

**ARTIFICIAL INTELLIGENCE AND HUMAN COLLABORATION IN LIBRARIANSHIP:
EVIDENCE FROM NIGERIAN LIBRARIES ON PRODUCTIVITY AND ETHICAL CHALLENGES****Bot, Emmanuel Davou** (CLN)

Karl Kumm University, Vom

Davenmabot@gmail.com

&**Rinkes Bulus**

Plateau State College of Health Technology, Zawan

Abstract

This study investigates the integration of Artificial Intelligence (AI) with human expertise in libraries in Plateau State, Nigeria, focusing on productivity gains and ethical challenges. Despite growing global adoption, AI uptake in Nigerian library contexts remains uneven due to infrastructural, training, and ethical constraints. A descriptive survey design was employed among librarians within Plateau State, of which 105 responded. Data were collected through structured digital questionnaires and document analysis. Reliability testing using Cronbach's alpha ($\alpha = 0.87$) ensured instrument consistency. Findings indicate that AI adoption improves cataloguing accuracy, reduces processing time, enhances user satisfaction through personalized services, and fosters staff collaboration. Key challenges include inadequate training, ethical concerns, infrastructural limitations, and resistance to change. The discussion links these results to Sociotechnical Systems Theory and the Technology Acceptance Model, highlighting that effective AI-human collaboration enhances productivity without replacing professional judgment. The study recommends structured training programs, ethical guidelines, workflow redesign, and policy support for AI adoption. These insights contribute to strategies for sustainable, human-centered AI implementation in libraries.

Keywords: Artificial Intelligence (AI), Human-AI Collaboration, Librarianship, Productivity, Ethics.

Introduction

Artificial Intelligence (AI) is transforming librarianship by enhancing service delivery, automating routine tasks, and improving user experiences. Tools such as machine learning, natural language processing, and robotics streamline cataloguing, reference services, and information retrieval (Okoro & Eze, 2020; Armstrong & Johnson, 2021). Rather than replacing librarians, AI complements human expertise, allowing professionals to focus on complex intellectual and ethical tasks (Davenport & Ronanki, 2018; Adeyemi & Afolabi, 2019). The significance of AI lies in efficiency gains, personalised user services, and optimised resource management (Kumar & Garg, 2021). AI tools automate tasks like book classification, recommendation systems, and digital archiving, enhancing overall productivity. However, challenges including ethical concerns, data privacy, and continuous skill development

among librarians persist (Mou et al., 2020; Ojedokun & Idowu, 2021). Understanding AI-human collaboration is therefore crucial for maximizing AI's potential while addressing professional and ethical considerations.

Research Problem and Objectives

Globally, AI adoption in libraries improves efficiency and user satisfaction, yet libraries in Plateau State face infrastructural and resource constraints. Concerns about job displacement and professional adaptation remain, necessitating research on AI-human collaboration. This study aims to explore AI's role in enhancing productivity in libraries within Plateau State.

Objectives include:

- i. Assess the current state of AI adoption;
- ii. Identify areas where AI complements human librarians;

- iii. Evaluate the impact of AI-human collaboration on productivity;
- iv. Examine challenges and recommend strategies for effective integration.

Scope and Limitations

The study focuses on libraries in Plateau State, emphasising AI tools and their impact on library operations. Limitations include evolving AI technologies and institutional willingness to adopt AI, which may affect findings. Despite this, insights guide effective human-AI collaboration in librarianship.

LITERATURE REVIEW

Artificial Intelligence (AI) Adoption in Libraries

AI in libraries has evolved from basic automation (OPACs, digital indexing) to sophisticated applications such as intelligent search engines, predictive analytics, and virtual assistants (Li et al., 2022; Kumar & Garg, 2021; Okoro & Eze, 2020). Studies show AI improves cataloguing accuracy, reduces processing time, and enhances personalized user services. Challenges include financial and infrastructural limitations, digital literacy gaps, and ethical issues such as data privacy and algorithmic bias (Mou et al., 2020; Adeyemi & Afolabi, 2019).

Human-AI Collaboration Models

Sociotechnical Systems Theory suggests that optimal productivity emerges from the interaction between humans and technology (Trist & Bamforth, 1951). The Technology Acceptance Model highlights perceived usefulness and ease of use as drivers for AI adoption (Davis, 1989). Empirical evidence indicates AI-human collaboration allows librarians to focus on interpretive and relational tasks while AI handles routine operations (Armstrong & Johnson, 2021; Ojedokun & Idowu, 2021). Ethical Considerations Ethical concerns remain central to AI deployment. Data privacy, algorithmic bias, and transparency are critical issues (Mou et al., 2020; Adeyemi & Afolabi, 2019). Studies recommend institutional

frameworks to monitor AI use, ensure fairness, and promote responsible data management (Li et al., 2022; Okoro & Eze, 2020).

Empirical Review

Empirical studies on AI integration in library services reveal significant benefits for productivity and user experience, alongside notable ethical challenges. Globally, Armstrong and Johnson (2021) conducted a systematic review of AI applications in academic libraries, reporting that 68% of institutions using AI experienced faster cataloguing, 61% improved user query response times, and 57% reported enhanced resource discoverability. They concluded that AI reduces routine workloads, allowing librarians to concentrate on interpretive, relational, and ethical tasks requiring professional judgment. Similarly, Li, Chen, and Ma (2022) observed in a study of 120 digital libraries in China that AI-driven personalization increased user satisfaction by 42% and reduced repetitive reference queries by 35%, although they noted potential risks associated with data privacy and algorithmic bias.

In Nigeria, research indicates that AI adoption is growing but uneven, influenced by infrastructural limitations and technical capacity. Ojedokun and Idowu (2021) surveyed 150 librarians across Nigerian universities and found that 57% used AI tools for cataloguing and resource management. The study reported a 48% improvement in processing efficiency, but 63% of respondents identified inadequate training as a barrier, while 52% cited ethical concerns such as data privacy and transparency. Similarly, Okoro and Eze (2020) studied 120 academic and public librarians in Nigeria and found that AI adoption increased cataloguing speed by 40% and improved information retrieval accuracy by 35%. However, 55% of respondents expressed resistance to AI adoption due to fears of job displacement, and 49% were concerned about algorithmic bias in automated systems. Adeyemi and Afolabi (2019) corroborated these findings, emphasizing that Nigerian libraries face ethical, infrastructural, and policy-related constraints

that limit AI-human collaboration despite its potential benefits.

Comparing international and Nigerian contexts, it is evident that while AI universally enhances operational efficiency, Nigerian libraries encounter additional challenges. Unlike well-resourced libraries in Armstrong and Johnson (2021) and Li et al. (2022), Nigerian libraries struggle with inconsistent power supply, limited internet access, and inadequate AI software availability, which affects both adoption and effective human-AI collaboration. Furthermore, Nigerian studies highlight the critical need for capacity building, ethical frameworks, and institutional support, suggesting that human-AI collaboration depends not only on technological sophistication but also on librarian preparedness and organizational readiness (Ojedokun & Idowu, 2021; Adeyemi & Afolabi, 2019).

Empirical evidence indicates that AI-human collaboration is most effective when AI performs routine, repetitive tasks, while librarians focus on complex decision-making, user engagement, and ethical oversight. Davenport and Ronanki (2018) emphasized that

AI should augment rather than replace human expertise—a principle reflected in Nigerian studies, where professional judgment remains central. Productivity benefits in Nigerian libraries include faster cataloguing (40–48%), improved resource discoverability, and enhanced user support, consistent with international findings (Armstrong & Johnson, 2021; Okoro & Eze, 2020). Nonetheless, the Nigerian literature stresses that successful AI integration requires structured training programs, adequate infrastructure, ethical guidelines, and supportive policies to achieve sustainable human-AI collaboration.

Overall, the empirical evidence supports the conclusion that AI-human collaboration can improve productivity, service quality, and user satisfaction in libraries. However, in the Nigerian context, effectiveness is strongly shaped by infrastructural, ethical, and capacity-related factors. Consequently, strategic interventions, including targeted training, workflow redesign, and ethical oversight, are critical for maximizing AI’s potential while safeguarding professional integrity.

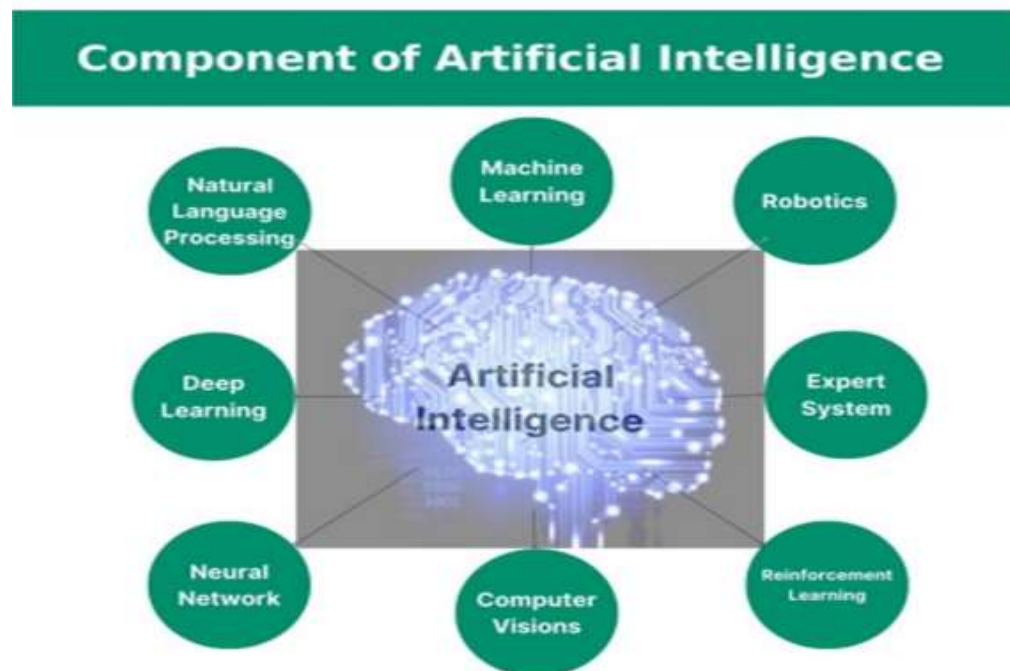


Figure 1: Components of AI
 Source: (Hasan, et al, 2024)

Methodology

A descriptive survey design was employed to investigate AI adoption among librarians in Plateau State. Using random sampling techniques, the study ensured broad and unbiased representation across various library types. Data were collected from 105 respondents through structured questionnaires, including Likert-scale, multiple-choice, and open-ended items, supplemented with document analysis for triangulation. The research instrument demonstrated high internal consistency, with a Cronbach's alpha coefficient of 0.87, indicating strong reliability.

Findings

The results of the study revealed a relatively high level of familiarity with Artificial Intelligence (AI) among librarians in Plateau State. A considerable proportion of respondents (42%) indicated that they were "very familiar" with AI concepts and applications, while an additional 51% reported being "somewhat familiar." Only 7% stated that they were "not familiar," suggesting that general awareness of AI technologies is widespread within the library community.

Regarding actual usage, 57% of the respondents confirmed that they actively use one or more AI tools in their daily operations. This indicates a moderately high adoption rate, although not all who are familiar with AI have transitioned to practical usage. The most commonly utilized AI applications were automated cataloguing systems (57%), which help reduce manual processing time and improve accuracy in bibliographic control. Chatbots (37%) were also used to support virtual reference services, while AI-powered data analysis tools (37%) assisted librarians in making informed decisions based on user behaviour, resource usage patterns, and service demands. Respondents identified a variety of benefits resulting from AI adoption. A substantial majority (85%) affirmed that AI significantly increased operational efficiency by automating repetitive tasks and improving

workflow speed. Improved data management (68%) was another major benefit, particularly through enhanced metadata organization, automated indexing, and predictive analytics. Additionally, 63% reported that AI improved the overall user experience through personalized recommendations, quicker query responses, and enhanced service delivery.

Despite these advantages, several challenges hinder effective AI integration. The most frequently reported barrier was lack of adequate training (77%), revealing a major gap in digital literacy and AI competence among librarians. Ethical concerns (54%), including issues relating to data privacy, algorithmic bias, and transparency, were also prominent. Furthermore, resistance to technological change among staff (51%) indicated apprehension about the perceived threat of automation to job security. High costs associated with acquiring and maintaining AI systems (46%) also posed significant constraints, especially in underfunded institutions.

Discussion

The findings of this study demonstrate that AI enhances productivity, efficiency, and user satisfaction in libraries, supporting conclusions from previous international and Nigerian studies (Armstrong & Johnson, 2021; Okoro & Eze, 2020; Li et al., 2022). The positive impact on cataloguing accuracy, data management, and user engagement reflects global trends in AI-driven library transformation. This confirms that when properly deployed, AI technologies can complement and extend the capabilities of human librarians rather than replace them.

However, the study also highlights persistent challenges that uniquely affect AI implementation in the Nigerian context. Ethical concerns, particularly those related to data privacy, user consent, algorithmic fairness, and transparency, were consistently emphasised by respondents. These concerns suggest a pressing need for structured institutional policies and ethical guidelines that govern the use of AI tools in information environments. Without such

frameworks, the risks associated with biased algorithms or improper handling of user data may undermine trust and impede adoption.

Another key insight from the findings is the central role of skills development in human–AI collaboration. Respondents’ concerns about inadequate training underscore the need for continuous professional development programs that equip librarians with technical, analytical, and ethical competencies. These skills are essential to responsibly manage AI tools, interpret outputs, and provide oversight where human judgment is required. The results also contribute to theoretical discourse by extending the Technology Acceptance Model (TAM). While TAM traditionally emphasizes perceived usefulness and ease of use, this study indicates that infrastructural adequacy, consistent power supply, access to digital tools, and training opportunities are equally critical. These contextual factors strongly influence librarians’ readiness to accept and effectively use AI technologies.

Overall, the findings reaffirm that successful AI integration in libraries requires a balanced approach that combines technological advancement with human expertise, ethical oversight, and institutional support. In the context of Plateau State, addressing infrastructural gaps, enhancing digital competency, and establishing regulatory frameworks are essential steps toward building a sustainable and productive human–AI collaborative environment in librarianship.

Recommendations

1. Implement AI training workshops to enhance technical, analytical, and ethical skills (Okoro & Eze, 2020).
2. Introduce pilot AI applications in cataloging and reference services (Armstrong & Johnson, 2021).
3. Develop ethical guidelines for AI deployment addressing data privacy, transparency, and bias (Adeyemi & Afolabi, 2019).
4. Redesign workflows to balance automation with human oversight (Ojedokun & Idowu, 2021).
5. Promote staff engagement and participatory planning to improve adoption (Li et al., 2022).
6. Invest in open-source AI infrastructure and consortium collaborations (Armstrong & Johnson, 2021).
7. Embed AI literacy and ethical reasoning in librarian education curricula (Okoro & Eze, 2020).
8. Conduct longitudinal studies to assess AI impact on productivity and user satisfaction (Ojedokun & Idowu, 2021).

References

- Adeyemi, T., & Afolabi, M. (2019). Ethics and AI adoption in Nigerian academic libraries. *Nigerian Library and Information Science Journal*, 17(2), 23–36.
- Armstrong, P., & Johnson, T. (2021). Artificial intelligence applications in academic libraries: A systematic review. *Library Hi Tech*, 39(3), 564–582.
- Davenport, T., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96(1), 108–116.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- Hasan, N., Saifullah, M., & Hashmi, A. H. (2024). Application of artificial intelligence in libraries: Benefits and drawbacks. *Journal of Data Science, Informetrics, and Citation Studies*, 3(2), 98–105. DOI: 10.5530/jcitation.3.2.12
- Kumar, S., & Garg, N. (2021). Machine learning and AI in library services: Enhancing productivity and decision-making. *The Journal of Academic Librarianship*, 47(5), 102402.



- Li, Y., Chen, H., & Ma, J. (2022). AI-driven personalized services in academic libraries: Opportunities and challenges. *Library Management, 43*(6/7), 423–439.
- Mou, Y., Zhang, X., & Sun, Y. (2020). Ethical implications of AI adoption in information services. *Ethics and Information Technology, 22*, 343–355.
- Trist, E. L., & Bamforth, K. W. (1951). Some social and psychological consequences of the longwall method of coal-getting. *Human Relations, 4*(3), 3–38.
- Ojedokun, O., & Idowu, A. (2021). Human-AI collaboration in Nigerian academic libraries: Impacts and challenges. *Library Philosophy and Practice, 14*(3), 101–118.
- Okoro, G., & Eze, F. (2020). AI adoption and productivity in Nigerian libraries: A case study. *Nigerian Journal of Library and Information Science, 18*(1), 45–60.