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Artificial Intelligence Integration, User Perception and Research Productivity of Librarians in Nigerian Research Centres

Victoria Olubola FADEYI
https://orcid.org 0009-0009-6865-0417
Mathematical Sciences Library, National Mathematical Centre, Abuja, Nigeria
Corresponding Details: vicfadeyi@gmail.com

Abstract
Artificial intelligence application in university libraries and research institutions is revolutionizing the way research is carried out, information sought, and services delivered. The study explored the level of implementation of AI in research institutions in Nigeria and its impact on librarians' research productivity. Concern has been evinced to determine how users perceive AI based library services that could lead to an improvement in research productivity. In this study, research productivity is regarded in terms of accessibility to information resources, efficiency of operations, and user satisfaction. The descriptive survey research design was adopted for the study. The population consists of 137 librarians drawn from 20 purposively selected Nigerian research centres and adopted the total enumeration technique to ensure full representation. Data were collected with the aid of a structured questionnaire and analyzed using descriptive statistics, namely, frequency counts, percentages, and mean scores, with the aid of SPSS. The results showed the different levels of adoption of AI in the institutions, which were associated with a high degree of the integration of AI, the positively perceived use of AI, and increased research productivity among librarians. Despite the aforementioned, challenges like poor infrastructure, lack of training in the area of AI, and poor policy environment were found to act as major hindrances in the effective use of the technology. The conclusion drawn from the research findings is that the effective adoption and implementation of the technology can greatly improve the research productivity and librarians' services.

Keywords: Integration**,** Artificial Intelligence, User Perception, Research Productivity, Digital Library Services, Nigerian Research Centres.

Introduction

Artificial Intelligence has become a contributing technology in modern research settings, revolutionizing the way information is organized, retrieved, analyzed, and exploited. In this sense, Artificial Intelligence can no longer be viewed as an adjunct technology supporting research libraries, but rather as a necessity for enhancing research productivity and competitiveness. While research has confirmed that AI-based research support technologies such as intelligent searching environments, automated indexing, research recommendation platforms, chatbots, and research analytics software can significantly improve research

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support services related efficiency and accuracy (Edam-Agbor et al. 2025; Madanchian & Taherdoost, 2025), there appears to be ambiguity on whether these can be achieved in developing research environments, such as in Nigeria.

For Nigeria, research centres are important in the development of the country in terms of their contribution to scientific development, development of policies, and transformation of socio-economic aspects of the nation. The librarians in research centres are increasingly getting involved in high-level support services such as searching, supporting research data, bibliometric services, and supporting scholarly publication. The effectiveness of such services, in this case, is greatly tied to or affected by how integrated AI technology in research centres in Nigeria, despite the National Digital Economy Policy and Strategy in Nigeria between 2020 and 2030, has largely been experimental and patchy, causing a concern regarding librarians' capability to handle the demands of a data-intensive research environment (Joel, 2023). Apart from the availability of the technology itself, the perception of the user also plays a vital role in the success of the use of AI based library services. There is evidence that the perception of the construct of usefulness, ease of use, reliability, and satisfaction plays a significant role in the usage and adoption of the AI system (Osagie & Oladokun, 2024; Abdullahi et al. 2024; Venkatesh et al., 2012). For researchers in research centres in Nigeria where researchers might be challenged by access and time constraints in their research activities, the positive perception of the user might improve the usage of the service and the effectiveness of the research capability of the librarians in the research centres. But in the context of existing research in Nigeria, the research has been examined in the context of university libraries and awareness or readiness for the use of AI in the libraries of the research centres; hence the research gap that this proposed research shall fill.

Statement of the Problem

Artificial Intelligence (AI), in its application in the support role within research institutions, has the potential to unlock efficiencies, precision, and feasibility of access to information. In the context of Nigerian research institutions, however, the coordination between AI and library operations has not reached an optimal stage. In fact, most institutions are characterized by poor support services in terms of appropriate technology, access to cutting-edge AI technology, and training of librarians to work with these technologies. These conditions result in librarians' reduced productivity in offering research support services. In turn, this reduced productivity affects the overall output of researchers who seek support services. Indeed, very little systematic knowledge has been established with respect to how AI integration enhances librarians' productivity in research. Furthermore, there is also a great impact from user acceptance on the effectiveness that may be attained by AI supported library services. On one hand, there is usually a challenge for researchers in using AI supported systems, and on the other hand, there may exist a lack of confidence in such systems, thereby hampering their utilisation and, consequently, hindering research productivity. Moreover, there is inadequate policy and institute level planning and implementation strategy for AI, leading to

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ineffectiveness that stems from ground realities with regards to technological investment and implementation.

Research Questions

1. To what extent have AI tools and applications been integrated into Nigerian research centre libraries?
2. What are the perceptions and attitudes of librarians towards AI adoption and its influence on their research productivity?
3. How do users perceive AI driven library services in terms of usefulness, ease of use, and satisfaction?
4. What are the key challenges and barriers affecting effective AI adoption in Nigerian research centre libraries?
5. How can AI integration be optimised to enhance librarians' productivity and improve user experiences?

Review of Literature

Agbarakwe and Ogbonna (2024) demonstrated how AI technologies are increasingly adopted in university libraries to support service provision, simplify operations and foster user engagement using technologies such as machine learning-based recommendation systems, virtual reference assistance and automated metadata management. However, they noted how inadequate infrastructure and insufficient training hinder the optimal use of such technologies. Similarly, Maphalala and Ajani, (2025) and Alshamy et al. (2025) noted that recommendation systems enabled by AI and virtual reference services are known globally for delivering resources in personalised form and real-time user assistance, but many libraries have challenges with ethical implementation and policy backing. The findings demonstrate that AI has tremendous potential to improve library services and resource delivery if organisations seize the opportunity to invest in infrastructure development and staff capacity. User perception is central to successful deployment of AI in library services. Suleiman et al. (2024) explained that while users perceive AI to enhance access and efficiency, privacy concerns, ethical issues and reduced human contact remain central issues. In the Nigerian context, Igbo et al. (2025) found that users and librarians see the potentials of AI to aid in information seeking and workflow automation but user interaction and adoption are limited by policy gaps in awareness and digital illiteracy. It is these findings that show that operational and ethical problems must be solved in order to maximise the positive impact from AI on library services.

Most of the African countries, particularly Nigeria, are still at the entry stage of embracing Artificial Intelligence into business, academic, and research work. Though more and more AI adoption is going on globally for the purposes of enhancing productivity, decision-making and innovation, most Nigerian organizations, research centres, and academic communities have not yet as fully exploited the potential of AI tools for change. Constraints like inadequate infrastructure, limited technical capacity, inadequate funding and poor policy regimes are still

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hindrances to widespread rollout. The efficiency, quality, and speed of work in such institutions lag compared to developed nations where AI systems have been implemented effectively to solve complex problems, mechanize operations, and enhance research output. This deficit mirrors the imperative need for strategic investment in AI capacity building, infrastructure development and policy enablers in order to enable Nigeria and other nations on the continent to leverage AI for sustained growth and global competitiveness.

Theoretical Framework

Diffusion of Innovations Theory

The Diffusion of Innovations (DOI) Theory: This theory outlines how and why and at what rate new and innovative ideas or technological advancements get diffused or disseminated at a given rate within a certain social setting (Rogers, 2003). Some of its features and characteristics of an innovative idea or technology involve relative advantages, compatibility, complexity, trialability, and observation. Coming back to our setting in Nigerian research centres or institutes, AI technology in library operations and functions can be said to be an innovative idea or technological advancement which will be adopted within these settings or among librarians after weighing its advantages over and above manual operations. DOI theory states that adoption or acceptance of innovative ideas and technological advancements has many characteristics at an institutional and social level. Empirical studies have recognized the relevance of DOI to the explanation of technology adoption, particularly within the library and information sector. For example, studies conducted within the sector of academic libraries within Nigeria and Africa have identified that librarians' perception of AI benefits, ease of integration, and benefits to output have significant effects on the adoption of AI technology. The more librarians and library professionals are made to see and experience the benefits of AI integration within their working environment, the better the adoption and productivity of the library and information professionals. The application of the DOI framework to this study will enable the researcher to measure the spread of AI integration to librarians and the impact of these factors on output productivity.

Methodology

This was a descriptive survey research design. The target population consisted of professional librarians currently working in research centres across Nigeria, through a total enumeration approach, 137 were identified from 20 purposively selected research centres that met the study criteria. The purposive sampling technique was used to select research centres, and then all eligible librarians were enumerated for complete population representation and minimizing the likelihood of biases during the course of the research. Data collection was done by a structured questionnaire in order to capture the various dimensions of AI adaption, such as technological integration, user perception, and its effects on research productivity. The questionnaire was validated by three library science specialists through expert review for content and construct validity and then pilot-tested by 15 librarians from research centres not included in the main study, with a Cronbach's alpha coefficient of 0.87, showing high internal

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consistency and reliability of the instrument. Quantitative data collected were analyzed using the Statistical Package for the Social Sciences (SPSS), within which descriptive statistics-findings in frequencies, percentages, and mean scores-and correlation analysis were used to test relationships among AI integration, user perception, and research productivity. Ethical protocols of institutional approval, consent, confidentiality, and volition ensured the protection of respondents' identities and the use of gathered data strictly for academic purposes. Such methodology helped this study generate valid, reliable, and actionable findings with regard to AI adoption and its impact on librarians' research support roles in Nigerian research centres.

Table 1: Population and Sample Size of Librarians in Selected Nigerian Research Centres

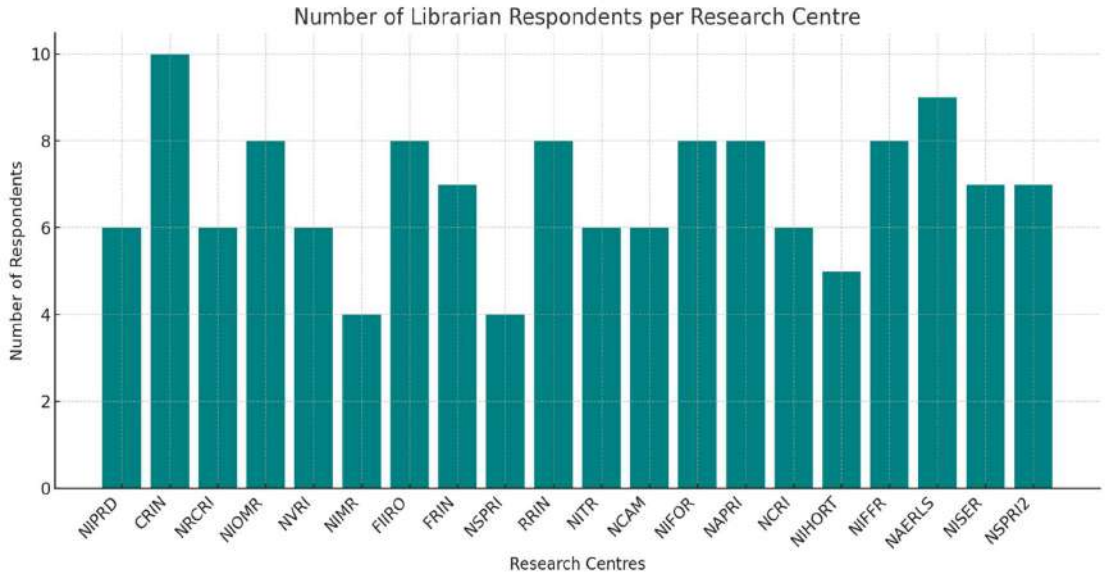
S/N	Research Centres	Location	Estimated Librarian Population	Sample Size (100%)
1	National Institute for Pharmaceutical Research (NIPRD)	Idu, Abuja	6	6
2	Cocoa Research Institute of Nigeria (CRIN)	Ibadan, Oyo State	10	10
3	National Root Crops Research Institute (NRCRI)	Umudike, Abia State	6	6
4	Nigerian Institute for Oceanography and Marine Research (NIOMR)	Lagos	8	8
5	National Veterinary Research Institute (NVRI)	Vom, Plateau State	6	6
6	Nigerian Institute of Medical Research (NIMR)	Yaba, Lagos State	4	4
7	Federal Institute of Industrial Research (FIIRO)	Oshodi, Lagos State	8	8
8	Forestry Research Institute of Nigeria (FRIN)	Ibadan, Oyo State	7	7
9	Nigerian Stored Products Research Institute (NSPRI)	Ilorin, Kwara State	4	4
10	Rubber Research Institute of Nigeria (RRIN)	Benin City, Edo State	8	8
11	National Institute for Trypanosomiasis Research (NITR)	Vom, Plateau State	6	6
12	National Centre for Agricultural Mechanisation (NCAM)	Ilorin, Kwara State	6	6
13	Nigerian Institute for Oil Palm Research (NIFOR)	Benin City, Edo State	8	8
14	National Animal Production and Research Institute (NAPRI)	Shika, Zaria	8	8

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15	National Cereals Research Institute (NCRI)	Badeggi, Niger State	6	6
16	National Horticultural Research Institute (NIHORT)	Ibadan, Oyo State	5	5
17	National Institute for Freshwater Fisheries Research (NIFFR)	New Bussa, Niger State	8	8
18	National Agricultural Extension and Research Liaison Services (NAERLS)	Zaria, Kaduna State	9	9
19	Nigerian Institute of Social and Economic Research (NISER)	Ibadan, Oyo State	7	7
20	Nigerian Stored Products Research Institute (NSPRI)	Ilorin, Kwara State	7	7
Total			**137**	**137**

The table presents the population and sample size of librarians across 20 selected Nigerian research centres, showing that all 137 librarians were included in the study using total enumeration to ensure complete representation.

Findings / Results



The bar chart illustrates the distribution of respondents who were librarians out of the 20 Nigerian research centres selected. Respondents within a centre ranged from 4 to 10, with CRIN having 10, while NIMR and NSPRI had 4 each. Most of the centres have 6 to 8 respondents, reflecting a fairly even distribution across the research centres. This distribution

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guarantees that the study was capable of looking into an overall view of librarian perception in different institutions, providing worthy data for the analysis of AI integration and its impact on research productivity.

Research question 1: To what extent have AI tools and applications been integrated into Nigerian research centre libraries?

Table 2: Extent of AI Tools and Applications Integration in Research Centre Libraries*(N = 137 librarians)*

Extent of Integration	Frequency (f)	Percentage (%)	Cumulative Percentage (%)
Very High	18	13.1	13.1
High	36	26.3	39.4
Moderate	50	36.5	75.9
Low	22	16.1	92.0
Very Low	11	8.0	100.0
Total	**137**	**100.0**	

The observation of Table 2 analysis is that the implementation of AI tools and applications by research centre libraries is moderate. A significant number of librarians (36.5%) said that AI has been applied moderately, which suggests that while these technologies are available, their implementation is not yet broad or deeply entrenched within library systems. In addition, 39.4% of the respondents indicated high to very high integration, implying that some research centres are actively adopting AI, presumably due to enhanced ICT infrastructure or training facilities. However, 24.1% of the librarians indicated low to very low integration, implying a high proportion of libraries with very low AI adoption, perhaps due to infrastructural deficiencies, ignorance, or financial constraints. The findings of the study show a trend of accelerating adoption over time, clustering at medium to high levels of integration, but also point to unevenness within institutions and the importance of particular interventions such as more training, improved infrastructure, and institutional policy facilitation.

Research question 2: What are the perceptions and attitudes of librarians towards AI adoption and its influence on their research productivity?

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Table 3: Librarians' Perceptions and Attitudes towards AI Adoption and Its Influence on Research Productivity ***(N = 137 librarians)***

Perception / Attitude Statement	Strongly Agree (f)	Agree (f)	Neutral (f)	Disagree (f)	Strongly Disagree (f)	% Strongly Agree	% Agree	% Neutral	% Disagree	% Strongly Disagree
AI improves research efficiency	42	53	22	15	5	30.7	38.7	16.1	10.9	3.6
AI reduces workload in libraries	36	50	28	18	5	26.3	36.5	20.4	13.1	3.6
AI enhances access to research data	40	48	25	18	6	29.2	35.0	18.2	13.1	4.4
I am confident using AI tools	34	46	28	22	7	24.8	33.6	20.4	16.1	5.1
AI positively influences my research output	39	51	23	18	6	28.5				

The data presented in Table 3 show that librarians also possess positive attitudes and opinions towards embracing AI and how it affects research productivity. Significant percentages of respondents between 26.3% and 30.7% strongly agreed that AI makes research more efficient, streamlines workload, expands access to research data, and improves their research output. When paired with the agree-alike, the majority of librarians 60% to 68% based on the assertion - are aware of the benefits of AI uses in library operations and research effectiveness. Despite this overall positive lean, there is a smaller but considerable percentage (13.1% to 16.1%) of librarians who do not agree with the statements, and some (3.6% to 5.1%) strongly disagree, perhaps indicating that librarians may be facing challenges such as low levels of confidence, poor training, or no easy access to AI tools. The findings of this study reflect a favorable attitude towards AI adoption, but also paint the need for capacity-building interventions to provide support that will avail all librarians' access to AI for enhancing research quality.

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Research Question 3: How do users perceive AI driven library services in terms of usefulness, ease of use, and satisfaction?

Table 4: Librarians' Perception of AI-Driven Library Services*(N = 137 librarians)*

Perception Dimension	Very High (f)	High (f)	Moderate (f)	Low (f)	Very Low (f)	% Very High	% High	% Moderate	% Low	% Very Low
Usefulness	40	55	28	10	4	29.2	40.1	20.4	7.3	2.9
Ease of Use	36	50	32	12	7	26.3	36.5	23.4	8.8	5.1
Satisfaction	38	53	30	10	6	27.7	38.7	21.9	7.3	4.4

Table 4 evidence suggests that librarians generally have positive attitudes towards AI based library services in usefulness, ease of use, and satisfaction. In usefulness, the majority of respondents (69.3%) placed AI services as very high or high, suggesting that librarians view AI as a valuable utility in enhancing library processes and research support. Similarly, for usability, 62.8% of the librarians reported high to very high ease of use, though a slightly higher percentage (23.4%) reported that it was moderate, an indication that while AI systems are largely usable, some librarians may still experience usability problems. On a satisfaction scale, 66.4% of the respondents reported very high or high satisfaction with AI based services, an indication of overall satisfaction with the services provided. A minority range of 7.3% to 8.8% reported these dimensions low, and few (2.9% to 5.1%) reported them very low, showing a low level of dissatisfaction that could be addressed by more training, user support, or interface improvements. The findings of the study show that AI library services are well received by librarians with great strength in perceived usefulness and satisfaction but moderate focus may be required to improve ease of use for everyone.

Research Question 4: What are the key challenges and barriers affecting effective AI adoption in Nigerian research centre libraries?

Table 5: Key Challenges and Barriers Affecting Effective AI Adoption in Nigerian Research Centre Libraries (N = 137)

Challenges/Barriers	Frequency (f)	Percentage (%)
Inadequate funding for AI tools	92	67.2
Poor ICT infrastructure	85	62.0
Lack of staff training and AI skills	78	56.9
Resistance to change by library staff	60	43.8
Insufficient institutional support/policy	55	40.1
Data privacy and security concerns	42	30.7
Limited access to AI software and platforms	37	27.0
Fear of job redundancy due to AI adoption	30	21.9
Lack of awareness about AI benefits	25	18.2

The analysis in Table 5 indicates that finance and infrastructure are the most significant barriers to effective AI adoption in Nigerian research centre libraries. Inadequate financing

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was mentioned by 67.2% of the librarians, followed by poor ICT infrastructure at 62%, which signifies financial and technological limitations as the primary hindrances. Human resource limitations are also a significant problem, with over 56.9% of librarians reporting the lack of AI competencies and training, which shows the immediacy for capacity building. Additionally, resistance to change (43.8%) and inadequate institutional support (40.1%) point towards organisational culture and policy gaps hindering adoption. Practical and moral barriers, such as data privacy and security concerns (30.7%) and limited access to AI platforms (27%), also inhibit adoption. Psychological barriers, such as fear of being made redundant (21.9%) and lack of awareness regarding the benefits of AI (18.2%), show that perception and knowledge lacunae are also contributing factors. AI application in Nigerian research centre libraries is constrained by a combination of funding, infrastructural, skill based, organisational, and perceptual limitations, and therefore efforts to improve application must address these challenges comprehensively through the avenues of finance, training, investment in infrastructure, policy support and publicity.

Research Question 5: How can AI integration be optimised to enhance librarians' productivity and improve user experiences?

Table 6: Strategies to Optimise AI Integration for Enhancing Librarians' Productivity and User Experience (N = 137)

Optimisation Strategies	Frequency (f)	Percentage (%)
Regular AI training and capacity-building programs	102	74.5
Investment in modern ICT infrastructure	95	69.3
Implementation of clear institutional AI policies	88	64.2
Adoption of user-friendly AI platforms and tools	83	60.6
Collaboration with AI experts and technology partners	71	51.8
Continuous monitoring and feedback on AI usage	65	47.4
Promoting awareness and benefits of AI among staff	60	43.8
Integration of AI with existing library systems	55	40.1
Encouraging user engagement with AI services	50	36.5

The table shows that routine AI training as a capacity building activity is the most recommended action, as 74.5% of the librarians emphasized its importance in improving productivity and competency. Similarly, investment in cutting-edge ICT infrastructure (69.3%) is required to ensure that AI tools work efficiently and last long. Institutional AI policies (64.2%) and adopting user-friendly AI platforms (60.6%) were also key enablers, reflecting the need for structured implementation and user-friendly technology. Collaborating with AI experts and technology partners (51.8%) can provide technical expertise and best practices, while continuous monitoring and comments (47.4%) keeps the system updated and valuable. Increasing staff awareness (43.8%) and incorporating AI into existing library systems (40.1%) also plays its part, while encouraging user engagement (36.5%) ensures that AI services are meaningful to library users. Streamlining AI integration involves an integrated strategy that merges staff training, infrastructure building, policy development, user-friendly

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interfaces, and regular assessment to double the productivity of librarians and satisfaction of users.

Discussion of findings

The findings of the study show that the optimisation of AI uptake in research centre libraries is a multifaceted process preoccupied with staff training, ICT infrastructural development, and developing clear institutional policies. These are important steps towards the increased productivity of librarians and the effective leveraging of AI-driven services to improve user experiences. This is corroborated by Agboke and Oladokun's (2024) report of the critical role played by capacity development, organisational support, and infrastructure in facilitating technology adoption. The study also implies that the utilisation of user-friendly AI platforms, collaboration with technology experts, and the implementation of continuous monitoring and feedback loops are critical to sustaining effective integration, consistent with Olowookere (2025), who emphasize the need for technical support and iterative evaluation. The findings show a trend of rising AI adoption over time, clustering at medium to high levels of integration, but also indicate unevenness between institutions and call for targeted interventions such as training, infrastructure development, and policy encouragement.

The findings of the study have the implication that optimal use of AI in research centre libraries requires a trade-off of staff capacity development, ICT infrastructure, use of user-friendly platforms, and institutional policy clarity. This is corroborated by the work of Oladokun and Emmanuel (2022), using the perspective that this study's findings reveal a positive attitude towards AI adoption, but also highlight the need for capacity-building interventions to provide assistance that will give all librarians' access to AI to enhance research quality. The study also indicates that collaboration with AI experts, constant monitoring and feedback, and increasing employees' awareness are essential strategies to sustain effective integration. This concurs with Rao and Sahu (2024) and Palade and Carutasu (2023), using the same perspective, highlighting that organisational preparedness and technical assistance are crucial to augment the benefits of AI. In addition, the integration of AI into the existing library systems and enabling user engagement reflect an extensive approach to adoption, supporting Igbinovia et al. (2023), and indicating that organisational support and user engagement are necessary in enhancing research productivity and the quality of services.

The findings of the study show that AI library services are accepted by librarians positively with high perceived usefulness and high satisfaction. This is brought out by Wagwu et al. (2024) using the perspective that the findings of this research show a positive disposition towards AI adoption but highlight the call for interventions in the correct direction to improve ease of use and make all librarians meaningfully work with AI tools to improve research productivity and service delivery. The findings from the research show that the use of AI in Nigerian research centre libraries is hindered by a combination of infrastructural, financing,

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skill, organisational, and perception-based constraints. This is corroborated by Nkomo and Matli (2025), drawing from the evidence that the results of this study reflect an optimistic orientation towards AI adoption but also underscore the necessity for all-around interventions through finance, training, investment in infrastructure, policy support, and publicity to enable effective and sustainable integration of AI.

The study presents that incorporation of AI in research centre libraries can be optimised through a synergy of interventions, including ongoing staff training and capacity development, investment in modern ICT infrastructure, adoption of user-friendly AI platforms, and the establishment of clear-cut institutional policies. This is corroborated by the finding of Hussain and Khan (2025) from the perspective that the result of this study depicts a positive disposition towards AI adoption and also highlights the need for capacity development interventions and support from the organisation to empower librarians with needed skills and resources. Moreover, communication with AI experts, constant checks and feedback, awareness among staff, combining AI with existing library systems, and encouraging user engagement are essential to ensure worthy integration. These are what Mallikarjuna (2024) recommend, noting that both technical support and organisational readiness are of considerable importance in enhancing productivity among librarians and improving user experience.

Conclusion

The study concludes that the adoption of Artificial Intelligence in Nigerian research centre libraries has high potential to enhance productivity among librarians and enhance user experience. Librarians generally have optimistic attitudes towards AI, particularly towards usefulness and satisfaction derived using it, but care is needed to maximise usability for all who work there. The study also identifies that AI integration is under various constraints like inadequate funding, lack of infrastructure, dearth of required skills, organisational resistance, and perceptual barriers. Overcoming these issues necessitates a broad strategy through infrastructural investment, capacity development for the staff, policy intervention, and public awareness campaigns. Furthermore, optimisation of AI adoption necessitates ongoing capacity development, application of easy-to-use platforms and engagement with technology experts, ongoing monitoring, and ongoing engagement of the users. Overall, the research emphasizes that while AI presents groundbreaking opportunities for research centre libraries, a synergy-based intervention with technical, organisational, and human-centered methods to the attainment of sustainable and effective application is what is being counted on.

Recommendations

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

1. Being that there has been a finding that AI tools and applications are partially integrated in Nigerian research center libraries, there is thus a recommendation that library management should invest in the application of AI.

2. Research centres should offer training and development opportunities related to AI skill development, digital literacy, and implementing AI in research services. This will help boost librarians' confidence, competence, and effectiveness in working with AI technology.
3. It is thus recommended that research centres should implement user-centric training and awareness programs and user-friendly AI interfaces. Additionally, there should be a feedback process in place so that services offered meet user expectations.
4. It is recommended that research institutions should establish an effective ICT infrastructure, ensure penetration of internet connectivity, offer support staff in AI, and establish proper AI implementation guidelines.
5. Renewed efforts are recommended to link AI integration with organizational workflow approaches, focus on high-impact applications in literature searches and research analytics, and monitor the performance level of available AI tools periodically. This not only fosters sustainable development but also ensures better user satisfaction.

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Notes on Contributor
Victoria Olubola FADEYI is a staff member of the Mathematical Sciences Library at National Mathematical Centre, Abuja, Nigeria. She holds B.Ed. MLS and PhD. Her professional expertise includes ICT application to library services (AI, Machine Learning, Internet of Things etc.), ICT in education. She has published in Library and Information Science and contributes actively to the academic community through research, teaching, collaborations and public engagement.

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