether public, academic or special library. The government should change this attitude towards library development. This will enhance library development as centre of educational institution. Such a change in attitude will help libraries to be well prepared and equipped to carry out various programs including digitization projects. Other issues that can hinder



the digitization project are escalating inflation in the country, insecurity, and lack of motivation from librarians.

## Conclusion

University libraries across the globe digitize their information resources to enhance easy access and

utilization. Nigerian university libraries are not behind in the digitization of library resources although some factors hinder the digitization process. This paper highlights some strategies that will enhance the digitization of information resources in Nigerian university libraries.

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