INSTITUTIONAL READINESS AS A DETERMINANT OF AI-DRIVEN COLLECTION DEVELOPMENT IN FEDERAL UNIVERSITY LIBRARIES IN NIGERIA

By

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Abstract

Artificial intelligence (AI) technologies are increasingly transforming information management practices in academic libraries worldwide. However, the successful integration of AI-driven tools into collection development depends largely on the institutional readiness of libraries. This study examined institutional readiness as a determinant of AI-driven collection development in federal university libraries in Nigeria. A descriptive survey research design was adopted. Data were collected from professional and paraprofessional library staff in selected federal university libraries in North-Central Nigeria. A structured questionnaire was used for data collection, and 224 valid responses were obtained from 248 questionnaires distributed, representing a response rate of 90.3%. The data were analyzed using descriptive statistics and multiple regression analysis. The findings revealed that traditional collection development practices remained dominant in the libraries studied, while the use of AI tools in core collection development activities was limited. The regression analysis showed that institutional readiness had a significant positive influence on effective collection development ($\beta = 0.296$, $p < 0.05$), whereas AI adoption had a weak and statistically insignificant influence ($\beta = 0.068$, $p > 0.05$). The study concluded that the effectiveness of AI-driven collection development in Nigerian university libraries depends largely on institutional readiness rather than on the mere availability of AI technologies. The study recommends improved digital infrastructure, the development of institutional policies for AI integration, and continuous professional training for librarians to enhance AI-driven collection development.

Keywords: Artificial intelligence, institutional readiness, collection development, academic libraries, Nigeria

Introduction

Academic libraries play a critical role in supporting teaching, learning, and research activities in universities. One of their core responsibilities is collection development, which involves the systematic selection, acquisition, organization, and evaluation of information resources to meet users' information needs (Ibrahim & Tukur, 2023). Traditionally, collection development decisions have relied on librarians' professional judgment, faculty recommendations, publishers' catalogues,

and users' requests. However, the rapid expansion of digital information resources and the increasing complexity of information environments have created new challenges for librarians in managing library collections effectively.

The emergence of artificial intelligence (AI) technologies has introduced new opportunities for improving decision-making in library operations, particularly in information retrieval, metadata generation, recommendation systems, and collection development (Asemi, Ko, & Nowkarizi, 2021). Artificial intelligence refers to the ability of computer systems to perform tasks that normally require human intelligence, including learning, reasoning, problem-solving, and decision-making (Wang, 2022). It may also be defined as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings, including reasoning, discovering meaning, generalizing, and learning from past experience (Encyclopaedia Britannica, 2025).

In academic libraries, AI technologies can be used to analyze user behaviour, predict information needs, automate acquisition processes, and recommend relevant resources. These capabilities have the potential to transform traditional collection development by enabling libraries to make data-driven decisions concerning resource selection and acquisition. AI-driven collection development involves the use of machine learning, natural language processing, and predictive analytics to automate or enhance tasks such as resource selection, metadata generation, and demand forecasting, and personalized recommendations (Wang, 2022). According to Sridevi and Shanmugam (2017), AI applications in library management include robotics, pattern recognition, expert systems, natural language processing, and other intelligent technologies.

The readiness of Nigerian university libraries to adopt AI in collection development refers to the combination of organizational, technical, and human capacities required to implement AI effectively. It includes digital infrastructure, stable internet connectivity, reliable electricity, cloud services, staff competence, digital literacy, AI training, data analytics skills, institutional policies, funding, and leadership commitment (Oyedokun, 2024). Without adequate institutional readiness, AI adoption may fail or remain superficial. Inadequate ICT infrastructure, poor funding, and limited staff training have been identified as major barriers to AI adoption in Nigerian universities (Isiaka, Agboola, Sulyman, Olaita, Aremu, & Saba-Jibril, 2024).

Despite the growing global interest in AI adoption in academic libraries, the successful implementation of AI technologies depends largely on institutional readiness. Institutional readiness refers to the extent to which an organization possesses the infrastructure, policies, financial resources, and human capacity required to adopt and implement new technologies effectively.

In Nigeria, university libraries operate in an environment characterized by limited funding, inadequate technological infrastructure, and insufficient training opportunities. These factors may affect the ability of libraries to adopt and implement AI-driven technologies in collection development. Although awareness of AI technologies among librarians is gradually increasing, the extent to which institutional readiness influences the adoption and effectiveness of AI-driven collection development in Nigerian university libraries remains insufficiently explored. This study therefore examined institutional readiness as a determinant of AI-driven collection development in federal university libraries in Nigeria.

Objectives of the Study

The study sought to:

1. Examine existing collection development practices in federal university libraries in Nigeria.
2. Assess the level of institutional readiness for AI-driven collection development.
3. Determine the extent of adoption of AI tools and practices in collection development.
4. Identify the challenges hindering institutional readiness and the adoption of AI-driven collection development.

5. Examine strategies for improving institutional readiness for AI-driven collection development.

Research Hypotheses

The following null hypotheses were formulated and tested at the 0.05 level of significance:

H_{01}: Institutional readiness and AI adoption do not have significant individual influences on effective collection development in federal university libraries in North-Central Nigeria.

H_{02}: Institutional readiness and AI adoption do not have a significant joint influence on effective collection development in federal university libraries in North-Central Nigeria.

Literature Review

Artificial intelligence has attracted increasing attention in Library and Information Science because of its potential to transform library operations and services. Scholars have argued that AI technologies can enhance information management through automation, predictive analytics, and intelligent information retrieval systems. Cox et al. (2021) observed that AI technologies can improve the efficiency of academic libraries by automating repetitive tasks and supporting data-driven decision-making. Similarly, Asemi et al. (2021) noted that AI tools can assist librarians in analyzing user data, predicting information needs, and improving resource selection strategies.

In collection development, AI technologies can support librarians in identifying relevant resources, analyzing usage patterns, forecasting demand, and recommending materials that align with users' academic needs. Sa'ari, Sahak, and Skrzeszewski (2023) noted that AI-driven recommendation systems are increasingly being integrated into library discovery platforms to improve users' access to relevant information resources. Asemi and Asemi (2018) stated that the idea of incorporating AI systems into libraries can be traced to the 1990s. These intelligent library systems provide knowledge-based services to library users and staff. For many years, scholars and library and information scientists have examined the potential applications of AI in libraries.

The Centre for the Future of Libraries of the American Library Association has also acknowledged the importance of emerging AI technologies for library systems (Andrews, Ward, & Yoon, 2021). The application of smart technologies to improve user experiences, automate tasks, and enhance services is commonly described as artificial intelligence in libraries.

The demand for AI applications in university library collection development is growing because of the technology's increasing adoption across different sectors. AI has the potential to improve the quality, effectiveness, timeliness, and efficiency of library collections. Isiaka (2023) observed that collection development is a technical library function that can be integrated with predictive AI to produce reliable and efficient results. Similarly, Moustapha and Yusuf (2023) noted that librarians and information professionals are increasingly aware of the impact of AI on various sectors, and discussions concerning its application to improve library services are gaining momentum.

Jatto and Tella (2024) examined librarians' readiness for AI integration in academic libraries through a review of existing literature. Their findings showed that Nigerian librarians generally have positive attitudes towards AI and recognize its potential to improve cataloguing, reference services, acquisitions, and user support. However, their readiness remains low because of inadequate funding, poor ICT infrastructure, lack of technical expertise, unreliable electricity, limited administrative support, and concerns about job displacement and the reliability of AI systems.

The absence of comprehensive national and institutional policies on AI integration further complicates the situation. Jatto and Tella concluded that Nigerian academic libraries are aware of the benefits of AI but are not adequately prepared for its adoption. They recommended targeted training and retraining, the development of institutional and national AI policies, substantial investment in ICT infrastructure, advocacy to reduce resistance to change, and continuous professional development.

Similarly, Ajani, Adeyinka, Salawu, and Abdullahi (2022), in their study titled *Perspectives of Librarians on Awareness and Readiness of Academic Libraries to Integrate Artificial Intelligence for Library Operations and Services in Nigeria*, adopted a qualitative approach and distributed open-ended questionnaires to 25 librarians from six federal universities representing Nigeria's geopolitical zones. The findings showed that respondents were highly aware of AI's potential to reduce human error and repetitive tasks in libraries. However, they expressed concerns about job displacement and infrastructural challenges, including a lack of technical expertise, unreliable electricity, and inadequate funding. The study highlighted systemic constraints that prevent widespread AI integration in Nigerian academic libraries. The researchers recommended increased funding, staff training, alternative energy sources, and other measures to facilitate AI adoption.

Despite these potential benefits, the adoption of AI technologies in academic libraries is often constrained by organizational and infrastructural factors. Cox et al. (2021) emphasized that successful AI integration requires adequate institutional support, technological infrastructure, financial resources, and skilled personnel. Institutional readiness encompasses technological infrastructure, staff competence, organizational culture, and policy frameworks that support technological innovation. Adamu et al. (2024) observed that many African university libraries face difficulties in adopting emerging technologies because of limited funding and inadequate ICT infrastructure.

In Nigeria, several studies have highlighted the slow pace of technological adoption in academic libraries. Oyedokun (2024) observed that although Nigerian libraries have begun integrating digital technologies into their services, the adoption of advanced technologies such as AI remains limited. Similarly, Adamu, Isah, and Adekunle (2023) reported that many Nigerian academic libraries continue to rely heavily on traditional collection development methods because of infrastructural and financial constraints. These studies suggest that although AI technologies offer substantial opportunities for improving collection development, their successful implementation depends largely on institutional readiness. However, empirical studies examining the relationship between institutional readiness and AI-driven collection development in Nigerian university libraries remain limited. This study therefore investigated how institutional readiness influences AI-driven collection development practices in federal university libraries in Nigeria.

Methodology

The study adopted a descriptive survey research design to examine institutional readiness as a determinant of AI-driven collection development in federal university libraries in North-Central Nigeria. The population consisted of professional and paraprofessional library staff working in selected federal university libraries in the region. The selected institutions were the Federal University of Technology, Minna; the Federal University, Lafia; and the University of Ilorin. A structured questionnaire was used as the main instrument for data collection. The questionnaire contained items designed to assess existing collection development practices, institutional readiness for AI adoption, the extent of AI adoption, challenges affecting AI-driven collection development, and strategies for improving institutional readiness.

A total of 248 questionnaires were distributed to library staff across the selected institutions. Of these, 224 valid copies were returned, representing a response rate of 90.3%.

The questionnaire employed a four-point Likert scale:

- Strongly Agree = 4
- Agree = 3
- Disagree = 2
- Strongly Disagree = 1

The Average Weighted Mean (AWM) was computed to determine the respondents' opinions. A criterion mean of 2.50 was adopted as the decision benchmark. Mean scores of 2.50 and above were interpreted as agreement or a high extent, while mean scores below 2.50 were interpreted as disagreement or a low extent.

The data were analyzed using frequencies, percentages, means, standard deviations, and multiple regression analysis. Multiple regressions were used to determine the individual and joint influences of institutional readiness and AI adoption on effective collection development. The hypotheses were tested at the 0.05 level of significance.

1. Analysis and Discussion of Results

Table 1: Questionnaire Response Rate

Institution	**Questionnaires distributed**	**Questionnaires returned**	**Response rate (%)**
Federal University of Technology, Minna	94	85	90.4
Federal University, Lafia	55	50	90.9
University of Ilorin	99	89	89.9
Total	**248**	**224**	**90.3**

Table 1 shows that 224 out of the 248 questionnaires distributed were returned, representing a response rate of 90.3%. The high response rate indicates a strong level of participation among respondents across the three federal university libraries. It also enhances the reliability of the findings. The relatively similar response rates across the institutions suggest consistency in the data collection process.

Table 2: Demographic Characteristics of Respondents

Variable	**Category**	**Frequency**	**Percentage (%)**
Variable	**Category**	**Frequency**	**Percentage (%)**
Gender	Male	128	57.1
	Female	96	42.9
Age	**21–30 years**	**72**	**32.1**
	31–40 years	84	37.5
	41–50 years	46	20.5
	51 years and above	22	9.8
Qualification	**Diploma**	**38**	**17.0**
	B.LIS	92	41.1
	M.LIS	58	25.9
	PhD	18	8.0

	Other qualifications	18	8.0
Experience	**Less than 5 years**	**64**	**28.6**
	5–10 years	88	39.3
	More than 10 years	72	32.1

Table 2 shows that 128 respondents, representing 57.1%, were male, while 96 respondents, representing 42.9%, were female. This indicates a slight male majority, although both genders were adequately represented. The age distribution indicates that most respondents were within the active professional age range of 21–40 years. Respondents aged 31–40 years constituted the largest group, with 84 respondents, representing 37.5%. This is important because professionals within this age range may be more likely to engage with emerging technologies such as AI.

Statement	Mean	SD	Decision
Processing materials through labeling, barcoding, and shelving	3.24	0.76	Agreed
Ordering materials through vendors and publishers	3.21	0.79	Agreed
Using publishers' catalogues	3.19	0.84	Agreed
Including electronic resources in the collection	3.18	0.84	Agreed
Using AI tools, such as Ex Libris and ECM	2.25	1.08	Disagreed

The qualification distribution shows that respondents with Bachelor of Library and Information Science degrees constituted the largest group, with 92 respondents, representing 41.1%. This was followed by respondents with Master of Library and Information Science degrees, who accounted for 25.9%. The qualifications of the respondents suggest that most participants possessed the professional background required to provide informed responses on collection development and AI adoption.

Respondents with 5–10 years of work experience constituted the largest group, with 88 respondents, representing 39.3%. They were followed by respondents with more than 10 years of experience, who accounted for 32.1%, and respondents with less than five years of experience, who accounted for 28.6%. The distribution provided a reasonable combination of early-career and experienced professionals, thereby strengthening the credibility of the findings.

Table 3: Existing Collection Development Practices

Average Weighted Mean (AWM) = 3.06

Table 3 shows that traditional collection development practices were widely used in the federal university libraries studied. Processing materials, ordering resources through vendors and publishers, using publishers' catalogues, and including electronic resources all recorded mean scores above the criterion mean.

Variable	Mean	SD	Decision
Management support for technology	3.24	0.76	High
Staff knowledge of AI	3.14	0.88	High
Training opportunities	3.08	0.91	High
ICT infrastructure	2.34	1.05	Low
Funding availability	2.25	1.08	Low

However, the use of AI tools, such as Ex Libris and ECM, recorded a mean score of 2.25, which was below the criterion mean. This indicates that the use of AI tools in collection development was limited. The findings suggest that traditional collection development methods remain dominant, while the integration of AI-driven tools is still at an early stage.

Table 4: Institutional Readiness for AI Adoption

Average Weighted Mean (AWM) = 2.81

Table 4 presents the level of institutional readiness for AI adoption. The findings show that respondents perceived management support for technology, staff knowledge of AI, and training opportunities as relatively high, with mean scores above the criterion mean.

However, ICT infrastructure and funding availability recorded mean scores below the criterion mean. This indicates that although the libraries possess some level of human and managerial readiness, their institutional readiness is constrained by inadequate infrastructure and insufficient funding

Table 5: Extent of AI Adoption

Variable	Mean	SD	Decision
AI analytics for identifying user needs	3.56	0.52	High
AI chatbots for information retrieval	3.56	0.53	High
Overall AI adoption	3.13	0.85	High
AI applications in acquisition processes	2.22	1.01	Low
Use of Ex Libris	2.11	1.02	Low

Average Weighted Mean (AWM) = 2.92

Table 5 shows that the extent of AI adoption was relatively high in user-oriented services, particularly AI-driven analytics for identifying user needs and AI chatbots for information retrieval.

However, the application of AI in core collection development functions, such as acquisition and material selection, was low. The use of Ex Libris also recorded a low mean score. This finding implies that AI technologies are more commonly applied in user services than in the core operational processes of collection development.

Table 6: Challenges Hindering AI-Driven Collection Development

S/N	Statement	Mean	SD	Decision
1	Lack of adequate funding hinders AI adoption in my library.	3.12	0.83	Agreed
2	Limited technical expertise among library staff affects AI readiness.	1.88	0.98	Disagreed
3	Poor ICT infrastructure limits the use of AI in my institution.	3.06	0.86	Agreed
4	Resistance to change among staff is a barrier to AI adoption.	2.03	1.00	Disagreed
5	Inadequate government policies and frameworks discourage AI implementation in libraries.	3.09	0.50	Agreed

Average Weighted Mean (AWM) = 2.64

Table 6 indicates that inadequate funding, poor ICT infrastructure, and inadequate government policies and frameworks were the major challenges hindering AI-driven collection development. These items recorded mean scores above the criterion mean. However, limited technical expertise and resistance to change recorded mean scores below the criterion mean. This suggests that the major challenges affecting AI adoption were institutional and structural rather than primarily related to staff capacity or resistance.

Table 7: Strategies for Improving Institutional Readiness for AI Adoption

S/N	Statement	Mean	SD	Decision
1	More funding should be allocated to AI adoption in libraries.	339	0.55	High
2	Regular staff training and workshops on AI tools should be organized.	357	0.50	High
3	Policies promoting the ethical use of AI in libraries should be established.	358	0.49	High
4	Libraries should collaborate with ICT professionals and technology vendors.	352	0.50	High
5	Pilot projects should be initiated to test AI tools in collection development.	356	0.52	High
6	Awareness of the benefits of AI should be created among staff.	3.50	0.53	High
7	AI-driven support systems should be made available.	3.57	0.50	High

Average Weighted Mean (AWM) = 3.53

Table 7 shows a high level of agreement with all the proposed strategies for improving institutional readiness. The most highly rated strategies were the establishment of ethical AI policies, regular staff training, the provision of AI-driven support systems, and the implementation of pilot projects.

Collaboration with ICT professionals and technology vendors, awareness creation, and increased funding also recorded high mean scores. The findings indicate that improving institutional readiness requires a combination of policy development, capacity building, technological support, funding, and strategic collaboration.

4.1 Regression Analysis

Table 8: Regression Model Summary

R	R^2	Adjusted R^2	Standard error
0.332	0.110	0.102	3.655

Table 8 presents the model summary of the regression analysis examining the influence of institutional readiness and AI adoption on effective collection development. The R value of 0.332 indicates a positive relationship between the independent variables and effective collection development. The coefficient of determination, $R^2 = 0.110$, shows that institutional readiness and AI adoption jointly explained 11.0% of the variation in effective collection development.

The adjusted R^2 value of 0.102 indicates that, after adjusting for the number of predictors, approximately 10.2% of the variance in effective collection development was explained by the model. This suggests that other factors not included in the model may account for a substantial proportion of the variation in effective collection development.

Table 9: Analysis of Variance

Source	Sum of squares	df	Mean square	F	Significance
Source	**Sum of squares**	**df**	**Mean square**	**F**	**Significance**
Regression	404.518	2	202.259	15.143	0.000
Residual	3272.317	221	14.807	—	—
Total	3676.835	223	—	—	—

Table 9 presents the ANOVA results for the regression model. The model was statistically significant, $F(2, 221) = 15.143$, $p < 0.05$. This indicates that institutional readiness and AI adoption jointly had a significant influence on effective collection development. Therefore, the second null hypothesis, which stated that institutional readiness and AI adoption had no significant joint influence on effective collection development, was rejected.

Variable	B	Beta (β)	t	Significance
Constant	22.620	—	22.661	0.000
Institutional readiness	0.328	0.296	4.465	0.000
AI adoption	0.072	0.068	1.051	0.294

Table 10: Regression Coefficients

Table 10 presents the individual contributions of institutional readiness and AI adoption to effective collection development. Institutional readiness had a positive and statistically significant influence on effective collection development ($\beta = 0.296$, $p < 0.05$). This indicates that improvements in institutional readiness were associated with improvements in collection development effectiveness.

AI adoption, however, had a weak and statistically insignificant influence on effective collection development ($\beta = 0.068$, $p > 0.05$). This suggests that the current level of AI adoption alone did not significantly improve collection development effectiveness. Thus, the first null hypothesis was partially rejected for institutional readiness but retained for AI adoption. Institutional readiness made a significant individual contribution, while AI adoption did not.

Discussion of Findings

The findings revealed that traditional collection development practices remained dominant in the federal university libraries studied, while the integration of AI tools into core collection development functions was limited. This finding is consistent with Ibrahim and Tukur (2023), who reported that many Nigerian academic libraries continue to rely heavily on manual and conventional approaches despite the availability of digital technologies.

The continued dominance of traditional methods suggests that the transition to AI-driven collection development is still at an early stage. Although AI technologies are available and increasingly discussed in the library profession, their integration into resource selection, acquisition, and evaluation remains limited. The study further revealed that institutional readiness was constrained by inadequate ICT infrastructure and insufficient funding, despite relatively high levels of management support, staff knowledge, and training opportunities. This supports Cox et al. (2021), who argued that the successful adoption of AI in academic libraries depends largely on organizational and infrastructural capacity. Similarly, Asemi et al. (2021) emphasized that technological innovation in African libraries is often hindered by structural limitations rather than by a lack of awareness or willingness among library staff.

Another important finding was that AI technologies were more commonly used for user-oriented services, such as information retrieval and user-needs analysis, than for core collection development processes. This suggests that libraries may prioritize visible, user-facing applications over backend systems that require deeper technological integration and greater institutional capacity. This finding is consistent with Adamu et al. (2023), who observed that AI adoption in libraries often begins with user services before extending to more complex operational functions. The low use of AI in acquisition and resource selection may therefore be attributed to inadequate infrastructure, limited funding, and the absence of specialized systems for collection development.

The regression analysis provided the most significant finding of the study. Institutional readiness had a significant positive influence on effective collection development, whereas AI adoption had a weak and statistically insignificant influence. This finding challenges the assumption that the mere presence or adoption of AI technologies automatically improves library performance. Instead, the finding emphasizes the importance of foundational conditions, including reliable infrastructure, adequate funding, institutional support, relevant policies, and staff training. Without these elements, AI implementation may not produce meaningful improvements in collection development.

The significant joint influence of institutional readiness and AI adoption further indicates that the two variables should be considered together. Although the model explained only 11.0% of the variation in effective collection development, the statistically significant result confirms that institutional and technological factors jointly contribute to collection development outcomes. Other factors, such as leadership style, organizational culture, user participation, staff motivation, vendor support, and the quality of

available AI systems, may also influence effective collection development.

Conclusion

This study examined institutional readiness as a determinant of AI-driven collection development in federal university libraries in Nigeria. The findings revealed that traditional collection development practices remained dominant, while the application of AI tools in core collection development activities was limited. The study established that institutional readiness had a significant positive influence on effective collection development. However, the current level of AI adoption had no significant individual influence on collection development effectiveness. The findings suggest that AI technologies cannot produce substantial improvements without adequate institutional support.

The successful integration of AI into Nigerian university libraries therefore depends on the availability of reliable ICT infrastructure, adequate funding, supportive institutional policies, committed leadership, and continuous professional training. Without these foundational elements, AI adoption may remain limited and may not generate the expected improvements in collection development.

Recommendations

Based on the findings, the study recommends that:

1. University libraries should modernize existing collection development practices by integrating AI tools into resource selection, acquisition, evaluation, and demand forecasting.
2. Library management and university authorities should strengthen institutional readiness by improving ICT infrastructure, ensuring stable internet connectivity, and providing reliable electricity and relevant digital systems.
3. Libraries should expand the application of AI beyond user-oriented services to core collection development functions.
4. Government and institutional stakeholders should increase funding for AI adoption and develop clear policy frameworks to guide AI implementation in libraries.
5. Libraries should organize regular training programmes, workshops, and retraining opportunities to improve librarians' AI literacy, data analytics skills, and technical competence.
6. Libraries should collaborate with ICT professionals, technology vendors, and other academic institutions to obtain technical support and share knowledge.

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