



SAFEGUARDING SCHOLARSHIP: THE ROLE OF ACADEMIC LIBRARIES IN NIGERIA IN THE DIGITAL PRESERVATION OF OPEN ACCESS CONTENT

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Abstract

This paper examines the role of academic libraries in Nigeria in safeguarding scholarship through the digital preservation of open access content. It underscores the critical importance of ensuring the long-term accessibility, authenticity, and usability of digital scholarly resources to sustain research, teaching, and innovation. Given the dynamic nature of open access materials and the rapid evolution of digital technologies, academic libraries occupy a central position in sustaining scholarly communication and protecting knowledge for future generations.

The paper reviews best practices and innovative strategies employed in digital preservation, including storage redundancy, migration and emulation techniques, metadata standardisation and interoperability, and the adoption of emerging technologies such as artificial intelligence and blockchain. It further identifies key challenges confronting libraries ranging from ownership and control issues to technological obsolescence, copyright ambiguities, inconsistent policies, and resource limitations that threaten the long-term sustainability of open access content.

By addressing these barriers through adaptive technologies, collaborative frameworks, and sustainable preservation models, academic libraries in Nigeria can reinforce their strategic role in preserving scholarly communication. This study contributes valuable insights into advancing digital preservation practices and highlights the enduring responsibility of libraries in ensuring the continuity and reliability of open access scholarship.

Keywords: *Academic Libraries in Nigeria; Digital Preservation Strategies; Open Access Sustainability; Scholarly Communication; Knowledge Safeguarding; Innovation in Library Practice*



Introduction

Open access has become a central paradigm in scholarly communication, particularly within academic libraries, where it seeks to remove financial and licensing barriers to the dissemination of research. Emerging prominently in the early 2000s, the Budapest Open Access Initiative (2002), the Bethesda Statement, and the Berlin Declaration (2003) collectively established the foundational principles of unrestricted access to scholarly outputs. Since then, the growth of digital publishing and networked technologies has consolidated open access as a sustainable and inclusive model, reinforced by institutional mandates and funding agency requirements. By redefining access to scholarship, open access has transformed not only how knowledge is produced and distributed but also how it must be preserved for long-term use.

Scholars define open access as digital, online, free of charge, and largely free from copyright and licensing restrictions (Suber, 2012), representing a significant departure from traditional subscription-based publishing (Roger Williams University, 2019). Its scope extends beyond journal articles to include theses, conference papers, technical reports, datasets, and multimedia, positioning open access as both a communication channel and a dynamic knowledge management platform. Research consistently highlights its benefits: higher citation impact, wider dissemination across geographic and institutional boundaries, enhanced collaboration through open science practices, and cost-effectiveness for libraries (Yang & Li, 2015). For developing regions such as Nigeria, open access presents a particularly transformative pathway toward equitable access, visibility, and capacity building in research and innovation.

Yet, the exponential growth of open access underscores an equally critical concern: its preservation. Without systematic preservation strategies, open access resources risk obsolescence, neglect, or digital decay. Libraries, as custodians of scholarship, bear the responsibility of ensuring not only accessibility but also the durability and authenticity of scholarly content. Digital preservation strategies ranging from digitisation and reprography to metadata-driven curation, repository management, and long-term archival storage are therefore indispensable to sustaining the usability and discoverability of resources across generations.

For academic libraries in Nigeria, this dual responsibility is both urgent and strategic. Many institutions are still developing the infrastructural, policy, and human capacity required to preserve open access resources effectively. Within this context, safeguarding scholarship requires libraries



not only to expand access through open access initiatives but also to assume a proactive role in digital preservation. Doing so ensures the continuity, integrity, and sustainability of the nation's scholarly record and reinforces the contribution of Nigerian academic libraries to the global knowledge ecosystem.

Problem Statement and Objectives

While open access has significantly expanded the visibility and reach of scholarly communication, the long-term preservation of open access content remains a growing challenge, particularly within developing academic environments. The assumption that open access equates to permanent access often obscures the complex technical, legal, and institutional frameworks required for sustainability. Unlike traditional print materials, digital objects are vulnerable to technological obsolescence, link rot, format incompatibility, inadequate metadata, and insufficient policy support. As a result, the scholarly record hosted on open access platforms faces risks of loss, inaccessibility, and fragmentation over time.

In Nigeria, academic libraries are increasingly adopting institutional repositories and digital platforms to support open access dissemination. However, many institutions lack comprehensive preservation policies, stable funding, and adequate technical infrastructure to ensure the long-term viability of digital content. Limited awareness of preservation standards, coupled with insufficient collaboration between libraries and research communities, further weakens national efforts to safeguard open scholarly assets. Consequently, the potential benefits of open access enhanced visibility, equitable knowledge sharing, and research impact are undermined by the absence of sustainable preservation frameworks.

This study therefore seeks to **examine the role of academic libraries in Nigeria in safeguarding scholarship through the digital preservation of open access content**. Specifically, the paper aims to:

1. Explore current practices and strategies employed by academic libraries in Nigeria for preserving open access resources.
2. Identify the challenges and limitations affecting effective digital preservation in these institutions.
3. Highlight emerging tools, technologies, and collaborative frameworks that can strengthen the sustainability of open access content.



4. Propose recommendations for enhancing the capacity of academic libraries to serve as custodians of digital scholarship in the open access environment.

By addressing these objectives, the paper contributes to ongoing discourse on digital preservation in the Global South and reinforces the critical role of Nigerian academic libraries in ensuring the durability, authenticity, and accessibility of open scholarly resources.

History and Evolution

The concept of **Open Access** began to gain prominence in the early 2000s as a response to the growing demand for wider, more affordable access to scholarly research. The **Budapest Open Access Initiative (BOAI)** of 2002 is widely regarded as a defining moment in the evolution of open access, advocating for unrestricted availability of scholarly outputs via the Internet. This landmark initiative was soon reinforced by the **Bethesda Statement on Open Access Publishing** and the **Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities**, both issued in 2003. Collectively, these declarations established the philosophical and practical foundation of the open access movement by emphasising free and universal dissemination of knowledge.

The evolution of open access has since been characterised by the emergence of diverse publishing models and strategic frameworks aimed at ensuring unhindered access to research outputs. Advancements in **digital technologies and networked information systems** have made open access a feasible and sustainable alternative to traditional subscription-based publishing. The proliferation of open access journals, institutional mandates, and funding agency requirements has accelerated this transformation, encouraging academic institutions to adopt open dissemination policies.

Within this broader context, **academic libraries in Nigeria** have increasingly embraced open access as a means of promoting visibility, accessibility, and equitable participation in global scholarship. The establishment of **institutional repositories** has become a central component of this movement, enabling universities to archive and preserve their scholarly outputs for long-term accessibility. By integrating digital preservation strategies into these repositories, Nigerian academic libraries not only expand access but also safeguard the continuity and authenticity of open access content, ensuring that the nation's intellectual contributions remain part of the enduring global knowledge record.



Advantages of Open Access Content in Libraries

Open access content critically reshapes the capacity of libraries to fulfil their core mandate of equitable knowledge dissemination and academic support. Beyond enhancing the visibility and impact of research, it directly contributes to the scholarly influence of authors through higher citation rates and the potential to shape policy frameworks (Suber, 2019). By dismantling paywall barriers, open access not only broadens collaboration across disciplines but also addresses longstanding inequalities in global knowledge production, particularly by enabling researchers in developing countries to engage with and contribute to international scholarship. In Africa, initiatives such as the African Journals Online (AJOL) platform and the Directory of Open Access Journals (DOAJ) have expanded opportunities for regional scholarship to gain global visibility (Adewumi & Osinulu, 2022). Similarly, in Nigeria, academic libraries within institutions like the University of Ibadan and Covenant University have adopted open access institutional repositories to improve accessibility and enhance research impact (Ezema, 2021). From an economic standpoint, open access offers a stronger return on investment for research sponsors, aligning financial accountability with scholarly advancement. At the same time, it fosters innovation by encouraging the rapid exchange of ideas, while ensuring compliance with the evolving requirements of funding bodies. Crucially, open access strengthens the broader educational mission of advancing knowledge as a public good, positioning libraries not merely as repositories of information but as active agents in democratising scholarship.

Open Access Content and Its Role in Safeguarding Scholarship

Open access refers to the practice of making scholarly resources such as journal articles, books, datasets, and other intellectual outputs freely available to the public without paywalls or subscription restrictions. By ensuring that research materials are openly accessible, reusable, and adaptable, open access promotes information sharing and accelerates scholarly advancement. These materials are typically released under open licenses, such as Creative Commons, which permit reuse, adaptation, and redistribution, thereby strengthening collaboration and innovation both within academia and across wider society.

Types of Open Access Content in Academic Libraries

Within academic libraries, open access encompasses a range of freely available scholarly resources that support research, teaching, and learning. These resources are disseminated through various publishing models and platforms, enabling libraries to serve their users more effectively. The main types include:



- **Gold Open Access:** Articles made freely available immediately upon publication in open access journals, often funded by article processing charges (APCs). For example, journals under the Public Library of Science (PLOS).
- **Green Open Access (Self-Archiving):** Authors deposit preprints or post prints in repositories, making them freely accessible, sometimes after an embargo period. Examples include global repositories like arXiv and institutional repositories such as DSpace platforms used in most Nigerian universities.
- **Hybrid Open Access:** Subscription-based journals that offer open access options for individual articles when authors pay a fee, such as those from Elsevier and Springer.
- **Bronze Open Access:** Content made freely available on a publisher's website but without a clear open license, often on a temporary basis, such as research released during COVID-19.
- **Diamond/Platinum Open Access:** Journals where both publishing and access are free, supported by institutions, consortia, or grants. In Africa, AJOL (African Journals Online) provides examples of such models.
- **Open Access Repositories:** Institutional or subject repositories hosting a variety of materials, including theses, dissertations, and conference papers. For instance, the University of Ibadan and Covenant University maintain repositories that showcase Nigerian scholarship.
- **Open Educational Resources (OERs):** Freely licensed educational materials such as textbooks and multimedia content, hosted on platforms like OERs Commons and MIT Open CourseWare, as well as emerging Nigerian OER initiatives led by the National Open University of Nigeria (NOUN).

Digital Preservation of Open Access Content
The sustainability of open access depends on digital preservation the systematic practice of ensuring that digital materials remain accessible and usable over time, despite shifting technologies or institutional changes. Unlike print materials, which libraries physically own, digital content is often accessed under license agreements, limiting long-term control. For example, libraries subscribing to e-journals typically pay annual fees, and discontinuing the subscription can result in the loss of previously accessed content.

To safeguard scholarship, libraries negotiate **perpetual access** and **archival rights**, which allow them to retain permanent use of digital content they have already licensed. Kumar and Padma (2015) highlight that these agreements are essential, but they alone are insufficient since digital preservation is an active, evolving process. Libraries must account for risks such as publishers ceasing publication, companies shutting down, or mergers that change access policies.



African libraries have increasingly recognised this challenge. For instance, AJOL and other institutional repositories across Nigeria have become vital in preserving and disseminating indigenous research outputs, ensuring global visibility. The National Open University of Nigeria has also invested in an institutional repository and open courseware platforms to provide long-term access to scholarly and teaching resources. These initiatives illustrate how libraries in developing contexts are adopting open access and digital preservation strategies not just to enhance visibility, but to guarantee continuity of access for future generations.

In this way, libraries play a dual role: enabling access through open access platforms and safeguarding scholarship through digital preservation, thereby securing their place as central actors in the knowledge society.

The Intersection of Open Access and Digital Preservation

Open access and digital preservation are often discussed as parallel issues in scholarly communication, yet they are deeply interconnected. Open access seeks to remove barriers to scholarly information by ensuring free and immediate access to research outputs, while digital preservation ensures that such access remains possible in the long term. Without effective preservation strategies, the promise of open access risks being undermined by digital obsolescence, unstable platforms, and the fragility of electronic formats (Lynch, 2021; UNESCO, 2021). The intersection of open access and digital preservation can be understood through three critical dimensions: **sustainability, accessibility, and stewardship**. First, sustainability highlights that the value of open access is only realised when content remains accessible beyond its initial publication. Digital preservation infrastructures such as institutional repositories, trusted digital archives, and community-driven initiatives like LOCKSS and CLOCKSS play a pivotal role in sustaining open access content over time (Pinfield et al., 2017). Second, accessibility underscores the principle that knowledge must not only be open but also reliably retrievable. Libraries ensure this by adopting metadata standards, persistent identifiers (e.g., DOIs, ORCID), and file format migration strategies to maintain usability despite evolving technologies (Suber, 2012). Finally, stewardship reflects the cultural and academic responsibility to safeguard scholarship for future generations. Libraries, as traditional custodians of knowledge and information, extend this role into the digital age by curating open access collections, negotiating preservation rights with publishers, and collaborating with global preservation networks (Beagrie, 2020).

African and Nigerian Perspectives

In Africa, universities and national libraries have begun aligning open access with digital preservation to bridge the knowledge divide. The University of Cape Town, for instance, maintains



an institutional repository that integrates preservation strategies through metadata standardisation and long-term file storage to support open access to theses and research outputs (Nabe & Schmidt, 2017). Similarly, the African Open Science Platform (AOSP) emphasises both open sharing and sustainable preservation as central to building an African knowledge commons (Academy of Science of South Africa [ASSAf], 2018).

In Nigeria, the National Open University of Nigeria (NOUN) manages an institutional repository that serves as both an open access outlet and a preservation mechanism for academic outputs, ensuring continued access despite infrastructural limitations (Gbaje & Mohammed, 2017). Other Nigerian universities, such as the University of Ibadan and Ahmadu Bello University Zaria, have developed open access repositories, but challenges such as unstable power supply, funding gaps, and lack of technical expertise and human capacity building often hinder long-term preservation (Ezema & Ugwu, 2013). These examples show that while African libraries are advancing open access, digital preservation must be more intentionally integrated to ensure scholarship remains both open and enduring.

In this way, open access and digital preservation converge to form a holistic approach to scholarly communication: one that not only democratises access in the present but also guarantees continuity and sustainability into the future. For academic libraries in Africa and Nigeria, this intersection defines their evolving role not only as access providers but as active agents in the long-term safeguarding of indigenous and global knowledge.

Importance of Digital Preservation for Open Access

Digital preservation is indispensable to safeguarding scholarship, as it provides libraries with structured approaches to sustain the long-term accessibility and usability of open access resources. Without effective digital preservation strategies, the very advantages of open access such as enhanced visibility, equity of access, and scholarly impact are at high risk of being eroded by technological obsolescence and inadequate infrastructure. For libraries in Africa and Nigeria, where uneven Information and Communication Technology capacity and resource limitations persist, digital preservation is not only a technical necessity but also a strategic imperative for protecting locally generated scholarship from loss or marginalisation (Rieger, 2008; UNESCO, 2023).

The **Open Archival Information System (OAIS) Model (ISO 14721:2012)** remains the most widely recognised framework, offering a comprehensive set of processes ingest, storage, data management, access, preservation planning, and administration that ensure long-term content stability. While its structured approach is strength, its implementation can be resource-intensive, posing challenges for libraries with limited technical expertise and funding (Suber, 2019).



The **LOCKSS (Lots of Copies Keep Stuff Safe)** and **CLOCKSS (Controlled LOCKSS)** models highlight the resilience of distributed preservation. LOCKSS's decentralised replication ensures authenticity by constantly verifying and repairing digital objects across multiple nodes, while CLOCKSS provides an additional safeguard by guaranteeing open access if publishers withdraw their content. However, both models require strong collaborative networks and reliable connectivity, which are not always consistently available in developing countries (Adewumi & Osinulu, 2022). **Migration-based preservation** offers practical solutions to combat format obsolescence by updating files into current formats such as converting Microsoft Word documents into **Portable Document Format (PDF) which would acts as a safeguard for open access scholarship** by ensuring that today's digital documents remain accessible, authentic, and usable for future generations. The strength of **migration-based preservation** is its flexibility, at the time its limitation due to repeated migration can sometimes introduce data loss or compromise authenticity, demanding careful oversight. By contrast, the **emulation model** preserves original environments by replicating obsolete software or hardware. While powerful for accessing legacy or multimedia content, it requires high technical skill and sustained investment, making it less feasible for resourceconstrained institutions (UNESCO, 2021).

The **institutional repository model** has gained significant traction in Nigerian universities, with platforms like DSpace and EPrints supporting the digital preservation and dissemination of theses, dissertations, and faculty publications. These repositories embody digital preservation principles such as metadata standards, backups, and open licensing. Their major strength lies in enhancing visibility of local scholarship, but sustainability remains a challenge due to inconsistent funding, weak policy frameworks, and inadequate staffing (Ezema, 2021).

The **third-party and commercial preservation services** such as Portico, JSTOR, and Ex Libris Rosetta provide certified, standards-compliant solutions. While they offer reliability and professional expertise, their high subscription costs may limit adoption by many African universities. This underlines the tension between global best practices and local resource realities (UNESCO, 2023).

Digital preservation is a cornerstone of safeguarding open access scholarship. Libraries, particularly in Nigeria and Africa, must strategically combine global models with locally adaptable approaches. Without sustained investment, human capacity building, and supportive policies, there is a risk that open access content though widely disseminated may not be securely preserved for the future. Therefore, libraries are not only repositories but also custodians of cultural and intellectual memory,



tasked with ensuring that today's scholarship remains accessible and meaningful for generations to come.

The Role of Libraries in Digital Preservation of Open Access Content

Libraries have historically been the custodians of information, and in the digital era, this role extends to the preservation of open access content in their custody. Beyond facilitating access, libraries act as **stewards of scholarly communication**, by ensuring that open access resources remain available, authentic, and usable over time. Their involvement is essential for bridging the gap between open dissemination and sustainable preservation.

Custodianship of Scholarly Outputs

Academic libraries are known to be central in curating institutional research outputs and safeguarding them for the future. By hosting institutional repositories, libraries provide platforms for digitally archiving theses, dissertations, articles, and other open access resources. Through this role, libraries not only facilitate visibility but also guarantee long-term storage and retrieval of academic work (Pinfield et al., 2017).

Development and Management of Repositories

Institutional repositories, often managed by the university libraries, are one of the most significant contributions to digital preservation. Institutional repositories like DSpace, EPrints, and Greenstone enable structured storage, metadata creation, and adherence to international preservation standards (Suber, 2012). In Nigeria, universities such as Ahmadu Bello University, University of Ibadan, and the National Open University of Nigeria (NOUN) operate repositories that both disseminate and preserve scholarly content, despite infrastructure challenges (Gbaje & Mohammed, 2017; Ezema & Ugwu, 2013).

Metadata Creation and Standardisation

Metadata is critical for discoverability and preservation. Libraries apply metadata standards such as Dublin Core, MARC, and METS to ensure open access resources remain interoperable and retrievable across platforms (Lynch, 2021). Persistent identifiers like **Digital Object Identifier**



(DOIs) and Open Researcher and Contributor ID (ORCID) further enhance preservation by linking resources to authors and their institutions.

Advocacy and Policy Development

Libraries play an advocacy role in shaping institutional and national policies on open access and digital preservation. By collaborating with academic leadership, libraries influence mandates that require faculty to deposit research outputs in repositories. For instance in South Africa, the University of Pretoria's repository policy requires researchers to submit electronic theses and dissertations (ETDs), thereby ensuring both access and preservation (Nabe & Schmidt, 2017). Similarly, in Nigeria, the Association of University Librarians of Nigerian Universities (AULNU) has advocated for stronger preservation frameworks in open access implementation (Ezema, 2011).

Collaboration with Preservation Networks

Libraries increasingly collaborate with global and regional preservation initiatives to strengthen open access sustainability. International services such as LOCKSS (Lots of Copies Keep Stuff Safe), CLOCKSS (Controlled LOCKSS), and Portico provide redundancy and safeguard against data loss. In Africa, collaborative projects like the African Open Science Platform (AOSP) are helping libraries align open access dissemination with preservation infrastructures (ASSAf, 2018).

Capacity Building and Professional Development

Effective digital preservation requires specialised skills in digital curation, metadata management, and IT infrastructure. Libraries serve as training hubs by up skilling staff and equipping them with competencies in digital preservation technologies. Though most Nigerian universities, often constrained by limited resources, have initiated workshops and training programs in partnership with international organisations such as EIFL (Electronic Information for Libraries) to assist in improving their digital preservation skills (Gbaje & Mohammed, 2017).

Comparative Analysis between Nigerian and African Libraries

In Africa, libraries are uniquely positioned to safeguard open access content against the dual risks of **technological obsolescence** and **knowledge marginalisation**. For instance, the University of Cape Town and Stellenbosch University have invested in repository systems that ensure open access content remains preserved and discoverable globally (Nabe & Schmidt, 2017). In Nigeria, National



Open University of Nigeria's institutional repository demonstrates how distance learning institutions are aligning open access with digital preservation to support lifelong learning and research (Gbaje & Mohammed, 2017). However, many Nigerian libraries still encounter persistent obstacles such as unstable electricity supply, bandwidth limitations, and inadequate funding from the government, which hinder large-scale digital preservation initiatives (Ezema & Ugwu, 2013).

Despite these obstacles, libraries across Africa are demonstrating resilience by leveraging **collaborative platforms, advocacy efforts, and innovative strategies** to strengthen the preservation of open access scholarship digitally. Their evolving role underscores the fact that access without preservation is unsustainable; thus, libraries must remain active agents in both ensuring access today and safeguarding it for tomorrow. **Strategies and Innovations in Digital Preservation**

A library ensuring the long-term sustainability of open access content requires deliberate strategies and innovative approaches that address the technical, organisational, and financial dimensions of digital preservation. As scholarly communication increasingly shifts to digital formats, libraries have adopted a range of practices to protect the integrity, authenticity, and accessibility of digital resources in their custody. These strategies include:

Storage Solutions and Redundancy

One of the most fundamental strategies in digital preservation of open access content is the adoption of robust storage systems with redundancy. Libraries deploy multiple backup systems, including on-site servers, cloud storage, and geographically distributed copies to prevent data loss.

Community-driven initiatives such as LOCKSS ("Lots of Copies Keep Stuff Safe") and CLOCKSS ("Controlled LOCKSS") embody this principle by ensuring content is replicated across numerous institutions worldwide (Lynch, 2021). The University of Cape Town as example leverages on distributed backup systems as part of its open access repository strategy (Nabe & Schmidt, 2017).

Migration and Emulation Techniques

Technological obsolescence poses a major challenge to preservation. Digital preservation technique such as migration periodically transfers open access content from outdated formats to current ones which would ensure long-term usability. Emulation technique as a strategy, that recreates the original environment needed to access obsolete formats. Nigerian libraries, although still developing



capacity in this area, have begun experimenting with format migration for theses and dissertations to ensure continued readability (Ezema & Ugwu, 2013).

Metadata Standards and Interoperability

Metadata standards not only enhances discovery but also facilitates preservation by documenting provenance, context, and authenticity. Libraries employ standards such as Dublin Core, METS (Metadata Encoding and Transmission Standard), and PREMIS (Preservation Metadata) to ensure interoperability and reliability (Beagrie, 2020). Persistent identifiers like **Digital Object Identifier** (DOIs) also strengthen preservation by linking digital content to stable metadata records. The National Open University of Nigeria (NOUN) repository integrates Dublin Core metadata to enhance both visibility and sustainability (Gbaje & Mohammed, 2017).

Perpetual Access and Licensing Strategies

Libraries increasingly negotiate preservation-friendly licenses with publishers to ensure that open access content remains accessible even if platforms become unstable. Initiatives such as Portico offer perpetual access agreements that safeguard content in case of publisher withdrawal (Pinfield et al., 2017). For African institutions with limited bargaining power, consortium approaches such as the Consortium of Academic and Research Libraries in Ghana (CARLIGH) and the Nigerian University Libraries Consortium (NULIC) provide collective leverage in negotiating sustainable access and preservation agreements.

Use of Emerging Technologies

The use of emerging technologies are offering libraries new frontiers for digital preservation of open access content. Artificial intelligence is being applied for automated metadata creation and predictive analysis of file degradation, while blockchain is being tested for ensuring authenticity and secure records management (Bartlett & von Suchodoletz, 2018). In Africa, pilot projects are beginning to explore blockchain for record verification, though widespread adoption is still constrained by infrastructural barriers.



Community-Driven and Collaborative Initiatives

Preservation is resource-intensive, and collaboration is increasingly recognised as key. Initiatives such as the African Open Science Platform (AOSP) promote cross-institutional and regional cooperation in managing and preserving open access content (ASSAf, 2018). In Nigeria, for example, inter-university collaborations and joint repository projects have emerged as cost-effective models, with institutions pooling resources to sustain open access repositories despite funding limitations (Ezema, 2011).

Challenges Facing Libraries in Digital Preservation of Open Access Content

While libraries have made significant progress in advancing digital preservation of open access content, multiple challenges threaten their sustainability. These challenges cut across technical, financial, legal, and institutional dimensions, and they are often more acute in developing regions such as Africa and Nigeria. The challenges are but not limited to:

Lack of Ownership and Control

A major challenge is the limited control libraries have over many open access platforms and digital infrastructures. Much open access content is hosted on publishers' servers or external platforms, leaving the libraries vulnerable to decisions beyond their control, such as discontinuation of services or platform instability (Lynch, 2021). In Africa, where reliance on donor-funded platforms is common, sustainability becomes a concern once external funding ends (Nabe & Schmidt, 2017).

Platform Instability and Technological Obsolescence

Digital preservation requires stability of host platforms and regular upgrading of technologies. Libraries in Nigeria constantly face unstable repository platforms due to limited infrastructure, poor internet bandwidth, and frequent system downtime (Ezema & Ugwu, 2013). Technological obsolescence also complicates preservation, as outdated software and hardware may render content inaccessible.



Technical Challenges and Skills Gaps

Effective preservation of open access contents in libraries demands expertise in digital curation, metadata standards, and information technology. Many African libraries face shortages of trained personnel capable of handling advanced preservation tools (Beagrie, 2020). In Nigeria, there is a limited training opportunity for the systems librarians and this mean that repository management often relies on a few specialists, making systems vulnerable to staff turnover (Gbaje & Mohammed, 2017).

Legal and Copyright Ambiguities

Unclear copyright frameworks and restrictive publishing agreements create additional obstacles. Most libraries often lack clear rights to preserve open access materials beyond their immediate institutional repositories. In Nigeria, weak copyright enforcement and inconsistent policies complicate the ability of libraries to archive and redistribute digital content legally (Ezema, 2011).

Resource and Funding Constraints

Digital preservation is resource-heavy, requiring sustainable funding for purchase and maintenance of servers, backup systems, software licenses, and expert staff. Many African and Nigerian libraries operate under chronic budget constraints, leaving preservation initiatives underfunded or donordependent (ASSAf, 2018). This financial limitation often leads to inadequate infrastructure, such as unstable and unreliable power supply and insufficient storage facilities, which compromise longterm access to the open access content. **Inconsistent Policies and Institutional Support**

A nonexistence of coherent institutional or national policies often weakens digital preservation initiatives. In Nigeria, inconsistent institutional support means open access repositories are often established without long-term strategic planning or adequate preservation frameworks (Ezema & Ugwu, 2013). Without addressing these barriers, the vision of open and enduring access to scholarship risks being undermined.

Recommendations

To strengthen the role of academic libraries in Nigeria in safeguarding open access scholarship, deliberate and sustained actions are required at institutional, national, and professional levels. The following recommendations are proposed: **Formulation of Clear Digital Preservation Policies:**



Each academic library should develop and implement comprehensive digital preservation policies aligned with international standards such as the OAIS model and the UNESCO Charter on the Preservation of Digital Heritage. These policies should define roles, workflows, metadata standards, and access protocols to ensure accountability and sustainability.

Capacity Building and Continuous Professional Development:

Librarians require ongoing training in areas such as metadata curation, repository management, data integrity, and preservation technologies. Institutions should integrate digital preservation modules into Library and Information Science curricula and professional workshops to ensure a workforce competent in both technical and policy dimensions.

Collaborative Preservation Models:

Libraries should adopt cooperative strategies by participating in regional and global preservation initiatives such as **LOCKSS**, **CLOCKSS**, and the **Digital Preservation Coalition (DPC)**.

National-level consortia can also facilitate resource sharing, knowledge exchange, and mutual technical support among Nigerian academic libraries.

Adoption of Hybrid and Emerging Technologies:

The integration of cloud storage, blockchain technology, and open-source repository systems (e.g., DSpace, Greenstone) can enhance data security, provenance verification, and long-term accessibility. Libraries should explore cost-effective hybrid solutions that combine local storage with cloud-based preservation services.

Sustainable Funding Mechanisms:

Long-term success depends on stable financial investment. Institutions should earmark budget lines for digital preservation and explore partnerships with research funding bodies, donor agencies, and national education commissions. Shared infrastructure models can further reduce costs and promote sustainability.

Stakeholder Engagement and Policy Advocacy:

Libraries should engage actively with researchers, academic administrators, and policymakers to cultivate a shared understanding of the importance of digital preservation. Advocacy for national frameworks on open access and preservation will help institutionalise best practices and foster a preservation culture within academia.



Conclusion

This study has underscored the pivotal role of academic libraries in Nigeria in safeguarding scholarship through the digital preservation of open access content. While open access has democratised knowledge dissemination, its long-term sustainability depends on proactive preservation efforts to prevent the loss or degradation of digital scholarship.

The paper emphasises that although global institutions often benefit from robust technological infrastructures, libraries in Africa and Nigeria face persistent challenges relating to funding, infrastructure, and expertise. Nonetheless, innovative strategies, collaborative partnerships, and adaptive use of emerging technologies present viable pathways toward sustainable preservation. Ultimately, the durability of open access scholarship relies on aligning innovation with local realities, reinforcing policy and governance frameworks, and ensuring long-term investment in preservation capacity. By embracing these measures, academic libraries in Nigeria can consolidate their position as custodians of knowledge safeguarding the intellectual and cultural record of the nation for present and future generations.



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