

# IMPACT OF EMERGING TECHNOLOGIES IN LIBRARIES: ISSUES AND OPPORTUNITIES

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## **Abstract**

*The employment of numerous modern technologies is possible in libraries. Emerging technology are technologies that has attained the highest level of acceptance. Technologies that support user services, instructions, library management, and technical services are included in emerging technology. These new technologies have given libraries all over the world fantastic potential to improve user access to library and information services. Libraries in developed countries have been using emerging technologies like Robotics, Cloud Computing, RFID, Big Data, Institutional Repositories, Virtual and Augmented Reality, Book Delivery Drones, and Web 2.0 to provide library and information services. Libraries in Nigeria shouldn't be an exception and should embrace and use these technologies as well in order to better serve their users. This paper describes emerging technology, emerging technology in and for libraries through a survey of the literature that is currently available. There have been several benefits stated for integrating emerging technology in libraries, including an increase in patronage, cost and time savings, and brand loyalty. Also mentioned were the difficulties preventing the widespread application of developing technologies in libraries. The article closed with crucial suggestions for resolving the problems.*

**Keywords:** Emerging Technologies, Libraries, Issues, Impacts, Opportunities

## **Introduction**

Libraries are responsible for a number of tasks, including gathering, compiling, archiving, retrieving, and displaying information to users. Since the beginning of time until the present Internet era, this has been the fundamental purpose of libraries. However, the delivery of library and information services globally underwent a significant paradigm shift with the dawn of the twenty-first century. Information technology (IT) is clearly important for all aspects of human development, and its influence on information services like libraries cannot be understated (Chloe, 2018). Libraries' core functions of collecting, organizing, and disseminating information have not been corrupted by their lengthy existence or the changes they have undergone over time. With the use of computers, the internet, and other information and

communication technology (ICT) capabilities, libraries today collect and preserve material in a variety of formats and offer information services (Iwhiwhu, & Okorodudu, 2012; Jantti, 2016).

According to the International Federation of Library Associations and Institutions (IFLA) (2001), today's libraries are places where materials are stored in a variety of formats and are expertly organized for the purposes of educating, informing, and entertaining people as well as promoting personal learning and advancing society as a whole. In order to support the learning and research efforts of members of the host communities, libraries collect, arrange, and transmit information resources in a variety of media.

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The impact of ICT (information and communication technology) on libraries is substantial. It has caused changes in people's thinking, behavior, communication, and working methods. Digital libraries, where all work is done by computer, have replaced traditional libraries as a result of ICT and globalization. As a result, user needs are now the focus of library operations, which have moved from being service-oriented to user-oriented. New technologies have been merged in library science, libraries have been rebranded as a result, among other things, as Digital Libraries, Virtual Libraries, Hybrid Libraries, Library Without Walls, and Library 2.0. Information Officer, Information Scientist, Documentation Officer, and so forth are now the names and duties of librarians. Libraries are accessible to us whenever it's convenient (Mittal, 2017).

The management of information and library services has been enhanced thanks to technological improvements, according to Barathi, Loganathan, & Rajan's explanation in (2017). By outlining the difficulties involved in integrating and utilizing cutting-edge technologies and innovative practices in libraries, the paper fills a vacuum in the literature on digital library project management. The identification, assessment, and application of new and current technology in library management and services is aided by developing

technologies. Constraints on library service management, such as technology advancements, must be adjusted frequently to keep up with the fast-paced environment.

### **Emerging Technologies and Emerging Technologies for Libraries**

Emerging technologies are those technologies that have attained the highest level of acceptance claim (Cervone, 2010). Emerging technologies are those that are still under development, have not yet made a name for themselves in their many fields of application, but have the potential to address issues and provide new opportunities for advancement in those disciplines (Rathna & Divyananda, 2018). Technologies that are still in their infancy yet have the potential to revolutionize how we live and solve some of the world's most serious issues are known as emerging technologies. These technologies offer answers to a range of problems, help with the growth of a range of existing facilities, and offer opportunities to build new ones. Information management and information services trends are being steered in new ways by a number of contributing factors. Current trends are influenced by a variety of factors, including volatile technologies, tech-savvy hyperactive user behavior, hyper-connected societies, liberalized access to information, re-defined data security, snowballing digitalization of business and administration at all levels, user-centric and user-driven content and services, and an online and collaborative learning environment.

- a. **Big Data:** Due to the extensive impact of information and communication technology (ICT), a tremendous amount of data is being produced globally by everyday people, researchers, scientists, and other stakeholders (Karimi, 2014). Data storage, analysis, retrieval, and dissemination provide substantial challenges for information professionals and data managers. Since they have the requisite expertise and experience to make the most of these enormous data sets, library and information workers can greatly profit from the storing and analysis of large datasets (Princh, 2019).
- b. **Institutional Repository (IR):** An institution's research and intellectual output are stored digitally in an institutional repository (Karimi, 2014). It makes the institution's top-notch scholarship available online to people all over the world. To put it another way, an IR is a service that a research organization offers to the academic and research communities within which it operates for the management and effective distribution of the research output produced by those communities. Leading academic and research institutions utilize it right now to make it easier to obtain research publications.
- c. **Cloud Computing:** Cloud computing is a technology that uses the web (Internet) and centralized remote servers to maintain data, software, and applications. According to Waljat (2018), cloud computing enables users to access their private and professional files from any internet-connected computer without the need to install any software on their local workstation.

- d. **Internet of Things (IoT):** The internet has had a significant impact on many facets of human existence and activity throughout the current era of information and communication technology. By providing effective services more quickly and easily, the Internet of Things (IoT) is the most cutting-edge developing technology for influencing library patrons. It eliminates the requirement for human interaction by enabling any natural or artificial objects to communicate with one another and transmit data using IP addresses.
- e. **Robotics:** Robotics seems to be amazing at helping people in the smartest way possible. (Harris, 2012). In libraries, robots are used to browse printed materials in real time via a Web interface.
- f. **RFID:** An effective instrument for collection management, RFID (Radio Frequency Identification Device) is a device that assists in the automatic tracking and identification of objects. An RFID system's transponder, often called a tag or microchip, is connected to an antenna. A user can get simple data like an identity number or detailed information (Waljat, 2018).
- g. **Artificial Intelligence:** Artificial intelligence (AI) is becoming pervasive in modern society. In current era of science and technology, artificial intelligence (AI) is the study of mental abilities using computational models.

#### **Used Emerging Technologies for Service Delivery in Libraries.**

According to Vysakh (2020) and Frey (2014), emerging technologies are used for service delivery in the library. Numerous technologies have emerged recently, and some of these technological facilities are used in the library. Artificially Intelligent Robots have penetrated almost all the fields of life including libraries which can do things even humans are incapable of with higher efficiency.

Robots can be used for a variety of operations within the library which include, filing, sorting, and replacing the books on the shelf, taking inventory, welcoming and directing guests and users to different locations in the library, and answering frequently asked questions among others. Many the libraries have piloted this technology such as the NY Public Library, Temasek Polytechnic Library, UMKC Library, University of Chicago Library, Shanghai Library, and so on (Vysakh, 2020). Many the libraries abroad like Dubai Library, Rose Memorial Library, NY Public Library, and Florida Library have started to use drones as an effective tool for delivering books from library to patrons and vice versa, where users request books via mobile library app, concern sections receive and process the requests, the ordered book will then be checked and handed over to the drone section, drone pilot attaches the book and make it flies to the user doorstep and thereby flies back after delivery(Rouse, 2018). Big data are a large and complex amount of data sets that traditional data processing application fails to capture, store, share, transfer, and analysis. Big data has a direct impact on libraries as the professionals use big data tools to analyze their large data like to know the users better to provide

services with full efficacy ((Sonawane and Sane, 2018). A library such as Harvard University Library as reported by Ball (2019), uses big data for data mining and text analytics for taking decisions, studying user behavior, developing library collections, and tracking the use of library materials.

### **Opportunities of Using Emerging Technology in Libraries**

The following are some of the advantages of emerging technologies for libraries, according to Neogi and Partap (2019);

- i. Emerging technologies boost libraries' capability to provide better and faster services.
- ii. It has an impact on librarians' and the library's creativity, problem-solving skills, and self-image.
- iii. It helps to process innovations and bring value to existing products and services.
- iv. It strengthened library knowledge and opportunities for the future.
- v. Quick service is simple to deliver.
- vi. It saves time.

Despite the multiple issues confronting Nigerian academic libraries, there are opportunities to find and deploy new and emerging technologies to provide library services while remaining relevant to society. One of the major elements that will save libraries is the availability of Open-Source Emerging Technologies (OSET). Savard and Dione (2007) in Bichi (2021), agreed that managing automated library systems and other technologies related to information management in developing countries is difficult due to a lack of resources that allow them to access technological tools as efficiently as those found in developed countries. The authors concluded that, if properly addressed, open- source software could be a solution to these issues. Libraries currently use a variety of technologies to support the services they provide, due to the advent of information and communication technology. Every day, new technology advancements have an impact on how information services are delivered to the public. As a result, libraries get the benefits of these emerging technologies in all parts of their operations, from information selection to distribution (Bichi, 2021).

### **Challenges Limiting the Use of Emerging Technologies in Libraries**

Although modern technologies have many advantages for libraries, various barriers prevent libraries from using these resources effectively and efficiently. According to Krubu & Asowaru (2011) and Bichi (2021), the main barriers to the effective use of technology resources in Nigerian libraries include a lack of search skills, inadequate budget, epileptic power supplies, and insufficient management training and staff retraining. Adoption of new technologies has been hampered by insufficient funding, a lack of capacity, and erratic power supplies. According to Lubanga and Mumba (2021), there are a number of obstacles that prevent libraries

from implementing high-end technologies, including a lack of well-established centers for research and innovation, the unpredictable nature of technological advancement in the twenty-first century, and university cultures that discourage research and innovation.

According to Saibakumo (2021), the largest barriers to adopting new technology are a lack of funding, a shortage of power, and inadequate maintenance. Both information costs and quality are increasing. Fiscal restraints, insufficient maintenance and cultural updating, and a problem with record conversion can be linked to infrastructure problems, a lack of informatics/learning, and a lack of government assistance. Due to the current digital revolution, Nigeria and other developing nations are dealing with a number of problems (Ajie, 2019). Due to institutional restrictions, a lack of employee training, restricted funding, and a lack of staff time, new technology has not been fully implemented in libraries (Golz, 2014). Time consumption and worries about privacy violations are two major issues brought on by the use of Web 2.0 technologies in library services (Hussain and Jan 2018). The main obstacles to implementing the newest technology in academic libraries have been identified as inadequate money for the library, a lack of competent library staff or a user education program on improving library technology, and frequent power outages (Jan and Sheikh, 2014). The difficulties of implementing and utilizing emerging technologies in libraries have been identified by Oghenetega, Umeji, & Oboe in 2014; Okojie and Okiy in 2019; these difficulties include lack of funding, an unstable power supply, a lack of trained staff, and government policies, among others. Makori and Mauti (2016) also listed a lack of knowledge, ICT infrastructure, information resources, social computers, weak institutional and physical structures, and a lack of skills and competence as factors that hinder the use of digital technology.

### **Conclusion and Recommendation**

New technologies have established itself in libraries as a transformation in the deliveries of information services, there is rapid transition from hard to soft and print to digital as the case may be. The need for library users is also changing literally mimicking the changing global environmental climate just to buttress the point that this change is almost uncontrolled by evident factors like management-system of libraries. The study carefully look into emerging technologies and emerging technologies for libraries, which include Robotic, Artificial Intelligence, Radio Frequency Identification (RFID), Internet of Things (IoT), and many more, the used emerging technologies for service delivery in libraries, opportunities of using emerging technologies in libraries; to include, it has an impact on librarians' and the library's creativity, problem-solving skills, and self-image, it helps to process innovations and bring value to existing products and services, it strengthened library knowledge and opportunities for the future, and the challenges limiting the use of these technologies were as well discussed.

It is recommended that full implementation of policies regarding the establishment and incorporation of modern technologies in libraries. Increased funding of libraries

and constant training and retraining of librarians on how best to manipulate emerging technologies to be adopted in libraries.

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