Librarians' Perception and Readiness for Artificial Intelligence Based Digital Library Services

By

Dr. Sagiru Bala Musa
sagirub@yahoo.com, **sagirubala66@gmail.com**

College Library
Federal College of Education (Technical) Bichi
PMB 3473 Kano

Abstract

This study investigated librarians' perceptions and readiness for the adoption and implementation of Artificial Intelligence (AI)-based digital library services in academic libraries in Kano State, Nigeria. Specifically, the study examined librarians' perceptions of AI technologies for digital library services, assessed their readiness for AI adoption and implementation, and identified challenges associated with the adoption of AI-based digital library services. A descriptive survey research design was adopted. The population comprised 67 academic librarians from four federal higher institutions in Kano State. Total enumeration sampling was employed due to the small and manageable population. Data were collected using a structured questionnaire, with 67 copies administered and 65 duly completed and returned, representing a 97% response rate. Data were analyzed using frequency counts, percentages, mean, and standard deviation. The findings revealed that librarians had a positive perception of AI technologies for digital library services, with a grand mean of 3.45. Similarly, respondents demonstrated a positive level of readiness for the adoption and implementation of AI-based digital library services, with a grand mean of 3.28. The findings further showed that respondents acknowledged significant challenges to AI adoption in academic libraries, with a grand mean of 3.20. The study concludes that academic librarians in Kano State have a favourable perception of AI and are reasonably prepared for its adoption in digital library services. However, adequate infrastructure, continuous professional training, funding, and institutional support are necessary to facilitate effective and sustainable AI integration.

Keywords: Artificial Intelligence, digital library services, librarians' perception, librarians' readiness, academic libraries.

Introduction

The rapid advancement of Artificial Intelligence (AI) has transformed the global information landscape, reshaping the manner in which information is created, organized, retrieved, preserved, and disseminated. Libraries, particularly academic libraries, have increasingly embraced emerging technologies to improve service delivery, enhance user experiences, and optimize information management processes. Artificial Intelligence, which encompasses technologies such as machine learning, natural language processing, computer vision, expert systems, and generative AI, has emerged as one of the most significant innovations driving the digital transformation of libraries in the twenty-first century. AI-powered applications are now being integrated into digital library environments to facilitate intelligent information retrieval, automated cataloguing, metadata generation, personalized recommendation systems, virtual reference services, predictive analytics, and digital preservation (Cox, Pinfield, & Rutter, 2019; Asemi & Asemi, 2018).

The integration of AI technologies into digital library services offers numerous opportunities for improving operational efficiency, reducing repetitive manual tasks, enhancing decision-making, and providing personalized information services that meet the dynamic needs of users. Through AI-enabled tools such as intelligent chatbots, semantic search engines, automated indexing systems, recommendation algorithms, and research assistants, libraries can provide faster, more accurate, and user-centered services while enabling librarians to focus on higher-value professional responsibilities (Zhang, Zhao, & Lei, 2021).

The successful adoption of Artificial Intelligence (AI) in digital libraries depends not only on the availability of technological infrastructure but also on librarians' perception and readiness to embrace AI-driven innovations. Librarians' perception influences their acceptance, confidence, and attitudes toward AI technologies, while readiness encompasses the knowledge, skills, willingness, and institutional preparedness required for effective implementation. Studies have consistently shown that although librarians generally acknowledge the transformative potential of AI in improving library operations and digital service delivery, concerns regarding inadequate training, limited technological infrastructure, funding constraints, and ethical implications continue to influence their readiness for AI adoption (Ajani, Tella, Salawu, & Abdullahi, 2022; Orubebe, Braide, & Oladokun, 2025).

Research Problem

Preliminary observations by the researcher indicated that while librarians are increasingly aware of Artificial Intelligence technologies, their adoption for digital library services remains limited in many academic libraries due to inadequate skills, poor infrastructure, and insufficient institutional support. This informed the need to examine librarians' perception and readiness for AI-based digital library services.

Aim and Objectives of the Study

The aim and Objective of the study is to investigate librarians' perception and readiness for the artificial intelligence based digital library services. The specific objectives of the study were to:

1. Examine librarians' perceptions of Artificial Intelligence (AI) technologies for digital library services;
2. Assess librarians' readiness for the adoption and implementation of AI-based digital library services;
3. Ascertain challenges to AI adoption in academic libraries.

Research Questions

The study was guided by the following questions;

1. what are the librarians' perceptions of artificial intelligence (AI) technologies for digital library services?
2. what is the librarians' readiness for the adoption and implementation of AI- based digital library services?
3. What are the challenges to AI adoption in the academic libraries?

Review of Related Literature

Concept of Artificial Intelligence

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the Fourth Industrial Revolution, influencing virtually every sector of society, including education, healthcare, business, and information management. AI refers to the ability of computer systems to perform tasks that traditionally require human intelligence, such as learning, reasoning, problem-solving, language understanding, decision-making, and pattern recognition (Russell & Norvig, 2021). Unlike conventional computer systems that operate strictly on predefined instructions, AI systems are capable of learning from data, adapting to new information, and improving their performance over time through techniques such as machine learning, deep learning, natural language processing (NLP), computer vision, and neural networks. The concept of Artificial Intelligence was first introduced by John McCarthy in 1956 during the Dartmouth Summer Research Project on Artificial Intelligence. Since then, AI has evolved from a theoretical concept into a practical technology that drives innovation across numerous disciplines. Recent advances in computing power, cloud computing, big data analytics, and machine learning algorithms have accelerated AI development, making it an indispensable tool for improving organizational efficiency and service delivery (Dwivedi et al., 2023).

In the library and information science (LIS) profession, AI is increasingly viewed as a strategic technology capable of enhancing the efficiency and effectiveness of library operations. AI applications enable libraries to automate repetitive tasks, improve information retrieval, personalize user experiences, and support evidence-based decision-making. Technologies such as intelligent search engines, recommender systems, virtual reference assistants, automated metadata generation, and digital preservation systems are becoming integral components of modern digital libraries (Cox et al., 2019). The emergence of generative AI technologies, particularly large language models (LLMs) such as ChatGPT, Google Gemini, Claude, and Microsoft Copilot, has further transformed the information landscape. These systems can understand and generate human-like language, summarize scholarly articles, translate documents, answer reference questions, and support literature reviews. Consequently, many academic libraries are exploring the integration of generative AI into their digital services to improve user engagement, research support, and knowledge dissemination (Kasneci et al., 2023).

These technologies enable systems to learn from data, recognise patterns, respond to changing information, and improve their performance as they are exposed to additional data and experience (Russell & Norvig, 2021). However, despite the significant opportunities presented by AI, concerns remain regarding ethical issues, data privacy, copyright, algorithmic bias, misinformation, and the changing role of librarians. These concerns have stimulated scholarly

interest in understanding how librarians perceive AI technologies and whether they possess the knowledge and competencies required for successful implementation (Asemi & Asemi, 2018; Cox et al., 2019).

Artificial Intelligence-Based Digital Library Services

Artificial Intelligence (AI)-based digital library services refer to the integration of intelligent computer technologies into digital library systems to automate library operations, improve information retrieval, personalize user services, and enhance decision-making. Unlike conventional digital library services, which depend largely on predefined search algorithms and manual information organization, AI-powered digital library services employ technologies such as machine learning, natural language processing (NLP), computer vision, expert systems, recommender systems, and generative artificial intelligence to provide adaptive and user-centred information services (Cox, Pinfield, & Rutter, 2019).

The application of AI in digital libraries has significantly transformed the management and delivery of library services. AI technologies are increasingly used to automate cataloguing, metadata generation, document classification, indexing, plagiarism detection, digital preservation, reference services, and intelligent information retrieval. These technologies enable libraries to process large volumes of digital information more efficiently while improving the accuracy, speed, and relevance of information retrieval (Asemi & Asemi, 2018). One of the most visible AI applications in digital libraries is the use of intelligent virtual assistants and chatbots. These AI-powered systems provide twenty-four-hour reference services by answering users' questions, directing them to appropriate information resources, and assisting them in navigating digital library collections. Through natural language processing, chatbots can understand users' queries in conversational language and provide instant responses, thereby improving accessibility, responsiveness, and user satisfaction (Cox et al., 2019). Machine learning has also enhanced search and retrieval services within digital libraries. AI algorithms analyse users' search histories, preferences, and behavioural patterns to recommend relevant books, journal articles, institutional repository materials, and electronic databases. Such personalized recommendation systems improve users' information-seeking experiences and increase the utilization of library resources (Yuan, 2021).

Librarians' Perception of Artificial Intelligence-Based Digital Library Services

Perception refers to an individual's beliefs, attitudes, opinions, awareness, and interpretation of a particular phenomenon or innovation. Within the context of library and information science, librarians' perception of Artificial Intelligence (AI) reflects how library professionals understand AI technologies, evaluate their usefulness, perceive their ease of use, and assess their implications for library operations and service delivery. Perception plays a significant role in determining librarians' willingness to embrace AI-driven innovations and integrate them into digital library services (Davis, 1989).

The introduction of AI into libraries has generated considerable interest among librarians worldwide. Many librarians perceive AI as an emerging technology capable of transforming traditional library operations through intelligent automation, improved information retrieval, personalized user services, automated cataloguing, digital preservation, and virtual reference services. According to Cox, Pinfield, and Rutter (2019), librarians generally recognize AI as a strategic technology that has the potential to improve operational efficiency and enhance the quality of library services. They argue that AI can reduce repetitive manual tasks and enable

librarians to concentrate on higher-value professional activities such as research support, digital scholarship, and information literacy instruction.

Positive perceptions of AI among librarians are largely associated with the technology's ability to improve service delivery, increase productivity, and support evidence-based decision-making. AI-powered search engines, recommender systems, intelligent chatbots, and automated metadata generation have demonstrated significant potential for improving users' access to digital information resources while reducing processing time and operational costs. Consequently, librarians who perceive AI as beneficial are generally more willing to support its implementation within their institutions ((Obi, 2026).

Librarians' Readiness for Artificial Intelligence-Based Digital Library Services

Librarians' readiness refers to the extent to which library professionals possess the knowledge, skills, competencies, willingness, confidence, and institutional support necessary to adopt and effectively utilize Artificial Intelligence (AI) technologies in the delivery of digital library services. Readiness encompasses not only technical preparedness but also psychological acceptance, organizational capacity, and the availability of resources required for successful AI implementation. As libraries continue to embrace digital transformation, librarians' readiness has become a critical determinant of the successful integration of AI into library operations and services (Ajani, Tella, Salawu, & Abdullahi, 2022).

The growing application of AI in academic libraries has heightened the need for librarians to develop new competencies that extend beyond traditional librarianship. AI technologies such as machine learning, natural language processing, intelligent search systems, recommender systems, automated cataloguing, and generative AI require librarians to acquire advanced digital literacy, data management skills, and the ability to interact effectively with intelligent information systems. Consequently, librarians' readiness depends largely on continuous professional development, AI literacy, and institutional investment in staff capacity building (Chukwuemeka & Moses; 2023).

Research Methodology

The study adopted a descriptive survey research design, which was considered appropriate for examining librarians' perceptions and readiness for Artificial Intelligence (AI)-based digital library services. The design enabled the researcher to collect quantitative data from respondents without manipulating the study variables. The population of the study comprised of 67 academic librarians drawn from the four (4) federal higher institutions in Kano State, Nigeria. Total enumeration was used because the population size was small and manageable. A total number of 67 questionnaire were administered to the respondents out of which 65 (97%) were duly filled, returned and found useful. The data collected were analyzed using descriptive statistics, including frequency counts, percentages, mean, and standard deviation.

Results and Discussions

Objective 1: To examine librarians' perceptions of artificial intelligence (AI) technologies for digital library services

Table 1: Librarians' Perceptions of AI Technologies for Digital Library Services (N = 65)

S/N	Statement	SA f (%)	A f (%)	D f (%)	SD f (%)	Mean	SD	Decision
1	I am familiar with the concept of Artificial Intelligence (AI).	47 (72.3)	16 (24.6)	2 (3.1)	0 (0.0)	3.69	0.52	Agreed
2	AI has the potential to improve digital library services.	38 (58.5)	26 (40.0)	1 (1.5)	0 (0.0)	3.57	0.53	Agreed
3	AI can enhance information retrieval and search accuracy.	35 (53.8)	23 (35.4)	5 (7.7)	2 (3.1)	3.40	0.76	Agreed
4	AI can improve users' satisfaction with digital library services.	30 (46.2)	27 (41.5)	3 (4.6)	5 (7.7)	3.26	0.86	Agreed
5	AI can reduce repetitive routine library tasks.	31 (47.7)	28 (43.1)	2 (3.1)	4 (6.2)	3.32	0.81	Agreed
	Grand Mean					**3.45**		**Agreed**

Note: SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree. Criterion mean = 2.50.

Discussions: The findings indicate that librarians generally have a positive perception of Artificial Intelligence (AI) technologies for digital library services in academic libraries. All five statements recorded mean scores above the criterion mean of 2.50, with mean scores ranging from 3.26 to 3.69, indicating agreement among the respondents. The highest mean score was recorded for familiarity with the concept of AI (M = 3.69, SD = 0.52), followed by the perception that AI has the potential to improve digital library services (M = 3.57, SD = 0.53). Respondents also agreed that AI can enhance information retrieval and search accuracy (M = 3.40, SD = 0.76), reduce repetitive routine library tasks (M = 3.32, SD = 0.81), and improve users' satisfaction with digital library services (M = 3.26, SD = 0.86). The grand mean of 3.45 demonstrates an overall positive perception of AI technologies for digital library services among the academic librarians.

Objective 2: To assess librarians' readiness for the adoption and implementation of AI-based digital library services

Table 2: Librarians' Readiness for the Adoption and Implementation of AI-Based Digital Library Services (N = 65)

S/N	Statement	SA f (%)	A f (%)	D f (%)	SD f (%)	Mean	SD	Decision
1	I possess the ICT skills required to use AI technologies.	34 (52.3)	26 (40.0)	4 (6.2)	1 (1.5)	3.43	0.68	Agreed
2	I am willing to learn AI applications relevant to library services.	33 (50.8)	27 (41.5)	4 (6.2)	1 (1.5)	3.42	0.68	Agreed
3	I am ready to use AI tools in my daily library activities.	22 (33.8)	29 (44.6)	11 (16.9)	3 (4.6)	3.08	0.83	Agreed
4	I am confident in operating AI-based digital library systems.	29 (44.6)	20 (30.8)	14 (21.5)	2 (3.1)	3.17	0.88	Agreed
5	I am willing to participate in AI-related professional training.	35 (53.8)	18 (27.7)	9 (13.8)	3 (4.6)	3.31	0.88	Agreed
	Grand Mean					**3.28**		**Agreed**

Note: SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree. Criterion mean = 2.50.

Discussions: The findings indicate that librarians demonstrate a high level of readiness for the adoption and implementation of AI-based digital library services. All five statements recorded mean scores above the criterion mean of 2.50, with mean scores ranging from 3.08 to 3.43, indicating agreement among the respondents. The highest mean score was recorded for possession of the ICT skills required to use AI technologies (M = 3.43, SD = 0.68), closely followed by willingness to learn AI applications relevant to library services (M = 3.42, SD = 0.68). Respondents also agreed that they are willing to participate in AI-related professional training (M = 3.31, SD = 0.88) and are confident in operating AI-based digital library systems (M = 3.17, SD = 0.88). The lowest mean was recorded for readiness to use AI tools in daily library activities (M = 3.08, SD = 0.83), although this still exceeded the criterion mean. The grand mean of 3.28 indicates an overall positive level of readiness among the librarians.

Objective 3: To ascertain challenges to AI adoption in academic libraries

Table 3: Challenges to AI Adoption in Academic Libraries (N = 65)

S/N	Statement	SA f (%)	A f (%)	D f (%)	SD f (%)	Mean	SD	Decision
1	Lack of AI training is a major challenge.	24 (36.9)	29 (44.6)	7 (10.8)	5 (7.7)	3.11	0.89	Agreed
2	Inadequate funding hinders AI implementation.	32 (49.2)	24 (36.9)	7 (10.8)	2 (3.1)	3.32	0.79	Agreed
3	Poor ICT infrastructure limits AI adoption.	30 (46.2)	21 (32.3)	8 (12.3)	6 (9.2)	3.15	0.97	Agreed
4	Lack of institutional policies affects AI implementation.	26 (40.0)	26 (40.0)	10 (15.4)	3 (4.6)	3.15	0.85	Agreed
5	Resistance to technological change among librarians hinders AI adoption.	32 (49.2)	19 (29.2)	13 (20.0)	1 (1.5)	3.26	0.83	Agreed
	Grand Mean					**3.20**		**Agreed**

Note: SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree. Criterion mean = 2.50.

Discussions: The findings indicate that librarians agreed that the identified factors constitute challenges to the adoption of AI in academic libraries. All five items recorded mean scores above the criterion mean of 2.50, with mean scores ranging from 3.11 to 3.32. In particular, inadequate funding recorded the highest mean score (M = 3.32, SD = 0.79), followed by resistance to technological change among librarians (M = 3.26, SD = 0.83). The lowest mean was recorded for lack of AI training (M = 3.11, SD = 0.89). The overall grand mean of 3.20 indicates that respondents generally agreed that the identified factors constitute significant challenges to AI adoption in academic libraries.

Conclusion

The study concludes that librarians have a positive perception of Artificial Intelligence (AI) technologies for digital library services in academic libraries, as reflected by the overall grand mean of 3.45. The respondents generally agreed that they are familiar with AI and recognize its potential to improve digital library services, enhance information retrieval and search accuracy, improve users' satisfaction, and reduce repetitive routine library tasks. The study also concludes that librarians demonstrate a positive level of readiness for the adoption and implementation of AI-based digital library services, with an overall grand mean of 3.28. The findings indicate that librarians possess relevant ICT skills, are willing to learn AI applications, are prepared to use AI tools, have confidence in operating AI-based digital library systems, and are willing to participate in AI-related professional training. However, despite the positive perception and readiness of librarians, the study concludes that significant challenges may hinder the effective adoption of AI in academic libraries. The overall grand mean of 3.20 indicates agreement that inadequate funding,

resistance to technological change, poor ICT infrastructure, lack of institutional policies, and inadequate AI training constitute important challenges. Therefore, successful AI adoption requires not only positive perceptions and readiness among librarians but also adequate institutional support and resources.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Academic library management should provide continuous AI-related training and professional development for librarians. Regular workshops, seminars, hands-on training, and capacity-building programmes should be organized to strengthen librarians' practical knowledge and confidence in using AI technologies for digital library services.
2. Library management and relevant institutional authorities should provide adequate funding and ICT infrastructure for AI adoption. Appropriate financial resources should be allocated for acquiring AI-enabled systems, improving internet connectivity and other ICT facilities, and providing the technical resources required for effective implementation.
3. Academic institutions should develop clear policies and provide adequate technical support for AI implementation in libraries. Such policies should guide the responsible use of AI, encourage librarians to embrace technological change, and establish mechanisms for continuous technical assistance. This will help reduce resistance to change and create a supportive environment for the sustainable adoption of AI-based digital library services.

References

Asemi, A., & Asemi, A. (2018). Artificial intelligence (AI) application in library systems in Iran: A taxonomy study. *Library Philosophy and Practice*, 1–17.

Chukwuemeka O. H. & Moses I. C. (2023). Preparedness For Artificial Intelligence for Optimal Service Delivery in University Libraries in Nigeria. *Global Review of Library and Information Science (GRELIS),* 19 . https://www.grelis.com.ng/admin/img/paper/18.%20OBIORA%20AND%20MOSES%20CONFERENCE%20PAPER%20UNN.pdf

Cox, A. M., Pinfield, S., & Rutter, S. (2019). The intelligent library: Thoughts on the application of artificial intelligence in libraries. *Library Hi Tech, 37*(3), 418–435. DOI: https://doi.org/10.1108/LHT-08-2018-0105

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. DOI: https://doi.org/10.2307/249008

Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., ... Wamba, S. F. (2023). So, what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI. International *Journal of Information Management, 71*, 102642. DOI: https://doi.org/10.1016/j.ijinfomgt.2023.102642

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., ... Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. https://www.sciencedirect.com/science/article/abs/pii/S1041608023000195

Obi, C. (2026). The Role of Artificial Intelligence in Enhancing Library Services: A Systematic Review. *International Journal of Librarianship, 11*(1), 33-46. https://doi.org/10.23974/ijol.2026.vol11.1.521

Russell, S. J., & Norvig, P. (2021). Artificial intelligence: A modern approach (4th ed.). Pearson. https://www.pearson.com/en-us/subject-catalog/p/artificial-intelligence-a-modern-approach/P200000003500/9780134610993