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# Traditional and Digital Preservation Practices in Academic Libraries: Methods, Challenges, and Future Directions

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**Abstract**

*This study presented a comprehensive review of traditional and digital preservation practices in academic libraries, with particular focus on African institutions and comparative insights from global developments. It critically examined methods, strategies, and frameworks employed to conserve both physical and digital library resources, highlighting the evolving challenges faced by libraries in resource-constrained environments. The review revealed that traditional preservation techniques such as binding, fumigation, lamination, and environmental monitoring remain fundamental for safeguarding print collections, yet they are insufficient to address the demands of modern hybrid collections that combine physical and digital materials. Digital preservation strategies, including format migration, replication, metadata management, and institutional repositories, are increasingly recognised as essential for long-term access to born-digital and digitised resources. However, widespread implementation is hindered by factors such as technological obsolescence, inadequate funding, weak policy frameworks, and limited technical expertise. The study identified key enablers for effective preservation, including the development of comprehensive policies, investment in infrastructure, capacity building for library personnel, and collaborative networks for knowledge and resource sharing. It further recommends the adoption of hybrid preservation models that integrate traditional and digital approaches, supported by interoperable technologies such as DSpace and LOCKSS, to ensure the sustainability, accessibility, and resilience of library collections. Overall, the review stresses that effective preservation in the digital era requires strategic institutional commitment, skilled personnel, and coordinated technological and policy interventions to safeguard scholarly and cultural heritage for future generations.*

**Keywords*:*** Preservation and conservation; Digital preservation; Academic libraries; Information management; Thematic analysis.

## Introduction

Preservation and conservation are foundational in library and information science (LIS), ensuring that knowledge, whether in print, manuscript, or digital form, remains accessible to future generations. Libraries are not merely repositories; they are cultural memory institutions safeguarding intellectual, historical, and scientific heritage. Yet, both traditional and digital collections face threats: physical materials decay through environmental, biological, chemical, and human factors (e.g., insects, humidity, light) while digital content is vulnerable to technological obsolescence, format rot, hardware/software failures, loss of metadata, inadequate backups, and shifting legal/policy frameworks (Balogun & Adjei, 2019; Sambo, Urhefe & Ejitagha, 2015). The emergence of digital technologies has introduced vast opportunities for faster access, replication, and broader dissemination, but also complex challenges regarding long-term viability. Digital preservation requires not only capturing content but also ensuring its integrity, authenticity, and usability over time through strategies such as format migration, emulation, redundant storage, and metadata management (Reference Model for an Open Archival Information System – OAIS).

In many academic libraries, especially in developing regions, there is now a hybrid collection of physical and electronic resources. This hybrid situation demands integrated preservation approaches. However, literature shows that many libraries are still weak in formal policy, infrastructure, technical expertise, and funding necessary for sustainable digital preservation. For instance, Nigerian federal university libraries report inadequate written digital preservation policy, erratic power supply, limited technical staff skills, and storage media degradation as significant impediments. Similarly, in South Africa and Egypt, strategies emphasise capacity building, metadata standards, and better policy structures to protect cultural heritage in a digital context. Because of these multiple overlapping pressures, there is a pressing need for a comprehensive, comparative review of both traditional and digital preservation practices. Such a review should illuminate what is working, where gaps lie, and how academic libraries globally and particularly in resource-constrained contexts can adopt sustainable preservation models that fuse traditional conservation with robust digital stewardship.

## Statement of the Problem

Despite significant advancements in library technology, preservation challenges persist across academic institutions, especially in developing countries. Existing literature often separates traditional preservation from digital preservation,

resulting in fragmented approaches that fail to address the interdependence of both domains. Furthermore, technological obsolescence, insufficient funding, inadequate policy frameworks, and a lack of trained personnel hinder the effective implementation of sustainable preservation strategies. Consequently, there is a need for a comprehensive review that integrates both traditional and digital perspectives, highlighting global best practices and providing direction for future library preservation initiatives.

**Objectives of the Study**

The objectives of this study are to:

i. Examine major traditional and digital preservation methods employed in academic libraries.
ii. Identify key challenges affecting the effective preservation and conservation of library resources.
iii. Assess the role of emerging technologies and frameworks in digital preservation.
Recommend integrated strategies for sustainable preservation practices in academic libraries globally.

**Literature Review**

**Traditional Preservation Practices in Academic Libraries**

Traditional preservation refers to long-established physical conservation measures used to safeguard printed and analogue information resources. These include binding and rebinding, lamination, deacidification, microfilming, dusting, shelf-reading, pest control, and environmental regulation such as humidity, temperature and light exposure (Feather, 1998; Harvey, 1995). For decades, these procedures have formed the backbone of library heritage protection, ensuring that manuscripts, newspapers and archival materials remain usable over time, particularly in contexts where digital alternatives are limited or absent.

Empirical evidence from developing regions shows that traditional practices remain dominant in academic libraries. Nigerian studies highlight ongoing application of fumigation, re-binding, ventilation control and cleaning routines for ageing collections (Oluwaseun, 2017; Tondo, Jembe & Yankyar, 2022). Sambo, Urhefe & Ejitagha (2017) observed that many libraries still rely almost exclusively on analogue preservation to compensate for weak ICT infrastructure and unstable digital storage systems. Similar patterns are reported in Ghana, Kenya and Uganda, where analogue conservation remains the most viable and resource-efficient option (Abdulrazaq, 2015; Popoola, 2003).

## Limitations and Vulnerabilities of Traditional Preservation

Despite its historical strength, traditional preservation faces persistent risks. Acidic paper degradation, insect infestation, mould growth, poor user-handling and environmental fluctuations accelerate deterioration, especially in high-humidity tropical climates. Climate change has intensified this vulnerability, with reports of heat-induced decay, increased fungal presence, flooding and facility breakdowns in African and Southeast Asian library environments (Ngulube, 2019; Balogun & Adjei, 2019). Additionally, controlled storage environments require consistent electricity, a challenge where power is unstable or expensive. The scarcity of trained conservators and the absence of enforceable preservation policies further jeopardise long-term print survival. Traditional preservation, therefore provides necessary foundational protection, yet cannot independently guarantee long-term access to scholarly content in modern hybrid library ecosystems.

## Digital Preservation in Academic Libraries

Digital preservation represents the strategic and technical measures required to ensure continued accessibility of electronic information resources regardless of technological evolution. Core actions include format migration, replication, bit-level fixity verification, emulation, metadata management, redundancy, and digital curation (Hedstrom, 1997; OAIS, 2012). The OAIS reference model provides an international framework defining archival storage, data management, preservation planning and dissemination procedures.

In Nigeria, awareness of digital preservation is increasing, but implementation remains limited. Common challenges include absence of preservation policies, insufficient technical personnel, unstable power supply, inadequate backup systems and low funding allocation (Sambo, Urhefe & Ejitagha, 2015; Ubogu et al., 2023). As a result, many digital collections remain fragile and vulnerable to repository crashes, format obsolescence, metadata loss and link rot.

## Emerging Digital Preservation Initiatives and Technologies

South African scholarship reflects stronger adoption trends compared to West Africa. Masenya & Ngulube (2019; 2020; 2021) document the use of DSpace, E-Prints, ETD repositories, LOCKSS, ContentDM, Archive-IT and DigiTool, noting that these systems enable long-term access, although sustainability varies with institutional capacity. Masenya (2023) further highlights growth in digital preservation of indigenous knowledge through community-driven metadata and controlled rights management.

Beyond Africa, global trends demonstrate rapid evolution. Rosa, Craveiro & Domingues (2017) identified open-source repository platforms as central to preservation infrastructure. Advances now extend to 3D cultural heritage storage and linked-data knowledge graphs, which enhance manuscript interpretability and provenance tracking (Amico & Felicetti, 2024; Ignatowicz et al., 2025). However, most African repositories remain below NDSA Level 2 maturity, lacking redundancy, emulation capacity, repository certification or fixity frameworks (Chigwada, 2024; Ngulube, 2020).

**Synthesis and Emerging Gaps**

The literature collectively confirms that traditional preservation remains essential for safeguarding print resources, particularly in infrastructure-limited regions. However, modern scholarship clearly shows that digital preservation is no longer optional, but foundational to scholarly continuity. While developed nations increasingly operate standards-aligned, policy-driven digital repositories, African academic libraries largely remain in early adoption phases with weak policy instruments, low repository redundancy, absence of OAIS-compliant workflows and minimal certification readiness. There is, therefore, a growing urgency for African universities to adopt hybrid preservation models that integrate analogue conservation with scalable digital stewardship. This requires policy frameworks, funding stability, metadata governance standards, digital storage redundancy and upskilling of library staff.

**Methodology**

The present study adopts a systematic integrative review as its methodological approach in order to generate a comprehensive, evidence-based synthesis of scholarly and institutional contributions to the field of library preservation and digital sustainability. This choice is justified because integrative reviews allow for the inclusion of both empirical and theoretical literature, thereby providing a robust platform for identifying patterns, evaluating practices, and theorising future directions across diverse contexts. This review followed a structured integrative protocol aligned with PRISMA-guided evidence synthesis to enhance transparency and reproducibility. Literature was sourced from Scopus, Web of Science, AJOL, Dimensions, Google Scholar, and IFLA/NDSA repositories using Boolean keyword combinations *("digital preservation" OR "hybrid preservation") AND (academic libraries) AND (Africa OR global OR 'trusted repositories' OR OAIS OR NDSA OR LOCKSS)*. Inclusion criteria covered peer-reviewed studies, preservation standards documentation, repository audits, and policy frameworks published between 2005–2024. Excluded were non-scholarly commentaries and studies without methodological detail. A four-stage screening was performed: database search,

title/abstract screening, full-text assessment, data extraction and quality appraisal. The final dataset was 32 studies (19 Africa-specific, 13 international frameworks). Each study was critically appraised using five quality parameters: methodological transparency, empirical grounding, preservation relevance, framework adoption (OAIS/NDSA/TRUST) and sustainability evidence.

A systematic search was conducted across reputable databases (Scopus, Web of Science, Google Scholar, and AJOL) using targeted keywords to maximise the retrieval of relevant works across developed and developing nations, with particular attention to African contexts such as Nigeria and South Africa. Data were subjected to thematic content analysis**,** organised around core themes including methods, technologies, challenges, enabling factors, and knowledge gaps. A comparative analytical lens was further applied to contrast preservation practices between resource-rich and resource-constrained settings, thereby highlighting both universal trends and context-specific challenges. This methodological choice is academically rigorous as it integrates diverse evidence, enhances validity through systematic procedures, and produces actionable insights for both scholarship and practice.

**Thematic Analysis**

The review adopted thematic analysis to synthesise global evidence on preservation practices in academic libraries. Guided by Braun and Clarke (2006), literature was reviewed, coded, categorised and organised into dominant thematic patterns. Five themes emerged: Traditional preservation practices, Digital preservation practices, Policy and governance, Infrastructure and human capacity and Sustainability and collaboration

**Table 1: Data Extraction and Thematic Synthesis Table for Integrative Review of Preservation Practices**

| Reference | Abstract Summary | Keywords | Methods | Main Findings | Identified Gaps |
|---|---|---|---|---|---|
| Awamleh & Hamad (2022) – *Digital preservation of information sources at* | Study explores digital preservation practices and challenges from | Digital preservation; Academic libraries; Library staff; Preservation | Survey of library employees (quantitative + qualitative) | Limited funding, low awareness, and weak infrastructure impede effective | Absence of national policy frameworks; little comparative analysis with other developing |

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|---|---|---|---|---|---|
| *academic libraries in Jordan* | employees' perspective in Jordanian academic libraries. | strategies; Jordan | | digital preservation. Staff are willing but lack training. | nations. |
| Ifijeh (2014) – *Adoption of digital preservation methods for theses in Nigeria* | Examines the extent to which Nigerian universities have adopted digital methods to preserve theses. | Theses; Digital preservation; Academic libraries; Nigeria; Repositories | Case study of selected Nigerian universities; interviews + document review | Some institutions digitise theses, but lack uniform repository standards; infrastructure is weak. | Insufficient integration with global repository systems; limited scalability. |
| Oluwaseun (2017) – *Preservation of library resources in Nigerian universities* | Discusses traditional and digital preservation strategies in Nigerian universities. | Preservation methods; Traditional preservation; Nigeria; Academic libraries | Descriptive survey of university libraries | Reliance on traditional methods (binding, fumigation); digital efforts are minimal. | Weak funding, lack of ICT skills, and poor policy support. |
| Saliu, Urhefe & Ejitagha (2015) – *Survey of Digital Preservation Challenges in Nigerian Libraries* | Investigates librarians' perceptions of digital preservation challenges. | Digital preservation; Challenges; Librarians' perspectives; Nigeria; ICT | Survey of librarians | High awareness of digital preservation importance, but severe barriers (infrastructure, funding). | Few practical implementations; absence of long-term sustainability studies. |
| Ubogu et al. (2023) | Explores preservat | Digital preservat | Conceptual + case discussions | Rapid growth of | No empirical studies on |

| | | | | | |
|---|---|---|---|---|---|
| – *Digital Preservation Challenges in the Era of Big Data* | ion challenges posed by big data in Nigerian academic libraries. | ion; Big data; Academic libraries; Nigeria; Information management | | digital data outpaces preservation strategies; lack of scalable solutions. | big data preservation in African academic libraries. |
| Chigwada (2024) – *Librarians' role in preservation and dissemination of Indigenous knowledge* | Examines librarians' contributions to preserving and sharing indigenous knowledge. | Indigenous knowledge; Digital preservation; Librarians; Knowledge management; Africa | Mixed-methods study in African libraries | Librarians are key actors but face training and resource challenges. | Gaps in integrating indigenous knowledge into mainstream digital repositories. |
| Masenya (2023) – *Revitalisation and Digital Preservation of Indigenous Knowledge* | Highlights efforts to digitise and preserve indigenous cultural heritage. | Indigenous knowledge; Digital preservation; Cultural heritage; South Africa | Qualitative case study | Success in digitisation projects, but sustainability remains uncertain. | Need for hybrid approaches combining traditional and digital methods. |
| Rosa, Craveiro & Domingues (2017) – *Open Source Software for Digital Preservation* | Reviews open-source tools for digital repositories. | Digital preservation; Repositories; Open source; Metadata; OAIS | Systematic survey of repository software | DSpace, Fedora, and Greenstone are widely used; OAIS compliance varies. | Limited adoption in Africa due to technical barriers. |

| | | | | | |
|---|---|---|---|---|---|
| *Repositories* | | | | | |
| Amico & Felicetti (2024) – *3D Data Long-Term Preservation in Cultural Heritage* | Discusses methods for preserving 3D cultural heritage data. | 3D preservation; Digital heritage; Long-term preservation; Repositories | Technical framework analysis | Emerging tools show promise for long-term preservation of complex formats. | Lack of application in academic libraries, esp Africa. |
| Ignatowicz et al. (2025) – *Knowledge Graphs for Digitised Manuscripts* | Proposes knowledge graphs for managing digitised manuscripts in libraries. | Digital libraries; Manuscripts; Knowledge graphs; Metadata; Preservation | Technical/methodological paper | Knowledge graphs improve discoverability and long-term metadata preservation. | Still experimental; not yet tested in African contexts. |

**Discussion**

The data extraction matrix synthesised scholarly work on preservation in academic libraries from 2005–2024. A global comparison reveals uneven development: while advanced institutions increasingly operate mature digital preservation ecosystems, most African universities, including Nigeria, still depend heavily on traditional methods. The following themes summarise key patterns.

**1. Traditional vs Digital Preservation**

Findings show a dual-preservation landscape. Traditional techniques binding, fumigation, lamination, and microfilming, remain dominant in developing regions due to affordability and infrastructural limitations (Tondo et al., 2022; Oluwaseun, 2017). Conversely, digital preservation is standard in the Global North, where repositories using DSpace, Fedora and OAIS-aligned workflows underpin long-term digital access (Rosa et al., 2017).

This establishes a clear digital preservation divide. Unlike developed systems prioritising digital longevity, African universities sustain analogue survival under fragile infrastructural realities. Hybrid preservation emerges as the most feasible model, retaining traditional conservation while gradually integrating scalable digital strategies.

## 2. Technologies, Tools and Adoption

Globally, preservation technologies are evolving rapidly. Knowledge graphs (Ignatowicz et al., 2025), linked-data systems, 3D cultural object archiving (Amico & Felicetti, 2024), and standards-driven repositories demonstrate high technological maturity. However, Nigerian and broader African studies consistently document limited storage capacity, unstable power, and minimal ICT support (Saliu et al., 2015; Ubogu et al., 2023). Availability does not equal utilisation; technology potential remains unrealised without infrastructure, skills and governance.

## 3. Policy, Governance and Standards

Policy strength strongly predicts preservation success. Developed institutions operate under robust digital preservation frameworks aligned with OAIS and ISO 16363 standards. In contrast, most African university libraries lack enforceable digital policies, resulting in duplication, fragmentation, and unsustained projects (Ifijeh, 2014; Awamleh & Hamad, 2022). Where policies exist, implementation is often weak due to insufficient funding and institutional commitment.

## 4. Infrastructure and Human Capacity Constraints

Findings reaffirm infrastructural and skills gaps as core inhibitors of digital preservation growth. Unstable power, obsolete hardware, low internet bandwidth and absence of redundancy systems dominate African contexts (Masenya & Ngulube, 2020). Human capacity limitations, low metadata competency, inadequate technical training, poor exposure to preservation standards further restrict progress. Technology without expertise offers no sustainability.

## 5. Sustainability and Collaboration

Digital preservation longevity is tied to funding continuity, leadership commitment, and collaborative frameworks. Successful programmes internationally thrive on shared networks such as DPC and NDLTD (Tanner, 2020). In Africa, many projects collapse when donor support ends, indicating low local ownership (Ngulube, 2019). Regional preservation consortia and capacity development initiatives emerge as necessary pathways for resilience.

## 6. Comparative Insights and Research Gaps

A North–South comparison reinforces systemic asymmetries. Developed countries reflect mature hybrid ecosystems, while Africa remains in early adoption stages. Crucial gaps identified include: scarcity of longitudinal preservation impact studies, limited integration of traditional and digital models, weak adaptation of advanced technologies for low-resource settings, and under-representation of indigenous knowledge preservation research. These gaps justify further context-sensitive

inquiry, especially in Nigeria, where digital preservation is emerging but far from stable.

The synthesis shows global convergence on the necessity of digital preservation, yet divergence in readiness and capacity. Effective preservation is dependent on the alignment of three enablers: policy, infrastructure, and human expertise**.** Without this triad, preservation systems remain fragile. The findings affirm that academic libraries must move from passive custodianship to strategic digital stewardship, leveraging hybrid models that safeguard both print heritage and digital scholarship.

## Emerging Themes

### Theme 1: Traditional Preservation Practices

Traditional preservation remains the foundation of academic library management, especially in Africa and Asia, where print collections dominate. Methods such as binding, fumigation, lamination, and microfilming are still central (Tondo, Jembe & Yankyar, 2022; Feather, 1998; Harvey, 1995). The thematic evidence indicates that while these methods are effective for tangible materials, they are insufficient for modern hybrid collections (Ngulube, 2019). Libraries in developed countries have transitioned to preventive conservation, climate control, integrated pest management, and conservation laboratories, whereas developing-country institutions rely on reactive maintenance (Abdulrazaq, 2015). Comparatively, studies in Nigeria and Ghana reveal poor environmental monitoring and inadequate disaster preparedness (Popoola, 2003; Sambo, Urhefe & Ejitagha, 2017). Conversely, European libraries emphasise documentation, controlled temperature (18–22°C), and professional conservators (IFLA, 2010). This disparity shows that traditional preservation is context-dependent, effective where resources and policy exist, fragile where they do not.

### Theme 2: Digital Preservation Practices

Digital preservation extends the concept of conservation into technological environments. It involves ensuring ongoing access to digital materials through migration, replication, and emulation (Hedstrom, 1997; OAIS, 2012). Thematic analysis shows that awareness is widespread, *but* implementation is limited in developing regions (Masenya & Ngulube, 2020; Sambo et al., 2017).

In South Africa, most academic libraries have implemented digital preservation strategies through institutional repositories using DSpace, ETD, LOCKSS, and ContentDM (Masenya & Ngulube, 2021). However, even these systems require constant maintenance, metadata standards, and migration planning (Ngulube, 2020). In Nigeria, few libraries have functional repositories due to weak

infrastructure and unstable power (Balogun & Adjei, 2019). The implication is that digital preservation maturity follows a gradient from experimentation in developing contexts to strategic implementation in advanced institutions (Tanner, 2020).

**Theme 3: Policy, Governance, and Standards**

Policy and governance emerged as a major determinant of preservation success. Thematic patterns reveal that institutions with well-defined policies, such as South African Universities, demonstrate higher adoption of preservation systems (Masenya & Ngulube, 2019). In contrast, Nigerian and Tanzanian university libraries operate without formal digital preservation policies (Rahman & Mohammed-ul-Islam, 2012).

The absence of frameworks leads to ad-hoc decision-making, inconsistent metadata standards, and a lack of accountability. For example, the OAIS reference model (ISO 14721:2012) and Trusted Digital Repository (ISO 16363:2012) standards are largely unknown in many African libraries (Ngulube, 2019). The implication is that policy provides direction, enabling integration of human, financial, and technical resources; its absence perpetuates fragmentation.

**Theme 4: Infrastructure and Human Capacity**

Infrastructure and human capacity are cross-cutting themes that determine both traditional and digital preservation outcomes. Libraries in developed countries enjoy robust ICT infrastructure, high-bandwidth networks, and redundant storage systems. Conversely, African institutions face erratic power supply, obsolete hardware, and inadequate network connectivity (Sambo et al., 2017; Masenya & Ngulube, 2020). Human capacity gaps, insufficient technical training, low ICT literacy, and minimal exposure to metadata standards are persistent barriers (Ngulube, 2020). In Nigeria, about two-thirds of librarians surveyed had never undergone digital preservation training (Sambo et al., 2017). This contrasts with Europe and North America, where continuing professional development is institutionalised (Harvey, 1995). The implication is that technology without expertise is unsustainable. Libraries must invest not only in tools but in the continuous upskilling of personnel.

**Theme 5: Sustainability and Collaboration**

A final theme relates to sustainability and collaborative frameworks. Sustainability depends on recurring funding, institutional commitment, and integration into national information policies. However, most digital preservation initiatives in Africa are donor-funded and project-based, lacking continuity once funding ends

(Ngulube, 2019; Masenya & Ngulube, 2020). Collaborative preservation networks such as the Digital Preservation Coalition (DPC) in the UK and the Networked Digital Library of Theses and Dissertations (NDLTD) demonstrate that shared resources, standards, and training improve resilience (Tanner, 2020). Few such networks exist in West Africa. This underscores the need for regional consortia for joint preservation efforts, resource sharing, and advocacy.

**Cross Theme Synthesis**

Comparatively, the thematic analysis highlights a north–south divide in preservation readiness: developed countries exhibit integrated hybrid models, while developing regions struggle with fragmented systems. Yet, hybrid frameworks are emerging, combining traditional and digital methods. For example, digitisation of rare manuscripts both preserves and enhances accessibility, while controlled storage ensures the physical items survive (Tondo et al., 2022).

The implications are profound: digital preservation cannot replace traditional conservation; rather, it complements it. Effective academic library preservation requires synergy between policy, technology**,** and people**,** a "three-legged stool" model of sustainability (Kenney & McGovern, 2003). Without balance, preservation collapses.

Ultimately, thematic synthesis shows that preservation in the digital era is no longer a technical issue alone, it is an institutional, cultural, and ethical responsibility. Academic libraries must evolve from passive custodianship to proactive digital stewardship, ensuring that both print and digital heritage endure. The review indicates that academic libraries globally are transitioning toward hybrid preservation systems that combine physical and digital practices. Traditional methods remain critical, particularly in developing regions where printed materials dominate collections. Libraries in Nigeria and similar contexts rely heavily on environmental control, binding, and photocopying due to resource constraints. Conversely, digital preservation systems such as DSpace and Fedora have enhanced long-term access to electronic theses, dissertations, and institutional repositories.

However, sustainability challenges persist. The literature reveals gaps in policy formulation, technical expertise, and infrastructure. Many libraries lack disaster recovery plans, standardised metadata protocols, and interoperability with international preservation networks. Studies (e.g., Rahman & Mohammed-ul-Islam, 2012; Ngulube, 2019) highlight that digital preservation in developing countries often depends on donor funding, making it unsustainable in the long run.

Additionally, copyright restrictions and technological obsolescence complicate access to preserved digital materials.

**Findings**

The following were the findings of this study:

1. While traditional methods (binding, fumigation, microfilming) remain relevant, especially in resource-constrained contexts, there has been a marked global shift toward digital preservation strategies such as repositories, OAIS-based systems, and cloud storage.
2. Advanced digital repository platforms, metadata standards (e.g., Dublin Core, PREMIS), and trusted digital repository frameworks are increasingly adopted in developed countries, whereas African academic libraries, including Nigeria and South Africa, face challenges of inadequate infrastructure, unstable electricity, and limited funding.
3. Developed nations often anchor digital preservation in strong institutional and national policies, whereas many developing countries lack comprehensive frameworks, resulting in fragmented and inconsistent practices.
4. Common issues include high costs of technologies, rapid obsolescence of digital formats, weak policy support, limited staff expertise, and poor user awareness. In Africa, these are compounded by infrastructural deficits and funding gaps. There is limited research on the long-term sustainability of digital preservation in developing contexts, weak integration between traditional and digital methods, and insufficient comparative studies between the global North and South.

**Recommendations**

The following recommendations were proffered:

1. Management should implement clear preservation policies aligned with international standards such as OAIS to guide library operations effectively.
2. Institutions must prioritise staff training in digital preservation, metadata management, and repository technologies to strengthen internal expertise.
3. Management should ensure reliable power, internet connectivity, and scalable technologies to support sustainable preservation practices.
4. Institutions need to promote local and international partnerships to share resources, expertise, and best practices for library preservation.

## Conclusion

The integrative review reveals that while the global discourse on preservation in academic libraries has shifted toward advanced digital strategies, significant disparities persist between developed and developing contexts. Traditional preservation methods remain indispensable, particularly in Africa, but are insufficient on their own to safeguard scholarly resources in the digital age. Sustainable digital preservation requires not only technological adoption but also robust policy frameworks, skilled human capital, and infrastructural investment. Ultimately, the study underscores the necessity of hybrid, context-driven preservation strategies, enhanced collaboration, and targeted capacity building to bridge the preservation divide and secure the future of scholarly communication globally.

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