

ARTIFICIAL INTELLIGENCE IN ACADEMIC LIBRARIES: OPPORTUNITIES AND CHALLENGES OF ADOPTION IN ACADEMIC LIBRARIES IN BAYELSA STATE, NIGERIA.

By

Iye, Ronami Samuel MNLA, CLN

University of Africa Toru-Orua, Bayelsa State

E-mail: iyeronky@gmail.com

Godfrey Vera Zaccheaus MNLA, CLN

Niger Delta university Wilberforce Island, Bayelsa State

E-mail: veragodsfrey7@gmail.com

ABSTRACT

This study investigates the opportunities and challenges of adopting Artificial Intelligence (AI) in academic libraries in Bayelsa State, Nigeria. The study was guided by two research objective. The study adopt using a descriptive survey design, data were collected from 40 library staff (30 professional librarians and 10 paraprofessionals) across four universities with functional academic libraries. A structured questionnaire, validated by experts and tested for reliability, was used for data collection, while descriptive statistics were applied for analysis with SPSS v25. Findings revealed that AI adoption remains at an early stage in Bayelsa State academic libraries. Respondents highlighted major opportunities of AI, such as enhancing efficiency, delivering personalized services, supporting research, enabling 24/7 access to information, and broadening access to digital resources. The study concludes that while AI offers transformative potential for service delivery in academic libraries, infrastructural and human-capacity challenges must be addressed. Recommendations include staff training, increased funding, collaboration with ICT firms, and the establishment of ethical policies to guide AI use.

Keywords: Artificial Intelligence, Academic Libraries, Opportunities, Challenges.

INTRODUCTION

The rapid growth of digital technologies has transformed the way academic libraries deliver information services worldwide. Among these innovations, Artificial Intelligence (AI) has emerged as a powerful tool capable of reshaping how libraries organize, manage, and provide access to information. AI encompasses technologies such as machine learning, natural language processing (NLP), robotics, and data analytics, which enable machines to simulate human intelligence and perform complex tasks with minimal human intervention (Russell & Norvig, 2021).

According to Igbo, Imo, Jidere, and Ugwu, (2025), Artificial Intelligence (AI) as a branch of computer science that deals with creating systems or machines capable

of performing tasks that typically require human intelligence, such as learning, critical reasoning, problem solving, and understanding language. Artificial Intelligence tools are being increasingly adopted in academic libraries to automate repetitive tasks, improve access to information, enhance discovery services, and deliver personalized user experiences.

In the context of academic libraries, Artificial Intelligence applications range from intelligent search and discovery tools, virtual reference services, recommender systems, automated cataloguing, plagiarism detection, and predictive analytics for resource management (Cox, Pinfield, & Rutter, 2019; Mahmood, 2022). Globally, libraries in developed countries have begun integrating Artificial Intelligence into their systems to enhance user experiences and streamline service delivery. For example, virtual assistants and chatbots now provide 24/7 reference services, while AI-powered discovery tools help students and researchers locate relevant resources more effectively (Tredinnick, 2020).

Artificial Intelligence presents significant opportunities for academic libraries. It has the potential to bridge gaps in service delivery, enhance access to both local and global scholarly resources, and improve operational efficiency in libraries. By leveraging Artificial Intelligence, libraries can provide personalized services, improve the visibility of indigenous research outputs, and strengthen decision-making in collection development and resource allocation (Ifijeh, 2021). On the other hand, risks such as ethical concerns, algorithmic bias, privacy issues, and the possibility of widening digital divides must be carefully addressed to ensure equitable and sustainable adoption (Cox & Pinfield, 2020).

Statement of the Problem

Academic libraries are at the forefront of knowledge dissemination, research support, and information literacy training. In recent years, Artificial Intelligence (AI) has emerged globally as a transformative tool capable of improving library service delivery by automating routine tasks, enhancing access to resources, and offering personalized user experiences.

However, in Nigeria, and particularly in Bayelsa State, the integration of Artificial Intelligence in academic libraries seems to be minimal. Many libraries in the state continue to rely on traditional manual or semi-digital processes for cataloguing, reference services, and collection management. While there are isolated initiatives such as e-libraries and online repositories, the extent of AI adoption for service delivery remains unclear.

Therefore, the problem this study seeks to address is the lack of empirical knowledge on the current state, opportunities, and challenges of Artificial Intelligence adoption in academic libraries in Bayelsa State.

Objectives of the Study

1. To evaluate the perceived opportunities for employing Artificial Intelligence in enhancing information service delivery in academic libraries in Bayelsa State.
2. To identify the challenges associated with the adoption and use of Artificial Intelligence technologies in academic libraries within Bayelsa State.

REVIEW OF RELATED LITERATURES

Concept of Artificial Intelligence (AI)

Artificial Intelligence (AI) refers to the ability of machines to mimic cognitive functions associated with human intelligence, such as learning, problem-solving, critical reasoning, and decision-making (Igbo, Imo, Jidere, and Ugwu, 2025). In the library and information science (LIS) domain, AI encompasses technologies like machine learning, natural language processing (NLP), chatbots, data analytics, and intelligent search systems (Nwangwu & Ozioko, 2022).

Artificial Intelligence tools are being increasingly adopted in academic libraries to automate repetitive tasks, improve access to information, enhance discovery services, and deliver personalised user experiences. According to Garoufallou et al. (2019), AI has the potential to streamline cataloguing, classification, and reference services while improving operational efficiency. Sharma and Arora (2020) also note that AI supports real-time user interaction and predictive analysis, enabling libraries to make data-informed decisions about resource management and service delivery.

Opportunities for Artificial Intelligence in Academic Libraries

The literature highlights several opportunities that Artificial Intelligence (AI) presents for academic libraries in enhancing service delivery, resource management, and user satisfaction.

1. **Enhanced Information Retrieval:** Artificial Intelligence (AI) has introduced significant improvements in the way information is retrieved in academic libraries, moving beyond traditional keyword-based search systems. Traditional Online Public Access Catalogues (OPACs) and integrated library systems often rely on Boolean logic and exact keyword matches, which may generate irrelevant results and contribute to information overload (Russell & Norvig, 2021). AI-driven discovery tools, however, incorporate natural language processing (NLP), semantic search, and machine learning Personalized Services.

One of the most significant opportunities offered by Artificial Intelligence (AI) in academic libraries is the ability to deliver personalized services that align with the unique needs of individual users. Traditional library services have often been generalized, providing uniform access to resources without considering differences in user interests, academic levels, or research focus. AI, however, enables a shift toward user-centered service delivery through recommender systems, adaptive learning platforms, and intelligent search engines.

According to Mahmood (2022), AI-powered recommender systems utilize algorithms that analyze user profiles, borrowing histories, and search patterns to suggest relevant books, journal articles, and databases. This mirrors the personalization strategies employed by commercial platforms such as Amazon and Netflix, but within the academic context. Such personalization enhances user engagement, reduces the time spent searching for resources, and supports more efficient research processes.

2. Efficiency and Automation: Artificial Intelligence (AI) has been widely recognized for its potential to enhance efficiency and automation in academic libraries by streamlining repetitive and time-consuming tasks. Traditionally, activities such as cataloguing, acquisitions, and circulation have required significant human effort. However, AI tools now provide opportunities to reduce this workload, thereby enabling librarians to focus on more specialized and value-added services.

According to Cox et al. (2019), automation in libraries is not a new phenomenon, but the integration of AI has significantly expanded its scope. AI-powered cataloguing systems, for example, can automatically classify and index resources using machine learning algorithms, thereby reducing errors associated with manual processes. Similarly, acquisitions workflows are increasingly automated, with AI assisting in vendor selection, demand-driven purchasing, and subscription management.

3. 24/7 Access to Services: One of the most transformative opportunities presented by Artificial Intelligence (AI) in academic libraries is the provision of round-the-clock access to services. Unlike traditional service models limited by staff working hours, AI-powered tools such as chatbots, virtual assistants, and automated reference systems ensure continuous availability of information resources and support.

According to Tredinnick (2020), AI-driven virtual reference platforms enable users to interact with library services at any time, thereby breaking the barriers of time zones and library schedules. These systems can provide instant answers to frequently asked questions, assist with resource navigation, and guide users through database searches without the need for human intervention.

4. Improved Research Support: One of the most significant contributions of Artificial Intelligence (AI) in academic libraries lies in its ability to enhance research support. As the demand for accurate, timely, and comprehensive research assistance grows, AI tools are increasingly being integrated to meet these needs.

- i. **Plagiarism detection and academic integrity:** AI-powered plagiarism detection systems, such as Turnitin, use advanced text-matching algorithms to compare documents against vast databases of academic and web content. Ifijeh (2021) emphasizes that these tools help uphold academic integrity by ensuring originality in student and faculty research outputs. The presence of such

systems not only deters plagiarism but also educates users on proper citation and ethical writing practices.

- ii. Citation management and referencing: AI-driven citation tools automate the generation of bibliographies and references in multiple styles, reducing human error and saving researchers considerable time. Zhang and Lee (2021) argue that by simplifying referencing processes, these tools allow students and academics to focus more on content development rather than formatting.
- iii. Knowledge discovery and text mining: AI also supports knowledge creation by enabling the analysis of large datasets and scholarly content. Cox, Pinfield, and Rutter (2019) highlight how machine learning and natural language processing (NLP) techniques help researchers identify emerging trends, themes, and gaps within scholarly literature. Such applications empower libraries to provide more advanced research consultations and evidence-based guidance.
- iv. Research recommendations and personalization: AI-powered recommender systems further strengthen research support by suggesting relevant books, journals, and articles based on a user's research history and interests. According to Mahmood (2022), this personalization enhances research efficiency and deepens engagement with academic resources.
- v. Collaboration and open science: Emerging AI tools facilitate collaborative research by enabling automated data sharing, visualization, and interpretation across platforms. As Russell and Norvig (2021) note, AI's ability to process and interpret large interdisciplinary datasets has the potential to position libraries as hubs of digital scholarship and open science initiatives.

Challenges to AI Adoption in Academic Libraries

While Artificial Intelligence (AI) offers numerous opportunities for enhancing information service delivery, its adoption in academic libraries, particularly in Nigeria faces significant barriers. These challenges limit the effective deployment and utilization of AI tools in supporting research, teaching, and learning.

1. **Infrastructural Deficits:** A major challenge in the Nigerian context is inadequate infrastructure, especially poor internet connectivity and unstable electricity supply. According to Oyedum and Ogbuiyi (2019), these limitations hinder the seamless operation of AI-driven systems, many of which require uninterrupted power supply and strong bandwidth to function effectively. Without reliable infrastructure, AI initiatives risk being unsustainable.
2. **Funding Constraints:** Another critical barrier is the limited financial capacity of many academic libraries. Adeleke and Nwalo (2020) argue that insufficient funding affects not only the acquisition of AI technologies but also their maintenance, staff training, and system upgrades. In many cases, library budgets are already stretched, making investments in emerging technologies less feasible.

3. **Low Digital Literacy:** The success of AI in libraries depends heavily on the technical skills of staff and users. Ifijeh (2021) notes that low levels of digital literacy among librarians, students, and faculty in Nigeria impede effective utilization of AI tools. Without adequate training, even the most advanced technologies may remain underused or misapplied.
4. **Ethical and Privacy Concerns:** The adoption of AI also raises ethical issues such as data privacy, surveillance, and algorithmic bias. Cox and Pinfield (2020) highlight the risks associated with entrusting sensitive user data to AI systems, particularly when safeguards are weak. These concerns may erode trust and limit user willingness to fully embrace AI-based services.
5. **Resistance to Change:** Finally, organizational and cultural factors also shape AI adoption. Eze and Ezeani (2021) point out that some library professionals resist AI technologies due to fears of job displacement or lack of confidence in their ability to manage new tools. Such resistance creates institutional inertia, slowing down the pace of digital transformation in libraries.

METHODOLOGY

The study adopted a descriptive survey design, considered appropriate for collecting quantitative data on attitudes, perceptions, and practices regarding AI adoption in academic libraries. The population of the study comprised library staff (professional and paraprofessional) from four universities with functional academic libraries in Bayelsa State: Niger Delta University, Federal University Otuoke, University of Africa Toru-Orua, and Bayelsa Medical University. A purposive sampling technique was used to select the institutions, while stratified random sampling ensured staff representation. A total of 40 respondents was drawn: 30 professional librarians and 10 paraprofessionals.

Data were collected using a structured questionnaire divided into four sections: Demographic information (gender, role, experience, qualification), Perceived opportunities of AI, Challenges and strategies for adoption., Items in Sections 2 - 4 were measured on a 5-point Likert scale (Strongly Agree, Strongly Disagree). Content validity was ensured through expert review, while reliability was established via a pilot study involving 20 respondents, using Cronbach's Alpha. The questionnaires were distributed electronically (Google Forms), with follow-ups conducted to maximize the response rate. Collected data were analyzed using descriptive statistics (frequencies, percentages, means, and standard deviations) with SPSS version 25. Results were presented in tables to answer the research questions.

DATA ANALYSIS, PRESENTATION, AND DISCUSSION OF FINDINGS

This section presents and discusses the findings of the study in line with the stated objectives and research questions. Data were analyzed using descriptive statistics such as frequency counts, percentages, means, and standard deviations.

1. Perceived Opportunities of AI in Improving Service Delivery

Opportunities	Mean	SD	Interpretation
Enhanced efficiency in routine tasks	4.6	0.50	Strongly Agree
Personalized information services	4.4	0.62	Strongly Agree
Improved research support	4.2	0.70	Agree
24/7 user support via chatbots	4.1	0.65	Agree
Broader access to digital resources	4.0	0.75	Agree

Table 1: Perceived Opportunities of AI in Academic Libraries: Respondents were asked to rate the opportunities of AI in academic libraries. The results, presented in Table 3, show that respondents strongly believe AI can enhance efficiency (Mean = 4.6), provide personalized services (Mean = 4.4), and improve research support (Mean = 4.2).

Findings align with TAM's construct of perceived usefulness, where librarians see AI as beneficial for productivity and user satisfaction. This result also corresponds with Mahmood (2022), who found that librarians globally consider AI to be a game-changer in enhancing user-centered services.

2. Challenges Hindering AI Adoption

Challenges	Frequency	Percentage (%)
Inadequate infrastructure	32	80.0
Lack of technical expertise	30	75.0
Insufficient funding	28	70.0
Ethical/privacy concerns	22	55.0

Table 2: Challenges of AI Adoption: As shown in Table 4, inadequate infrastructure (80%), lack of technical skills (75%), and insufficient funding (70%) emerged as the most pressing challenges. Ethical and privacy concerns were also noted by 55% of respondents.

These findings echo earlier works (Ezema & Ugwuanyi, 2020; Adeleke & Nwalo, 2020), which reported poor infrastructure and funding as barriers to ICT innovation in Nigerian libraries. From a TAM perspective, these challenges lower perceived ease of use, as staff may find AI systems complex and resource-intensive to adopt.

SUMMARY OF FINDINGS

This study examined the opportunities and challenges of Artificial Intelligence (AI) adoption in academic libraries in Bayelsa State, Nigeria. Based on data collected and analyzed, the major findings are summarized as follows:

1. The study indicates that AI offers significant opportunities for enhancing academic library services. These include increased efficiency in routine tasks, delivery of personalized services, improved research support, provision of 24/7 access to library services, and expanded access to digital resources.
2. The study revealed that the major challenges identified were inadequate ICT infrastructure, limited technical skills among staff, insufficient funding, and ethical/privacy concerns.

CONCLUSION

Artificial Intelligence holds significant potential to transform academic library service delivery in Bayelsa State by improving efficiency, personalization, and research support.

However, its adoption is still at an early stage. The study also reveal that while librarians and paraprofessional staff recognize the usefulness of Artificial Intelligence, structural and contextual barriers such as inadequate infrastructure, insufficient funding, and limited expertise hinder full adoption.

Unless these barriers are addressed, academic libraries in Bayelsa State risk lagging behind in leveraging AI to deliver modern, user-centered information services.

RECOMMENDATIONS

Based on the findings, the following recommendations are proposed:

1. Universities should organize regular workshops and training sessions on AI literacy, data science, and digital librarianship to equip staff with relevant skills.
2. Libraries should collaborate with ICT firms, start-ups, and consortia to develop context-specific AI applications tailored to the needs of Bayelsa state academic libraries.

REFERENCES

- Adeleke, D. S., & Nwalo, K. I. N. (2020). Funding challenges of Nigerian university libraries in the digital age. *Library Philosophy and Practice*, 1–12.
- Chang, R. (1990). The development of cataloguing expert systems. *Journal of the American Society for Information Science*, 41(5), 344–352.
- Cox, A. M., & Pinfield, S. (2020). Research libraries and the ethics of artificial intelligence. *Journal of Librarianship and Information Science*, 52(4), 1146–1156.

- Cox, A. M., Pinfield, S., & Rutter, S. (2019). The intelligent library: Thought leaders' views on the likely impact of artificial intelligence on academic libraries. *Library Hi Tech*, 37(3), 418–435.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. Debrower, T., & Jones, M. (1991). Expert systems for collection development: A practical approach. *Library Resources & Technical Services*, 35(2), 145–153.
- Eze, J. U., & Ezeani, C. N. (2021). Artificial intelligence and the future of library professionals in Nigeria. *Library Hi Tech News*, 38(8), 1–6.
- Garoufallou, E., Zafeiriou, G., Siatri, R., & Balapanidou, E. (2019). Technology acceptance model (TAM) and its application to the adoption of digital libraries. *Library Review*, 68(3), 236–248.
- Igbo, H. U., Imo, N. T., Jidere, U. J., & Ugwu, F. N. (2025). Adopting Artificial Intelligence in Academic Library Services in Nigeria: Requirements And Challenges. *Nigerbiblios: Journal of National Library of Nigeria*, 34(1), 1–18. Retrieved From <https://Nigerbiblios.NIn.Gov.Ng/Index.Php/Nigerbiblios/Article/View/145>
- Ifijeh, G. (2021). Artificial intelligence and library services in Africa: Prospects and challenges. *Library Philosophy and Practice*, 1–15.
- Ifijeh, G., & Yusuf, F. (2020). Artificial intelligence and its implications for academic libraries in Nigeria. *Library Hi Tech News*, 37(7), 1–5.
- Iravis, M. (1990). Automated systems for subject classification: Progress and prospects. *Information Processing & Management*, 26(4), 555–562.
- Kemp, D. (1988). The application of expert systems in reference services. *Reference Services Review*, 16(1–2), 5–13.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610.
- Mahmood, K. (2022). Artificial intelligence applications in libraries: A review of current practices and future directions. *Global Knowledge, Memory and Communication*, 71(6–7), 505–521.
- Nwangwu, W. E., & Ozioko, R. E. (2022). Artificial intelligence applications in Nigerian academic libraries: Opportunities and threats. *Library Philosophy and Practice*, 1–15.
- Oyedum, G. U., & Ogbuiyi, S. U. (2019). ICT infrastructure and library service delivery in Nigerian university libraries. *Communicate: Journal of Library and Information Science*, 21(1), 22–35.
- Russell, S., & Norvig, P. (2021). *Artificial intelligence: A modern approach* (4th ed.). Pearson.
- Sharma, A., & Arora, A. (2020). Artificial intelligence in libraries: Boon or bane? *International Journal of Library and Information Studies*, 10(2), 23–30.

- Tella, A. (2020). Repositioning library and information services in the era of artificial intelligence. *Library Philosophy and Practice*, 1–18.
- Tredinnick, L. (2020). Artificial intelligence and professional roles. *Journal of Librarianship and Information Science*, 52(1), 3–17
- Zhang, Y., & Lee, C. (2021). Machine learning applications for automated indexing and classification in digital libraries. *Information Processing & Management*, 58(5), 102–115.