



ICT Applications and Management in Nigerian Academic Libraries

Abstract

Information and Communication Technology (ICT) has reshaped how academic libraries organise information, support research and respond to users. In Nigerian academic libraries, ICT is visible in automated cataloguing, circulation control, electronic databases, institutional repositories, online reference services, library orientation, research assistance and administrative record keeping. However, successful ICT application is not measured by the presence of computers and internet facilities alone. It depends on purposeful management, steady funding, functional infrastructure, trained librarians, user education, technical support and clear institutional policy. This paper examines ICT applications and management in Nigerian academic libraries through a literature-based review. The review was organised around four questions on major ICT applications, ICT support for library management and service delivery, factors influencing ICT management, and recommendations for improvement. The discussion is supported by library and information science studies, including works associated with Sophia V. Adeyeye and Lead City University scholars. The paper is guided by the Technology Acceptance Model and Task-Technology Fit Theory. The review shows that ICT improves access to information, enhances service delivery, supports academic research and promotes efficient library administration. It also shows that weak infrastructure, irregular power supply, limited digital skills, inadequate training, poor maintenance and insufficient funding continue to affect ICT management.

The paper concludes that ICT should be managed as an integrated service system that connects technology, staff capacity, user needs and institutional objectives.

Keywords: Academic libraries, digital literacy, ICT applications, ICT management, library services

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Introduction

Academic libraries are changing because the information needs of students, lecturers and researchers are also changing. In the past, many library services depended mainly on printed books, manual catalogues, handwritten circulation records and face-to-face reference assistance. Today, users expect faster and wider access to information through computers, internet services, electronic databases, online catalogues, institutional repositories and digital communication platforms. This development has made Information and Communication Technology (ICT) an important part of library operations.

ICT refers to the digital equipment, software, networks and communication systems used to create, organise, store, retrieve and share information. In academic libraries, ICT includes computers, internet connectivity, library management software, online public access catalogues, barcode systems, electronic databases, digitisation tools, institutional repositories, social media platforms, e-mail services and research support tools. This understanding is consistent with the view that ICT enables the collection, processing, storage, retrieval and dissemination of information for educational and organisational purposes (UNESCO Institute for Statistics, 2009; Venkatesh et al., 2003). These technologies help libraries to improve the way information resources are acquired, processed, preserved and delivered to users.

The role of ICT in academic libraries is significant because it improves both access and efficiency. A student can search for a book through an online catalogue before coming to the library. A lecturer can consult electronic journals for teaching and research. A librarian can use library software to manage borrowing, returning and user records. Library managers can also use digital statistics to understand resource use and plan future services.

Despite these benefits, ICT does not automatically improve library services. A library may have computers but still lack reliable internet access. It may subscribe to electronic databases but fail to create awareness among users. It may introduce automation without training staff properly. It may also digitise resources without planning for long-term preservation. These issues show that ICT application must be supported by effective ICT management.

ICT management in libraries involves planning, funding, installation, staff training, user education, maintenance, monitoring, policy development and evaluation of technology-based services. It also includes ethical issues such as data protection, copyright awareness and responsible use of digital information. For Nigerian academic libraries, ICT management is especially important because many institutions face problems such as unstable electricity, limited bandwidth, inadequate funding, shortage of skilled personnel and weak maintenance culture.

Studies connected with Adeyeye and Lead City University scholars provide useful support for this discussion. Ogunmola and Adeyeye (2024) emphasised the role of facilitating conditions in the use of library technology by academic librarians. Olufemi and Adeyeye (2022) related the use of electronic information resources to lecturers' research productivity. Adeyeye and Daniel Olufemi (2025) examined lecturers' information-seeking behaviour, while Adeyeye, Surajudeen and Ajala (2025) linked library orientation and information literacy with research productivity. These studies show that ICT in libraries should be understood not only as equipment but also as a service system shaped by users, staff and institutional support.

This paper examines ICT applications and management in Nigerian academic libraries. It discusses the major areas where ICT is applied, the theoretical basis for ICT adoption, the management issues affecting its use and the recommendations that can improve ICT-based library services.

Literature Review and Theoretical Framework

ICT Applications in Academic Libraries

ICT applications in academic libraries refer to the practical use of digital technologies in library work. These applications cover technical services, reader services, reference services, research support and administrative activities. In technical services, ICT is used for cataloguing, classification, acquisition, serials control and metadata management. In reader services, ICT supports circulation, reservation, renewal, user registration and access to electronic resources. In reference services, ICT enables librarians to respond to enquiries through e-mail, websites, social media and other online channels.

Academic libraries also use ICT to support teaching, learning and research. Electronic databases provide access to scholarly journals, books, conference papers and reports. Institutional repositories help universities preserve and showcase theses, dissertations, journal articles and other scholarly works. Online catalogues help users locate information resources without depending on manual card catalogues. These services make the academic library more visible and more responsive to the needs of the university community.

Olufemi and Adeyeye (2022) showed the relevance of electronic information resources to the research productivity of lecturers in private universities in Oyo State. Their work supports the idea that ICT is not simply an administrative tool; it is also a research support system. When lecturers and students have access to quality digital resources, they are better positioned to produce academic work, prepare lectures and engage with current scholarship.

Odusanya and Adeyeye (2024) also linked ICT skills with service quality among librarians in agricultural research institutes in Ibadan. The implication is that ICT competence among library staff can influence the quality of services users receive. A library may have digital facilities, but the usefulness of those facilities depends partly on the ability of librarians to apply them professionally.

ICT Management in Libraries

ICT management is the process of ensuring that technology resources are properly planned, funded, used, maintained and evaluated. In libraries, ICT management includes selecting appropriate technologies, providing infrastructure, training staff, guiding users, maintaining systems and protecting digital records. It also requires regular assessment of whether the technology is meeting the needs of users.

The management of ICT is important because technology can fail when it is not properly supported. Library automation may not succeed if there is no trained staff to operate the software. Electronic databases may be underused if users are not informed about them or if internet access is unstable. A repository may lose value if metadata are poorly prepared or if copyright issues are ignored.

Ogunmola and Adeyeye (2024) provide a useful explanation of this issue by emphasising facilitating conditions in the use of library technology. Facilitating conditions include infrastructure, technical support, training, power supply, internet connectivity and

institutional encouragement. Without these conditions, librarians may be aware of technology but unable to use it effectively.

ICT management also requires attention to the work environment of librarians. Esharefasa and Adeyeye (2025) examined work environment and organisational commitment among librarians in tertiary institutions in Lagos State. Their study is relevant because librarians who operate ICT systems require supportive working conditions, recognition, training and manageable workloads. Where the work environment is poor, technology use may become stressful rather than productive.

Digital Literacy and User Education

Digital literacy is a major requirement for effective ICT application in libraries. Users may have access to computers and smartphones but still lack the ability to search scholarly databases, evaluate online information, use citation tools, avoid plagiarism and apply digital information ethically. Library user education therefore remains important in ICT management.

Adeyeye, Surajudeen and Ajala (2025) examined library orientation, information literacy skills and research productivity among postgraduate students in private universities in Osun State. Their study supports the argument that orientation and information literacy should be treated as continuous academic support services. In the same way, Ikubaje and Adeyeye (2025) argued that libraries support lifelong learning and continuous education. ICT strengthens this role by making digital resources and learning opportunities more widely available.

ICT and Research Support

Academic libraries use ICT to support research through electronic databases, institutional repositories, reference management tools, plagiarism-checking platforms, open access resources, current awareness services and scholarly communication support. These services help researchers identify relevant literature, manage citations, deposit publications and improve research visibility. In addition to Olufemi and Adeyeye's (2022) evidence on electronic information resources, Ayodele and Adeyeye (2024) showed that research self-efficacy contributes to research productivity, while Adeyeye, Surajudeen and Ajala (2025) linked information literacy skills with postgraduate research productivity. These studies

suggest that ICT-based research support should combine access to digital resources with user training, confidence building and ethical guidance.

Ayodele and Adeyeye (2024) examined research self-efficacy and research productivity among academic staff in private universities in Oyo State. Their study is useful because ICT-based research support does not depend only on access to digital tools; it also depends on users' confidence and ability to conduct research. Libraries should therefore provide ICT services that build users' competence and confidence.

Theoretical Framework

This paper is anchored on the Technology Acceptance Model and Task-Technology Fit Theory. The Technology Acceptance Model, developed by Davis (1989), explains that users are more likely to accept technology when they perceive it as useful and easy to use. In the library context, students, lecturers and librarians will be more willing to use ICT tools when they believe that such tools improve their work and are not difficult to operate. This theory is relevant because many ICT facilities in libraries remain underused when users are not properly trained or when systems are difficult to access.

Task-Technology Fit Theory, developed by Goodhue and Thompson (1995), states that technology is more likely to improve performance when it fits the task users want to perform. In academic libraries, ICT tools must match the needs of cataloguers, reference librarians, circulation staff, researchers, students and lecturers. A database, repository, catalogue or library management system will be useful only when it supports real library and academic tasks.

Together, the two theories suggest that ICT management should focus on usefulness, ease of use, task relevance, training and support. Technology should not be introduced merely because it is modern. It should be selected and managed according to library goals, staff capacity and user needs.

Methodology

This paper adopts a literature-based review method. Relevant studies on ICT applications, library technology, electronic information resources, digital literacy, information-seeking behaviour, research productivity, library orientation, work

environment and ICT management were reviewed. The review focused on Nigerian academic library literature and related theoretical works on technology adoption.

The review covered foundational technology adoption literature published between 1989 and 2003 and recent Nigerian library and information science studies published between 2022 and 2025. The older sources were included because they provide the theoretical foundation for technology acceptance and task-technology fit, while the recent studies were included because they provide current Nigerian-based evidence on academic library ICT use, electronic resources, information literacy and research support.

The inclusion criteria were: studies that addressed ICT use, electronic information resources, library technology, digital literacy, research support or service quality in libraries and universities; studies with clear relevance to Nigerian academic or research libraries; peer-reviewed journal articles or credible scholarly sources; and works that contributed directly to the four review questions. The exclusion criteria were: sources that focused on general information technology without library relevance; publications without adequate bibliographic details; duplicated sources; opinion pieces without scholarly support; and studies that did not address ICT application, ICT management, user education, research support or library service delivery.

The selected literature was read thematically. Evidence was grouped under four review questions: major ICT applications in academic libraries; ways ICT supports library management and service delivery; factors influencing effective ICT management; and recommendations for improving ICT applications in Nigerian academic libraries. Particular attention was given to studies associated with Sophia V. Adeyeye and Lead City University scholars because they provide Nigerian-based evidence on library technology use, electronic information resources, information literacy, user behaviour, research support, work environment and library service development.

The review was therefore analytical rather than statistical. It did not test hypotheses or combine numerical findings through meta-analysis. Instead, it synthesised relevant literature to identify patterns, management implications and practical recommendations for Nigerian academic libraries.

Results

The reviewed literature reveals that ICT is applied in several areas of academic library service delivery. The findings are presented according to the four review questions so that each table responds directly to a specific issue in the study. This structure also shows that ICT effectiveness depends not only on technology acquisition, but also on planning, infrastructure, staff competence, user education, policy direction and continuous evaluation.

Table 1
Major ICT Applications in Academic Libraries

ICT application	Library task addressed	Management attention required
Online public access catalogue (OPAC)	Enables users to search library holdings electronically before or during library visits.	Requires accurate metadata, software maintenance and user orientation.
Library management system	Supports cataloguing, circulation, acquisition, serials control and user records.	Requires staff training, data backup, access control and technical support.
Electronic databases and e-books	Provides access to journals, books, conference papers and scholarly resources.	Requires subscription funding, authentication support, awareness creation and usage monitoring.
Institutional repository	Preserves and promotes theses, dissertations, articles and institutional research output.	Requires copyright policy, metadata standards, digitisation planning and preservation strategy.
Digital reference and communication services	Allows librarians to answer enquiries through e-mail, websites, chat tools and social media.	Requires response guidelines, trained staff, privacy awareness and communication policy.
ICT-based user education and research tools	Trains users on OPACs, databases, citation tools, plagiarism awareness and research visibility.	Requires continuous orientation, tutorials, workshops and assessment of user competence.

Note. Table 1 answers the first review question by identifying the main areas where ICT is applied in academic library work.

Table 1 shows that ICT applications in academic libraries cut across technical services, reader services, reference services, research support and administration. The table also shows that every application has a management requirement. For example, electronic databases require funding and awareness, while repositories require metadata standards and copyright guidance.

Table 2

How ICT Supports Library Management and Service Delivery

Service or management area	ICT contribution	Service delivery implication
Collection development and technical processing	Improves acquisition records, cataloguing, metadata preparation and serials control.	Resources are organised faster and made discoverable to users.
Circulation and user records	Automates borrowing, returning, renewal, reservation and user registration.	Reduces manual errors and improves accountability in user services.
Reference and information services	Supports online enquiries, current awareness, database alerts and digital communication.	Users can receive support beyond the physical library desk.
Research and scholarly communication	Provides access to e-resources, repositories, citation tools and plagiarism checks.	Lecturers and students receive stronger support for academic writing and publication.
Monitoring and evaluation	Generates statistics on resource use, user behaviour and service performance.	Library managers can make evidence-based decisions on subscriptions, training and service improvement.
Administrative communication	Supports reports, internal communication, meeting records and policy documentation.	Library administration becomes more efficient and transparent.

Note. Table 2 answers the second review question by showing how ICT strengthens both library management and user-facing service delivery



Table 2 indicates that ICT supports academic libraries as both a service tool and a management tool. Its value is seen in faster processing, improved access, stronger research support, better communication and data-based decision-making. However, these benefits depend on the ability of library managers to align technology with actual service needs.

Table 3

Factors Influencing Effective ICT Management in Academic Libraries

Influencing factor	Evidence from the reviewed literature	Management implication
Infrastructure and facilitating conditions	Ogunmola and Adeyeye (2024) emphasised power supply, internet connectivity, technical support and institutional encouragement.	Libraries should treat infrastructure as a continuous service requirement rather than a one-time purchase.
Staff ICT competence	Odusanya and Adeyeye (2024) linked ICT skills with service quality among librarians.	Regular professional development is necessary for automation, repositories, databases and digital reference.
User digital literacy	Adeyeye, Surajudeen and Ajala (2025) linked orientation and information literacy with research productivity.	User education should include database searching, citation tools, plagiarism awareness and ethical information use.
Research confidence and information behaviour	Ayodele and Adeyeye (2024) and Adeyeye and Daniel Olufemi (2025) show that research confidence and information-seeking behaviour affect resource use.	ICT services should be designed around actual user needs and research practices.
Work environment and staff commitment	Esharefasa and Adeyeye (2025) connected work environment with librarians' organisational commitment.	Managers should provide supportive conditions, recognition and manageable workloads for ICT-related duties.

Influencing factor	Evidence from the reviewed literature	Management implication
Policy, maintenance and ethical control	The review shows that ICT services require data protection, copyright awareness, backup procedures and maintenance culture.	Libraries should develop written ICT policies and evaluate compliance regularly.

Note. Table 3 answers the third review question by identifying the main conditions that influence effective ICT management.

Table 3 shows that the success of ICT in Nigerian academic libraries is affected by material, human and organisational factors. This finding supports the argument that ICT management is not limited to computers and software. It also includes training, motivation, user behaviour, ethical control, maintenance and policy implementation.

Table 4

Recommendations Derived from Adeyeye-Related Studies

Adeyeye-related evidence	Practical recommendation	Expected improvement
Olufemi and Adeyeye (2022) on electronic information resources and research productivity.	Increase awareness, access support and training on electronic databases.	Better use of e-resources for teaching, research and publication.
Odusanya and Adeyeye (2024) on ICT skills and service quality.	Provide regular ICT training for librarians in automation, e-resources and digital support tools.	Improved professional competence and better user service quality.
Ogunmola and Adeyeye (2024) on facilitating conditions.	Improve internet access, power supply, technical support and institutional backing.	Higher adoption and more reliable use of library technology.
Ayodele and Adeyeye (2024) on research self-efficacy.	Design library training that builds research confidence, not only tool awareness.	Stronger user confidence in literature searching, citation management and scholarly writing.

Adeyeye-related evidence	Practical recommendation	Expected improvement
Adeyeye and Daniel Olufemi (2025) on lecturers' information-seeking behaviour.	Study user needs before designing ICT-based library services.	ICT services that match lecturers' and students' real information practices.
Adeyeye, Surajudeen and Ajala (2025) on orientation and information literacy.	Make information literacy and ICT-based orientation continuous rather than one-off.	Better database use, ethical information behaviour and research productivity.
Esharefasa and Adeyeye (2025) on work environment and commitment.	Support librarians with good work conditions, recognition and manageable ICT workloads.	Improved commitment and sustainability of technology-based services.
Ikubaje and Adeyeye (2025) on libraries and lifelong learning.	Use digital platforms to extend learning support beyond the physical library.	Wider access to continuous education and lifelong learning resources.

Note. Table 4 answers the fourth review question by translating Adeyeye-related evidence into practical recommendations for Nigerian academic libraries.

Table 4 demonstrates that the recommendations emerging from the literature are not isolated. They point to an integrated ICT management approach in which infrastructure, staff development, user education, research support and policy implementation reinforce one another. This strengthens the argument that ICT should be managed as a library-wide service system.

Discussion of the Findings

The findings show that ICT has become essential to academic library services in Nigeria. ICT supports access to information, reduces manual workload, improves communication, strengthens research support and enhances the visibility of institutional scholarship. Through online catalogues, electronic databases and institutional repositories, libraries can provide faster and wider access to information resources.

The findings also show that ICT application must be accompanied by effective management. This supports Ogunmola and Adeyeye's (2024) position that facilitating conditions influence the use of library technology. Without electricity, internet access, technical support, training and institutional encouragement, ICT tools may remain

underused. Therefore, library managers must provide the conditions that allow technology to function effectively.

Another important finding is that ICT services should be user-centred. Adeyeye and Daniel Olufemi (2025) showed that information-seeking behaviour influences how lecturers use information resources. This means that libraries should study their users before designing ICT services. If lecturers need access to databases, research alerts and citation support, the library should provide services that respond to those needs. If students lack digital research skills, the library should strengthen orientation and information literacy training.

The findings further reveal that digital literacy and user education are central to ICT management. Adeyeye, Surajudeen and Ajala (2025) linked library orientation and information literacy skills with research productivity. This suggests that ICT investment will not produce full benefits unless users are trained to search, evaluate and apply information properly. Library orientation should therefore include OPAC use, database searching, citation management, plagiarism awareness and ethical use of online resources.

Staff competence is also a major issue. Librarians are expected to manage library software, electronic databases, digital repositories, social media platforms and online reference tools. These responsibilities require continuous professional development. Odusanya and Adeyeye (2024) showed that ICT skills are related to service quality, while Esharefasa and Adeyeye (2025) showed the relevance of work environment to librarians' organisational commitment. This implies that library managers should create supportive environments where staff can learn, adapt and use ICT confidently.

Finally, the findings show that ICT can support lifelong learning and continuous education. Ikubaje and Adeyeye (2025) emphasised the role of libraries in lifelong learning. ICT strengthens this role by allowing libraries to provide access to digital resources, online learning materials and virtual support services. Nigerian academic libraries should therefore see ICT as a tool for widening access to knowledge beyond the physical library building.

Conclusion and Recommendations

This paper examined ICT applications and management in Nigerian academic libraries. It showed that ICT is applied in cataloguing, circulation, reference services,

electronic databases, institutional repositories, user education, research support and administration. The paper also showed that ICT effectiveness depends on management factors such as planning, funding, training, infrastructure, technical support, staff competence, user education and policy implementation.

The paper concludes that ICT should not be treated as isolated equipment. It should be managed as a strategic system for improving access to information, research productivity, learning support and library service quality. Studies associated with Adeyeye and Lead City University scholars support this conclusion because they show the importance of facilitating conditions, electronic information resources, information-seeking behaviour, research self-efficacy, ICT skills, information literacy, work environment and lifelong learning.

1. Academic libraries should develop clear ICT policies covering acquisition, use, maintenance, training, data protection and evaluation.
2. Library management should provide reliable internet connectivity, alternative power supply and functional ICT infrastructure.
3. Librarians should receive regular training on library automation, electronic resources, digital repositories, research support tools and online reference services.
4. ICT-based user education should be strengthened through library orientation, database training, digital literacy workshops and online guides.
5. Libraries should monitor the use of electronic databases, OPACs, repositories and digital reference services to guide decision-making.
6. Library managers should improve technical support and maintenance culture to prevent ICT facilities from becoming abandoned.
7. ICT planning should consider user needs, staff capacity and institutional goals rather than technology acquisition alone.
8. Nigerian academic libraries should promote ethical ICT use by protecting user privacy, respecting copyright and encouraging responsible use of digital information.

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