

## A REVIEW OF THE APPLICATION OF INFORMATION TECHNOLOGY IN NIGERIAN LIBRARIES

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### Abstract

*There are several literatures pertaining to the application of information technology in Nigerian libraries, however, these literatures do not sufficiently address issues about the application of information technology in Nigerian libraries. Hence, this work attempts to review the available literatures with the aim of capturing these applications. To achieve the stated research goal, the study applied systematic literature methodology. Seventy-five (75) papers in the area of the application on information technology in Nigerian libraries were downloaded. Out of these papers, twenty-seven (27) most relevant studies were selected for review in order to extract the appropriate information needed for the analysis. The results from the review reveal that there is scarcity of appropriate literatures in the areas pertaining to the application of information technology in Nigerian libraries. The research outcome showed the areas of application of information technology in Nigerian libraries, the extent of such application, the challenges facing the application and the solutions to the problems confronting the application of information technologies in Nigerian libraries. The results from this paper provide additional knowledge to library practitioners and the research community on the current state of research on the application of information technology in Nigerian libraries.*

**Keywords:** Application of Information Technology, Nigerian Libraries, Systematic Review.

### Introduction

According to Diafiaghor (2012), the use of information technology in academic libraries has been profoundly affecting all aspects of information acquisition, storage, and transfer. Its magnificent development has dramatically changed the mode of library operations and information services. Hundreds of thousands of monographic materials, journals, learning resources, databases, etc. are now available in electronic formats, and these materials can now be accessed from the remote corner of any country, thereby increasing the use of information and literature and the efficiency of information services in Nigerian libraries. Users are now more independent than before; they can access these electronic formats from their home computers and search databases according to their information needs. Akintunde (2006) stated that information technology (IT) stressed the use of computer and other technologies such as telephone and the Internet to process, and transfer voice and data singularly or mixed in libraries. IT have changed and modified how library staff work and how library users learn and access information in libraries. The backbone of this transformation and changes depend heavily upon the availability of information technology facilities. Oyedum (2007) opined that information technology facilities like computer, printer, telephone, Internet and e-mail services etc. contribute vastly toward information technology development in Nigerian libraries. IT in general comprises digital technologies which includes; network technologies,

Internet, printers and scanners. Hence, the application of information technologies in Nigerian libraries has facilitated operational and efficient acquisition, processing, storage, organization, and dissemination of information, and the quality of library and its services given to the library users like remote access. This is because in an information technology based environment, library users, through a good network can access what is in their library and other libraries. Meanwhile, there are many challenges facing the use of information technologies in Nigerian libraries such as lack of sufficient funds, and lack of regular electric power supply, etc. However, even though some works has been done in the application of information technology in Nigerian libraries, there is still scarcity of literature in this area of study. This work therefore intends to review systematically available literature on the application of information technology in Nigerian libraries to ascertain the extent of scholarly works on this subject of study. Within this ambit, the need to address the issues raised will become imperative in future researches.

### Statement of problem

This study is based on the fact that information service is a key resource to all developmental activities and nowadays, it is widely recognized that information technology facilitates information collection and its dissemination is a dire necessity. As a repository of knowledge, which makes information storage,

retrieval, and dissemination to be possible, there is no doubt that libraries play a fundamental role in meeting information needs of all types of users. Hence, it is important to take a study on the application of information technology in Nigerian libraries, to determine the strength and weakness of information technology in Nigerian libraries, its areas of application, the extent of application, and problems faced by Nigerian libraries for effective application of information technology. However, it is necessary to say that several studies have been carried out in the application of information technology in Nigerian libraries. However, even though some works has been done in the application of IT in Nigerian libraries, nonetheless, there is scarcity of literature in this area of study. This work therefore intends to review systematically available literature on the application of information technology in Nigerian libraries, to ascertain the extent of scholarly works in this subject of study.

### **Review of literature**

The application of information technology in Nigerian libraries

As the world is undergoing a transition from paper to a digital economy, libraries are encouraged to take part in the changing scene. This review mainly centered on the application of information technologies in Nigerian libraries. The following themes were discussed; definition of terms, areas of application of information technology in Nigerian libraries, the extent of the application of IT in Nigerian libraries, the problems facing the application of information in Nigerian libraries and the solutions to the challenges confronting the application of IT in Nigerian libraries. Information and communication technology (ICT) comprises the hardware and software elements that allow us to access, store, organize and manipulate information. This involves the equipments, infrastructures, and software through which information can be received, accessed and disseminated. However, the focus of this study is on information technology with regard to Nigerian libraries. Today, we are dealing with information which is strength to every nation as the status of any nation can be determined by its information resources and not just her economic resources. All professions, library and information science in particular, are dominated by IT and now we hear of e-governance, e-banking, e-retailing, e-advertisement, e-shopping, e-learning, e-business, e-education, e-publishing, e-documents, e-journals etc. Information technology as the synergy between computer devices is a composite term which embodies two important concepts, i.e. information and technology. Information means many

things to many people depending on the context. Information is any potentially useful facts, quantity or value that can be expressed uniquely with exactness. Information is processed data that we come in contact with directly or indirectly that adds to our knowledge and is capable of causing human mind to change about the current state of the real world and in a library, information is data that has been processed into form that is meaningful to the recipient/user and is real or perceived value in current and future decision.

On the other hand, technology refers to the use scientific knowledge to invent tools that assist human beings in their efforts to overcome environmental hazards and impediments to comfort. Thus, information technology as defined by Emuakpor (2002) is all forms of technology applied to the processing, storing, and of transmitting information in electronic form. He stressed that the physical equipment used for these purposes includes computers, networks, fax machines and electronics, etc. Information technology is also a generic term used to denote activities connected with computer based processing, storage, and transfer of information. These are micro processors, cable access television, fiber optics, satellites, Tele-text, and word processing, e-mail, video and others. The applications of IT contribute heavily toward efficient and effective processing and dissemination of information. As stated by Madu and Adenira (2000) with the use of IT especially computer, jobs are performed faster, neater, better, and with a high level of accuracy. Aina (2003) pointed out that the application of IT has many advantages in that it reduces the number of repetitive routine tasks, it is more efficient than manual services because it enables library users/customers to have access to their library and even what is in other libraries. It more importantly speeds up library services. The provision of services using manual method in the Nigerian libraries especially in academic libraries makes work more tedious, repetitive, time consuming and serves very little number of users at a time.

### **Areas of applications of information technology in Nigerian libraries**

In libraries, several systems have been developed for various house-keeping chores and more still are being designed and refined, due to the technology of large-scale integration. These are known as microcomputers; designed to handle any of the library processes like acquisitions, cataloguing, serials control, circulation control, bibliographic control, or selective dissemination of information (SDI). Information technology is applied to the operation of

libraries and information centers to ensure that information delivered is timely, accurate, precise and relevant (Madu, 2002). The application of information technology in Nigerian libraries has improved the quality of library and the services given to their patrons. Many of the Nigerian university libraries have applied IT to some of their operations in order to meet the present needs of their students and staff. For instance, in Ahmadu Bello University Library, apart from having digital library connections, it is presently involved in the retrospective conversion of its collections as a step toward IT application to its services. However, academic libraries have integrated e-books into their collections and research. Studies have shown that librarians are keen to expand their e-book holdings. Electronic books are the electronic version of traditional prints books which have the same characteristics and outlook of the traditional prints books but the main difference lies in the fact that the e-book can be accessed digitally using personal computer, and smart mobile devices, etc or a specially designed electronic device called e-book reader. The following are some of the areas where IT is applied in the library.

**Acquisition unit:**

This is an important unit in any library whether academic, public or any kind of library. All materials of a library must come through the acquisition unit. Acquired library materials may come in one or more sources such as purchase, gift/donation, exchange, deposit and some time through bequeath. Ode and Omokaro (2007) stated that the acquisition unit of many university libraries looks like business centers where vendors and publishers troop in to sell their products. Application of IT in this unit simplifies and makes many things easy, accurate and achievable in time.

**Cataloging unit:**

The library materials (books, journals, etc.) acquired, need to be properly organized in such a way a library user will easily identify and access them within a shortest possible time. Nwalo (2003) articulated that the items contained on the catalogue include name of author, title, editor of the book/journal; editing date, and the place of publication of the book/journal; ISBN/ISSN; population, illustration, size, class number, and location of the book/journal in the library. This is to give clear description of a document to a library user for easy identification and accessibility. IT has been applied in the process of cataloguing and makes it much easier and relevant to access library holdings. The advancements in IT opportune libraries to embark upon the use of online public access catalogue (OPAC). Oduwole (2005) described that the automation of cataloguing process has increased the

efficiency of the cataloguing processes in the Nigerian university libraries, which in turn has resulted in increased productivity. The most interesting thing is that the users will remotely confirm whether the document is available or not without wasting his/her time coming to the library.

**Circulation unit:**

This is one of the most important sections in the library that deals much with contact with the public and with library users. Sometimes it is called public services section. According to Ode and Omokaro (2007), the circulation unit can be defined as one of the customer services unit in which library try to satisfy the needs of their users. Ohio library (2013) defined circulation unit as a portion in a library committed to meeting the diverse and changing needs of students, staff, scholars, and researchers by providing information services.

**Serials operations:**

Regarding serial operations, Agbaje (2002) asserted that "information technology is an effective hand-maid to serials management at every stage of management process and irrespective of content, use, format and the overall strategy adopted for serials control unit by the organization in question". Oketunji (2001), Agbaje (2002) and Oni (2004) noted that applying various approaches, IT facilities in serials operations can be for the following functions and activities: subscription control, procurement process, order preparation, fund analysis and accounting. Effecting serials additions, changes and collection control can be performed with IT facilities. Aina (2004) posits that information technology has enabled efficiency in resource organization as delivery and dissemination of information have become effective and easy. However, the IT facilities used in the library is defined by the American Library Association (ALA) (1993) as "the application of computers and other technology to the acquisition, organization, storage, retrieval and dissemination of information. It is part of the library that deals with receiving and processing publications issued consecutively at regular or irregular intervals and intended to continue indefinitely.

Advancement of IT resulted to management of financial transactions between the library and the vendor or publishers from a remote location. Oketunji (2001) maintained that using IT facilities in serial section in library will enhance the management functions, which cover areas like management of work performance and user service. Library activities in serial section have in one way or the other improved through the application of IT compared to the

traditional practices. Akintunde in Faboyede (2006) asserted that libraries use IT in several ways which include library management and administration, processing of library materials, developing online resources, provision of regular services to library users, and inter-library cooperation. IT is also applied in inter-library loan (ILL), a process by which one library borrows from other libraries, materials it does not hold in order to meet the information needs of its patrons. ILL is however facilitated by various online services including electronic union catalogs and automatic ILL request services attached to OPACS (online public access catalog) and online databases. Bierman in Madu (2002) defined library automation as "the use of computers and associated technology to do exactly what has been done in libraries with the justification of reduced cost or increased performance. Thus, automation helps in the acquisitions, organization, storage and dissemination of information in libraries. IT applies to libraries in a number of ways which includes: acquisitions, cataloguing, circulation, serials control unit, selective dissemination of information (SDI), resource sharing and user services.

**Resource sharing/web access:**

Resource sharing is the commonest form of resource access in which Nigerian libraries are involved in interlibrary loan. Nigerian libraries make photocopies of needed materials to users. As pointed by Omekwu (2006), Nigerian libraries generally lack functional web access, and also do not have homepages to aid users in accessing information.

**The extent of the application of information technology in Nigerian libraries**

IT facilities are designed to serve a particular purpose in information systems like library. However common IT facilities that libraries use most often are as follows:

- i. Computer: An electronic device that accepts processes, stores, and outputs data at high speed according to the programmed instructions. The stored data by libraries can be easily accessed by library customers especially OPAC and the e-resources downloaded by the library for the use of their users through the use of computer.
- ii. Internet: This is a network that links computer all over the world by satellite and telephone, connecting library customers with services network such as e-mail and the World Wide Web. Nigerian libraries use Internet as a source of their information to access what is in their libraries. This enables library customers to access library contents even while mobile, anywhere and at anytime especially on their mobile devices.
- iii. Printer: A device that produces computer-generated text or graphics on paper, transparencies, or similar media. It enables library customers to possess a personal copy of e-resources stored by their library and other libraries even for future use.
- iv. Photocopier: A machine that uses a photographic process to produce an almost instant copy of something printed, written or drawn. Photocopy opportune library customer to have a copy of those library materials that cannot be borrowed for home use.
- v. Scanner: An electronic device that is used for the conversion of information in either text or image form into digital form (softcopy). The application of scanner to customer services is very important because it enables customers to scan their picture during registration with the library even from a remote location.
- vi. Customer Services: Customer services are the series of activities designed to enhance the level of satisfaction. Ode and Omokaro (2007) defined library customer services as the provision of information and services, in which the library tries to satisfy the needs of their users. Also, Ohio library (2013) defined customer services as an act committed to meeting the diverse and changing needs of students, staff, scholars and researchers by providing information and services. Customer service plays an important role in an organization especially the library that serves as information center where library users troop in to relieve their stresses in terms of information needs. Library customer services includes lending services; inter-library services; referral services; SDI; current awareness services (CAS) and users education. Hence, application of IT to customer services help in providing effective services at less cost and without delay. Information technologies in Nigerian libraries assist services such as: Internet access services, remote access services, online reservation services, photocopying services, printing services, e-query services, audio-visual services, and registration, etc. Advances of technology enhance the image of the library and the librarian in such a way that the function and services of university libraries have been massively promoted to the extent that some of the manual routines were either replaced or modified.
- vii. Current Awareness Services: It is the responsibility of library to let its users know what is happening in terms of the resources available, rules and regulation, and how to use the resources. Current awareness service is easily done through the use of IT to reach many library customers at a time

- within a shortest possible time. This can be done through the use of library website or an institution's portal.
- viii. Lending Services: Lending services are one of the services that gives users the opportunity to use library resources at home or in the hostel. Application of information technology to services is very important. As stated by some researchers, information technology application in customer services let users reserve books, journals or any other material that is entitled to them. The books that are on loan by another patron will be reserved by a user while at home or remote location using the request option on the online catalogue.
- ix. Referral Services: Referral services is one of the library services that customers enjoy which is given to them by directing them where to get what they are looking for inside or outside the institution. The service offers opportunity to the users to get even what they did not ask for. In applying information technology to the users' need instead of trekking or travelling to have access, a website is provided, to access what is needed in or outside the library.
- x. Users Education: Users education involves the responsibility of any library to educate its user on how to use the library resources effectively. Libraries use lecture, orientation, exhibition and handbook to inform their customers on how the library is organized and how the resources will be utilized. The use of information technology for user education simplifies or modifies how to educate library customers even if the customer is at home.
- xi. Reference and Information Services: Reference and information service is one of the professional services rendered to library customers. Questions presented before the reference desk officer need to be answered by the officer in order to satisfy the library customer. The application of IT to the reference of information modifies how answers will be given within the shortest possible time. Internet is one of the ITs that plays a vital role in reference and information services. Other services include: inter-library services, remote access services, electronic mail (e-mail) services, Internet access services, photocopying services, online reservation services etc.

#### **Merits of the application of information technology in Nigerian libraries**

Some library users are adopting electronic habits, making increasing use of new ITs including computers, the Internet, the Web, Intranet and other technologies. As a result, library users are placing new demands on their libraries. They require access to the

latest updated information resources and access to IT facilities that they can use in their work. Hence, the application of information technology in Nigerian library enhances users' satisfaction. It provides numerous benefits to library users. Some of the benefits are: it provides speedy and easy access to information; provides remote access to users; provides round-the-clock access to users; provides access to unlimited information from different sources; provides information flexibility to be used by any individual according to his/her requirement; and it facilitates the reformatting and combination of data from different sources.

Libraries are also providing various IT based services to their users including the following: provision of web access to OPACS; electronic documents delivery; networked information resources; and online readers' advisory services.

The merits of IT applied to information retrieval are the immediate and local access to a much wider range of library resources. IT has made impacts on the alerting services, news/business services of one kind to another in electronic form; it has provided efficient and accurate services; it controls the rapid growth of information; it enables new services and facilitates cooperation; and it accommodates increased work load. With the application of Information Technology, repetitive and routine tasks in the libraries are been eliminated.

#### **Problems facing the application of information technology in Nigerian libraries**

The following are the problems hindering the effective application of IT in Nigerian libraries:

- i. **Problem of funding:** Another and perhaps the greatest challenge facing the application of IT in Nigerian libraries is that of poor funding. This is not on the part of government alone, but also on the part of private owners of academic institutions. The problem of poor funding is listed by various studies such as Ani et al. (2005). This shows the gravity and centrality of the problem. Poor funding expresses itself in different areas such as poor power supply, poor human resources recruitment and development, poor state of communication and ICT infrastructure and virtually the non-existence of ICT policies and poor funding. None of these problems facing IT application in Nigerian libraries has effectively been solved. Without increased funding, all advances such as human resource development will be hampered. Lack of personnel skilled in IT applications, inadequate IT infrastructure and intermittent electric power supply are the major challenges to the successful application of IT in university libraries in Nigeria

(Badu, 2004). All these are occasioned by poor funding. Some literatures clearly stated that lack of sufficient funds is a barrier in the application of information technology in Nigerian libraries. The studies conducted by Ani, Esin and Edem (2005) found that lack of funding and power cuts are among the major problems confronting the application of information technology in libraries of the Nigerian higher education sector. Hence, in the words of Amusa and Odunewu (2006), funding is an issue that cannot be toyed with in order to ensure the success of any organization, academic libraries inclusive. Thus, libraries require good funding in order to provide better facilities and services to users. Libraries in Nigeria are not adequately funded. For instance, the fate of academic libraries is not different as funding for these libraries comes largely from their parent institutions and Education Trust Fund (ETF). Libraries in the country cannot continue to rely on the present sporadic and insufficient budgetary allocation of the government through their parent institutions. On this note, some income-generating ventures have been identified, which if implemented, would yield the additional financial resource required to meet the increasing complex demand of library services in 21<sup>st</sup> century Nigerian libraries or tertiary institution. Funding for academic libraries is of paramount importance because the libraries are not in a position to generate substantial income (Nnadozie, 2005).

- ii. **Poor information technology knowledge:** There is a severe and pronounced "low level computer literacy among Nigerians" Okiy (2005). This makes it difficult for them as users and patrons of academic libraries and others to make full use of information technology facilities. The problem is further aggravated by the "shortage of technology literate staff and librarian information technologists in libraries, lack of skilled human resources to install and manage technology networks and poor funding to attract such staff" (Ashcroft & Watts, 2005). Without the relevant IT skills, information technology professionals will be unable to guide library patrons on how to maximize available IT facilities and to explore the opportunities they offer (Elisha, 2006). Other challenges are: lack of training opportunities for Library and Information Science (LIS) professionals, lack of long term approach towards automation, and lack of technical skill to develop local in-house database.
- iii. **Insufficient and unrealistic infrastructural facilities:** poor infrastructural facilities in our universities provide a major constraint in the

application of information technologies. Information technology is a combination of hardware and software to access, retrieve and disseminate information. Thus, lack of adequate bandwidth size and the appropriate antivirus and other necessary software can also deny both information professionals and other users of IT the optimum utilization of the facilities on ground. Nigerian libraries lack the necessary infrastructures needed to provide efficient IT services. Inadequate bandwidth connectivity hampers the effective functionality of the libraries' information technology units. Accordingly, Gbaje (2007) maintains that "bandwidth and connectivity for higher education institutions and their providers can be deployed using expensive technology like the VSATs and for most institutions the Internet connections are very erratic and slow to support the uploading and downloading of electronic resource".

- iv. **Lack of adequate power supply:** Information technology equipment solely depends on electric power supply for functionality and effective performance. In Nigeria, intermittent and frequent power outages, erratic and epileptic electricity with an unending sign of improvement are posing a serious threat to Nigerian libraries. Nnadozie (2007) reveals that public power supply is unreliable and the alternative is expensive and out of the reach of the poorly funded university libraries. The poor state of public electric supply is of much concern and a challenge to the effective application of information technology in Nigerian libraries.

Synthesis of the reviewed literatures on the problems facing the application of information technology in Nigerian libraries reveals also the following problems: high dependence of the country on importation of IT equipment; inadequacy of locally available manpower to set up, operate and maintain automation projects; high rate of obsolescence of imported IT equipment; absence of qualitative library automation software locally and the high cost of acquiring imported ones. The application of information technology promotes development and improves services in any organization. In academic and library environments, IT speeds up information delivery, facilitates teaching, learning and research. Omolayole (2002) points out three strong reasons that stand against the effective use of IT in Nigerian academic libraries. The factors includes: low level of computer culture; poor information technology infrastructure; and general lack of awareness. However, when librarians are not computer literate, application of facilities would become a problem. Hence, having a good background

in computer skill makes the use of computers in work places very practicable. Lack of awareness on the other hand makes accessibility impossible. Okiy (2005) also points out poor and inadequate information technology facilities; poor level of computer literacy, poor level of computer facilities and poor level of awareness of internet facilities among policy markers, etc.

**Methodology**

In order to identify the existing literature that deals with application of information technology in Nigerian libraries, this study used systematic literature review approach to search for the relevant journals and conference proceedings on the application of information technology in Nigerian libraries. The activities in the systematic review included: Planning the review as the first stage, conducting the review as the second stage and finally result presentation. However, once the three stages were achieved, the results of the analysis was then presented (see Hussain & Mkpojiogu, 2015; 2016a; 2016b; Hussain et al., 2016a; 2016b; 2017; Mkpojiogu & Asuquo, 2018) .

A. Planning the Review:

The aim was to collect important and appropriate information related to the application of information

technology in Nigerian libraries. In this regard, the search and selection strategy was defined as the primary search. The primary search was carried out using Internet databases for high ranking journals and conference proceedings in the area of the application of information technology in Nigerian libraries. In this review, the search was carried out applying the following search strings, inter alia: S1 ("Application of information technology in Nigerian libraries"), Thus, the full string employed in the review was S1. However, emphasis was given to recent studies ranging from the year 2002 to 2017. This provided current issues on the application of information technologies in Nigerian libraries. Literatures on the application of information technology in Nigerian libraries were however, very limited and scare. Table 1 below describes the selected journals and conference proceedings. The papers selected for the review were gotten from the following journals: International Journal of Library and Information Science, International Journal of Innovative Knowledge Concepts, International Journal of Knowledge Development and Technology, International Journal of Library Science, Library philosophy and Practice and The Information Technologist

Table 1: Selected Journals and Conference Proceedings

Journals	Conference proceedings
International Journal of Library and Information Science	International Conference on computer services and Automation Engineering
International Journal of Innovative Knowledge Concepts	44th Annual National Conference and AGM organized by NLA
International Journal of Knowledge Concept Development and Technology	Biennial Conference of NALISE
International Journal of Library and Information Science	The Information Technologist
International Federation of Library Association and Institutions	
Library philosophy and practice(e-journal)	
The Information Manager	

Table 2: Number of papers per journal/ conference proceedings

Journals and conference proceedings	No. of paper
IJLIS	2
IJKC	1
IJKCDT	1
IJLIS	2
IFLAI	2
LPP	14
TIM	2
ICCSAE	1
BCN	1
44THANCAON	1

The selected papers for the study centered mostly in the area of the application of information technology in Nigerian libraries. However, the review procedure was hinged mostly on the keywords: Information technology, Nigerian libraries, application of information technology and application of information technology in academics libraries. Hence, all related and appropriate papers were carefully selected for effective review and data extraction (see Table 2). Table 2 displays the number of papers selected per journal or conference proceeding. The least number of papers captured per journal/conference proceeding was 1 while 14 was the highest. The following are some of the journal/conference proceedings from which papers were obtained: Annual National Conference (ANC), Biennial Conference of NALISE (BCN), International Journal of Innovative Knowledge Concept (IJKC), International Conference on Computer Service and Automation Engineering (ICCSAE) and International Journal of Knowledge Concept Development and Technology (IJKCDT).

**B. Conducting the Review:**

In this phase, the papers selected were downloaded using the study's search string, and the abstract of

each was carefully read in order to examine its relevance to this study. Seven-seven (75) works were downloaded from both journals and conference proceedings. However, only relevant papers with significant contributions were selected for further reading, as such only 27 papers were considered. The 27 papers that were subsequently selected were then thoroughly read, searched, and studied for relevant detailed that pertain to the subject matter of the review. Important and needful information (related to application of information technology in Nigerian libraries) were extracted, collected and summarized. These formed the basis of the analysis presented in the results section. Table 2 presents the number of papers selected per journal and conference proceeding. The selected conference proceedings and journals from which the papers were selected from are reputable conference proceedings and journals. Table 3 shows the complete list of selected papers. These selected papers spanned from 2002 to 2013. These papers provided a good coverage of the literature on information technology collated after a keen selection from the 75 downloaded papers on the review's subject matter.

Table 3: List selected papers

Paper ID	Authors	Year
IT1	Akintunde, S.A.	2006
IT2	Ani, O.E. et al.	2005
IT3	Oyedum, G.U.	2007
IT4	Oduwole, A.A.	2005
IT5	Oni, F.A.	2004
IT6	Okolo, E.O.	2002
IT7	Nnadozie, C.O.	2005
IT8	Nwalo, K.I.N.	2000
IT9	Omolayole, O.O.	2002
IT10	Omekwu, C.O.	2006
IT11	Ashcroft, L., & Watts, C.	2005
IT12	Oduwole, A.A.	2005
IT13	Nok, G.	2006
IT14	Elisha, M.J.	2006
IT15	Mohammed, Z.	2003
IT16	Gbaje, E.S.	2007
IT17	Okiy, R.B.	2005
IT18	Oketunji, I.	2001
IT19	Emuakpor, A.O.S.	2002
IT20	Amusa, O.I., & Odunewu	2006
IT21	Ohio Library	2013
IT22	Madu, E.C. & Adeniran, T.N.	2000
IT23	Dafiaghor, F.K.	2012
IT24	Aina, L.O.	2003
IT25	Aina, L.O.	2004
IT26	Agbaje, A.A.	2002
IT27	Ode E.O. & Omokaro, D.A.	2002

In carrying out this research, different database were used such as ResearchGate, Academia.edu and Google Scholar. In the three databases used, a total 75 articles were found, and 27 articles were finally

selected for the research work. Table 4 below shows the different database consulted and the total number of articles found and selected.

Table 4: Databases and Selected Articles

Database	Articles found	Articles selected
Academia.edu	27	9
Google Scholar	26	10
Research Gate	22	8
Total	75	27

#### Exclusive criteria and inclusive criteria

This research work also employed some exclusion criteria to exclude the out of scope aspects that were not relevant to the study. It also introduced inclusive criteria to narrow the research to the subjects that give useful information to the objective of this paper. 1) Exclusive Criteria: In this paper, IT policies and designs as they relate to Nigerian libraries were excluded from the study as they were not the focus of the study. They are outside the scope and coverage area of the study. 2) Inclusive Criteria: The inclusive

criteria include all aspects of IT application in Nigerian libraries together with the merits of the application of IT in Nigerian libraries and the challenges facing IT application in Nigerian libraries.

#### Results and discussion

The selected papers were carefully reviewed and the results of the applications of information technology in Nigerian libraries were generated and presented accordingly. This section of the paper presents results on the review of the application of information technology in Nigerian libraries, and the

problems/challenges facing the application of information technology in Nigeria libraries. The situation with the libraries vary from one library to the other, with some libraries having experiences that are encouraging and others having discouraging experiences. These experiences whether encouraging

or discouraging, good or bad, have a far reaching outcome on Nigerian libraries. The percentage of research papers in areas of application of IT in Nigerian libraries, and the problems and challenges confronting the application of IT in Nigerian libraries from the reviewed literature are shown below.

Table 5: Areas of application of IT in Nigerian libraries

Areas of application of IT in Nigerian libraries	Frequencies of studies	Percentage
Acquisition unit	4	14%
Cataloguing unit	2	7.4%
Circulation Unit	3	11.1%
Serials operations	7	25.9%
Resource sharing	1	3.7%

Table 6: Extent of the Application IT Nigerian libraries.

Extent	Frequencies of Studies	Percentage
Encouraging	17	62.9%
Discouraging	10	37%

Table 7: Problems/ Challenges Facing the Application of IT in Nigerian Libraries

Problems/ Challenges	Frequencies of studies	Percentage
Poor funding	8	29.6%
Insufficient and unrealistic infrastructure facilities	3	11.1%
Poor IT knowledge	3	11.1%
Lack of adequate power supply	3	11.1%

Furthermore, the results obtained from the selected literatures indicates that studies that captured the areas of application of information technology with regard to the acquisition unit was 14.8%, cataloguing unit 7.4%, circulation unit 11.1%, serial operation 25.9% as shown in Table 5. Table 6 reveals that 62.9% of studies reviewed indicated that the extent of the application of information technology (IT) was encouraging while 37% of studies indicated otherwise (that is, that the extent of IT application in Nigerian libraries was discouraging). In Table 7 above, a total of 63% of studies reviewed show some of the problems and challenges confronting the application of information technology (IT) in Nigeria libraries. The application of IT in Nigerian libraries has exposed its patrons to all kinds of experiences such as adopting electronic habit, making increasing use of new ITs including computers, the Internet, the Web, Intranet and other technologies thereby placing new demands on the libraries. They require access to the latest information, updated information resources and access to information technology facilities that they use in their work. From the research findings, it can be said that the applications of IT in Nigerian libraries can be described as a mixed experience. Tables 5, 6 and 7 reveal the both experiences and situations.

Apparently, the results also show the scarcity of literatures on the application of information technology in academic libraries and other libraries in Nigeria as the low percentage of study outcomes indicate that much research work has not been carried out in the area of the application of IT in Nigerian libraries as well as in the area of challenges confronting the application of IT in Nigeria libraries. However, the small percentage could also be as a result of the small number of papers downloaded and selected for the study. On the positive side, the area of application of information technology in Nigeria libraries can be said to be also somewhat encouraging. Nwalo (2000) asserts that many libraries in the third world including Nigeria are gradually but steadily converting from manual to computerized routines. According to him, the benefits of the automation or the uses of information technology in Nigeria library system are both self-evident and overwhelming. He further stressed that IT helps Nigerian libraries to improve their service and enables them in reporting all their various operations. Okolo (2002:34) opines that in this age of information technology, the library needs technology in order to give efficient services to its users. Therefore, not only will the speed of its operation be high, the volume of its output will be also

correspondingly large. When information technology is applied in the library, there will be the economics of labor and operating cost. Hence, this leads to the overall performance of libraries in the offering of their library services. Furthermore, Table 6 indicated that the extent of the application of information technology is an encouraging experience (62.9%) and the discouraging experience was captured in 37% of studies. The application of information technology is no doubt flawed with problems/ challenges as revealed in the reviewed studies.

Despite the not so encouraging situation in terms of funding, recent efforts has been made in the provision of Internet and information technologies especially in Nigerian academic libraries. However, information technology literacy among academic librarians in most libraries is still at the peripheral level. Nok (2006) observed that many staff of many university libraries were still not computer literate and as such they find it difficult to cope with the requirements of the electronic age. This is a worrisome situation that needs urgent and continuous attention. Furthermore, the application of information technology in Nigerian libraries is also faced with a lot of challenges with some literatures viewing this situation as a very frustrating experience. It is needful that more researches on the application of ITs in Nigerian libraries be done more frequently to capture more current gaps to be filled and problems to be solved. Based on the review, IT applications in Nigerian libraries is better off now than it was in the past but the current experiences and situation with the application of IT in libraries in Nigeria is far from optimum (and is a cause of concern). The situation is very critical when compared to what is obtained in the libraries domiciled in the advanced nations or when compared with the universally accepted standards/ basic requirements for any functional modern library today. Therefore, there is the need for more concerted effort in the adoption of IT applications and utilization in Nigerian libraries.

In the light of the foregoing results and the discussions that followed, the following are proposed to address the challenges faced by Nigerian libraries for effective application and utilization of IT particularly with regard to services.

- i. **Appropriate Funding:** Nigerian libraries are faced with severe and in some cases acute financial constraints that hampers the initiation of new services but also the sustenance of existing ones, hence, Nigerian libraries should allocate adequate and separate funds on a priority basis to fully automate the libraries, if they are not already

automated and to sustain and improve existing IT based resources and services where there is some sort of IT application and utilization. In either case, funding is pivotal and critical. Nigerian libraries may also search out for alternate funding opportunities. Libraries should also allocate some of their budget to fund the training and building of the capacity of their staff particularly in IT applications and utilization in the library.

- ii. **Constant Power Supply:** incessant power failure, intermittent power supply as well as brown-outs and power surges are big problems and barriers to the effective application and use of IT. This is not only affecting smooth library operations and services but also damages IT equipments. Therefore, there is the need for regular suitable power supply in the libraries. The government should exempt higher education institution from electricity load shading and high electricity tariffs. University libraries should also generate energy from alternative sources so as to be power self-reliant and to enable a smooth teaching, learning and research environment.
- iii. **Capacity Building of Library Professionals:** this is an important area that needs to be addressed in order to implement IT effectively in Nigerian Libraries. Online courses may also be used to fill in the existing gap of lack of training programs.
- iv. **IT Infrastructure:** this is the foundation for library and information services. Nigerian libraries are required to develop a strong infrastructure to cope with the growing need of systems, staff and patrons. These infrastructures also need to be maintained as this is not the case at the moment. There should a good culture of maintenance in Nigerian libraries.
- v. **IT Policy and Strategic Planning:** Nigerians libraries should formulate its own IT Policy that is grounded on seasoned IT design. This policy should include Internet and e-resources usage policy, IT security policy, Website and Web content policy, and IT infrastructure policy. This initiative will maximize the benefits of the financial investments in IT related projects.
- vi. **Expansion of IT-based Resources and Services:** Nigerian libraries should expand the cycle of their IT based resources and services. They should implement standardized integrated library software.

Libraries should also develop a balance of library collection and holdings in print and electronic formats.

### Conclusion

Apparently, there are a number of literatures concerning the application of information technology in Nigerian libraries especially in academic libraries. This paper was aimed at reviewing the application of information technology in Nigerian libraries. To achieve the stated objective, a systematic review was employed. Relevant papers on the application of information technology in Nigerian libraries were selected through the protocol of systematic review. Seventy five (75) works were downloaded but only twenty-seven (27) were finally selected. All the selected papers were carefully read in order to obtain the expected results that answered the research questions and that are based on the objectives of the study. From the analysis, the results indicate the following: there are various areas in which information technology is applied in Nigerian libraries. Hence, the results gotten from this study showed the existing state of application of information technology in Nigerian libraries. However, a lot of the selected papers did not provide the specific application areas of information technologies in Nigerian libraries. In addition, the research identified some short comings on the application of information technology on Nigerian libraries. The results from this paper provide additional knowledge to information scientists, information technologists, librarians, the research community and institutions on the current state of research and practices in the application of information technology in Nigerian libraries. Further studies will focus on IT design and policies as it relate to IT implementation in Nigerian libraries.

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