

Impact of Information Technology Innovation on Digital Library Services in Academic Libraries, Nigeria

Philip Gana MALGWI (PhD)¹; Nkem Emilia ORSU (CLN)²; Aborisade Mariam OYINDA (CLN)³

¹Department of Library and Information Science, Federal University Otuoke, Bayelsa State

ORCID: <https://orcid.org/0000-0002-4059-0071>

Corresponding Author: philmalgwi@gmail.com

²Nnamdi Azikiwe Library, University of Nigeria, Nsukka

³Department of Library and Information Science, Osun State University, Osogbo

Abstract

The rapid advancement of Information Technology (IT) has significantly transformed the structure and service delivery mechanisms of academic libraries worldwide. In Nigeria, academic libraries are increasingly integrating innovative technologies to enhance digital library services and improve access to scholarly information. This study presents a narrative review of the literature on the impact of IT innovation on digital library services in Nigerian academic libraries. Drawing on recent empirical and conceptual studies (2020–2025), the review examines how emerging technologies influence access to information, service efficiency, user satisfaction, and librarians' professional roles. The study adopts a narrative review methodology, synthesizing peer-reviewed literature from reputable databases to identify key trends and challenges. Findings reveal that IT innovation has improved digital library services through enhanced accessibility, automation, and user-centred service models. However, persistent challenges such as inadequate infrastructure, poor funding, and limited digital competencies hinder optimal implementation. The study concludes that while IT innovation offers transformative potential, its effectiveness depends on institutional readiness and strategic investment. The paper recommends policy reforms, infrastructural development, and continuous professional training to strengthen digital library services in Nigeria.

Keywords: Academic libraries; artificial intelligence; digital library services; emerging technologies; information technology innovation; Nigeria.

Introduction

Academic libraries have traditionally served as the intellectual hub of higher institutions, supporting teaching, learning, and research activities. However, the emergence of Information Technology (IT) has fundamentally altered the landscape of library and information services. The transition from print-based systems to digital environments has introduced new paradigms in information access, organisation, and dissemination. In this digital age, academic libraries are expected to provide seamless, efficient, and remote access to information resources, thereby necessitating the integration of innovative technologies into their operations. However, the emergence of Information Technology (IT) has fundamentally transformed the traditional roles and functions of libraries, shifting them from physical repositories of information to digitally driven knowledge systems. This transformation is largely driven by the increasing demand for instant, remote, and seamless access to scholarly resources in a globalised information environment.

Globally, academic libraries are leveraging emerging technologies such as artificial intelligence (AI), cloud computing, big data analytics, and digital repositories to enhance service delivery (Adetayo & Olatokun, 2021; Mishra & Yadav, 2021). These innovations have enabled libraries to provide personalised services, improve information retrieval systems, and support digital scholarship. In developing countries, particularly Nigeria, the adoption of IT innovation is gaining momentum as institutions strive to remain relevant in the digital age. In Nigeria, the adoption of IT innovations in academic libraries has gained momentum in response to the growing demand for digital information services. Technologies such as institutional repositories, cloud computing, artificial intelligence, and mobile applications are increasingly being deployed to enhance service delivery.

Despite these advancements, the integration of IT innovation in Nigerian academic libraries remains uneven. Challenges such as inadequate infrastructure, unstable power supply, and limited funding continue to hinder effective implementation (Kabir & Ootobo, 2022). Consequently, there is a need for a comprehensive synthesis of existing literature to understand the extent of IT innovation's impact on digital library services in Nigeria. This study, therefore, provides a comprehensive narrative review of the impact of IT innovation on digital library services in Nigerian academic libraries, with a view to identifying trends, challenges, and research gaps.

Objectives of the Study

The study is guided by the following objectives:

1. To examine the concept and scope of IT innovation in academic libraries in Nigeria.
2. To analyse the impact of IT innovation on digital library services in Nigerian academic libraries.
3. To identify challenges affecting the effective implementation of IT innovation in digital library services in Nigeria.

Literature Review

Concept of IT Innovation in Academic Libraries

IT innovation in academic libraries refers to the adoption and integration of advanced digital technologies to improve service delivery, enhance access to information, and optimise library operations. These innovations include artificial intelligence, cloud-based systems, automation technologies, and digital repositories. Recent studies highlight the transformative role of IT innovation in library services. Bashorun et al. (2024) emphasise that AI technologies enable automation of cataloguing, indexing, and user services, thereby improving efficiency and accuracy. Similarly, Khan and Bhatti (2021) argue that AI-driven systems enhance information retrieval and enable personalised user experiences. Beyond operational efficiency, IT innovation supports scholarly communication and global visibility. Aithal (2020) notes that digital platforms facilitate knowledge sharing and institutional visibility, particularly through open access repositories. However, the successful adoption of these technologies requires institutional readiness, funding, and skilled personnel. These innovations include artificial intelligence, cloud-based systems, big data analytics, automation software, and digital repositories. The integration of such technologies has transformed libraries from traditional information storage centres into dynamic, technology-driven knowledge hubs.

Scholarly evidence indicates that IT innovation plays a crucial role in redefining library services by enhancing efficiency, accuracy, and accessibility. Ojobor, Okafor, and Ugwuanyi (2024) observe that the deployment of innovative technologies in Nigerian academic libraries has improved cataloguing processes, digital resource management, and user engagement. Similarly, Bashorun et al. (2024) emphasise that artificial intelligence applications in libraries facilitate personalised information services and predictive user support systems. These developments underscore the strategic importance of IT innovation in modern library environments. According to Agboke and Oladokun (2025), emerging technologies offer significant opportunities for Nigerian academic libraries through artificial intelligence-driven services, robotic applications, open-access platforms, and electronic security systems that enhance information access and operational efficiency. Beyond operational improvements, IT innovation also fosters institutional visibility and scholarly communication. Digital platforms such as institutional repositories enable universities to showcase their research outputs globally, thereby increasing academic impact. However, the successful implementation of these technologies depends on organisational readiness, funding, and technical expertise, which vary significantly across Nigerian academic institutions.

Impact of IT Innovation on Digital Library Services

IT innovation has significantly enhanced access to information resources by enabling remote and real-time access to digital collections. Tenopir et al. (2020) report that digital access increases scholarly reading and research productivity. Similarly, Owate (2024) found that digital applications improve accessibility and information retrieval in Nigerian libraries. Automation and

digital tools have improved operational efficiency and user satisfaction. Idhalama et al. (2025) found that digital literacy and technology integration significantly enhance service quality and user experience. IT innovation has redefined librarians' roles, requiring new competencies in digital systems and data management. Nwachokor and Chegwe (2023) highlight the growing need for digital skills among librarians in Nigeria. Emerging technologies have introduced innovative service models such as virtual reference services and online user education. Boateng and Liu (2020) note that Web 2.0 tools enhance user engagement and service delivery.

Digital Library Services in Nigerian Academic Libraries

Digital library services refer to electronically mediated services that provide users with access to information resources in digital formats. These services include online catalogues, e-books, e-journals, institutional repositories, digital reference services, and virtual learning support systems. In Nigeria, academic libraries have progressively embraced digital services to meet the information needs of students, researchers, and faculty members.

Empirical studies reveal that digital library services have significantly enhanced access to scholarly resources in Nigerian universities. Olubiyo and Olubiyo (2023) note that the adoption of digital platforms has enabled libraries to provide 24/7 access to information resources, thereby overcoming the limitations of physical library spaces. Similarly, Owate (2024) reports that digital applications have improved information retrieval processes and facilitated efficient knowledge dissemination in academic libraries. These services are essential in meeting the evolving information needs of users in academic environments. Ezeani and Igwesi (2020) observe that digital platforms have significantly improved communication between libraries and users, enhancing service delivery. Similarly, Islam and Habiba (2020) found that ICT-based services improve user satisfaction by providing convenient and timely access to information resources. However, the development of digital library services in Nigeria is constrained by infrastructural challenges. Oyelude (2020) highlights that inadequate ICT infrastructure and funding limitations hinder effective service delivery. This uneven development affects the accessibility and quality of digital services across institutions.

Despite these advancements, the development of digital library services in Nigeria faces several challenges. Issues such as inadequate ICT infrastructure, unreliable power supply, and limited funding continue to hinder the effective delivery of digital services. Furthermore, disparities in technological capacity among institutions have resulted in uneven access to digital resources, thereby affecting the overall impact of digital library services in the country.

Improved Access to Information Resources

One of the most significant impacts of IT innovation on digital library services is the enhancement of access to information resources. Through the integration of digital technologies, academic libraries can provide remote access to a wide range of scholarly materials, including e-books, journals, and databases. This has effectively removed geographical and temporal barriers to information access. Studies indicate that technologies such as institutional repositories and web-

based platforms have democratized access to knowledge in Nigerian academic institutions. Ugwuanyi and Ezeani (2010) highlight that digital technologies enable users to retrieve information conveniently from any location, thereby promoting academic productivity. This aligns with global trends where digital libraries serve as critical tools for knowledge dissemination and academic collaboration. Furthermore, mobile technologies and cloud-based systems have expanded access to library services, particularly for distance learners and researchers. These innovations ensure that users can interact with library resources in real-time, thereby enhancing the overall user experience.

Enhanced Efficiency and User Satisfaction

IT innovation has also significantly improved the efficiency of library operations and user satisfaction. Automation of library processes such as cataloguing, circulation, and indexing has reduced manual workload and increased service speed. As a result, users can access information more quickly and efficiently.

Empirical findings by Idhalama, Makori, and Oredo (2025) demonstrate that the integration of digital technologies in academic libraries leads to improved service quality and higher levels of user satisfaction. The study shows that digital literacy and effective use of IT tools are critical factors influencing user experience in Nigerian university libraries. In addition, virtual reference services and online user support systems have enhanced interaction between librarians and users. These services provide immediate assistance and personalised support, thereby improving the overall effectiveness of library services.

Transformation of Librarians' Roles

The adoption of IT innovation has led to a significant transformation in the roles and responsibilities of librarians. Traditionally, librarians were primarily responsible for managing physical collections and providing basic reference services. However, the digital environment has expanded its roles to include information technology management, digital content curation, and user education. Nwachokor and Chegwe (2025) observe that librarians in Nigerian academic institutions are increasingly required to develop competencies in digital technologies, data management, and online service delivery. This shift reflects the evolving nature of library services in the digital age. Moreover, librarians now play a critical role in supporting research activities through digital platforms. They assist users in navigating electronic databases, managing research data, and utilising digital tools effectively. This transformation highlights the importance of ongoing professional development and capacity building among library professionals.

Innovation in Service Delivery Models

IT innovation has introduced new service delivery models that enhance the flexibility and responsiveness of academic libraries. These include virtual reference services, online information

literacy programs, and digital research support services. Such models enable libraries to meet the diverse needs of users in a rapidly changing information environment. Research indicates that technology-driven service models have improved the quality and reach of library services in Nigeria. The integration of e-learning platforms and digital communication tools has enabled libraries to support remote learning and academic collaboration effectively. However, the sustainability of these innovative service models depends on institutional support, funding, and the availability of skilled personnel. Without these factors, the full potential of IT innovation in transforming library services may not be realised.

Challenges Affecting IT Innovation in Digital Library Services

Several challenges constrain the implementation of IT innovation in Nigerian academic libraries. These include inadequate infrastructure, insufficient funding, limited technical expertise, and resistance to change among library staff. Kabir and Ootobo (2022) identify poor internet connectivity and unstable power supply as major barriers to effective digital library services. Similarly, Agboke and Oladokun (2024) highlight the lack of skilled personnel and inadequate training as significant challenges affecting technology adoption in libraries. These challenges underscore the need for strategic interventions to improve the implementation of IT innovation in Nigerian academic libraries.

Methodology

This study adopts a narrative review methodology, which involves the systematic identification, analysis, and synthesis of existing literature on the impact of IT innovation on digital library services. Relevant scholarly articles, journal publications, and credible online sources were selected based on their relevance to the study topic. The narrative review approach allows for a comprehensive understanding of the subject by integrating findings from multiple studies and identifying emerging trends and research gaps.

Discussion of Findings

The findings of this review demonstrate that IT innovation has become a critical driver of transformation in digital library services within Nigerian academic libraries. Across the literature, there is strong convergence that the integration of emerging technologies such as artificial intelligence, cloud computing, and web-based platforms has significantly improved access to information resources, enhanced operational efficiency, and enabled more user-centred service delivery. This aligns with global evidence suggesting that digital transformation in libraries is no longer optional but essential for sustaining relevance in contemporary knowledge ecosystems (Adetayo & Olatokun, 2021; Mishra & Yadav, 2021). In particular, the shift toward remote access and digital collections has expanded the reach of academic libraries beyond physical boundaries, thereby supporting research productivity and lifelong learning.

A key insight from the review is that IT innovation has reconfigured the nature of access to information. Digital platforms such as institutional repositories, electronic databases, and mobile-

enabled services have facilitated real-time, ubiquitous access to scholarly content. This finding corroborates the work of Tenopir et al. (2020), who observed that increased digital access correlates with higher levels of scholarly reading and research engagement. Within the Nigerian context, Owate (2024) similarly reports that digital applications have improved information retrieval efficiency and accessibility in academic libraries. However, while access has improved in technologically equipped institutions, disparities remain in less-resourced universities, thereby reinforcing a digital divide within the higher education system.

The review further reveals that IT innovation has significantly enhanced service efficiency and user satisfaction through automation and digitisation of core library functions. Automated cataloguing systems, integrated library management systems, and virtual reference services have reduced manual workload and improved the speed and accuracy of service delivery. Empirical evidence from Idhalama et al. (2025) indicates that digital literacy and effective utilisation of IT tools are strongly associated with improved user satisfaction in Nigerian academic libraries. This suggests that the benefits of IT innovation are not solely dependent on technology availability but also on users' and librarians' competencies in leveraging these tools effectively.

Another important dimension of the findings is the transformation of librarians' professional roles. The transition from traditional librarianship to digital librarianship has necessitated the acquisition of new skills in information technology, data management, and digital curation. As noted by Nwachokor and Chegwe (2023), librarians in Nigeria are increasingly expected to function as information technology facilitators, research support specialists, and digital content managers. This shift reflects broader global trends in the profession but also raises concerns about capacity gaps, particularly in institutions with limited opportunities for professional development.

Despite these positive developments, the review highlights significant structural and systemic challenges that constrain the full realisation of IT innovation in Nigerian academic libraries. Chief among these are inadequate ICT infrastructure, unstable power supply, and insufficient funding, which continue to undermine the sustainability of digital initiatives (Kabir & Ootobo, 2022). These challenges are particularly pronounced in public universities, where budgetary constraints limit investment in modern technologies. Consequently, while some institutions have adopted advanced digital systems, others remain at the basic stages of automation, resulting in uneven levels of service delivery across the country.

This uneven implementation underscores the importance of contextual factors in shaping the impact of IT innovation. The findings suggest that technological adoption alone is insufficient; rather, its effectiveness depends on a combination of institutional readiness, policy support, and human capacity. From a theoretical perspective, this aligns with the Technology Acceptance Model (TAM), which emphasises perceived usefulness and ease of use as key determinants of technology adoption, as well as the Diffusion of Innovation theory, which highlights the role of organisational and environmental factors in influencing adoption rates. Furthermore, the findings reveal a gap between technological potential and actual utilisation. While many academic libraries have access to digital tools, their full capabilities are often underutilised due to inadequate training and resistance to change among staff. This indicates that the success of IT innovation is not merely a technological issue but also a socio-organisational one, requiring a shift in institutional culture

and continuous capacity development. Summarily, this review reveals that IT innovation has had a transformative but uneven impact on digital library services in Nigerian academic libraries. While significant progress has been made in enhancing access, efficiency, and service delivery, persistent infrastructural and institutional challenges continue to limit its full potential. Addressing these challenges requires a holistic approach that integrates technological investment with policy support, capacity building, and strategic planning.

Conclusion

The study concludes that IT innovation plays a critical role in transforming digital library services in Nigerian academic libraries. It enhances access, improves efficiency, and supports innovative service delivery models. However, the full potential of IT innovation is hindered by challenges such as inadequate infrastructure, poor funding, and limited technical expertise. Providing solutions to these challenges is essential for maximising the benefits of digital technologies in academic libraries.

Recommendations

Based on the findings, the following recommendations are made:

1. Increased funding should be provided to academic libraries for the acquisition and maintenance of IT infrastructure.
2. Capacity-building programs should be organised to enhance the digital skills of librarians.
3. Collaboration among academic libraries should be encouraged to facilitate resource sharing and knowledge exchange.

References

- Agboke, A. L., & Oladokun, B. D. (2025). Emerging technologies in academic libraries: Prospects and challenges in Nigeria. *Communicate: Journal of Library and Information Science*, 26(2), 10–20.
- Adetayo, A. J., & Olatokun, W. M. (2021). Artificial intelligence in academic libraries: A review of current applications and prospects. *The Journal of Academic Librarianship*, 47(5), 102371. <https://doi.org/10.1016/j.acalib.2021.102371>
- Aithal, P. S. (2020). Emerging trends in digital libraries and their impact on academic institutions. *International Journal of Management, Technology, and Social Sciences*, 5(2), 368–380. <https://doi.org/10.47992/IJMTS.2581.6012.0100>
- Bashorun, M. T., Tella, A., Ajani, Y. A., & Adisa, R. M. (2024). Innovating academic library services through the adoption of artificial intelligence technologies in tertiary institutions: The Nigeria experience. *UMYU Journal of Library and Information Science*, 1(1), 1–15.
- Boateng, F., & Liu, Y. Q. (2020). Web 2.0 applications' usage and trends in top US academic libraries. *Library Hi Tech*, 38(1), 87–103. <https://doi.org/10.1108/LHT-12-2018-0201>
- Ezeani, C. N., & Igwesi, U. (2020). Using social media for dynamic library service delivery: The Nigerian experience. *Library Philosophy and Practice*.
- Idhalama, O. U., Makori, E. O., & Oredo, J. O. (2025). Analysing the impact of digital literacy practices on the quality of library services and user satisfaction in public university libraries in Nigeria. *Journal of Librarianship and Information Science*. Advance online publication. <https://doi.org/10.1177/09610006251335951>
- Islam, M. A., & Habiba, U. (2020). ICT-based library services and user satisfaction: Evidence from academic libraries. *The Electronic Library*, 38(3), 593–608. <https://doi.org/10.1108/EL-06-2019-0139>
- Kabir, S. M., & Ootobo, E. E. (2022). Academic library and challenges of service delivery in Nigerian universities in the digital era. *Information Impact: Journal of Information and Knowledge Management*, 13(2), 1–12.
- Khan, A., & Bhatti, R. (2021). Application of artificial intelligence in libraries: A systematic review. *Library Hi Tech*, 39(2), 485–502. <https://doi.org/10.1108/LHT-02-2020-0034>

- Mishra, R., & Yadav, S. (2021). Digital transformation in academic libraries: A review of trends and challenges. *DESIDOC Journal of Library & Information Technology*, 41(4), 219–226. <https://doi.org/10.14429/djlit.41.4.16641>
- Nwachokor, I. M., & Chegwe, A. O. (2025). Digital transformation of academic libraries in Nigeria: Post-COVID-19 perspectives. *Information Impact: Journal of Information and Knowledge Management*, 14(3), 45–58.
- Ojobor, R. C., Okafor, V. N., & Ugwuanyi, R. N. (2024). Leveraging innovative technologies for improved library practices in the digital era: The Nigerian perspective. *Information Technology and Libraries*, 43(1).
- Olubiyo, P. O., & Olubiyo, L. M. (2023). Digital library services in university libraries in Nigeria: A literature study. *International Journal of Library and Information Science Studies*, 9(4), 1–12.
- Owate, C. N. (2024). Knowledge and utilization of digital applications for effective service delivery in academic libraries in South-South universities, Nigeria. *International Journal of Intelligent Information Systems*, 13(3), 45–52. <https://doi.org/10.11648/j.ijis.20241303.11>
- Tenopir, C., Mays, R., & Wu, L. (2020). Journal article usage and scholarly reading patterns in the digital age. *Learned Publishing*, 33(1), 63–75. <https://doi.org/10.1002/leap.1288>
- Ugwuanyi, R. N. C., & Ezeani, C. N. (2010). Internet services and academic libraries: A critical appraisal. *Journal of Applied Information Science and Technology*, 4, 99–104.