



LEVERAGING GENERATIVE AI AND INTEGRATED LIBRARY SYSTEMS TO TRANSFORM SCHOLARLY COMMUNICATION IN NIGERIAN UNIVERSITY LIBRARIES

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Abstract

This study examined the role of Generative Artificial Intelligence (GenAI) and Integrated Library Systems (ILS) in transforming scholarly communication in Nigerian university libraries. The study adopted a mixed-methods research design. The population comprised librarians, ICT personnel and academic researchers drawn from federal, state and private universities in Nigeria. A proportional sampling technique was used to select 180 respondents, while 15 senior ICT experts and library managers participated in semi-structured interviews. Data were collected using a structured questionnaire and interview guide. Quantitative data were analyzed using frequency counts, percentages and mean scores, while qualitative responses were analyzed thematically. The findings showed that awareness of Generative AI tools was quite high among respondents. The actual integration into library operations was moderate. Integrated Library Systems were found to significantly improve cataloguing efficiency, access to library resources, workflow automation and resource management in university libraries. However, the integration of AI-driven scholarly communication services was still limited due to inadequate ICT infrastructure, insufficient funding, shortage of skilled personnel, inadequate training opportunities, poor institutional support and ethical concerns relating to data privacy and interoperability. The research concluded that despite the operational transformations brought about by ILS, the integration of GenAI in Nigerian university libraries remains underutilized for scholarly communication. The study recommends the need for improved ICT infrastructure, staff training, sustainable funding, supportive institutional policies, and strategic AI integration to enhance scholarly communication and university library services.

Keywords: Academic Libraries, Generative AI, Integrated Library Systems, Research Productivity, Scholarly Communication

Introduction

The world has witnessed the tremendous growth of information and communication technologies, which has revolutionized the functioning and service provision of academic libraries all over the world. Modern academic libraries transcend their traditional roles as print repositories, serving instead as digital knowledge ecosystems that drive teaching, research, and scholarly communication. The continuous advancement and integration of Artificial Intelligence (AI), machine learning, cloud computing, and Integrated Library Systems (ILS) have propelled this digital transformation. Generative AI represents a transformative milestone in modern technology,



distinguished by its proficiency in synthesizing human-like content, streamlining complex data processing, and fostering user engagement. According to Narayanan (2024), the integration of Generative AI has fundamentally improved educational and library environments by facilitating better access to information, tailoring learning experiences, and streamlining the exploration of knowledge. The rise of advanced AI tools like ChatGPT, Gemini, and Claude has catalyzed ongoing discussions on how to upgrade university library services.

Generative Artificial Intelligence (GenAI) are systems that generate text, summaries, metadata, recommendations and other digital content using machine learning and natural language processing (NLP) technologies. Academic libraries are rapidly leveraging on GenAI to automate routine tasks such as cataloguing to metadata generation, indexing and abstracting, plagiarism checking, and virtual reference and personalized information retrieval. Boateng (2025) noted that GenAI is gradually shifting the role of academic libraries from being merely information service providers to becoming facilitators of knowledge creation and dissemination. The study also highlighted the role of AI-driven systems in enhancing user engagement, facilitating personalized services and improving access to scholarly information resources. The widespread adoption of GenAI has changed how universities operate, offering new methods to manage research data and foster scholarly communication. The continuous lifecycle of academic research in universities involves creation and peer review to digital publishing, open access, and long-term preservation.

University libraries play important roles in supporting scholarly communication through institutional repositories, digital archives, electronic databases and research support services. With the development of digital scholarship and open access publishing, libraries have upgraded to embrace cutting-edge technologies that allow effective research management and information delivery. A robust digital foundation is essential for advancing scholarly communication, fostering research collaboration, and ensuring open access to academic outputs (Rieger et al. 2023). Consequently, university libraries are expected to deliver smart, technology-enabled resources tailored to support contemporary digital scholarship. Despite the rise of Generative AI, Integrated Library Systems remain foundational for library automation and resource management. An Integrated Library System (ILS) is software that automates essential library operations, such as circulation, cataloging, acquisitions, and public catalog (OPAC) services. Adoption of ILS has greatly improved operational efficiency, resource organization and access to library resources.



University libraries are increasingly facilitating digital service delivery through both open-source platforms such as Koha and Evergreen and commercial systems, including Alma and Sierra (Liu & Shao, 2024). According to Johnson and Tetteh (2022), flexible, affordable, interoperable and effective administration of print and e-resources are important drivers of increased adoption of open-source ILS. The transition from traditional integrated systems to LSPs has strengthened libraries' capabilities to administer electronic resources and coordinate scholarly publishing operations. The seamless integration of Generative AI with Integrated Library Systems (ILS) empowers academic libraries to elevate user services and revolutionize scholarly communication. While ILS serves as the bedrock for reference services, GenAI integration elevates the capability by automating metadata workflows, optimizing search, delivering personalized recommendations, and powering conversational user interfaces (Oghuvbu & Okoh, 2025).

Likewise, ILS offers the technological structure that is required for the management of digital collections, the preservation of scholarly products and for accessing scholarly resources. These technologies, when used together, can positively impact research productivity, foster greater collaboration between researchers and increase the quality of university library services (Ayinde et al. 2026). Despite the opportunities, the use of GenAI and ILS in university libraries in developing nations like Nigeria is not widespread. Poor infrastructure, unstable electricity supply, inadequate funding, skilled human resource deficit and lack of training opportunities are cited as the major challenges to the adoption of ICTs in academic libraries in Nigeria (Atanda & Gbotosho, 2024; Akinola, 2024).

According to Jatto and Tella (2024), Nigerian librarians are well-informed about AI technologies, but face challenges in their practical application due to infrastructural limitations and a lack of technical expertise. In a similar manner, Suleiman et al. (2024) pointed out that data privacy; intellectual property rights and algorithmic bias are crucial ethical issues that must be addressed to ensure AI's successful application in university libraries. Similarly, Omeluzor (2020) found that while the use of Integrated Library Systems has promoted efficient cataloguing and efficient management of resources in Nigerian university libraries. The effect of inadequate infrastructure and limited technical capacity is still a challenge. Thus, this paper investigates the potential of Generative Artificial Intelligence (GAI) versus Integrated Library Systems (ILS) to reshape and enhance scholarly publishing and research dissemination in Nigerian university libraries.



Statement of the Problem

Despite the growing potential of Generative Artificial Intelligence (GenAI) and Integrated Library Systems (ILS) in easing university library services, the majority of libraries continue to face significant challenges. Poor usage of GenAI applications, restricted digital infrastructure and insufficient staff training hinder libraries from fully leveraging AI for tailored user interaction and efficient resource management. Similarly, as ILS systems keep developing, there remain inconsistencies in merging these systems toward facilitating efficient scholarly communication and optimal research workflows. These limitations inhibit the ability of university libraries to attain optimal productivity, improve service provision and address evolving user needs in the digital landscape.

Objectives of the Study

The main objective of this study is to examine the role of Generative Artificial Intelligence and Integrated Library Systems in enhancing scholarly communication in Nigerian universities. The specific objectives are to:

1. assess the extent to which GenAI tools are adopted in university libraries in Nigerian universities.
2. examine the effectiveness of ILS in supporting resource management and scholarly communication in Nigerian universities.
3. identify the challenges that hinder the integration of GenAI and ILS in university libraries operations in Nigerian universities.
4. examine the strategies to optimise the use of GenAI and ILS for improving university library productivity and user satisfaction in Nigerian universities.

Literature Review

The application of Artificial Intelligence (AI) technology in university library infrastructure has gradually evolved from automating through experiment to building strategic infrastructure for communication in academia. Initially, research conducted on Artificial Intelligence in libraries explored automation through expert systems and production rule-based systems in cataloguing,



classification and reference work (Emumejakpor et al. 2024; Omame & Alex-Nmecha, 2020). With advancements in Integrated Library System (ILS), libraries function as core infrastructure hubs in handling repository management and access to publications (Bagewadi et al. 2025). However, recent literature suggests that machine learning and Natural Language Processing (NLP) technologies are used to optimize-metadata quality, precision indexing and next-generation discovery environments (Cox et al. 2019). Such evolution has led to innovations in Generative-AI technologies, unlike ILS management that is limited to handling repository management and access to publications, as it now includes content summarization, linkage through semantics and research (Narendra et al. 2025).

Generative AI and, in particular, large language models have further blurred the lines between scholarly communication activities by making possible the automatic synthesis of literature, abstracts and searches, as well as facilitating semantic searches and research assistance in context (Peterson, 2025; Nsirim, 2025). By citing experiences in Ahmedtelba et al. (2025) and Hanafi et al. (2025), it can be noted that within academia, generative AI has moved from the fringes of scholarly activities and become integral to the very nature and process of scholarly activities, right from the way researchers search for and make sense of their discoveries to the way they are articulated and communicated. Generative AI, when applied in libraries, has helped in strengthening the user interface layers, increasing user interactions and personalizing information services when integrated with conventional ILS and digital libraries (Raghavendra et al. 2025; Matsieli & Mutula, 2025). Yet, all of these studies have remained largely limited and isolating in nature, specifically in their focus on AI applications independent of ILS, whether in the form of chatbots and/or recommenders.

Recently, emerging studies also point out the institutional and human aspects of AI adoption in university libraries. Technologically based acceptance and organizational readiness studies particularly clarify the institutional support, staff capabilities and governance structures as critical determinants of the successful implementation of AI (Hussain & Khan, 2025; Venkatesh et al. 2003). Developing country-based studies clarify the adoption is impeded not just by infrastructure deficits or skill shortages but is also impeded by policy ambiguities among the librarians ICT personnel who generally have displayed supporting attitudes towards AI adoption (Orubebe et al. 2025). Moreover, the ethical use of data, privacy issues in data handling and usage and algorithmic



bias also continue to significantly influence the academic debates connected to AI based scholarly communication (Farheen et al. 2025). Nonetheless, very few studies bring out the institutional readiness concepts and staff capabilities and system transformation concepts based on the same framework.

One area where there is a significant void in existing scholarship is in the area of synthesized, system-level analyses between the capabilities offered by generative AI systems, specifically in ILS-mediated scholarly communication. This area has been traditionally treated as discrete spaces, ignoring the interconnected nature between these aspects, especially within the context of modern digital scholarship practices (Pinfield et al. 2019). There also exists a conspicuous lack of mixed-methodology research, especially in the context of the Global South, specifically Nigeria, which faces distinct dynamics, especially in the area of digital infrastructure development, which impact AI adoption (Okiki & Asiru, 2024).

The originality with respect to the current study, therefore, consists in its holistic approach to both Generative AI and Integrated Library Systems as networked technologies that are transforming the realm of scholarly communication ranging from metadata to manuscript. Whereas previous studies have investigated individual technologies/services, the current study seeks to critically interpret the perceptions and adoption patterns of all three groups, namely, librarians, ICT and academic researchers, within a holistic paradigm. The adoption of a mixed-methods approach by this study done on federal, state and private universities, therefore, serves to add much-needed depth and clarity to the existing debate within the domain of scholarly communication and its transformations aided by the newer wave of AI.

Theoretical Underpinnings

The theoretical foundation of this study relies on three main theories of technology adoption, user adoption and integration in organizational contexts. These theories illuminate the adoption and utilization of Generative Artificial Intelligence and Integrated Library Systems in academic libraries.

***Diffusion of Innovation Theory***

Diffusion of Innovation (DOI) Theory, developed by Rogers (2003), explains how new technology and innovations are spread in a social system over time. According to this theory, the adoption of innovation is relative to advantage, compatibility, complexity, trialability and observability. For university libraries, DOI provides a pattern to see how GenAI tools and ILS platforms get introduced and adopted by library users and staff. Libraries that best exemplify the advantages of AI driven services such as improved search, automation in metadata generation and personalized user interfaces are likely to achieve rapid uptake and assimilation.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) of Davis (1989) emphasizes perceived usefulness and perceived ease of use as the leading drivers of users' adoption intention for technology. In research libraries, TAM is utilized specifically to predict librarians' and users' responses to GenAI applications and ILS platforms. Library staff is most likely to adopt and utilize these systems to the fullest when they view these technologies as helpful for improving productivity and automating processes and when users experience AI based services as convenient to use. TAM has been widely employed to study user acceptance of computer library applications, web-based databases and AI based information services.

Socio-Technical Systems Theory

The Socio-Technical Systems (STS) Theory assumes the highest possible performance occurs when both social and technical subsystems are designed and controlled simultaneously (Abbas & Michael, 2025). In library contexts, this theory defines the interdependence between technology (GenAI, ILS) and human agents (librarians, researchers and library users). Effective integration of AI and ILS encompasses not only technical infrastructure but organizational culture, staff training, workflow procedures, as well as user interaction. The STS approach guarantees that technological innovations are institutionally aligned and human-centered, thus promoting effective and sustainable utilization of digital library technologies.

Methodology

A mixed methods design was used in this study to investigate the effect of generative Artificial Intelligence (AI) and Integrated Library Systems (ILS) on scholarly communication in Nigerian university libraries. The population used in this study included librarians, ICT staff and researchers in federal, state and private universities that have operational digitized libraries. Employing multi-



stage sampling methods, nine universities (three from each category) were purposively sampled because they had functional digitized libraries and made use of AI based technologies. For each university, subjects were stratified depending on their professional status and proportionate random sampling was used to sample a total of 180 subjects (60 from each category). In addition to that, 15 managers in charge of university libraries and senior officials in ICT departments in each university were purposefully selected because they played strategic roles in rolling out technologies related to generative AIs. Data is collected through structured questionnaire and semi-structured in-depth interviews that aimed to address adoption rates, levels of readiness within institutions and perceptions about its effect on scholarly communication. The validity of the instruments was determined by professionals in the fields of library and information science and educational technology, while a pilot study was conducted on a total of 20 participants coming from a university that is not part of the study. The reliability of the data was computed using Cronbach's Alpha and the result revealed a level of 0.87. Descriptive statistics and regression analysis were employed in the data from quantitative tools to identify relationships between institutional support, AI adoption and scholarly communication, while content analysis was applied in the data from the qualitative tools. Moreover, the confidentiality and anonymity of the participants strictly observed. The employment of a combination of two methodologies allowed data triangulation, thus adding rigor to the data interpretation.

Table 1: Population and Sample Size Distribution

Category of Institution	Selected Universities	Respondent Category	Sample Size (n)	Percentage (%)
Federal Universities	1. University of Lagos (UNILAG), Lagos	Librarians, ICT Staff, Academic Researchers	60	33.3
	2. University of Nigeria, Nsukka (UNN)			
	3. University of Ilorin (UNILORIN)			
State Universities	1. Lagos State University (LASU), Lagos	Librarians, ICT Staff, Academic Researchers	60	33.3
	2. Delta State University (DELSU), Abraka			



	3. Osun State University (UNIOSUN), Osogbo			
Private Universities	1. Covenant University, Ota	Librarians, ICT Staff, Academic Researchers	60	33.3
	2. Babcock University, Ilishan-Remo			
	3. Bowen University, Iwo			
Total	—	—	180	100

This table summarizes the population and sample split for the study. The investigation was conducted among librarians, ICT staff and academic researchers in nine randomly selected universities in Nigeria, including federal, state and private universities. Each category of institution types federal, state and private had 60 respondents, making up 33.3% each of the total for their category. The sum total of 180 participants was used for even distribution by institution types and professional categories.

Results

Table 2: Demographic Characteristics of Respondents (n = 180)

Demographic Variable	Category	Frequency	Percentage (%)
Institution Type	Federal University	60	33.3
	State University	60	33.3
	Private University	60	33.3
Professional Category	Librarians	60	33.3
	ICT Staff	60	33.3
	Academic Researchers	60	33.3
Gender	Male	92	51.1
	Female	88	48.9
Years of Experience	0–5 years	50	27.8
	6–10 years	60	33.3
	11–15 years	40	22.2
	16+ years	30	16.7
Age Group	21–30 years	40	22.2
	31–40 years	70	38.9
	41–50 years	50	27.8
	51+ years	20	11.1

The study used 180 participants proportionally drawn from federal, state and private universities in Nigeria, with equal ratios from each category of institutions representing 33.3% of the total



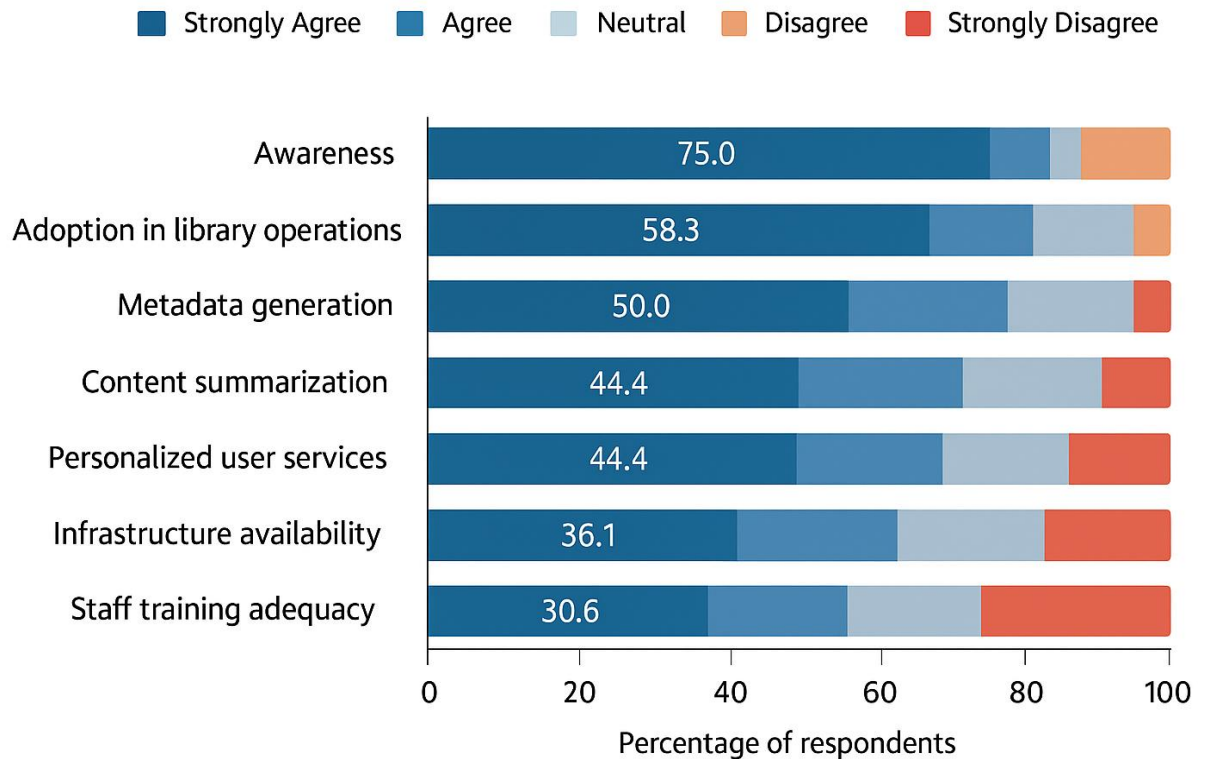
sample. Similarly, the participants were also proportionally divided into three groups of professionals, i.e., librarians, ICT personnel and academic researchers and each representing 33.3% of the overall sample for representative balancing of stakeholders of university library services. The gender division was closely split, with 51.1% of the sample being male and 48.9% female, indicating closely similar numbers of each sex in university library and ICT careers. The majority of respondents (33.3%) had 6–10 years' experience of work, followed by 27.8% with 0–5 years, 22.2% with 11–15 years and 16.7% with over 16 years, indicating a mix of early-career, mid-career and senior staff. Age-wise, most of the respondents belonged to the 31–40 years (38.9%) category, followed by 22–30 years (22.2%), 41–50 years (27.8%) and 51+ years (11.1%). This suggested that most of the participants are in the mid-career to early phases, which is the prevalent situation for individuals actually working towards putting in place and managing library technologies. The demographic is verified as balanced and representative by institution type, professional category, gender, age and experience, verifying the validity of subsequent analysis of perceptions, adoption and usage of Generative AI and Integrated Library Systems in Nigerian universities.

Objective One: assess the extent to which GenAI tools are adopted and utilised in university libraries in Nigerian universities.

Table 3: Extent of Adoption and Utilization of GenAI Tools in University Libraries in Nigerian Universities (n = 180)



Extent of Adoption and Utilization of Generative AI Tools in Nigerian Academic Libraries



Results show Generative AI tool awareness among library staff, with 75% of the participants concurring or strongly concurring that they are aware of GenAI applications. High awareness is a positive indicator of potential adoption. However, adoption of GenAI tools in library functions is lower, at just 58.3% of the participants using them. Some usage such as metadata generation (50%) and content abstraction (44.4%) shows that while some libraries are experimenting with AI, full integration is in the minority. Similarly, the use of GenAI for personalized user services is also at 44.4%, which is in the introductory phase of implementation and yet to become widespread. The study identifies some of the main infrastructural and human capacity constraints. Only 36.1% of the respondents attested to their institutions having adequate infrastructure to support GenAI, while 30.6% affirmed that training of GenAI personnel is adequate. The findings are consistent with findings from semi-structured interviews of 15 senior ICT experts and library managers, who pointed out concerns of minimal hardware, minimal AI -driven training and ethical concerns in the deployment of AI.



Analysis of Interviews

The interviews with 15 senior ICT staff members and library managers were semi-structured and designed to question the application and adoption of Generative AI in Nigerian university libraries in greater depth. The interviews provided the following significant themes:

All respondents envisioned the potential of GenAI to transform library processes, particularly in the creation of metadata, summarizing information and improving user engagement. Managers noted that some universities have had awareness campaigns and workshops, but staff awareness is uneven, with newer and younger staff being more amenable to the adoption of AI. While interviewees concurred that some pilot projects using GenAI had been tried, the majority of libraries were yet to apply AI tools in practice. Some managers stated that it is hard to make the investment in AI tools due to tight budgets, competing priorities and a lack of institutional guidelines. One senior librarian responded *"We know what AI can do, but our systems and budgets currently restrict us to little experiments. Going full tilt will require more planning and support."*

Respondents showed that where AI solutions are used, they primarily contribute to metadata management, document summarizing and cataloging through automation. Somewhat fewer libraries have explored user personalization using AI due to technological constraints and capabilities. This is in line with questionnaire findings for minimal application of personalized services. A commonality of the responses was the lack of infrastructure to support AI tools like servers, high speed connectivity and access to cloud. Also, personnel usually do not have training on AI technologies. A number of managers called for capacity development, with one ICT head observing: *"Even if the technology is in place, our staff need systematic training to utilise AI tools proficiently in handling library resources."* A few interviewees posed ethical concerns, such as data privacy, plagiarism and dependency on AI outputs, which might influence the integrity of research work. Libraries with uncertain AI policies were slow to implement GenAI solutions.

The interviews confirm the results from the questionnaire. While there is strong awareness of GenAI in general, adoption and utilization remain weak in Nigerian higher education library settings. Barriers such as weak infrastructure, weak staff capacity, lack of institutional support and ethics are central problems. The interviews collect qualitative data that strategic planning, infrastructure investment, staff professional development and policy guidelines are critical to implementing GenAI successfully.



Objective two: examine the effectiveness of ILS in supporting resource management and scholarly communication in Nigerian universities.

Table 4: Effectiveness of ILS in Supporting Resource Management and Scholarly Communication

Item	Strongly Agree (SA)	Agree (A)	Neutral (N)	Disagree (D)	Strongly Disagree (SD)	Mean	Interpretation
ILS facilitates efficient cataloging of resources	90 (50%)	60 (33.3%)	15 (8.3%)	10 (5.6%)	5 (2.8%)	4.28	Effective
ILS improves accessibility of library resources to users	80 (44.4%)	70 (38.9%)	20 (11.1%)	5 (2.8%)	5 (2.8%)	4.22	Effective
ILS supports effective tracking of resource usage	70 (38.9%)	65 (36.1%)	25 (13.9%)	10 (5.6%)	10 (5.6%)	4.00	Effective
ILS enhances scholarly communication and collaboration	60 (33.3%)	70 (38.9%)	30 (16.7%)	10 (5.6%)	10 (5.6%)	3.89	Effective
ILS has sufficient features to integrate AI for research support	50 (27.8%)	60 (33.3%)	40 (22.2%)	20 (11.1%)	10 (5.6%)	3.56	Effective
Training and support for ILS are adequate	40 (22.2%)	50 (27.8%)	30 (16.7%)	40 (22.2%)	20 (11.1%)	3.17	Effective
ILS improves efficiency in resource management processes	85 (47.2%)	55 (30.6%)	20 (11.1%)	10 (5.6%)	10 (5.6%)	4.11	Effective

Analysis of Table 4 reveals that ILS is generally considered an efficient way of enhancing resource management and academic communication among Nigerian university libraries. A vast majority of respondents confirmed that ILS significantly improves efficiency in cataloging (mean = 4.28) and access to library materials (mean = 4.22), which suggests automation has streamlined workflow and user experience. Similarly, ILS was observed to support tracking of resources reasonably well (mean = 4.00) and scholarly communication (mean = 3.89), but with scope for strengthening research collaboration capabilities.



However, the findings express moderate perceptions regarding AI integration (mean = 3.56), which reflect that extant systems lack advanced intelligent features such as automated metadata generation or predictive analysis. Support and training were rated (mean = 3.17) and the ongoing requirement of frequent capacity-building and technical assistance to ensure maximum system utilization was suggested. *Overall, the participants agreed that ILS improves operating efficiency (mean = 4.11) and allows for better resources management but that its usage for AI scholarly communication is not optimally utilized. Filling infrastructure gaps, training and integrating systems would also maximize the overall effect of ILS in library academic environments.*

Analysis of Interviews

Interviews with cataloging staff, ICT officers and librarians provided deeper perspectives on the use and acceptance of Integrated Library Systems (ILS) in Nigerian university libraries. The interviewees were in agreement that ILS has transformed the traditional library procedures, particularly in cataloging, circulation and material availability. Systems librarians averred: "Cataloguing was a laborious manual process prior to our coming on board with the ILS." And now, with automation, we can update and process records online and users can access materials through OPAC without the need for staff." The statement follows the questionnaire finding where 83.3% of the users agreed that ILS enables proper cataloging of resources (mean = 4.28), indicating a widespread feeling of more efficiency and accuracy in operation.

Similarly, ICT staff noted: "The system has greatly improved tracking of resources and their circulation. It is easy to track book loans and returns, although system downtime issues occasionally restrict access." This observation supports the result that ILS enables good monitoring of resource use. It is also consistent with the discovery that infrastructural problems such as unstable network connectivity and unpredictable power supply affect system performance in general.

However, some interviewees grumbled about the limited AI features in their current ILS tools. Heads of technical services declared: "Our system has not yet got AI functions like smart search or auto metadata creation. We still do most of it manually in those aspects." This supports the questionnaire finding where just 61.1% affirmed they concurred that ILS uses AI based tools (mean = 3.56). Moreover, interviewees identified training deficiencies as a persistent issue. Cataloguer said: "Most of us had only basic training when the system was first implemented. There



were no follow-up workshops or refresher courses ever since." This corresponds directly to the questionnaire result that a mere 50% of respondents interviewed said they felt adequately trained and supported (mean = 3.17). Despite these limitations, interview participants agreed that ILS greatly improved efficiency in resource management. University librarians encapsulated: "Even with the drawback, the ILS has made our operations quicker and more transparent. It's a big step forward from manual record keeping." This is in line with the quantitative finding where 77.8% agreed that ILS improves overall efficiency in resource management (mean = 4.11).

Both the interview and questionnaire analyses show significant consensus that ILS enhances cataloging precision, accessibility and workflow optimization in Nigerian university libraries. Both also concur on significant limitations: lack of training, inferior technical infrastructure and little AI integration. The intersection of both sources affirms that while ILS adoption has transformed core library functions, more development via AI integration, capacity building and infrastructure upgrade is essential for realizing complete optimization of its function in scholarly communication and resource management.

Objective three: identify the challenges that hinder the integration of GenAI and ILS in university library operations in Nigerian universities.

Table 5: Challenges Hindering the Integration of GenAI and ILS in University library Operations (n = 180)

Challenges	Strongly Agree (5)	Agree (4)	Undecided (3)	Disagree (2)	Strongly Disagree (1)	Mean	Std. Dev.
Inadequate ICT infrastructure (power, bandwidth, hardware)	108 (60.0%)	54 (30.0%)	9 (5.0%)	6 (3.3%)	3 (1.7%)	4.43	0.88
Insufficient funding for AI and digital systems	102 (56.7%)	57 (31.7%)	12 (6.7%)	6 (3.3%)	3 (1.7%)	4.39	0.91
Lack of skilled personnel to manage AI and ILS platforms	87 (48.3%)	69 (38.3%)	12 (6.7%)	9 (5.0%)	3 (1.7%)	4.27	0.97
Low awareness and resistance to technological change	72 (40.0%)	78 (43.3%)	15 (8.3%)	9 (5.0%)	6 (3.3%)	4.12	1.03
Limited institutional policy support and leadership commitment	69 (38.3%)	81 (45.0%)	18 (10.0%)	9 (5.0%)	3 (1.7%)	4.12	0.92



Data privacy and ethical concerns in AI applications	60 (33.3%)	84 (46.7%)	21 (11.7%)	9 (5.0%)	6 (3.3%)	4.02	1.05
Poor system interoperability between GenAI tools and ILS platforms	69 (38.3%)	72 (40.0%)	21 (11.7%)	12 (6.7%)	6 (3.3%)	4.03	1.00
Irregular training and professional development opportunities	63 (35.0%)	75 (41.7%)	21 (11.7%)	15 (8.3%)	6 (3.3%)	3.98	1.09

Table 5 data indicate that respondents identify a wide range of challenges to the operations of university libraries in Nigerian universities to adopt Generative AI and ILS. The most critical challenge identified was a dearth of ICT infrastructure, which had a mean of 4.43, indicating that low connectivity, poor power supply and outdated hardware significantly hinder automation and AI powered library services. Immediately following was insufficient funding (mean = 4.39), suggesting most institutions lack specific budgets for the procurement of advanced systems or updating license software. Lack of skilled staff (mean = 4.27) came in third, repeating the lack of human capacity for putting in place and maintaining advanced AI and ILS systems. It was reported by many respondents that technical expertise is mostly concentrated in ICT departments, with no or minimal inter-organizational] collaboration between librarians and system developers. Other important constraints are low change resistance and awareness (mean = 4.12) and weak institutional policy support (mean = 4.12). These reflect organizational barriers with management resistance and lack of vision hindering technology uptake. Ethical and interoperability concerns (means = 4.02 and 4.03, respectively) also emerged as moderate issues, illustrating that the challenge of data privacy as well as a lack of integration between AI driven tools and legacy ILS platforms remains. Last but not least, irregular training (mean = 3.98) also limits sustainability, showing that ongoing professional development is not institutionalized in most libraries. The study brings to light that effective incorporation of GenAI and ILS relies on plugging infrastructural gaps, investment, enhancing human capacity and the involvement of institutions. The study concluded that Integrated Library Systems are extremely effective in improving cataloging efficiency, resource availability and overall resource management in Nigerian university libraries but less so in AI driven scholarly communication due to inadequate training, lack of technical support and infrastructural challenges, highlighting the need for system improvement, capacity



building and further augmentation of AI integration to fully leverage their influence on university library operations.

Analysis of Interviews

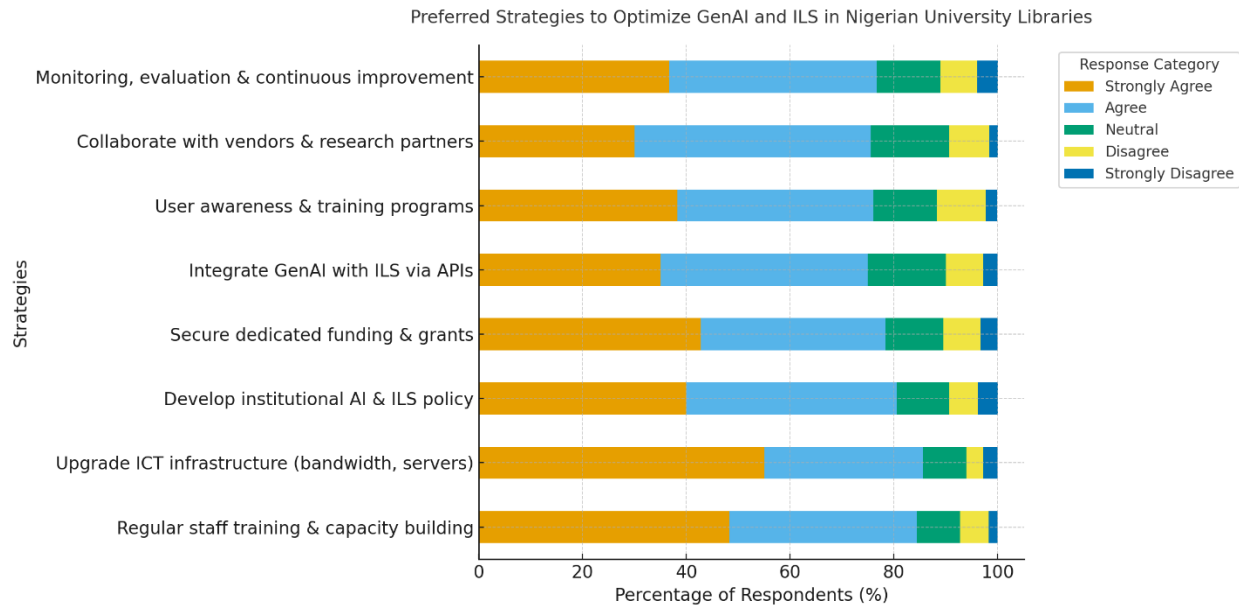
The qualitative interviews supplemented and deepened the quantitative findings, giving voice to the subtlety in the realities that were found behind the statistical patterns. Senior ICT administrators sought a federal university stated: "Our infrastructure is the biggest setback. Network downtime and unstable power mean we can't rely on the system for continuous AI driven services." This agrees with the questionnaire finding where 90% of respondents agreed that infrastructural inadequacy remains a significant barrier (mean = 4.43). Similarly, University librarians identified gaps in policy and funding: "There's enthusiasm for digital transformation, but the leadership and funding support aren't there. Without administrative will, AI projects are pilot projects." This corroborates the high mean ratings for insufficient funding (4.39) and lack of institutional policy support (4.12).

Another of the respondents mentioned the skills gap: "Most librarians possess minimal technical skills to operate AI integrated systems. We depend significantly on ICT staff who does not necessarily know library workflows." This is echoed in the survey result whereby 86.6% admitted a shortage of skilled people (mean = 4.27). Ethical issues also arose and these concerned data security and transparency of algorithms. It has been succinctly stated by a systems librarian, that "We need clear guidelines on data handling and privacy when integrating AI tools with user databases." "Right now, it's a grey area." This qualitative observation is reinforced by the quantitative finding (mean = 4.02) that ethical questions and data privacy are still open challenges. Quantitative and qualitative results alike all point to the final conclusion that infrastructural vulnerabilities, underfunding and lack of capacity are the most significant challenges to GenAI and ILS integration in Nigerian university libraries. Additionally, policy inconsistencies, ethical uncertainty and limited interoperability between existing systems also impede progress. But the interviews do show optimism among library professionals most of them believe that with specific investment, ongoing training and more focused policy guidance, Nigerian university libraries can effectively make the shift towards AI enhanced service environments.



Objective four: examine the strategies to optimize the use of GenAI and ILS for improving library productivity and user satisfaction in Nigerian universities.

Table 6



The most critical strategy to drive GenAI ILS adoption was ranked as infrastructure upgrade and staff training by the participants. Upgrading ICT infrastructure recorded the highest mean (≈ 4.29) with 85.6% (SA + A) in favor, which implies that stable power, servers and bandwidth are seen as foundational pillars for any AI enabled library services. Regular staff training and capacity building also obtained very high ratings (mean ≈ 4.22 ; SA + A = 84.4%), affirming the value of human capacity to operate and sustain GenAI augmented systems. Organizational-level measures initiating an AI & ILS policy and securing committed funding both received strong support (each mean ≈ 4.04), reflecting respondents' recognition that strategic leadership and funding are fundamental for converting pilot projects into sustainable services. Integration-focused strategies (Integrate GenAI with ILS via APIs; mean ≈ 3.94) and user-focused activities (user training & awareness; mean ≈ 3.95) were scored moderately-high, indicating enthusiasm for technical integration alongside training of users but with caution or perceived level of sophistication involved in doing so. Research and vendor partnership came in slightly lower (mean ≈ 3.86) but nevertheless was accepted (SA + A = 75.6%), showing that the majority of the respondents want



to view internal updates first before they are open to external partnership. Monitoring, evaluation and continuous betterment (mean ≈ 3.97) lagged behind but nevertheless shows that there is widespread agreement that feedback loops are needed in order to enhance deployments over time. The trend suggests a successful sequence of priorities fix infrastructure, train personnel, obtain policy/funding, integrate systems, educate users and regularly evaluate outcomes.

Analysis of Interviews

15 senior ICT officials and library managers were interviewed to supplement and enhance these quantitative findings. On infrastructure a senior ICT officer said: "We can't run reliable AI features with intermittent bandwidth and routine power cuts infrastructure first."

This reinforces the questionnaire priority ranking of upgrading infrastructure as number one. During training, a systems librarian further contributed: "Where features are present, staff feels too timid to use them; regular hands-on training would make that difference. This is consistent with the high rating of regular staff training and user training schemes." On policy and funding a group of university librarians commented: "Without a clear institutional policy and budget line for AI/ILS, initiatives remain fragmented and short-lived." This is echoed by formal policy and special funding backed by the survey. On integration and partnerships ICT managers had the view: "We need API-based integration rather than bolt-on tools." Vendor and research team collaborations can speed that up, if contracts are made open. This reinforces the moderate API integration and vendor collaboration preference shown in the poll. Regarding monitoring & evaluation, a library director expressed: "Pilots are useful, but we must evaluate, record lessons and scale on evidence." This is an affirmation of the call for M&E and iterative improvement.

Interview narratives always confirm the questionnaire order of priority. Interviewee respondents provided contextual reasons (e.g., electricity outages, lack of refresher training, shortage of budget lines and technical debt on legacy ILS) that explain why infrastructure and training ranked first in the survey. Interviews also revealed complexity: while most are in favor of vendor partnerships, cost and fit issues keep institutions cautious in explaining the questionnaire middle-of-the-line ranking for partnerships. Finally, interviewees ranked sequencing (infrastructure → training → policy/funding → integration) as against the pragmatic hierarchy proposed in the quantitative findings.



Discussion

The study revealed that while Integrated Library Systems have immensely improved cataloguing effectiveness, resource accessibility and information retrieval in Nigerian university libraries, the utilization and integration of Generative Artificial Intelligence tools are moderate. Most of the libraries demonstrated high competence in automating work processes of resource management through ILS such as Koha and Evergreen, which provided user satisfaction and operational accuracy. Several challenges, however, restricted the full integration of GenAI into ILS. Poor ICT infrastructure, inconsistent power supply, insufficient funding, lack of skilled personnel, low level of awareness, inoperability of legacy systems and ethical and data privacy concerns slow down the effective utilization. They are consistent with some recent empirical research studies. For instance, Atanda and Gbotosho (2025) indicated that AI adoption in Nigerian university libraries has great potential to enhance information retrieval, cataloging and user interaction, but, progress is delayed due to the weak ICT infrastructure, limited funding and technical capacity. Similarly, Suleiman et al. (2024) emphasized that while AI driven automation enhanced cataloguing and metadata management, ethical issues such as data privacy, intellectual property and algorithmic bias in addition to improper funding as well as fluctuating power supplies present the overall obstacle to wide-scale uptake. This vindicates the current research's observation that ethical and infrastructural issues inhibit GenAI usage.

The result of this study reveals that with high levels of GenAI tool awareness among Nigerian higher education ICT personnel and librarians, the actual use and adoption remain weak. The barriers to such poor use are poor ICT infrastructure, inadequate staff capacity and training, poor institutional support and ethical considerations regarding data privacy and bias. The qualitative interviews further confirmed that strategic planning, infrastructure investment, continuous professional education and policy guidelines are crucial for successful GenAI roll-out in Nigerian university libraries. This is attested to by a series of recent studies. Atanda and Gbotosho (2025) reported that the awareness of AI technologies is high among academic librarians, but, its application is hampered by poor finance, technological skill shortages and infrastructural deficits. Similarly, Edam-Agbor et al. (2025) also found that Nigerian librarians were adequately familiar with AI usage; nevertheless adoption was hindered by few training opportunities, institutional constraints and insufficient government funding. Likewise, Orubebe et al. (2025) found that though librarians recognize the potential of AI to enhance efficiency, challenges such as the lack



of infrastructure and insufficient technical knowledge hinder its widespread application. Consensus was achieved by Suleiman et al. (2024) who identified ethical challenges namely data privacy issues, algorithmic bias and accountability as important hindrances to the adoption of AI in Nigerian universities, besides lack of adequate institutional resources. Subsequently, Akinola (2023) observed that awareness of AI among library professionals continues to increase but resistance to change, ineffective strategic planning and weak infrastructural capability continue to serve as barriers to adoption.

There is consensus in the findings generated from both interview and questionnaire analyses that Integrated Library Systems enhanced cataloging accuracy, accessibility and workflow efficiency in Nigerian university libraries. The research also discovered significant constraints that include a lack of training opportunities, poor technical infrastructure and less application of Generative Artificial Intelligence (GenAI) tools. The alignment of the two sources is in support that ILS has transformed fundamental library functions such as cataloguing, circulation and resource management, achieving full optimisation in scholarly communication requires strategic investment in AI integration, staff capacity development and infrastructural support.

The findings of the study indicated that analyses of both the questionnaire and interview are in complete agreement that Integrated Library Systems have enhanced Nigerian university libraries' in the areas of cataloguing accuracy, accessibility and workflow automation. Nevertheless, the study also established convincing limitations which include limited training opportunities, inadequate technical infrastructure and absence of integration of Generative Artificial Intelligence tools. The convergence of both information sources guarantees that while ILS has transformed elementary library functions such as cataloguing, circulation and material management, total optimization for scholarly communication requires strategic investment in the integration of AI, capacity development of personnel and infrastructure enhancement. Such findings are underpinned by current empirical researches. For example, Atanda and Gbotosho (2025), in prospects and challenges of AI adoption in Nigerian academic libraries, pointed out that while librarians are mostly aware of the possibilities of AI, practical implementation remains limited because of infrastructural constraints and unavailability of skilled staff. Similarly, Odigie (2024), in exploring the awareness, use and challenges facing the integration of artificial intelligence in library services, posited that professional usage of AI is low owing to the absence of proper training and



institutional backing. Besides, Omeluzor (2020) found that use of ILS has greatly improved efficiency and precision in cataloging in Nigerian university libraries but is still limited by inadequate infrastructure and low technical capacity. The findings of the present study indicate that successful integration of Integrated Library Systems and Generative Artificial Intelligence in the library systems of Nigerian universities depends mainly on addressing infrastructural inadequacies, funding in terms of technology, capacity building in human resources and enthusiastic institutional engagement.

While the study demonstrates ILS to be immensely effective in improving cataloging precision, availability of resources and resource administration, its potential for facilitating scholarly communication through AI is hardly realized. This deficit is largely due to inadequate technical education, inadequate infrastructural support and poor institutional emphasis on AI adoption. Accordingly, the study asserts that for optimal yields from ILS in university library services, system interventions, continuous professional education and proactive AI assistance are required. These findings continue to be strongly corroborated by current research evidences. Atanda and Gbotosho (2025) reported that AI and ILS software have improved information retrieval and cataloging at Nigerian universities, however, uptake remains low due to infrastructural limitations, under-capitalization and lack of technical expertise among librarians. Similarly, Suleiman et al. (2024) highlighted ethical issues, trust and poor infrastructure as challenges to effective implementation of AI in Nigerian university library systems and emphasized digital the need preparedness and institutional readiness. In a parallel context, Igbo et al. (2025) stated that awareness and benefits from AI is widespread, but practice is hindered by a shortage of policy frameworks to underpin it, a lack of adequate technical capacities and an inadequate solid digital infrastructure. Consistent with prior studies, the interview narratives highlighted infrastructure and staff training limitations, electricity outage, poor budget planning and technical inadequacies hindered effective utilization of available ILS platforms. These are major issues in the Nigerian university libraries. However, majority of respondents show willingness for vendor collaboration, cost and fit concerns temper excitement, which explains prioritising partnerships as mid-priority and not high.

Moreover, interview participants suggest a cascade of action infrastructure first for actions supporting solutioning, then training personnel, then policy/funding and finally AI integration



highlighting what they see as a pragmatic way toward complete integration. Various recent studies confirm this trend. For instance, Zondi et al. (2024) in exploring implementation of AI in academic libraries, identified challenges including lack of infrastructure digital, human capital, policy frameworks, electricity supply, training and financial constraints as barriers to implementation. Similarly, Odigie (2024) identified low usage due to infrastructural deficits and a lack of technical training. In the same vein, Suleiman et al. (2024) pointed out that technological infrastructure limitations, staff incompetence and lack of appropriate policy/ethical frameworks are barriers to the adoption of AI.

Conclusion

This study concludes that while Integrated Library Systems have become fundamental tools in Nigerian university libraries, enhancing cataloguing accuracy, resource availability and workflow efficiency, their integration with Generative Artificial Intelligence remains limited. Findings from both the questionnaire and interview analyses are uniform in demonstrating that infrastructural deficiencies, inadequate staff training, lack of institutional support and ethical concerns are the major challenges hindering full integration. The study further indicates that the utilization of ILS in supporting AI driven scholarly communication and research collaboration is hindered by inadequate digital infrastructure, epileptic power supply and low awareness of advanced features. Furthermore, the study revealed that interview narratives corroborated the quantitative findings with contextual explanations such as power instability, lack of refresher training and insufficient funding. Participants emphasized that sustainable adoption of GenAI requires a sequential movement, starting with infrastructure development, followed by training, policy and funding support and finally system integration. Overall, the study concludes that Nigerian universities are in a mid-stage of digitalization: while they have made significant strides in ILS implementation, smoothing out GenAI integration will require strategic investment, policy harmony and institutional leadership.

Recommendations

1. Nigerian universities must invest in a robust ICT infrastructure, i.e., steady power, dependable servers, high internet bandwidth and scalable cloud-based systems, to host GenAI and ILS operations effectively.



2. Regular professional development activities must be put in place to develop librarians' technical competencies in GenAI applications, data analysis and intricate ILS modules. Periodic refresher workshops and vendor-sponsored training must be encouraged.
3. There should be clear policies and budgetary lines for university administrations and regulatory bodies such as the National Universities Commission (NUC) for AI incorporation in library services. This will include system upgrade funding, digital literacy training and technical upkeep.
4. Libraries should seek collaborative agreements with ILS and AI providers on software customization, maintenance and technical support. Partnership agreements, however, should prioritize cost-effectiveness, interoperability and institutional appropriateness.
5. Organizations should establish AI governance frameworks addressing ethical concerns, data privacy and transparency of algorithmic decision-making to facilitate responsible and equitable deployment of AI tools in library services.
6. University libraries should form research clusters to pilot AI driven projects and share best practices across universities, foster innovation and prevent duplication of effort in system development.
7. A pragmatic, step-by-step strategy needs to be adopted starting with capacity building and infrastructure, policy harmonization and subsequent integration of AI tools in ILS for research communication, predictive cataloguing and user services.

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