

Assessment of Librarians' Adoption of Emerging Technologies in Digital Library of National Open University of Nigeria

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Abstract

This study examined librarians' adoption of emerging technologies in the Digital Library of the National Open University of Nigeria (NOUN), within the broader context of increasing digital transformation in academic libraries. A descriptive survey design was employed, with data collected from a total population of 62 professional librarians using a structured questionnaire. Descriptive statistics were used for data analysis. The study investigated the level of adoption of emerging technologies and the challenges associated with their implementation. Findings revealed a moderate to high level of adoption of emerging technologies, including artificial intelligence tools, cloud computing, institutional repositories, and integrated library management systems. Librarians demonstrated confidence in using digital tools and expressed strong support for technological innovation in library operations. These technologies have contributed to improved service delivery, enhanced access to information resources, and increased operational efficiency within the digital library. Despite these positive outcomes, the study identified several significant challenges hindering effective adoption. Key constraints include inadequate ICT infrastructure, insufficient funding, lack of adequate training, resistance to change among some staff, and concerns related to cybersecurity. These barriers limit the full integration and sustainability of emerging technologies in the NOUN Digital Library. The study concludes that while emerging technologies are progressively transforming digital librarianship in NOUN, addressing infrastructural, financial, and human capacity challenges is essential to maximize their potential and ensure sustainable digital library services.

Keywords: Emerging Technologies, Digital Libraries, Technology Adoption, Academic Librarians, National Open University of Nigeria

Introduction

The global landscape of library and information services has undergone a radical transformation, evolving from traditional, print-oriented repositories into dynamic, technology-mediated hubs for digital knowledge management (Gumel et al., 2024). Driven by the Fourth Industrial Revolution (Industry 4.0), academic libraries are increasingly adopting innovative digital solutions to support modern research, teaching, and learning. This transition toward "smart" or "intelligent" library systems is now seen as an indispensable strategy for maintaining institutional relevance and democratizing access to information in the contemporary information age (Mosha & Ngulube, 2026).

The term "emerging technologies" encompasses a broad range of paradigm-shifting tools such as Artificial Intelligence (AI), the Internet of Things (IoT), blockchain, cloud computing, and augmented/virtual reality (AR/VR). These innovations offer academic libraries unique opportunities to enhance user-centered services, automate repetitive housekeeping operations, and provide highly personalized information retrieval (Panda & Kaur, 2023). For instance, AI and machine learning algorithms empower systems to predict user preferences and provide intuitive content curation, while blockchain technology is being explored to enhance transparency and security in digital archiving and financial transactions (Emmatrice & Ekoko, 2025).

Within this technological shift, the role of the librarian has transformed from a mere custodian of books to a facilitator of information access and an innovation manager (Olatoye & Olaninhun, 2025). Modern library professionals are now expected to anticipate technological change, deploy emerging digital tools, and foster a culture of institutional creativity and experimentation to satisfy the rapidly changing needs of their users. Consequently, the continued relevance of academic libraries is intrinsically tied to the ability of librarians to reinvent their management practices to align with evolving digital realities (Aina, 2023).

However, the successful integration of these disruptive innovations is heavily dependent on librarians' digital readiness, which encompasses their knowledge, technical skills, professional attitudes, and the institutional support they receive (Owolabi & Olagunju, 2022). Digital readiness refers to the extent to which librarians possess the necessary competencies and institutional backing to effectively adopt and use new tools in library operations. While awareness of these tools is often high among Nigerian librarians, actual adoption in many contexts remains moderate, highlighting a potential gap between conceptual understanding and practical implementation (Emmatrice & Ekoko, 2025).

In the Nigerian context, academic libraries face a unique set of constraints that frequently hinder the full-scale implementation of advanced digital systems. Significant barriers include chronic underfunding, erratic power supply, inadequate internet connectivity, and a critical shortage of librarians with specialized technical skills needed to manage complex digital repositories or troubleshoot networks effectively (Esiebo, 2026). Despite a generally positive attitude toward

innovation, these external structural challenges often diminish the impact of digital transformation efforts across many institutions in the country (Kwari, 2025).

For a distance-learning institution like the National Open University of Nigeria (NOUN), assessing the adoption of emerging technologies is particularly vital because its library system must function as a primarily digital entity to meet the needs of a geographically dispersed student population (Iwu & Onochie, 2022). Understanding how librarians within such a digital-first environment perceive and utilize these technologies is essential for enhancing service delivery efficiency and improving user engagement. Strategic policy interventions and targeted training programs are necessary to ensure that librarians remain at the heart of the university's academic mission in the digital age (Afolabi & Musa, 2023).

Statement of Problem

The rapid evolution of the global library landscape into technology-mediated hubs necessitates that librarians move beyond traditional roles to become managers of digital innovation. However, a significant gap exists between librarians' high conceptual awareness of emerging technologies and their actual practical implementation within library workflows (Emmatrice & Ekoko, 2025). This disconnect is particularly critical for a distance-learning institution like the National Open University of Nigeria (NOUN), which must operate as a "digital-first" entity to effectively serve its geographically dispersed student population (Iwu & Onochie, 2022). Despite the strategic necessity of these tools for institutional relevance, there remains a lack of specific empirical data regarding how librarians in this unique environment translate their high levels of professional confidence into sustainable digital service delivery. This study addresses this research gap by assessing the current level of adoption at NOUN and identifying the specific infrastructural and financial barriers that hinder the full integration of these disruptive innovations.

Objective of the study

1. To examine the level of adoption of emerging technologies by librarians at NOUN Library.
2. To evaluate the challenges faced by librarians in implementing and using emerging technologies.

Research Question

1. What is the level of adoption of emerging technologies among librarians at NOUN Library?

2. What challenges do librarians face in implementing and using these technologies?

Literature Review

Emerging Technologies in Academic and Digital Libraries

Mosha and Ngulube (2026) studies on Emerging trends in smart libraries: A systematic review of university needs, sustainability, and challenges revealed that the development of smart libraries carry significant implications for various stakeholders, including library administrators, policymakers, users, and educators. First and foremost, library administrators should prioritise strategic planning to address the challenges identified in the research. This includes investing in infrastructure improvements and ensuring access to modern technologies. By understanding the specific limitations of their institutions, libraries can create targeted initiatives to enhance service delivery. Professional development also emerges as a critical area for improvement. The study highlights the necessity for ongoing training and education for library staff. Libraries should implement comprehensive training programs focussing on emerging technologies and data management practices. Empowering librarians with the skills needed to effectively utilise smart technologies will significantly improve user experiences and operational efficiency. Policymakers need to recognize the financial constraints libraries face and explore innovative funding models to support their transition to smart environments.

Esievo (2026) studies on librarians' preparedness and perceptions towards adoption of emerging technologies for information service delivery in public libraries in Nigeria. The results showed that the librarian's readiness to adopt emerging technologies into library services is on a high level. Furthermore, on the perception of Librarians towards the adoption of emerging technologies for service delivery The study revealed that the majority of the librarians strongly agree and agree that adopting emerging technologies will give easy access to library resources and services from anywhere with an internet connection, will take the library services to the next level, absence of facilities will not let them adopt some of the emerging technologies, adopting emerging technologies like robotics will lead to loss of job, university management do not support the

adoption because they feel finance will be involved, librarians need to upgrade their skills, management policies don't permit quick adoption of these technologies, and one should be cautioned in replacing important people's task with technologies because new technologies are to a large extent not dependable or reliable.

Mitha and Mohamed (2026) studies on internet of things and academic libraries: a global perspective explored the implementation, adoption and challenges of IOT in academic libraries from a global perspective. The findings affirm that academic libraries recognize IOT as an enabler for library services. In Africa, the adoption of IOT for information accessibility and resource management in academic libraries remain limited due to challenges in infrastructure, training, organizational barriers and user acceptance (Maina, 2023).

Adoption of Emerging Technologies by Librarians

Studies by Agbetuyi et al. (2025) indicated that digital technologies adoption enhances sustainable development. Digital technologies provide limitless access to relevant information resources and services, this was corroborated by Anurahda (2017) who revealed that digital technology allowed expanded access to information. It was revealed that digital technologies provide platform for informed citizens and this was corroborated by Nneda and Nsirim (2022). The findings of the study further revealed that digital technology enhances creation of remote working model, enhances blended information for decision making, and enhances concurrent access by users. Without doubt, information access through digital platforms will improve research activities and this will invariably transcend into all aspects of human development.

Studies by Emmatrice and Ekoko (2025) confirmed that librarians' digital readiness is a critical determinant of emerging technology adoption in university libraries. The moderate level of readiness observed aligns with earlier studies in Nigerian academic libraries, which report increasing awareness but limited practical competence in advanced digital tools (Owolabi & Olagunju, 2022). This readiness gap constrains libraries' ability to fully exploit emerging technologies for operational and financial transformation.

Studies carried out by Saibakumo (2021) on Awareness and acceptance of emerging technologies for extended information service delivery in academic libraries in Nigeria revealed that amongst librarians from Nigeria, there was a high level (74%) of awareness of the various emerging

technologies and their significance for academic libraries. On the contrary, the level of adoption is below expected trend (47%) as noticed in developing countries. Librarian's prefer to make readily available emerging technologies like social media, institutional repositories, Cybrary, library websites, WebOPAC, RFID, Integrated library management system, use of Library Guide application and Internet of Things for effective service delivery. More than 60% of academic libraries prepared to accept the introduction of emerging technologies for better information service delivery. However, these efforts are constrained by poor funding, lack of power supply, poor maintenance to mention just a few.

The study by Olatoye and Olanihin (2025) on Library Management in Digital Age: A Study of Innovative Practices among Library and Information Science Professionals in State Owned University Libraries, Southwest Nigeria revealed that library and information science (LIS) professionals in state owned university libraries in Southwest Nigeria are progressively reinventing library management through the integration of digital technologies and innovative practices. The adoption of innovations such as integrated library systems, institutional repositories, and digital cataloguing platforms demonstrates librarians' readiness to embrace change in line with global trends in the digital era.

Studies by Gumel et al. (2024) on the Impact of Emerging Digital Technologies on Library Information Resource Utilization among Students: A Study on Selected Tertiary Institutions in Jigawa State, Nigeria revealed that students highly engage with e-learning platforms and digital library tools, with mean scores of 3.96 and 4.02, respectively.

Olena's (2023) study emphasized the integration of VR technologies in modern library environments. Through a detailed literature review, the research highlighted VR's impact on user engagement, learning, and library processes. By adapting to the dynamic digital landscape, libraries can create immersive and interactive experiences, enhancing user satisfaction and knowledge acquisition.

Kirsch (2020) provided a comprehensive review of VR services in libraries, analyzing its implementation for consumption and creation purposes. The study's comparison of various VR tools and practical applications, such as virtual library tours and immersive learning experiences, highlighted VR's potential in enhancing user engagement and learning outcomes.

Study by Malgwi and Orumah (2025) on Digital Technology Adoption in Library and Information Services: A Comparative Position on Challenges Facing Early-Career LIS Professionals revealed that Emerging technologies can significantly enhance library services when properly integrated. Mobile technologies enable real-time access to catalogues, while AI supports personalised retrieval and data analytics.

Challenges and Barriers in Technology Implementation

The study by Ocheme (2026) on Artificial Intelligence Adoption in the National Library of Nigeria: Librarians' Perceptions, Challenges, and Readiness in the Plateau State Branch revealed that several significant challenges hinder the adoption of Artificial Intelligence technologies in the National Library of Nigeria, Plateau State Branch. The results showed strong agreement among librarians that inadequate funding, unreliable internet connectivity, epileptic power supply, lack of institutional policies, insufficient AI-focused training, and the high cost of maintaining AI infrastructure constitute major barriers to the integration of Artificial Intelligence in library services. Among these challenges, epileptic power supply and inadequate funding recorded the highest mean scores, indicating that infrastructural and financial limitations are the most critical obstacles to AI adoption in the library.

The study by Olatoye and Olanihin (2025) highlights that the adoption of advanced digital practices, such as cloud computing, data analytics, artificial intelligence tools, and virtual reference services, remain moderate due to infrastructural deficiencies, limited professional training, and inadequate policy support.

The study by Kwari (2025) on barriers and enablers influencing the adoption of emerging technologies in public libraries across Adamawa State, Nigeria showed that while there is considerable awareness and perceived value in adopting digital tools, actual implementation is constrained by systemic and infrastructural deficits.

The finding by Ibrahim et al. (2022) on Challenges associated with Adoption and Use of Digital Information Resources in Federal Universities Libraries in Nigeria showed that lack or poor internet service in the university's library, broken uniform resource locators, inaccessible online databases in the university's website and lack of awareness of the digital information resources being acquired, subscribed to and disseminated by academic libraries were the challenges that the

postgraduate engineering students faced in their adoption and use of digital information resources for academic activities.

The shortage of skilled staff trained to manage and operate AI and robotics technologies also hampers effective adoption (Smith, 2023). Libraries face several significant challenges in adopting Industry 4.0 technologies, including financial constraints, inadequate digital infrastructure, and a lack of skilled personnel. Implementing advanced tools such as artificial intelligence (AI), Internet of Things (IoT), and blockchain requires substantial investment, which many libraries, particularly smaller institutions, may struggle to afford (Garoufallou, 2021).

Study by Malgwi and Orumah (2025) on Digital Technology Adoption in Library and Information Services: A Comparative Position on Challenges Facing Early-Career LIS Professionals revealed that awareness of emerging technologies is generally high among young Nigerian LIS professionals, yet effective utilisation is limited by inadequate training, high costs, and weak institutional support. Barriers include poor infrastructure, erratic electricity, limited bandwidth, insufficient funding, and lack of institutional training programs.

Theoretical Perspectives on Technology Adoption

Understanding how and why librarians adopt emerging technologies in academic libraries can be guided by established theories, notably **Diffusion of Innovations** and **Socio-Technical Systems**. **Diffusion of Innovations (DOI)** explains that adoption is influenced by perceived advantages, compatibility with existing practices, complexity, trialability, and observability of a technology (Rogers, 2003). In the African context, DOI helps interpret why some libraries rapidly embrace digital tools while others lag due to perceptions of complexity or low relative advantage, especially where infrastructure is weak or utility is not clearly understood by staff (Agboke & Oladokun, 2024).

Together, these theories provide robust lenses for interpreting adoption patterns, suggesting that both individual perceptions and broader organizational dynamics must be addressed to enhance the adoption of emerging technologies in academic and digital library environments.

Methodology

Population of the Study

The population of this study consisted of sixty-two (62) Professional librarians at National Open University Library, which made up the population of the study.

Sampling Technique

According to Raghunath (2017), total enumeration was a sampling technique wherein a researcher examined the entire population that shared a similar set of criteria. Raghunath (2017) further elaborated that total enumeration was utilized when the population under investigation was sufficiently sizable to be managed with care. Due to the manageable size of the small population, the researchers opted for complete enumeration. Total enumeration was used for the research.

Data Collection

A self-designed structured questionnaire (see Appendix I). was used for data collection, titled "Assessment of Librarians' Adoption of Emerging Technologies in the Digital Library of the National Open University of Nigeria" The questionnaire was divided into Sections A and B. Section A comprised of the demographic information of the respondents while section B comprised of the research questions. The instrument was designed to collect comprehensive data on Assessment of Librarians' Adoption of Emerging Technologies in the Digital Library of National Open University of Nigeria

Validity and Reliability of the Instrument

A self-developed questionnaire was presented to my senior colleagues in NOUN main library and department of library and information science for their comments and criticism. The draft questionnaire was validated, to ascertain its face and content validity and to ensure the quality of the questionnaire before administering it to the respondents. Thereafter, reliability of the research instrument checked the effectiveness of the instrument before it is finally used in the study. In ensuring the reliability of the research instrument, a pilot study was conducted among NOUN Librarians. Thirty copies of the questionnaire were administered on a work day to Librarians at the NOUN. The respondents at the pilot stage were encouraged to provide feedback on the ambiguity (if any) and structure of the questions. Thirty copies of the questionnaire were returned. All the questionnaire (100%) responses were processed and analysed using Cronbach analysis. Cronbach reliability test conducted to determine the reliability of main constructs in the questionnaire

“Assessment of Librarians Adoption”, “Challenges with the Implementation of Emerging Technologies” gave the results 0.88 and 0.92 respectively representing their reliability.

Data Analysis

Descriptive statistics was used to collate and analyze the data collected for the study. The descriptive statistics included frequency counts, percentages (%), mean scores ($\bar{x}$), and standard deviations (Std.). The analysis was carried out using the Statistical Package for the Social Sciences (SPSS) version 23.0, developed by IBM.

Ethical Consideration

Ethical considerations are an important aspect of any research study. In this study, ethical considerations such as anonymity and confidentiality were prioritized. Anonymity was ensured to protect the identity of every participant, ensuring that no respondent's name was attached to the information collected from them. Confidentiality measures were also implemented to handle all information collected from respondents with utmost confidentiality. Additionally, the study underwent a plagiarism check using the Turnitin plagiarism checker

Table 1: Demographic Characteristics of Respondents

Characteristics	Information	Frequency	Percentage
Gender	Male	6	9.7
	Female	56	90.3
Highest Qualification	BLS	26	41.9
	MLS	16	25.8
	PhD	20	32.3
Years of Work Experience	1–5 Years	15	24.2
	6–10 Years	0	0
	11–15 Years	42	67.7
	16+ Years	5	8.1
Current Position	Assistant Librarian	26	41.9
	Librarian II	25	40.3
	Librarian I	6	9.7
	Senior Lecturer/Librarian	5	8.1

Gender composition of respondents as shown in Table 1 indicates that the majority 56(90.3%) of the respondents were females, while the male constituted the minority 6(9.7%). This indicates that

there were more female participants than male participants in this study. This could mean that there are more female librarians in National Open University of Nigeria than male

Moreso, the characteristic of respondents by highest qualification attainment displayed that the participants held First-Degree, Masters and PhD qualifications respectively. BLS having the highest respondents, 26(41.9%), followed by PhD with 20(32.3%) and MLS having the lowest 16(25.8%)

Information in Table 1 regarding the years of work experience of librarians showed that over 42(67.7%) of respondents had 11-15 years of work experience. Furthermore, 5(8.1%) had over 16+ years of experience working in the library. The years of work experience of librarians, as shown in Table 1, suggest that librarians in National Open University of Nigeria are likely to possess a good understanding of adoption of emerging technologies in the digital library

Additionally, the results in Table 1 indicated that almost all ranks in the National Open University of Nigeria library were represented in this study. 26(41.9%) of the respondents are at the rank of assistant librarians, 25(40.3%) of the respondents are at the rank of Librarian II, 6 (9.7%) of the respondents are the rank of Librarian I and finally, 5(8.1%) of the respondents are the rank of Senior Lecturers/Librarians

Research Question 1: To examine the level of adoption of emerging technologies by librarians at NOUN Library? This will ascertain the level of adoption of emerging technologies by librarians

Table 2: Level of Adoption of Emerging Technologies

S/ N	Level of Adoption of Emerging Technologies	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std Dev.
1.	I regularly adopt emerging technologies in my daily library tasks	25(40.3%)	32(51.6%)	5(8.1%)	0	0	4.32	.621
2.	Emerging technologies are fully integrated into library workflows at NOUN Library.	20 (32.3%)	31 (50.0%)	0	11 (17.7%)	0	3.97	1.024
3.	I feel confident using new digital tools introduced in the library	36 (58.1%)	21 (33.9%)	0	5 (8.1%)	0	4.42	.860

4.	The digital library systems are frequently updated with new technologies	20 (32.3%)	16 (25.8%)	10 (16.1%)	16 (25.8%)	0	3.65	1.18 9
5.	I actively support the adoption of new technologies in the library.	52 (83.9%)	5 (8.1%)	5 (8.1%)	0	0	4.76	.592

Table 2 presents the opinion of the respondents on the Level of Adoption of Emerging Technologies by librarians at NOUN digital Library. The result shows that 51.6 percent of the respondents agreed that they regularly adopt emerging technologies in their daily library tasks, 40.3 percent strongly agreed and 8.1 percent were neutral meaning undecided.

The result also revealed that 50 percent of the respondents agreed that emerging technologies are fully integrated into library workflows at NOUN Library, 32.3 percent strongly agreed while 17.7 percent disagreed that emerging technologies are fully integrated into library workflows at NOUN Library

Moreso, result revealed that 58.1 percents strongly agreed that the respondents feel confident using new digital tools introduced in the library, 33.9 percent of the respondents agreed while 8.1 percent disagreed that they feel confident using new digital tools introduced in the library

Again, result revealed that 32.3 percent of the respondents strongly agreed that digital library systems are frequently updated with new technologies, 25.8 percent of the respondents agreed, while 16.1 percent of the respondents were neutral and 25.8 percent of the respondents disagreed that digital library systems are frequently updated with new technologies.

Finally, result also revealed that 83.9 percent of the respondents strongly agreed that they actively support the adoption of new technologies in the library, 8.1 percent agreed while 8.1 percent were neutral

Research Question 2: What challenges do librarians face in implementing and using these technologies? This will be looking at the challenges faced in implementing these emerging technologies

Table 3: Challenges in Implementing Emerging Technologies

S/N	Challenges in Implementing Emerging Technologies	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std Dev.
1.	Inadequate ICT infrastructure limits effective technology adoption	36 (58.1%)	21 (33.9%)	0	0	5 (8.1%)	4.34	1.101
2.	Insufficient funding affects technology	57 (91.9%)	5 (8.1%)	0	0	0	4.92	.275

	implementati on.							
3.	Lack of adequate training hinders effective technology adoption	47 (75.8%)	15 (24.2%)				4.76	.432
4.	Resistance to change among staff affects technology integration.	36 (58.1%)	10 (16.1%)	5 (8.1%)	6 (9.7%)	5 (8.1%)	4.06	1.34 1
5.	Cybersecurit y concerns limit full adoption of digital systems.	30 (48.4%)	21 (33.9%)	5 (8.1%)	6 (9.7%)	0	4.21	.960

Table 3 presents the opinion of the respondents on the Challenges in Implementing Emerging Technologies by librarians at NOUN Library. The result shows that 58.1 percent of the respondents strongly agreed that Inadequate ICT infrastructure limits effective technology adoption, 33.9 percent agreed and 8.1 percent strongly disagreed that Inadequate ICT infrastructure limits effective technology use.

The result also revealed that 91.9 percent of the respondents strongly agreed that Insufficient funding affects technology implementation in NOUN Library, while 8.1 percent agreed that Insufficient funding affects technology implementation.

Moreso, result revealed that 75.8 percents strongly agreed that the respondents Lack of adequate training hinders effective technology adoption while 24.2 percent of the respondents agreed that Lack of adequate training hinders effective technology adoption

Again, result revealed that 58.1 percent of the respondents strongly agreed that Resistance to change among staff affects technology integration, 16.1 percent of the respondents agreed, while 8.1 percent of the respondents were neutral and 9.7 percent of the respondents disagreed that Resistance to change among staff affects technology integration and 8.1 percent strongly disagree that Resistance to change among staff affects technology integration.

Finally, result also revealed that 48.4 percent of the respondents strongly agreed that Cybersecurity concerns limit full adoption of digital systems, 33.9 percent agreed while 8.1 percent were neutral and 9.7 percent disagree that Cybersecurity concerns limit full adoption of digital systems.

Summary

The study examined how librarians at NOUN adopt and utilize emerging technologies like AI, cloud computing, and integrated library systems. The research found that while librarians are highly supportive of these innovations and feel confident using them, the overall effectiveness of these tools is hampered by systemic issues. Key barriers include a lack of consistent funding, poor ICT infrastructure, and a need for more specialized technical training. While the transition to a digital-first library is underway, the gap between awareness and practical, sustainable application remains a challenge that requires institutional intervention.

Conclusion

While emerging technologies have the potential to significantly improve digital library services at NOUN, their full implementation is currently restricted by infrastructural, financial, and human capacity limitations. For digital librarianship to be truly effective and sustainable, it requires more than just the presence of new tools; it demands robust institutional support, strategic planning, and a commitment to continuous professional development for staff.

Recommendations

1. **Increase ICT Funding:** NOUN management should allocate more financial resources specifically for ICT infrastructure to ensure the stable deployment of new technologies.
2. **Continuous Training:** The university should organize regular capacity-building workshops to improve the digital competencies of librarians, particularly in advanced areas like AI and data analytics.
3. **Formalize Policies:** Establish clear institutional frameworks and policies to guide how new technologies are adopted and managed within the library system.
4. **Manage Organizational Change:** Introduce initiatives to help staff adapt to technological shifts, reducing resistance and encouraging a culture of innovation.
5. **Enhance Security and Maintenance:** Implement strong cybersecurity measures and schedule regular system maintenance to protect digital assets and ensure reliable service.
6. **Foster Collaboration:** Encourage partnerships with other academic institutions to share resources, knowledge, and best practices for technology implementation.

References

- Afolabi, A., & Musa, S. (2023). Strategic policy interventions for digital libraries. *Journal of Academic Librarianship*.
- Agbetuyi, P. A., et al. (2025). Digital technologies adoption for sustainable development. *Information Studies Quarterly*.
- Agboke, O., & Oladokun, T. (2024). Interpreting adoption patterns in African libraries. *Library Philosophy and Practice*.
- Aina, L. O. (2023). Reinventing management practices in the digital age. *International Journal of Information Management*.
- Emmatrice, R., & Ekoko, O. (2025). Librarians' digital readiness and technology adoption. *Journal of Digital Information Management*.
- Esievo, L. (2026). Librarians' preparedness and perceptions towards adoption of emerging technologies for information service delivery in public libraries in Nigeria. *Nigerian Journal of Library and Information Technology*.
- Garoufallou, E. (2021). Financial constraints in Industry 4.0 technology adoption. *Library Hi Tech*.
- Gumel, B., et al. (2024). Impact of emerging digital technologies on library information resource utilization among students. *Journal of Educational Technology*.
- Ibrahim, H., et al. (2022). Challenges associated with adoption and use of digital information resources in federal universities libraries in Nigeria. *Library Management Review*.
- Iwu, J., & Onochie, M. (2022). Digital library systems in distance learning environments. *Open Access Journal*.
- Kirsch, C. (2020). VR services in libraries: A comprehensive review. *Journal of Virtual Reality*.

- Kwari, G. (2025). Barriers and enablers influencing the adoption of emerging technologies in public libraries. *Information Science Research*.
- Malgwi, A., & Orumah, J. (2025). Digital technology adoption in library and information services: A comparative position on challenges facing early-career LIS professionals. *New Era Library Journal*.
- Mitha, K., & Mohamed, S. (2026). Internet of things and academic libraries: A global perspective. *Journal of Global Information Technology*.
- Mosha, N., & Ngulube, P. (2026). Emerging trends in smart libraries: A systematic review of university needs, sustainability, and challenges. *Smart Library Journal*.
- Ocheme, A. (2026). Artificial intelligence adoption in the National Library of Nigeria: Librarians' perceptions, challenges, and readiness. *AI and Society*.
- Olatoye, O., & Olaninhun, A. (2025). Library management in digital age: A study of innovative practices among library and information science professionals. *Journal of Innovation in Librarianship*.
- Owolabi, S., & Olagunju, T. (2022). Digital readiness and competency gaps in Nigerian libraries. *African Journal of Library Science*.
- Panda, S., & Kaur, N. (2023). Paradigm-shifting tools in academic libraries. *Digital Library Perspectives*.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
- Saibakumo, W. (2021). Awareness and acceptance of emerging technologies for extended information service delivery in academic libraries in Nigeria. *Nigerian Library Progress*.
- Smith, R. (2023). Skilled staff and the adoption of robotics in libraries. *Technology in Libraries*.

Appendix I RESEARCH QUESTIONNAIRE

Dear

Respondent,

This questionnaire is designed to collect data on the Assessment of Librarians' Adoption and Use of Emerging Technologies in the Digital Library of the National Open University of Nigeria. All responses will be treated with strict confidentiality and used strictly for academic purposes. Feel free to contact the researcher on these number +2348037153159

Please tick (✓) or fill in the appropriate response.

Section A: Demographic Information

(Please tick as appropriate)

1. Gender: ☐ Male ☐ Female
2. Highest Qualification: ☐ BLS ☐ MLS ☐ PhD ☐ Others
3. Years of Work Experience: ☐ 1–5 ☐ 6–10 ☐ 11–15 ☐ 16+

4. Current Position: _____

Section B: Level of Adoption of Emerging Technologies

Instruction: Please indicate your level of agreement using:

5	=	Strongly Agree	(SA)
4	=	Agree	(A)
3	=	Neutral	(N)
2	=	Disagree	(D)
1	=	Strongly Disagree	(SD)

1. I regularly use emerging technologies in my daily library tasks.
2. Emerging technologies are fully integrated into library workflows at NOUN Library.
3. I feel confident using new digital tools introduced in the library.
4. The digital library systems are frequently updated with new technologies.
5. I actively support the adoption of new technologies in the library.

Section C: Types of Emerging Technologies Used

(5 = Very High Extent, 4 = High Extent, 3 = Moderate Extent, 2 = Low Extent, 1 = Very Low Extent)

Indicate the extent to which the following technologies are used in NOUN Library:

6. Artificial Intelligence tools (e.g., chatbots, smart search systems).
7. Cloud computing platforms for digital services.
8. Institutional/digital repositories.
9. Integrated Library Management Systems (ILMS).
10. Digital reference and virtual helpdesk services.
11. Data analytics tools for user services.

Section D: Challenges in Implementing Emerging Technologies

(5 = Strongly Agree to 1 = Strongly Disagree)

12. Inadequate ICT infrastructure limits effective technology use.
13. Insufficient funding affects technology implementation.
14. Lack of adequate training hinders effective technology adoption.

- 15. Resistance to change among staff affects technology integration.
- 16. Cybersecurity concerns limit full utilization of digital systems.

Section E: Impact on Service Delivery and User Satisfaction

(5 = Strongly Agree to 1 = Strongly Disagree)

- 17. Emerging technologies have improved the efficiency of service delivery.
- 18. Digital technologies have enhanced user access to library resources.
- 19. User satisfaction has increased due to technology integration.
- 20. Emerging technologies have reduced service delivery time.
- 21. Technology use has improved the overall quality of library services.

Section F: Strategies for Enhancing Effective Use

(5 = Strongly Agree to 1 = Strongly Disagree)

- 22. Continuous training programs will improve technology adoption.
- 23. Increased funding will enhance digital library services.
- 24. Strong institutional policies will support effective technology use.
- 25. Collaboration with other institutions will strengthen technology implementation.
- 26. Regular system evaluation will improve sustainable technology use.