
ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING COMMUNITY LIBRARY SERVICES IN NIGERIA

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Abstract

Community libraries serve as vital hubs for education, information access, and social development, particularly in underserved communities. With the rapid advancement of artificial intelligence, these institutions now hold unprecedented opportunities to transform their services and to meet the evolving information needs of their users. This paper examines the role of artificial intelligence in enhancing community library services in Nigeria, drawing on contemporary literature to explore the conceptual dimensions, practical applications, benefits, and challenges of adoption. Community libraries are conceptualised as people centred institutions that provide free and equitable access to knowledge, while artificial intelligence is understood as the simulation of human cognitive functions in machines to support learning, reasoning, and decision making. The study identifies key roles of the technology in community library services, including automated cataloguing and classification, intelligent information retrieval, personalised user services, virtual reference and chatbot services, enhanced community engagement, digital preservation, inclusive and accessibility services, improved operational efficiency, and support for lifelong learning and digital literacy. The paper further highlights significant benefits such as improved service diversity, enhanced security, efficient resource management, and stronger research support, while acknowledging critical challenges that confront Nigerian community libraries, including data privacy concerns, ethical issues, high implementation costs, and inadequate staff training. The paper concludes by advocating increased infrastructure investment, sustained professional development, and policy frameworks that promote the ethical deployment of artificial intelligence in Nigerian community libraries.

Keywords: artificial intelligence, community libraries, library services, Nigeria, digital inclusion

1. Introduction

Libraries are service oriented organisations, and in the present era sophisticated technologies have reshaped the way their services are delivered. The needs of library patrons are evolving quickly in the digital age, and institutions once thought of as physical archives of books are changing into vibrant community centres that offer far more than the loan of materials (Aina, 2018). Abdulsalam et al. (2025) define a community library as an establishment created to serve the information needs of a communal setting and structured to provide learning and information resources to its users. Omigie, Makinde, and Oboite (2023) similarly describe the community library as a small public library established to meet the information needs of a specific community, characterised by an innovative and user centred approach that aims to provide free access to educational and informational resources.

By offering resources and services that promote education, lifelong learning, and information access, community libraries contribute to the general growth and wellbeing of people and communities, with consequences for productivity and the development of human capital (California State Library, 2023). They are increasingly recognised as essential community assets that support education, research, and economic development (Agim, Mohammed, and Obande, 2024), and this evolution requires libraries to embrace new technologies and to develop new skills in order to serve their communities effectively in the digital age.

The rise of artificial intelligence is having a profound influence on libraries, offering opportunities to enhance services, to improve efficiency, and to personalise the experience of users. Artificial intelligence is the ability of computer systems and machines to simulate human intelligence and to perform tasks that traditionally required human cognition, such as learning, problem solving, decision making, and the understanding of natural language (Jakhar and Kaur, 2020; Russell and Norvig, 2022). Its applications in libraries are expanding rapidly and now encompass chatbots for user assistance, automated cataloguing and classification, personalised information retrieval, and predictive analytics for collection development (Bhattacharya, 2022). This paper synthesises the contemporary literature to map the conceptual terrain, applications, benefits, and challenges of artificial intelligence in the specific context of Nigerian community libraries.

2. Conceptual Framework

2.1 The Concept of the Community Library

A community library can be described as a public library, or an alternative to one, that is founded and run by local people with or without public funding, usually in underprivileged areas, to provide study spaces and community information services for the development of the community (Anyim, 2018). Such libraries provide access to knowledge, information, and works of the imagination through a range of resources and services that are equally available to all members of the community regardless of race, nationality, age, gender, religion, language, disability, and economic or educational status (IFLA and UNESCO, 2001). Akanwa (2013), citing Emenalor, defines the public library as one that provides information resources, services, and recreational

outlets for the generality of citizens, the young and old, literate and non literate alike. Stanistreet (2019) describes the community library as a provider of varied learning opportunities to marginalised residents, while Banks (2021) frames it as a de facto community centre that connects people in need with resources to build their societies.

2.2 The Concept of Artificial Intelligence

Artificial intelligence has been described as the ability of computers to carry out tasks that would previously have required human intelligence, such as autonomous driving, robotics, and conversational agents (Diaz, 2023). Nwakunor (2021) characterises it as computer controlled systems that think intelligently like human beings, while Oname and Alex-Nmecha (2020) define it as a branch of computer science concerned with how computers learn, interpret information, and perceive the world, encompassing machine learning, natural language processing, speech recognition, and expert systems. The scope of the field is broad and draws on philosophy, mathematics, psychology, linguistics, and computer science (Amudha, 2022), and it is now widely acknowledged as a tool essential for increasing productivity and organisational effectiveness (Sukumar, 2024). Within this study, artificial intelligence is understood as the simulation of human cognitive functions in machines designed to support learning, reasoning, problem solving, perception, and language understanding (Russell and Norvig, 2022).

Conceptual framework: roles of artificial intelligence in community library services

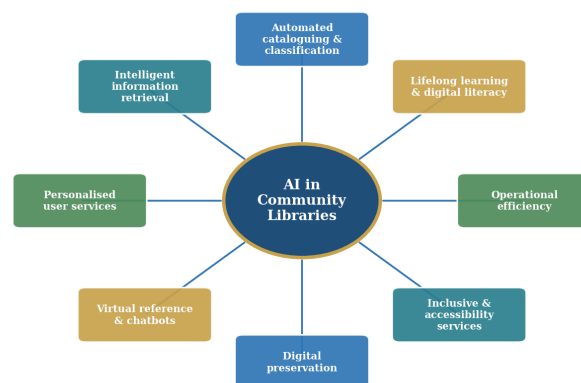


Figure 1. Conceptual framework of the roles of artificial intelligence in community library services, organised around ten interlocking service domains.

Source: Authors' conceptualisation.

3. Methodology

This study adopts a narrative literature review design to examine the role of artificial intelligence in enhancing community library services in Nigeria. A narrative review was considered appropriate given the broad and multidisciplinary nature of the subject, which spans library science, information technology, and community development, and which calls for a comprehensive synthesis of conceptual, theoretical, and applied scholarship across these intersecting domains. A search of the literature was conducted between January and April 2025 across Google Scholar, Scopus, Web of Science, the Library, Information Science and Technology Abstracts database, JSTOR, EBSCOhost, and ResearchGate, supplemented by grey literature that included UNESCO and IFLA

policy documents and institutional repositories.

Sources were selected on the basis of publication in English; peer reviewed articles, book chapters, conference papers, and credible institutional reports; publication between 2013 and 2025, with priority given to work from 2018 onward to ensure currency; and direct relevance to artificial intelligence, community libraries, public libraries, or library services in developing country contexts. The initial searches yielded approximately 214 sources. After the removal of duplicates and the screening of titles and abstracts, 68 sources were retrieved for full text review, and following assessment against the inclusion criteria, 47 sources were incorporated into the final synthesis. The selection process is summarised in Figure 2. The selected sources were analysed thematically around the conceptual framework of the paper.

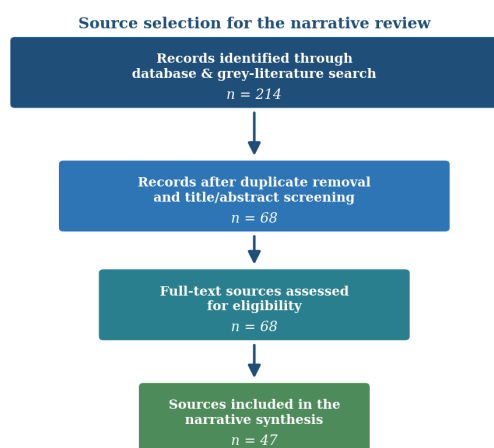


Figure 2. Flow of source identification, screening, and inclusion for the narrative review.
Source: Authors' compilation.

4. Roles of Artificial Intelligence in Community Library Services

4.1 Automated Cataloguing and Classification

Cataloguing has long been one of the most time consuming and labour intensive functions of the library. Moulaison-Sandy and Coble (2024) examine the use of artificial intelligence for cataloguing and show how the process can be supported through automated metadata generation, subject heading assignment, authority control, name disambiguation, multilingual support, and content analysis and summarisation (Mahmud, 2024). Tella and Ajani (2022) further demonstrate the use of robotics in shelving and locating materials, security, real time reference, and automated storage and retrieval, each of which conserves the time and effort of library staff and frees them for more complex, user facing work.

4.2 Virtual Reference and Chatbot Services

Virtual reference and chatbot services are arguably the most immediately impactful applications for Nigerian community libraries, given the severe shortage of trained staff in many communities. Libraries are chronically understaffed, and many rural and peri urban branches cannot provide consistent reference services during extended hours (Omigie et al., 2023). Chatbots and virtual assistants address this gap directly by offering patrons real time, round the clock assistance without a proportionate increase in personnel, helping users navigate catalogue searches, access digital materials, respond to frequent queries, and complete registration

(Mane, 2024). Asim et al. (2024) note that chatbots are a particularly vital tool for filling knowledge gaps in underserved or rural areas where physical access to librarians may be limited.

These technologies are also among the more accessible implementations from a resource standpoint. Cloud based and open source solutions are available at relatively low cost and can be deployed without heavy on site infrastructure, a significant advantage where reliable power and high specification hardware cannot be assumed (Barsha and Munshi, 2024). Text based and voice enabled chatbots can be localised to support Nigerian languages such as Yoruba, Hausa, and Igbo, extending their usefulness to communities where proficiency in English may be limited; Martinez-Concha et al. (2024) identify language accessibility as a central barrier to library use in multilingual contexts. Al-Aamri and Osman (2022) report measurable improvements in user satisfaction and information access where such services are deployed, suggesting that chatbot adoption is not merely a cost saving measure but a genuine enhancement of service quality.

4.3 Support for Lifelong Learning and Digital Literacy

Support for lifelong learning and digital literacy is particularly significant in Nigeria, where formal educational attainment remains uneven, adult literacy in several states is low, and access to vocational and continuing education is constrained for large segments of the population (Kumar, 2025; Aljazi, 2025). Community libraries occupy a strategic position as one of the few public institutions capable of bridging this gap, and artificial intelligence substantially amplifies their capacity to do so. Adaptive learning platforms can diagnose a user's current knowledge level and generate customised learning pathways, whether those needs relate to basic literacy, digital skills, health information, civic education, or vocational training (Kumar, 2025). Such individualisation is not achievable at scale through traditional programming, and it represents a genuine transformative shift in what community libraries can offer.

The promotion of digital literacy is also self reinforcing: as users develop digital skills through assisted programmes, they become better equipped to access other enhanced services, creating a virtuous cycle of capability development (Boateng, 2025). Boateng (2025) found that intelligent search tools and recommendation systems demonstrably enhanced engagement and learning outcomes, while Gajbhiye (2024) identified recommendation and preservation tools as effective in improving access, subject to appropriate policy safeguards. For Nigerian community libraries, the practical priority is partnership with government and non governmental organisations to deploy low bandwidth, mobile compatible learning tools that function within prevailing connectivity constraints.

5. Benefits of Artificial Intelligence Adoption

The adoption of artificial intelligence broadens and diversifies library services and makes them more accessible. Jackson et al. (2018) observe that these developments are consistent with the library's aim of providing access to knowledge for all people regardless of ability or language, and Hussain (2023) found artificial intelligence to be a powerful instrument for improving community library services. The principal benefits identified in the

literature, summarised in Figure 3, span several dimensions. Chatbots and virtual assistants offer fast and continuous support that raises user satisfaction (Al-Aamri and Osman, 2022). The automation of repetitive tasks increases staff efficiency and reduces both working hours and error rates (Han, 2021). Artificial intelligence also strengthens security, since machine learning and surveillance technologies can monitor library spaces, identify anomalous behaviour, and alert staff to possible problems, while related techniques enhance the integrity of library network security (Li, 2021).

Further benefits include accessibility and inclusion, where translation, speech to text, and text to speech tools assist users with disabilities and those who require materials in different languages; efficient resource management, where the technology forecasts borrowing trends and automates routine transactions such as checkouts and notices; and enhanced research support, where virtual assistants aid inquiry, database navigation, and bibliographic search, and where analytical tools help interpret and visualise large datasets. Taken together, these benefits position artificial intelligence not as a peripheral convenience but as a means of extending the core mission of the community library.

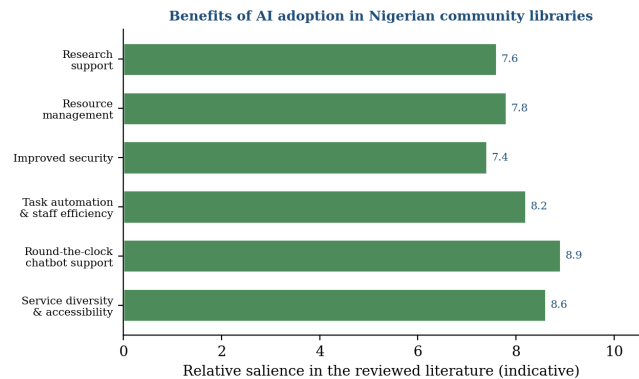


Figure 3. Principal benefits of artificial intelligence adoption identified across the reviewed literature.

Source: Authors' synthesis of the reviewed literature.

6. Challenges of Implementation in Nigeria

Notwithstanding these benefits, the implementation of artificial intelligence in Nigerian community libraries faces substantial obstacles, summarised in Figure 4. The first concerns cost and infrastructure. The deployment of automated systems requires reliable connectivity, adequate computing hardware, and software licensing that many community libraries lack (Barsha and Munshi, 2024). Although cloud based tools reduce on premise demands, consistent broadband remains a barrier in rural and peri urban areas, and learning platforms face the most acute challenge because their effectiveness depends on both connectivity and a stable electricity supply. Libraries must therefore weigh the cost of implementation against available budgets and prioritise phased adoption that begins with low bandwidth solutions (Gajbhiye, 2024).

The second challenge is staff capacity and training. Automated systems, although designed to reduce manual workloads, require staff to understand metadata standards, manage exceptions, verify generated records, and maintain accuracy over time (Moulaison-Sandy and Coble, 2024; Mahmud, 2024). For chatbot services, staff must configure, update, and troubleshoot the assistants and manage the handover of complex queries to human

librarians, while learning tools demand both technical and pedagogical capacity. The learning curve is significant and ongoing professional development is essential, yet training budgets are typically limited (Barsha and Munshi, 2024).

The third challenge concerns data privacy, security, and ethics. Chatbot services and learning platforms collect and process substantial volumes of user data, including query histories and learning behaviours (Thompson et al., 2023). The legal framework governing data protection in Nigeria, principally the Nigeria Data Protection Act of 2023, is recent and its application to public library settings is not yet well established. Beyond compliance, there are ethical risks: systems trained on datasets that underrepresent African languages and knowledge systems risk encoding classification biases that marginalise local knowledge (Gajbhiye, 2024), and platforms may reflect educational frameworks that do not align with local needs. Libraries must therefore audit tools for bias and work with developers to ensure culturally appropriate and locally relevant training data. The fourth challenge is low digital literacy among users, which is at once the problem that learning tools are designed to solve and a barrier to their adoption, since users unfamiliar with digital interfaces may be reluctant to engage, especially where technology distrust is prevalent (Echedom and Okuonghae, 2021).

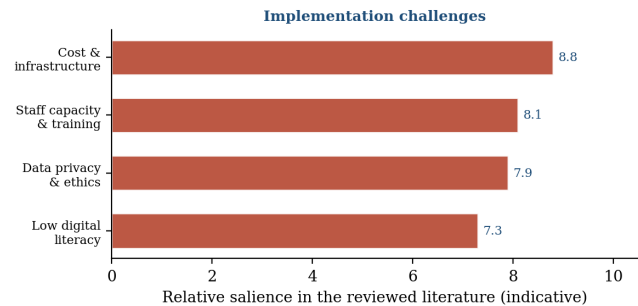


Figure 4. Principal implementation challenges confronting Nigerian community libraries.

Source: Authors' synthesis of the reviewed literature.

7. A Phased Pathway for Adoption

Synthesising the evidence on benefits and constraints, a phased pathway offers the most realistic route to adoption for Nigerian community libraries (Figure 5). A foundational phase would prioritise low bandwidth chatbots, open source cataloguing, and staff sensitisation, since these carry the lowest infrastructure burden and yield visible early gains. A consolidation phase would introduce personalised retrieval and adaptive learning tools alongside structured staff upskilling. A transformation phase would extend to multilingual services, digital preservation, and the development of a validated readiness instrument calibrated for sub Saharan African library contexts. Sequencing adoption in this way allows libraries to build capability and public trust incrementally, rather than committing scarce resources to ambitious deployments that prevailing infrastructure cannot yet sustain.

Proposed phased roadmap for AI adoption in Nigerian community libraries

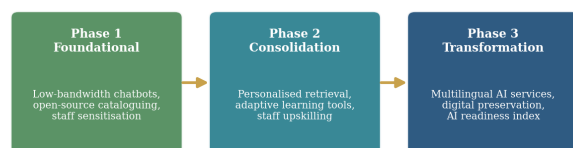


Figure 5. Proposed phased roadmap for the adoption of artificial intelligence in Nigerian community libraries.

Source: Authors' conceptualisation.

8. Conclusion and Recommendations

Artificial intelligence holds considerable potential for community library services in Nigeria. Tools such as chatbots, automated cataloguing systems, and recommendation algorithms can help librarians complete routine tasks more effectively while freeing them to concentrate on user centred services such as information literacy and community engagement. By implementing these technologies thoughtfully, community libraries can become more significant hubs for education, information sharing, and digital inclusion. Obstacles nevertheless remain, among them cost, ethical concerns, data privacy and security, staff training, and an erratic power supply, and these impede successful application. Increased infrastructure investment, sustained professional development, and policy frameworks that encourage the ethical use of artificial intelligence are all necessary to overcome these challenges.

Future research should address the limitations of a review based study by incorporating primary fieldwork across community libraries in Nigeria's geopolitical zones, using mixed methods to assess infrastructure, staff capacity, and institutional readiness, with a view to developing a validated readiness index for sub Saharan African library contexts. Such work would convert the conceptual mapping offered here into an evidence based foundation for policy and practice.

Declarations

Conflict of interest. The authors declare that there is no conflict of interest regarding the publication of this paper. This research received no specific grant from any funding agency in the public, commercial, or not for profit sectors.

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