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TRANSFORMING LIBRARY SERVICES THROUGH AUTOMATION: THE NIGERIAN PERSPECTIVE

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Abstract

Library automation is the use of computer software and hardware to perform traditional library tasks like cataloguing, circulation, and acquisitions more efficiently and accurately, replacing manual methods. Library automation is essential to library functions and services as it aims to reduce staff effort on repetitive tasks, improve service speed and quality, enhance user access to resources and digital content, and facilitate resource sharing between libraries. The paper adopted a qualitative research design, gathering data from both primary and secondary sources of data. This paper offers an insight into the importance of library automation and progress made so far by Nigerian libraries in the application of ICT for library and information services. An intensive review of the literature reveals that Nigerian libraries still have a long way to go in achieving the ideal setting of a well-automated library. The paper examined the daily operations and routines of the library and how ICT can assist with those functions. The paper also looked at the numerous benefits of automating libraries for the usefulness of both librarians and library users. The challenges limiting the progress of ICT applications in Nigerian libraries were identified, and recommendations were made to improve the present state of ICT applications for libraries and information services, aiming to make Nigerian libraries the pride of African libraries.

Keywords: Information Communication Technology, Library Automation, Information Resources, Software, Digital library.

Introduction

A library is an institution where information resources of different kinds are carefully selected, acquired, processed, organised, stored, retrieved and disseminated, thus serving a variety of information services. Libraries today are repositioning themselves from traditional modes of operation and services to automated library services, which involve the use of Information and Communication Technologies (ICT) in library operations and management. This would go a long way in satisfying the information needs of society. Information as power is effectively an infinite resource and a vital tool needed for the development of all sectors in any nation (Baba, Ibrahim & Grema, 2021). Libraries have become one of the most important institutions for managing, disseminating, and preserving knowledge. They try to meet the demands and needs of the current and future civilisations. In other words, they are established to satisfy the educational needs, cultural needs and the general information needs of their users. The technological change and its resultant transition from printing to digital publications have affected how information is managed, processed and used. For library automation to be possible, Information Communication Technologies are needed in the library.

ICT is a catalyst for generating, processing, storing and disseminating information. Onuoha and Obialor (2015) stated that technology has influenced the traditional library services in the process of identifying, acquiring, processing, organising, storing, retrieving and disseminating information. Obotu, Chukwuka, and Gambo (2019) regard Information and Communication Technology (ICT) as encompassing the acquisition, analysis, manipulation, storage, and distribution of information, as well as the design and provision of equipment and software for these purposes. Also, Omosor and Nelson (2017) defined ICT as computers and other technologies that are used in the acquisition, organisation, storage and dissemination of information in libraries.

New Information technologies are becoming an integral component and have the potential of changing the status quo of libraries and librarianship. Computers, as well as other information technology, have come to play prominent roles in information

management (Kwofie, Aigbavboa & Thwala, 2020). According to Ranganathan (1957), one of his five laws of librarianship states that "Library is a growing organism". This shows that the library will continue to evolve, change and move along with the trends. ICT in libraries has changed the mode of information storage and retrieval, acquisition, cataloguing and classification, circulation of materials, serials control, management statistics and administrative activities such as budgeting. The process of using technology to perform these roles is known as library automation. This has brought about the provision of more efficient information services to the users and the overall improvement in the performance of the libraries and other related information institutions.

Library automation, as a concept, therefore refers to the use of computers to perform library service tasks so that any user can receive the desired information with maximum comfort and at the lowest cost. Major areas of automation can be classified into two, which are: organisation of all library databases and all housekeeping operations of libraries. A digital library is an assembled digital computing, storage and communication machinery with the content and software needed to reproduce, emulate and extend the services provided by conventional libraries based on paper and other material means of collating, cataloguing, finding and disseminating information. A full-service digital library must accomplish all essential services of traditional libraries and also exploit the well-known advantages of digital storage, searching and communication and when properly implemented, automated systems such as Koha, DSpace, and Evergreen will shift libraries from passive repositories to active, technology-driven knowledge centres.

Libraries in Nigeria have traditionally played a critical role in supporting education, research, and national development. However, many library systems across the country continue to rely heavily on manual processes for cataloguing, circulation, record-keeping, and information retrieval. These conventional methods are often slow, prone to human error, and inefficient in meeting the growing and dynamic information needs of users in a digital age (Onuoha & Obialor, 2015). Despite the global shift toward automated library services—driven by advancements in information and communication technologies (ICT), the adoption of automation in Nigerian libraries remains inadequate. Several institutions

face challenges such as inadequate funding, poor infrastructure, unreliable power supply, limited internet connectivity, and a shortage of skilled personnel to manage automated systems. As a result, many libraries struggle to provide timely, accurate, and user-friendly services comparable to international standards (Egharevba, 2018).

This situation creates a gap between user expectations and the quality of services delivered by libraries in Nigeria. Users increasingly demand faster access to digital resources, remote services, and efficient information retrieval systems, which manual operations cannot sufficiently support. Consequently, the continued reliance on traditional methods risks rendering libraries less relevant in an increasingly digital and information-driven society. Therefore, there is a pressing need to examine the importance of library automation, how automation can transform library services in Nigeria, identify the barriers to its effective implementation, and explore strategies for enhancing its adoption to improve service delivery and user satisfaction.

Theoretical framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is one of the most widely used theoretical frameworks for explaining users' acceptance and use of technology. It was developed by Fred Davis in 1989 to predict how individuals adopt and use new technologies. Davis (1989) stated that two primary factors determine whether users will accept and use a technology. They are: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived usefulness refers to the level to which a user believes that using a particular technology will enhance their job performance, while perceived ease of use means the extent to which an individual believes that using a technology will make activities effortless. According to TAM, when users perceive a system as useful and easy to use, they develop a positive attitude toward it, which influences their intention to use the technology. The model suggests a causal relationship where perceived ease of use also influences perceived usefulness, as systems that are easier to use are more likely to be considered beneficial (Venkatesh & Davis, 2000).

The Technology Acceptance Model is particularly relevant to understanding the adoption of automated systems in Nigerian libraries. Library automation tools such as Integrated Library Systems (ILS), Online Public Access Catalogues (OPAC), and digital repositories require acceptance by both librarians and users to be effective. Perceived usefulness may relate to how automation improves service delivery, enhances access to information resources, and supports academic and research activities. If librarians and users recognise these benefits, they are more likely to embrace automated systems. Similarly, perceived ease of use is critical, especially in environments where digital literacy levels may vary. Complex or poorly designed systems can discourage use, while user-friendly interfaces and adequate training can enhance acceptance (Ma & Lui, 2004). However, some factors, such as inadequate infrastructure, unreliable power supply, and limited technical skills, can negatively influence both perceived usefulness and ease of use. These challenges may reduce users' willingness to adopt automated systems, even when the potential benefits are clear. However, factors such as staff training, improving ICT infrastructure, and institutional support can positively influence perceptions and encourage adoption.

The application of Davis' Technology Acceptance Model in this study provides a useful framework for analysing how and why library automation is adopted or resisted in Nigeria. It also explains the use of technology in libraries and highlights the importance of user perception in the implementation of technologies. By applying Davis' Technology Acceptance Model, it highlights an important factor that the transformation of library services through automation is not solely dependent on the availability of technology, but also on users' perception, acceptance and readiness to engage with such systems.

Historical Development of Library Automation

The present digital age cannot be appreciated and understood without recourse to the past. In those days, libraries served as a place where books and other literary materials were kept or borrowed for reading or other recreational activities within the four walls of the library. When exploring the history of library automation, it is possible to return to past

centuries when visionaries, before the computer age, created devices to assist with their book lending system. Even as far back as 1588, the invention of the French "Book Wheel" allowed scholars to rotate between books by stepping on the pedal that turns a book table. Another example was the book indicator developed by Albert Cotgreave in 1863, which housed miniature books to represent books in the library's collection. The miniature book was part of a design that made it possible for a book to be in and out, or overdue. These and many more examples of early ingenuity in library systems and services exist. Library automation development began in the 1930s when punch card equipment was implemented for use in library circulation and acquisition. During the 30s and 40s, progress on computer systems was slow, which is not surprising, given the depression and World War II in 1945. The library automation was further developed at MIT in 1957. With the advent of technology, they were able to make great advancements in the use of computers for library systems. This now led to the explosion of library automation in the 60s and 80s. The advancement of technology in 1960 and 1980s led to an increase in the use of computers in libraries.

There has been a growing interest and concern over the modernisation of library operations and services in Nigeria since the 1970s. This led to the introduction of technology in academic libraries in 1975, led by the University of Ibadan, Ahmadu Bello University, and Obafemi Awolowo University. But the progress has been very slow, many colleges and universities are still behind in providing services to their patrons through technology (Shahabi & Otobo, 2022). Over the years, many academic libraries in Nigeria have made attempts to deploy Information and Communication Technology (ICT) to enable them to manage their libraries and also to join the global information phenomenon. Serious application of information technology to library processes started in Nigerian university libraries in the 1990s. Individual effort at using ICTs was attempted in the mid-70s and 1980s by the University of Lagos, University of Ibadan and Ahmadu Bello University, Zaria.

More recently in Nigeria, some modern technologies are replacing old tools and techniques. Databases are gradually replacing the huge amounts of inventories and records and online resources and media technology are replacing print. Advanced countries are no

doubt ahead in this area; this gap, known as the digital divide, that has been between advanced countries and developing countries must be eliminated and abridged in the shortest possible time.

Global trends in library operations

The global information landscape has shifted toward digital, automated, and user-centred systems, which redefine how libraries operate and services are delivered. One of the most prominent global trends is the digitisation of library resources. Libraries are increasingly focusing on digital formats such as e-books, electronic journals, and online databases. This shift has led to the emergence of digital libraries, which provide remote access to information resources beyond the physical boundaries of the library. The growth of digital collections has also necessitated the adoption of advanced systems capable of managing diverse formats and ensuring secure access to information (Naik, 2025).

Libraries worldwide have adopted integrated library systems (ILS) and automation technologies. utilising automated systems to handle core operations such as cataloguing, acquisitions, circulation, and serial control. The use of these technologies reduces manual workload, improves accuracy, and enhances operational efficiency. Automation also enables faster information retrieval and better resource organisation, thereby improving overall service delivery (Hoque, 2023). Libraries in developed nations are utilising cloud-based library services. Many libraries have transitioned from locally hosted systems to cloud-based platforms, offering scalability, cost-effectiveness, and remote accessibility. Cloud computing allows libraries to update their systems in real time, share resources across institutions and reduce the need for extensive physical infrastructure (Holland, 2020).

The integration of artificial intelligence (AI) and machine learning is another emerging global trend. These technologies are used for automating cataloguing, personalised information recommendations, and data analytics. AI-driven systems help libraries understand user behaviour, optimise collections, and provide tailored services, thereby enhancing user experience. In addition, there is a growing emphasis on user-

centred and remote library services. Library users in modern society expect instant, seamless, and on-demand access to information. As a result, libraries are incorporating mobile applications, online public access catalogues (OPACs) and self-service technologies such as RFID and automated check-out systems (Gul & Bano, 2019). These innovations make library services more convenient and accessible, especially in an increasingly digital society.

Another important trend is collaboration and resource sharing among libraries. Through digital networks and consortia, libraries can share resources, databases, and services across institutions and countries (Mittal, 2017). This approach improves access to a wider range of information while reducing costs and duplication of resources. Also, libraries are evolving into multifunctional knowledge and community hubs. Modern libraries support digital literacy, research services, and collaborative learning spaces, integrating both physical and virtual services to meet diverse user needs in the 21st century.

Current Status of Library Automation in Nigeria

The advancement in library automation is becoming a driving force in a modern-day society and it is only right for libraries in Nigeria to move with the trend. Academic libraries in the third world, including Nigeria, are slowly converting from manual to computerised routines. The most common conventional library services provided by librarians in the past were reference and circulation services (Egharevba, 2018). Today, libraries in the developed world have grown to the level that exceeds the four walls of the library, whereby information services can reach the library users wherever they are in the world as a result of the application and use of library automation. Egharevba (2018) listed various ICT facilities used in managing library resources in Nigeria, such as computers, DVDs, CDs, internet, telephones, digital cameras, webcams, CCTVs, smart cards, scanners, E-Books, printers, electronic journals, E-Mail, CD-ROM, DVD, and RFID technologies. He further stated that many of these facilities and equipment are unavailable in most libraries, and some that do have them are no longer functional.

The complete automation of library tasks has not been achieved due to numerous challenges (Ahmed & Buba, 2024). Nigerian libraries must address these challenges to fully adopt ICT. Shahabi and Otobo (2022) asserted that libraries in Nigeria, as centres for learning, teaching, and research, can no longer rely solely on traditional methods for information management. The demand for access to information in Nigeria is increasing, although this is still based on the traditional technology of print media. Thus, there is a need to fully integrate ICT into the library operations. Agbo, Onyemachi and Ogunmola (2024) noted that the majority of higher institutions in Nigeria, even those with good internet connectivity, are still at a low level of integration of ICT in teaching, learning, research, library services, information and managerial services. He further stated that Nigerian academic libraries should not be left out of this global educational revolution.

Similarly, Adigun (2015) confirmed the poor state of the library and library services in Nigeria. These cases depict the funding problems being experienced by all Nigerian libraries. In a more recent study, Ilori and Onanuga (2025) stated that Nigerian libraries are facing a severe crisis characterised by dilapidated infrastructure, outdated collections and poor service delivery, primarily driven by chronic underfunding. Limited allocations have crippled the ability to acquire new materials, maintain facilities and implement technology, affecting the effectiveness and efficiency of library staff. Ahmed and Buba (2024) stated that the cost of ICT facilities such as networking, cabling, networking cards, software administration and the maintenance of the file servers is intensive. The funds are usually not available for libraries.

In a study on the usage and application of ICT in the University of Nigeria, Nsukka (UNN), Odionye (2016) measured the level of availability and usage of ICT facilities. The study indicated that ICT facilities are not fully available in the library. The major challenges encountered in the use of ICT facilities, as revealed by the findings, were irregular power supply and irregular cooling environment. While the developed countries are far in front, the developing countries, including Nigeria, are still far behind, with much more work to revolutionise the academic libraries in Nigeria. In Nigeria, the academic libraries are said to be at a crossroads because they are operating in an era of dwindling financial resources

and this affects the effectiveness of their functions. These findings reveal that the current state of ICT application for library operations is generally poor; however, some libraries are still doing better than others. Most academic and research libraries in Nigeria have not fully computerised all their functions and services (Kabir, 2022). It is therefore important that an effort is made to enable the usability of digital library services.

Impact of Automation on Core Library Services

Automation represents one of the most significant developments in modern librarianship. One of the major transformations brought about by automation is the improvement in efficiency and accuracy of library operations. This section examines how automation has transformed key areas of library services.

1. Cataloguing and Classification

Automation has significantly transformed cataloguing and classification by making processes faster, more accurate, and standardised. Automated systems rely on international bibliographic standards such as MARC (Machine-Readable Cataloguing) and AACR (Anglo-American Cataloguing Rules). This ensures uniformity in data entry and facilitates information sharing across libraries. It also reduces duplication of effort, makes updating easy and enhances interoperability among library systems.

2. Circulation Services

Automation has revolutionised circulation services by introducing computerised systems for borrowing, returning, and renewing library materials. Technologies such as barcodes and Radio Frequency Identification (RFID) have simplified check-in and check-out processes, reducing time wasted and minimising human errors. Library users can reserve, renew, and track borrowed materials remotely through automated systems. These developments have improved operational efficiency and enhanced service delivery in libraries.

3. Reference and Information Services

Automation has transformed referencing and information services by integrating digital tools and online platforms. Libraries now provide access to electronic databases, digital catalogues, and virtual reference services such as email, chat, and online help desks. This allows information users to obtain information assistance and access information without physical visits to the library. The use of automated systems also enables faster retrieval of relevant information, improving the quality and responsiveness of reference services.

4. Access to Electronic Resources

Automation facilitates seamless access to a wide range of electronic resources, including e-books, electronic journals and online databases. Through integrated library systems and digital platforms, users can have access to information remotely at any time, overcoming geographical and time constraints. This has significantly expanded the scope of library services supporting academic research and lifelong learning.

5. User Experience and Satisfaction

Automation has improved user experience by providing faster, more convenient, and user-friendly library services. Tools such as Online Public Access Catalogues (OPAC), self-service centres, and mobile library applications now allow users to independently search for and access information. Automated notifications for due dates and reservations also enhance user convenience. These innovations contribute to higher levels of user satisfaction, increased library usage and staff convenience.

6. Resource Sharing and Networking

Automated libraries engage in resource sharing and networking through digital connectivity and library consortia. Automated systems support union catalogues and inter-library loan services, allowing information centres to share resources and provide users with access to a wider range of materials. This reduces the cost of collection development and promotes collaboration among institutions. Resource sharing has become an essential aspect of modern library operations in the digital age.

Challenges of ICT in libraries

1. There is a lack of a comprehensive ICT policy that regulates standards of ICT facilities, which hinders libraries a great deal. Elisha (2006) explained that no library can be effective without a policy, which sets out aims and objectives, identifies user groups and services and indicates priorities among them.
2. There are inadequate ICT-skilled professional Librarians and information users. There is a severe and pronounced low level of computer literacy among Nigerians (Akparobore, 2020). This makes it difficult for them as users and patrons of academic libraries to make full use of available ICT facilities. There is a lack of skilled human resources to install and manage technology networks.
3. The reluctance or resistance of library staff towards the introduction of computer technology and library automation is a great problem in achieving major strides in library services. There is a fear of adverse impact on employment (Akparobore, 2020). It is generally believed that computers can do a lot of tasks of library operations, thereby relieving staff of their positions, resulting in the loss of jobs.
4. Libraries in Nigeria are not adequately funded (Ilori & Onanuga, 2025). The commitment and obligation of the government and university management towards the library continue to diminish, handicapping the library in procuring the latest ICT facilities.
5. The high cost of maintaining ICT facilities is a great challenge in maintaining the facilities to serve library users. Most of the library facilities, equipment and resources are overly expensive compared to the limited funding of libraries in Nigeria.

Prospects of library automation in Nigeria

Despite the challenges highlighted above about library automation, it is obvious that the environment in which these libraries operate is open to rapid change; hence, the adoption of new technologies can accelerate almost all aspects of human survival. ICT in

libraries is changing the mode of information storage and retrieval, acquisition, cataloguing and classification, circulation of materials, serials control, management statistics and administrative activities such as budgeting. Once Nigerian academic libraries are fully automated, it is expected that they will bring about efficient and effective information services to the users and the overall improvement in the performance of the libraries and other related information institutions (Kumar, 2018). As a result, the library must identify the appropriate way to deliver information services to users through new information technologies, which can be used to achieve this objective.

Most libraries in Nigeria are not fully automated; to attain full automation, it is fundamental that there is a level of planning needed for libraries, whether or not they are heavily involved with information technologies (Ajani & Buraimo, 2026). The plan must align with the direction of the library, that is, what kind of institution it wishes to be in the future; how its users will relate to it; what strengths will be needed; and what level of funding will be required. Accomplishing this exercise will give the library administration and the institutional administration a strong sense of the role of the library within the institution and the resources needed (Eruotor, 2024).

The application of ICT for libraries and their services will bring tremendous benefits to librarians and the information users. It will continue to facilitate cooperation and the formation of a library network, accurate and timely completion of tasks. Also, it will help to increase the range of services offered, increase control of library activities that are repetitive in nature and reduce mutilation and defacing of library materials (Garba, Garba & Zubairu, 2019). It will also improve the image and efficiency of the libraries and librarians, both of which are important in securing the confidence and patronage of users.

Recommendations

1. Library authorities should intensify efforts on the constant acquisition and provision of ICT facilities to libraries.
2. The poor ICT knowledge among both users and professionals in Nigeria makes it difficult for them to apply ICT. The need for periodic training for librarians and

other library staff must be emphasised in libraries. Awareness and training programs should be put in place by libraries and bodies like the Nigerian Library Association (NLA), to sensitise and teach library users and staff on the benefits of library automation in order to hasten the progress of ICT application on library services.

3. There should be a massive injection of funds and financial assistance from both the Nigerian government and organisations in providing ICT infrastructural facilities for effective library services in academic libraries in Nigeria.
4. Librarians in Nigeria should seek alternative power supply, like solar systems, inverter batteries, coupled with good internet connectivity, to check the menace of frequent electricity power failure and poor internet connection.
5. Libraries and librarians as providers of information on all aspects of human development must redefine their roles and professional responsibilities to meet the challenges posed by the changing information world.
6. Libraries should have a well-documented ICT policy in place. Also, the policy should include details of how to maintain equipment and facilities. It is important to imbibe a maintenance culture so as to manage the available ICT facilities effectively.

Conclusion

This study examined the role of automation in transforming library services, with particular reference to the Nigerian context. Drawing on existing literature, it is evident that automation can significantly shape core library operations such as cataloguing and classification, circulation, reference services, access to electronic resources, user experience, and resource sharing in Nigerian libraries. These transformations can lead to greater accuracy, improved efficiency, better access to information, and a more user-centred service delivery.

Globally, libraries have embraced automation as a strategic tool for remaining relevant in an increasingly digital and information-driven society. However, in Nigeria, there is slow progress in adopting an automated mode of operation in the library due to

challenges such as inadequate funding, poor infrastructure, limited technical expertise, and inconsistent power supply.

To achieve a full realisation of the benefits of automation in Nigerian libraries, there is a need for sustained investment in ICT infrastructure, continuous training of library personnel, supportive government policies, and increased institutional commitment to technological innovation. In conclusion, automation is no longer optional but essential for the survival and growth of modern libraries. Its effective adoption and implementation will play a crucial role in transforming Nigerian libraries into dynamic, accessible, and efficient information centres capable of meeting the evolving needs of users in the 21st century.

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