AN EVALUATION ON OPEN ACCESS REPOSITORIES IN PRESERVING DIGITAL RESOURCES IN ACADEMIC LIBRARIES IN SOUTH-WEST, NIGERIA

By

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Abstract

In the 21st Century with the advent of technology, there is a high rate at which academic research is being generated and disseminated. Therefore, it is important that information generated and disseminated are preserved digitally for posterity. Open Access Repositories (OARs) have become critical tools for ensuring research accessibility and sustainability, therefore, this study focused on OARs in preserving digital resources in academic libraries in South-west,Nigeria. This study adopted the descriptive survey research design and 15 academic institutions with open access repository were randomly selected from the six states in South-West, Nigeria. The population comprised 88 repository manager, system librarians, ICT library staff and librarians involved with institutional repository in the 15 academic institutions and used a questionnaire for data collection that was analysed.. The result showed that DSpace and EPrints are the most used repository software platforms, PDF and DOC/DOCX are the most used digital file format. The implementation of international digital preservation standards was generally low and most of the libraries rely only on migration and standard usage as their preservation strategies. Lack of funding, irregular power supply, poor internet connectivity and software or hardware obsolescence were the major challenges. Preservation of resources in OARs is very important. Therefore, university management and government should invest in stable power infrastructure and also prioritise financial support for digital preservation.

Keywords: *Digital preservation, Open access, Institutional repositories, Academic Libraries, Nigeria*

Introduction

The main duty of any academic library, according to Hotsonyame (2023), is to support the information needs of user in its parent institution, which includes the faculty, staff, students and the entire community. It is also the responsibility of academic libraries to make sure that scholarly materials are made accessible to users. Before the advent of the Internet, the only means of accessing the result of any research study published in a journal is by subscribing to the journal or through interlibrary loan (Nworie *et al*, 2021). However, the growth of digital technology has

brought in new development such as academic publishing and library management, which have transformed how research content is disseminated and accessed (Awamleh & Hamad, 2021). Similarly, technology has assisted academic libraries providing access to information sources to researcher as results of previous studies are widely known or accessible (Taylor, 2016). Academic libraries need to make use of new technologies in order to preserve the lifespan of scholarly materials digitally in order to easily access by users.

The goal of scholarly publications is that they are accessible to the general audience. Therefore, Open Access Repositories (OARs) are essential to raising the visibility of scholarly publications (Orsu, 2019). Oladokun, Afolayan, & Oyetola (2024). (2024) viewed open repository as a digital platform that offers free, instant and permanent access to research productions, such as, journal articles, preprints, data and other scholarly materials. In addition, George (2024) posited Open Access (OA) as the means in which scholarly research works are access freely online by removing some barriers such as; financial, legal and technical to reading and reusing academic literature. This implies that individuals can search, read, download, copy, print, disseminate or link open access resources without encountering financial, legal or technical obstacles.

Open Access Repositories (OARs) can be viewed as digital interface where all scholarly outputs of an academic institution and research community are housed, preserved and disseminated freely to all users, they also increase the visibility of the institution. With the advent of OARs, academic libraries can now share and preserve digital contents within an academic community with a sense of relief. Ndegwa & Gitau (2022) posited that the development and maintenance of OARs have always been challenged by issues pertaining to their long-term preservation. The aim of making scholarly materials accessible for a long time may be undermined, if the issue of their long-term preservation is not well handled. According to the America Library Association (2007), digital preservation is the process of ensuring that electronic materials endure technical advances without fear of alteration, loss of readability or access over a longer period of time.

Ahmad, Rafig & Arif (2024) also explained digital preservation as all processes which encompass policies, technologies and strategies put in place to ensure that digital contents and collections are sustained for future use. Jalaludin, Rosly, Sahriman, Rosihidin, & Kadir, (2025) affirmed that the goal of digital preservation is typically to use one or more digital preservation techniques to maintain, preserve and make digital contents accessible to users for a long time. Digital preservation helps in prolonging the life of records and protects information and documents

that would have been destroyed because of aging. Digital preservation of information resources has helped users to be free from barriers hindering their accessibility and it has also contributed to the success of information literacy (Alex-Nmecha & Owate, 2019).

Statement of the problem

The advent of technology in the 21st Century has resulted in high rate of academic research which must be preserved digitally. The shift from print to digital scholarly research has also increased the impact of OARs which have been developed into vital infrastructure that offer unrestricted access to scholarly work. However, it is still unclear how well these platforms would work to guarantee the long-term preservation of digital works, particularly in academic libraries in Nigeria. While, OARs have expanded throughout academic libraries in Nigeria, Omoju & Omotayo (2024) revealed that many academic library repositories set up in Nigeria face lots of challenges such as lack of digital preservation strategies, unreliable infrastructure or incompliance with international preservation standards. As such many repositories are facing the risk of degradation, loss or even obsolescence over time. Furthermore, lack of finance, shortage of qualified staff, lack of policy frameworks and technological constraints make it extremely difficult for sustainability of long-term preservation plans. However, there is limited empirical evidence on how OARs has helped in preserving digital resources and on how it has been able to sustain the long-term preservation of research output in academic libraries. This study therefore, examined OARs in preserving digital research output in academic libraries in South-west Nigeria.

Objectives of the study

The main objective of this study was to investigate how OARs ensures long-term preservation of digital research output in research output in libraries in South-west, Nigeria. The specific objectives are to:

1. find out the software and platforms used for digital preservation of OARs in academic libraries in South-west, Nigeria;
2. determine the level of infrastructure and technical capacity available for digital preservation in libraries in South-west, Nigeria;
3. examine the preservation strategies practices for OARs in academic libraries in South-west Nigeria;

4. ascertain the extent to which academic libraries comply with digital preservation policies and standards in South-west, Nigeria;
5. find out the challenges academic libraries face in sustaining long-term digital preservation of OARs in academic libraries in South-west, Nigeria: and
6. find out the strategies that can be adopted to improve digital preservation in OARs in academic libraries in South-West, Nigeria.

Research questions

The following research questions were derived from the sepcific objectives:

1. What are the software and platforms used for digital preservation practices of OARs in academic libraries in South-west Nigeria?
2. What infrastructure and technical resources are available to support digital preservation in academic libraries in South-eest Nigeria?
3. What preservation strategies are currently implemented in academic libraries in South-west Nigeria?
4. To what extent do academic libraries comply with recognised digital preservation policies and standards in academic libraries in South-west, Nigeria
5. What are the major challenges affecting sustainable digital preservation in academic libraries in South-west Nigeria?
6. What are the strategies that can be adopted to improve digital preservation in OARs in academic libraries in South-West, Nigeria?

Literature Review

Concept of digital preservation and digital preservation strategies

Digital preservation refers to the series of actions taken to ensure that digital content remains accessible and usable over time. It is a holistic process that involves planning, policies, and the use of appropriate technologies. Digital preservation strategies are essential for ensuring the longevity and accessibility of digital information, particularly in the face of rapid technological changes and potential data loss. Several strategies have been proposed and implemented. One of the key strategies is the development of comprehensive digital preservation policies. These policies should provide a clear mandate and direction for the preservation of digital assets, ensuring that all stakeholders are aware of their roles and responsibilities (Adjet *et al*, 2019 ; Pavao *et al*, 2016).

Another important strategy is the use of metadata in digital preservation, according to Farias et al. (2023) and Diaz et al. (2019), repositories should adopt standardized metadata formats and ensure that metadata is accurately and consistently applied to all digital assets. This will enhance the discoverability, accessibility, and long-term preservation of digital content. The integration of digital preservation strategies into the management of institutional repositories is also crucial. This involves the use of appropriate technologies and tools, such as Archivematica and DSpace, which are designed to support the preservation of digital assets. Archivematica, for instance, is a trusted digital repository that provides a robust framework for the ingest, storage, and preservation of digital content (Chaves, 2023; Gava and Flores, 2021; Machado *et al*, 2020).

According to Giusti and Villarreal, (2018) DSpace is another popular repository platform that supports digital preservation. Though, it is primarily used for storage and access, it can also be integrated with other tools, such as Archivematica, to enhance its preservation capabilities.

Other strategies will include:

1. Migration involves transferring digital content from one format or storage medium to another to ensure continued access. This can include migrating to updated file formats or transferring data to new storage systems., the importance of this is that It helps combat technological obsolescence and ensures that digital materials remain usable over time (Baggio and Flores, 2013 ; Maharana and Panda, 2001).
2. Emulation is the recreating of the original environment in which digital content was created, allowing it to be accessed as intended. This strategy is particularly useful for software and applications that may no longer be supported on current systems, the advantage of this is that emulation preserves the functionality of digital objects, making them accessible despite changes in technology (Baggio and Flores, 2013; Luan et al., 2010).
3. Digital Archaeology involves recovering and reconstructing lost or damaged digital content, It may include the use of forensic tools to retrieve data from obsolete formats or damaged media. Digital archaeology is crucial for salvaging cultural heritage and historical records that may otherwise be lost (Putra et al, 2023; Baggio and Flores, 2013).
4. Metadata Management: Metadata provides essential information about digital resources, facilitating their discovery and long-term management; initiatives like the OAIS Reference Model emphasise the importance of robust metadata for digital preservation, effective metadata

management enhances the accessibility and usability of preserved digital content (Arora, 2006 ; Maharana and Panda, 2001)

Digital preservation strategies may also include technological environmental conservation that addresses technical limitations in other to ensure data integrity, manage intellectual property rights and maintains proper metadata. These strategies aim to overcome challenges like obsolescence and data loss, ensuring long-term accessibility**.**

The role of OARs in academic libraries

Open Access Repositories (OARs) are digital platforms used by libraries and information centers to offer perpetual and unrestricted access to research outputs, such as journal articles, preprints, theses, and datasets, without financial or legal barriers (Wikipedia, 2025). The main feature of OARs is that they are governed Open Access standards such as the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) which mandates that they charge no fee for access to information they contain. Subscribing to these protocols also facilitates the interoperability of OARs allowing search engines such as Google scholar to harvest content and construct global databases of freely available research (Wikipedia, 2025). In academic libraries, OARs serve as institutional or disciplinary repositories, hosting research outputs to enhance visibility and accessibility (Network, 2025).

OARs are fast becoming integral part of academic libraries' strategies for promoting unrestricted access to research outputs and amplifying institutional impact (Demetres *et al.,*2020). These digital systems boost visibility of scholarly works resulting in more citations and broader community engagement which cannot be matched by paywalled journals (Engeszer and Sarli, 2014). Librarians play a great role in the development of OARs by repository development through metadata management, ensuring interoperability with global discovery services like OAI-PMH and Google Scholar (Hadad and Aharony, 2024). They also create awareness and promote the use of OARs through library marketing, training sessions and support on self-archiving workflows, copyright considerations, and the use of persistent identifiers (e.g., DOIs), thereby fostering a culture of open scholarship (Das and Chowdhury, 2019). Researchers such as Oladokun, *et al*. (2024) have outlines how OARs are reshaping library activities and processes by overhauling collection development process, helping libraries to effectively reallocate budgets from expensive journal subscriptions toward repository infrastructure and digital preservation

Digital preservation practices in Nigeria

Open Access Repositories have been found to be a veritable tool for digital preservation. According to Gbaje (2011), digital preservation practices can include strategies such as standardisation, normalisation, encapsulation, refreshing, migration, and emulation. The use of OARs supports standardisation as it provides a uniform approach to the preservation and dissemination of digital, particularly among tertiary institutions. In Nigeria, libraries, especially in universities, use software like DSpace and e-Print to preserve digital materials, such as research papers and local records, so they can be used in the future. With over 200 National Universities Commission (NUC)-approved universities, only about 10–15% have established functional IRs. According to Oladokun (2023), Nigeria has approximately 37 active institutional repositories (IRs), predominantly hosted by universities.

Among federal university libraries in South-western Nigeria, common preservation methods include web-archiving, bit-level preservation, and distributed backup strategies, often implemented via open-source platforms such as DSpace and EPrints. (Omoju and Omotayo, 2024). A related study by Akinola et al, (2024) on institutional repository development in Nigerian universities revealed that Nigerian libraries often adopt structured workflows such as scanning, metadata enrichment and off-site replication in the process of digitising theses and dissertations. However, Ifijeh (2014) reported that majority of Nigerian libraries often struggle with sustainable funding and staffing.

Challenges to digital preservation in developing countries

Digital preservation has become widely embraced among tertiary institutions in developing countries. However, several challenges are limiting the progress of these projects. Some of the challenges that have been identified in literature include inadequate funding and infrastructure, lack of standards and policy frameworks, technological obsolescence, as well as legal and intellectual property issues. Digital preservation initiatives in developing countries often grapple with insufficient funding and infrastructural deficits. Many memory institutions rely on limited recurring budgets, which hamper their ability to acquire reliable servers, high-capacity storage solutions, and ensure uninterrupted power supply. This financial constraint increases the risk of

data loss and service outages, undermining the sustainability of digital preservation efforts (Ahmad *et al*,2025).

The absence of comprehensive national and institutional policies for digital preservation poses a significant challenge. Without standardized metadata schemas and preservation formats, interoperability and long-term access to digital resources are compromised. This policy vacuum is particularly evident in many African nations, where digital preservation is not yet integrated into the strategic plans of universities and other institutions (Ndegwa, Bosire, and Odero 2022).
Rapid technological advancements lead to the obsolescence of file formats, hardware, and software, necessitating frequent migration and emulation strategies. Institutions in developing countries often lack the dedicated technical expertise required to keep pace with these changes, resulting in challenges in maintaining and safeguarding digital resources over the long term.

A significant barrier to effective digital preservation is the lack of formal training programmes in digital curation and preservation. This skills gap undermines the implementation of best practices and emerging standards. Many libraries and archives in developing countries struggle to find appropriate training opportunities, which hinders their ability to manage digital preservation effectively. Unclear copyright laws and licensing frameworks complicate decisions around rights management, reproductions, and access controls for digitised and born-digital content. In many cases, digital preservation entails copying, which can infringe on intellectual property rights unless specific legal exceptions are in place (Barrueco and Termens, 2022). However, such exceptions have not kept pace with digital technology, posing legal challenges for preservation institutions.

Empirical review

Masenya & Ngulube (2019) conducted research on digital preservation practices in South African university libraries in order to provide solution to ensure effective digital preservation. The study confirmed that the biggest challenges encountered in maintaining and protecting digital resources were a lack of set standards, policies, and processes, insufficient resources, and a lack of expertise and training. The results identified other difficulties, such as a lack of funding and cooperation, the risk of technological obsolescence brought on by rapidly evolving hardware and software, inadequate technology infrastructure, and potential legal restrictions on the digital preservation process. Friday & Eze (2022) carries out research on the strategies for overcoming

challenges in digital preservation of electronic theses and dissertations in public university libraries in South-East Nigeria. Other challenges encountered in preserving e-theses and dissertations in libraries were lack of adequate funding, inadequate ICT facilities, unskilled staff, poor power supply, absence of staff development programme and lack of digital preservation policy.

Agbodeji & Akporhonor (2021) investigated the motives and difficulties associated with digitising information resources in five federal university libraries in Northern and Southern Nigeria that are engaged in the digitisation of library contents. According to their finding, it was revealed that the university's libraries were active in the digitisation of information resources, the primary materials that were digitised included, theses, dissertations and staff abstracts, among others. Digital preservation was undertaken using a variety of devices, including blogs/repositories, external drives, hard drives, local servers, and web servers. Dspace, KOHA, and Endnote were the main software programs utilised, and desktop PCs, laptops, and scanners were the main hardware facilities.

Umana (2020) examined long-term digital preservation efforts in digital contents stored in Institutional Repositories (IRs) in academic libraries in Namibia. The results showed that, the primary methods employed are short-term preservation strategies which include regular backups, upgrading and maintaining systems and software and utilising open file formats like PDF. Additionally, the survey found that employees were significantly ignorant of the idea of long-term digital preservation. The result also showed that neither institution has given the issue of policies and guidelines enough thought. Lack of long-term preservation methods, lack of funding, lack of IR policies to ensure long-term preservation and lack of training and expertise were also noted as challenges.

Methodology

The descriptive survey research design was adopted and the population was 15 academic institutions with OARs and randomly selected from the six states in South-West, Nigeria. The sample size comprised 88 repository manager, system librarians, ICT library staff and librarians engaged in OARs in the academic institutions. The instruments for data collection was the questionnaire and 88 copies of the questionnaire were found valid and analysed using descriptive statistics (frequencies, percentages, mean scores) and inferential statistics with SPSS version 27.

Results

Table 1 shows the respondents in each university library. Covenant University and University of Ibadan had the highest number of respondents with 14 participants, while Elizade, Redeemers, Afe Babalola, Bowen, Lead City and Ajayi Crowther universities had the lowest no of staff (1) involved with OARs.

Table 1: Distribution of Respondents by Institution

Institution	Frequency	Percentage (%)
Covenant University, Ota	14	16.32
University of Ibadan, Ibadan	14	15.99
University of Lagos, Lagos	11	12.52
Federal University, Oye, Ekiti State	11	12.36
University of Medical Science, Ondo	9	9.59
Obafemi Awolowo University, Ife	7	7.40
Federal University of Technology Akure	5	5.25
Landmark University, Omu-Aran	3	3.60
Babcock University, Ilishan-Remo	3	3.50
Elizade University	1	1.54
Redeemers University, Ede	1	1.38
Afe Babalola University, Ado-Ekiti	1	0.94
Bowen University, Iwo	1	0.90
Lead City University, Ibadan	1	0.79
Ajayi Crowther University, Oyo	1	0.66
Total	**88**	100

The respondents' distribution based on job status and career experience is in Table 2. From the Table, librarians were the highest respondents (40) and archivists were the least no of respondents (8) in the study. This is not surprising as librarians are traditionally the core personnel managing institutional repositories and digital collections. Regarding career experience, participants with 1–5 years of experience make up the largest portion (40.9%) of the respondents.

Table 2: Distribution of Respondents by Job Description and Career Experience

	Frequency (N)	Percentage (%)
Job Role / Description		
Librarian	40	45.5
ICT Staff	18	20.5
Repository Manager	12	13.6
System Manager	10	11.4
Archivist	8	9.1
Career Experience		
1–5 years	36	40.9
6–10 years	30	34.1
More than 10 years	22	25.0

N = 88

Research Question One: What are the software and platforms used for digital preservation of OARs in academic libraries in South-west, Nigeria?

The types of software used for digital preservation of OARS in the academic libraries is presented in Table 3. The Table reveal the types of repository software platforms currently in use, which are a key component of digital preservation practices in academic libraries. The findings indicate that DSpace ($\overline{x}$ = 3.57) is the most widely implemented repository software, followed by EPrints ($\overline{x}$ = 3.25) both occuring in the "Very High" usage category. In contrast, platforms like Fedora Commons ($\overline{x}$ = 1.25) and Roda ($\overline{x}$ = 1.39) received the lowest ratings, indicating very low implementation (Table 3).

Table 3: Type of Repository software and platforms

Repository Software	VH		H		L		VL		Mean	STD
	N	%	N	%	N	%	N	%		
DSpace	53	59.8	02	2.2	31	34.8	02	2.2	3.57	0.620
DAITSS	15	16.9	27	30.3	29	32.6	17	19.1	2.45	0.993
Eprint	41	46.1	31	34.8	13	14.6	03	3.4	3.25	0.833
Roda	01	1.1	03	3.4	25	2.81	60	67.4	1.39	0.679
Fedora Commons	00	00	02	2.2	18	20.2	69	77.5	1.25	0.551
Greenstone	10	11.2	19	21.3	36	40.4	23	25.8	2.18	0.953
Weighted mean									**2.68**	**0.772**

Decision Rule: If mean is 1.0 to 1.74 = Very Low; 1.75 to 2.49 = Low; 2.50 to 3.24 = High; 3.25 to 4.0 = Very High. (Criterion Mean = 2.5)

Research Question Two: What infrastructure and technical resources are available to support digital preservation in academic libraries in South-West, Nigeria?

Table 4 revealed the adequacy of the available infrastructure in the libraries and the most adequately available infrastructure was "Reliable server and backup systems," ($\bar{x}$= 3.14), followed by skilled technical personnel ($\bar{x}$ =2.76) both in the "Adequate" category. A combined 76.4% of respondents rated reliable server and backup systems as Very Adequate (42.7%) or Adequate (33.7%). On the other hand, "Preservation planning tools" received the lowest rating, ($\bar{x}$ = 2.11).

Table 4: Adequacy of the available infrastructure in the libraries

Infrastructure	VA		A		I		NA		Mean	STD
	N	%	N	%	N	%	N	%		
Reliable server and backup systems	38	42.7	30	33.7	16	18.0	5	5.6	3.14	0.902
Power supply/inverter systems	14	15.7	22	24.7	28	31.5	25	28.1	2.28	1.086
Preservation planning tools	9	10.1	18	20.2	36	40.4	26	29.2	2.11	0.979
Skilled technical personnel	25	28.1	32	36.0	18	20.2	14	15.7	2.76	1.023
Weighted mean									**2.57**	**0.998**

Decision Rule: If mean is 1.0 to 1.74 = Not Available; 1.75 to 2.49 = Inadequate; 2.50 to 3.24 = Adequate; 3.25 to 4.0 = Very Adequate. (Criterion Mean = 2.5)

Research Question Three: What are the preservation strategies currently implemented in academic libraries in South-west Nigeria?

The most commonly employed digital preservation strategies among the academic libraries are migration ($\bar{x}$= 3.02) and the use of standards ($\bar{x}$ = 2.91)as seen in Table 5. Migration indicates that many institutions actively transfer digital content from older formats to newer ones to prevent obsolescence and a significant number of libraries adopt recognised preservation protocols to ensure long-term accessibility and interoperability of digital resources. Conversely, strategies such as emulation and technology preservation were the least implemented, with mean scores of 2.10 and 2.24 respectively (Table 5).

Table 5: Strategies employed in the preservation of OARs

Preservation strategies	SA		A		D		SD		Mean	STD
	N	%	N	%	N	%	N	%		
Migration	35	39.3	30	33.7	15	16.9	9	10.1	3.02	0.974
Encapsulation	20	22.5	28	31.5	22	24.7	19	21.3	2.55	1.053
Refreshing	17	19.1	23	25.8	25	28.1	24	27.0	2.37	1.048
Replication	30	33.7	29	32.6	15	16.9	15	16.9	2.83	1.019
Normalization	19	21.3	25	28.1	27	30.3	18	20.2	2.51	1.027
Emulation	12	13.5	18	20.2	26	29.2	33	37.1	2.10	1.043
Technology preservation	14	15.7	20	22.5	28	31.5	27	30.3	2.24	1.052
Use of standards	32	36.0	30	33.7	14	15.7	13	14.6	2.91	0.986
Bit preservation	25	28.1	27	30.3	18	20.2	21	23.6	2.61	1.059
Weighted mean									**2.57**	**1.020**

Decision Rule: If mean is 1.0 to 1.74 = Strongly Disagree; 1.75 to 2.49 = Disagree; 2.50 to 3.24 = Agree; 3.25 to 4.0 = Strongly Agree. (Criterion Mean = 2.5)

Table 6 showed the result if current strategies employed in the libraries to ensure long term digital preservation. From the Table, only 22 respondents (25.9%) believe that current strategies in their institutions effectively ensure long-term digital preservation. On the other hand, a significant 36.5% of respondents answered “No,” indicating that they do not believe current strategies are adequate for long-term preservation. Additionally, 23.5% responded “Maybe” and 14.1% stated “Don’t know,”.

Table 6: Current Strategies Ensure Long-Term Digital Preservation

Effectiveness Level	Frequency (N)	Percentage (%)
Yes	22	25.9
No	31	36.5
Maybe	20	23.5
Don't know	12	14.1

The results in Table 7 reveal the specific areas covered by institutional digital preservation policies in the academic libraries. The highest-rated policy area is "Intellectual Property Right," ($\bar{x}$ = 2.87), followed by Access and Use " ($\bar{x}$ = 2.80). In contrast, the lowest-rated item is "No policy" ($\bar{x}$ =2.11), signifying that a sizable number of institutions either lack a formal digital preservation policy or respondents are unaware of one. Additionally, "Financial Policy" also recorded a low mean score of 2.46 (Table 7).

Table 7: Components in the digital preservation policy of the libraries

Components	SA		A		D		SD		Mean	STD
	N	%	N	%	N	%	N	%		
Financial policy	18	20.2	24	27.0	28	31.5	19	21.3	2.46	1.037
Storage policy	26	29.2	30	33.7	20	22.5	13	14.6	2.78	0.992
IT strategic plan	25	28.1	28	31.5	18	20.2	18	20.2	2.67	1.030
Digital preservation policy	20	22.5	26	29.2	22	24.7	21	23.6	2.50	1.061
Security	24	27.0	29	32.6	19	21.3	17	19.1	2.67	1.020
Access and use policy	30	33.7	27	30.3	16	18.0	16	18.0	2.80	1.030
Content policy	21	23.6	25	28.1	24	27.0	18	20.2	2.56	1.029
Preservation standard and ethics	19	21.3	27	30.3	26	29.2	17	19.1	2.54	0.981
Intellectual property right	28	31.5	30	33.7	15	16.9	12	13.5	2.87	0.958
No policy	12	13.5	15	16.9	25	28.1	33	37.1	2.11	1.054
Weighted mean									**2.60**	**1.020**

Research Question Four:To what extent do academic libraries comply with recognised digital preservation policies and standards in academic libraries in South-West, Nigeria?

As shown in Table 8, the awareness of international digital preservation standards such as OAIS, PREMIS, and METS among respondents is relatively moderate. A combined 56.5% of respondents indicated that they are either “Very Aware” (21.2%) or “Aware” (35.3%), suggesting that over half of the academic library professionals surveyed possess a fair to strong understanding of global preservation frameworks. However, a notable 43.5% of respondents indicated limited or no awareness, with 25.9% being “Slightly Aware” and 17.6% indicating they are “Not Aware” of such standards (Table 8).

Table 8: Awareness of any international digital preservation standards

Effectiveness Level	Frequency (N)	Percentage (%)
Very Aware	18	21.2
Aware	30	35.3
Slightly Aware	22	25.9
Not Aware	15	17.6
Total	**88**	**100**

Research Question Five: What are the major challenges affecting sustainable digital preservation in academic libraries in South-West, Nigeria?

The major challenges encountered by the respondents from Table 9 are lack of funding, ($\overline{x}$ = 3.39), irregular power supply ($\overline{x}$ = 3.32) and poor internet connectivity ($\overline{x}$ = 3.28). A substantial 56.2% of respondents strongly agreed, and another 31.5% agreed, that inadequate financial resources hinder the sustainability of digital preservation efforts. Low knowledge and understanding by university leadership was the least challenge ($\overline{x}$ = 2.61), though still within the "Agree" range)

Table 9: Challenges affecting long-term digital preservation of open Access repositories

Challenges	SA		A		D		SD		Mean	STD
	N	%	N	%	N	%	N	%		
Poor internet connectivity	45	50.6	29	32.6	10	11.2	5	5.6	3.28	0.799
Software or Hardware obsolescence	38	42.7	30	33.7	14	15.7	7	7.9	3.11	0.886
Absence of institutional policies	25	28.1	32	36.0	18	20.2	14	15.7	2.76	0.978
Low management support	24	27.0	30	33.7	22	24.7	13	14.6	2.73	0.951
Lack of fund	50	56.2	28	31.5	7	7.9	4	4.5	3.39	0.782
Lack of skill and training among staff	30	33.7	35	39.3	16	18.0	8	9.0	2.98	0.882
Low knowledge and understanding by university leadership	21	23.6	29	32.6	22	24.7	17	19.1	2.61	1.010
Irregular power supply	48	53.9	26	29.2	10	11.2	05	5.6	3.32	0.811
Weighted mean									**3.02**	**0.887**

Decision Rule: If mean is 1.0 to 1.74 = Strongly Disagree; 1.75 to 2.49 = Disagree; 2.50 to 3.24 = Agree; 3.25 to 4.0 = Strongly Agree. (Criterion Mean = 2.5)

Research Question Six: What strategies can be adopted to improve digital preservation in open access repositories in academic libraries in South-West, Nigeria?

The results of the strategies that can be adopted to improve digital preservation in OARs is presented in Table 10. The major strategies are provision of constant power supply ($\bar{x}$ = 3.51) falling into the "Strongly Agree" category. A significant 61.8% of respondents strongly agreed, while another 29.2% agreed. The second most endorsed strategy is more funding from government/university ($\bar{x}$ = 3.41), with 88.8% of respondents agreeing or strongly agreeing. Similarly, regular training and staff development also received strong support ($\bar{x}$ = 3.36), emphasising the need for capacity building. Conversely, the use of AI/Machine Learning for automation received the lowest mean score of 2.87, though still within the "Agree" range. The overall weighted mean of 3.20 indicate the importance of all the strategies listed for preservation of OARS in the academic libraries (Table 10).

Table 10: Strategies that can improve digital preservation in the academic libraries

Strategies	SA		A		D		SD		Mean	STD
	N	%	N	%	N	%	N	%		
Constant power supply	55	61.8	26	29.2	6	6.7	2	2.2	3.51	0.741
Regular training and staff development	47	52.8	30	33.7	09	10.1	03	3.4	3.36	0.812
Development of a good institutional policy	40	44.9	33	37.1	10	11.2	06	6.7	3.21	0.902
Partnerships with IT companies	35	39.3	30	33.7	15	16.9	09	10.1	3.02	0.972
More funding from government/university	50	56.2	29	32.6	07	7.9	03	3.4	3.41	0.789
Use of A/Machine Learning for automation	28	31.5	30	33.7	22	24.7	09	10.1	2.87	0963
Regular system audits	33	37.1	32	36.0	15	16.9	09	10.1	3.00	0.951
Weighted mean									**3.20**	**0.876**

Decision Rule: If mean is 1.0 to 1.74 = Strongly Disagree; 1.75 to 2.49 = Disagree; 2.50 to 3.24 = Agree; 3.25 to 4.0 = Strongly Agree. (Criterion Mean = 2.5)

Discussion of the findings

The findings revealed that DSpace and EPrints are the dominace repository software platforms, because of its flexibility, community support, and compatibility with open access standards and valued for its simplicity and efficiency in managing academic content respectively. This strongly validates existing literature that identifies these platforms as the most widely adopted open-source solutions for institutional repositories (Omoju & Omotayo, 2024; Oladokun, 2023). With DSpace receiving a very high usage rating, it aligns with observations by Akinola et al. (2024), who noted that Nigerian libraries rely heavily on DSpace for digitising theses and dissertations, due to its reliability, scalability, and community support. Conversely, the low adoption of Fedora Commons and Roda supports earlier claims by Ndegwa and Gitau (2022) that complexity and infrastructural demands hinder the use of more sophisticated preservation systems in developing contexts.

The results suggest that while there is strong adoption of a few open-source platforms (notably DSpace and EPrints), other more complex or resource-demanding platforms remain largely underutilised in the region. The overall weighted mean falls within the “High” category, suggesting that while some advanced repository software may not be widely used, a solid

foundation for digital preservation practices exists, primarily built on trusted and proven platforms. This points to growing awareness and implementation of digital preservation practices among academic libraries in South-west Nigeria, albeit with room for further diversification and technical advancement.

The results showed that reliable server and backup systems were rated as "adequate, preservation planning tools indicating that many institutions have made commendable investments in ensuring stable and secure data storage environments. This suggests that foundational infrastructure for digital preservation is present in most libraries, which supports the effective management of open access repositories. On the other hand, "Preservation planning tools" received the lowest rating, with a mean score of 2.11, falling within the "Inadequate" category. This indicates a significant gap in long-term preservation strategy implementation, as tools specifically designed for digital longevity planning are lacking in many institutions. It reflects a need for targeted investment and policy development to strengthen preservation planning capabilities in academic libraries.

The overall weighted mean of 2.57 shows that while basic infrastructure like servers and skilled personnel are moderately available, critical tools and stable power infrastructure remain weak points, hindering the full effectiveness of digital preservation efforts. These outcomes underscore the infrastructural weaknesses commonly cited in recent studies. Ahmad et al. (2025) and Ndegwa et al. (2022) note that institutions in developing countries often lack uninterrupted power supply and dedicated preservation tools hindering effective long-term storage. This infrastructural deficiency was similarly emphasised by Friday and Eze (2022), who found that poor power and inadequate planning tools are critical barriers in South-west Nigerian university libraries.

The study also revealed that migration and the use of standards were the most implemented techniques which reflect a relatively strong orientation toward foundational preservation practices within the libraries surveyed. The findings align with Gbaje (2011) and Jalaludin et al. (2025), who identify these methods as fundamental in preserving digital content over time. However, less adoption was observed for strategies like emulation and technology preservation, likely due to their technical complexity and resource demands, consistent with the findings of Ifijeh (2014).

The result indicated that a quarter of the respondents do not see the current preservation strategies used in their libraries as being able to ensure long term digital preservation. This

relatively low percentage suggests that while some institutions have confidence in their preservation approaches, a majority may see them as insufficient or underdeveloped. The limited assurance in strategy effectiveness highlights a potential gap between implementation and actual performance or sustainability of preservation efforts. With the average no of respondents not certain if the preservation methods can ensure long term preservation reflects a high level of uncertainty and lack of clarity regarding preservation outcomes. These findings emphasise the need for clearer guidelines, performance evaluation, and capacity building to strengthen institutional confidence in digital preservation strategies.

The components covered in the preservation policy in many universities revealed the most cited components as intellectual policy rights, access and use and storage which indicates that many institutions recognise the legal and ethical importance of managing ownership and rights related to digital content. Also, these components are very important possibly due to their foundational relevance in managing digital repositories. The component on financial policy had a low mean score which implies insufficient financial planning or commitment toward sustaining preservation efforts. The overall weighted mean of 2.60 suggests a moderate level of policy coverage, with several essential components in place, but also critical gaps especially in financial support and formal documentation that needs to be addressed to strengthen institutional digital preservation efforts.

The study also revealed that limited implementation of international digital preservation standards, with only OAIS ($\overline{x}$ = 2.84) approaching adequacy. This highlights a significant knowledge gap, particularly among professionals who may be directly involved in digital repository management. The data suggests a pressing need for training programmes, workshops, and policy reinforcement aimed at increasing awareness and application of international standards, which are essential for ensuring long-term access, authenticity, and interoperability of digital assets in open access repositories. This confirms prior findings by Barrueco and Termens (2022), who reported a widespread gap between awareness and actual implementation of standards such as PREMIS, METS, and LOCKSS in developing regions. The current study affirms that while awareness exists, operationalising these models remains a challenge due to lack of training, technical expertise, and institutional mandates a view stated by Masenya and Ngulube (2019).

The study revealed lack of funding, irregular power supply, and poor internet connectivity as the major challenges. This underscores the critical need for improved budgetary allocations and

financial planning within institutions to support infrastructure, training, and long-term storage solutions. Irregular power supply and poor internet connectivity reflect the reality of many Nigerian institutions, where unreliable electricity and connectivity disrupt the operation of repository systems and limit real-time access or backup functions critical for digital preservation. On the lower end, low knowledge and understanding by university leadership had the lowest mean score which suggests that it is not perceived as critically limiting compared to more immediate logistical and financial barriers. These major challenges are widespread and significantly affect the ability of academic libraries to sustain long-term open access preservation efforts. The findings on the major challenges in this study support with those of Ahmad et al. (2025) and Akinola et al. (2024) that reported that these challenges significantly threaten the sustainability of digital preservation in African academic institutions. The high mean scores for these challenges affirm that financial and infrastructural constraints remain at the heart of digital preservation struggles.

Finally, the result showed that the strategies for improvement are: constant power supply, more funding, and regular training. This underscores the centrality of stable electricity in supporting repository infrastructure and maintaining long-term access to digital resources in South-West Nigerian libraries. Adequate financial investment is essential for acquiring preservation tools, improving infrastructure, and training personnel and regular training and staff development emphasises the need for capacity building. Conversely, the lowest strategy was use of AI/Machine Learning for automation which suggests that while emerging technologies are acknowledged, there may be limited familiarity, infrastructure, or readiness to implement advanced automation strategies in most institutions. With an overall weighted mean of 3.20, the findings indicate general agreement across the board on the importance of strategic interventions, particularly those addressing power supply, funding, policies, and human capacity development, to improve digital preservation outcomes in open access repositories.

The findings of this study is supported by Akinola et al. (2024) and Ahmad et al. (2024) that emphasise that sustained investment, technical training, and robust institutional frameworks are necessary to scale digital preservation efforts. These recommendations highlight the broader call for policy support and partnerships in the digital transformation of academic libraries, a view also shared by Das and Chowdhury (2019) and Hadad and Aharony (2024). In summary, the findings of this study are strongly validated by recent scholarly evidence from 2022 to 2025,

demonstrating consistency with known challenges, tools, and practices in digital preservation, while also highlighting persistent gaps that require strategic attention in the Nigerian context.

Recommendations

Based on the findings of this study, the following targeted recommendations are made to improve digital preservation practices and strengthen open access repositories in academic libraries in South-West, Nigeria:

1. The study found that irregular power supply and inadequate backup systems significantly hinder digital preservation efforts. Therefore, university management should invest in stable power infrastructure, including inverters and alternative energy sources, to ensure uninterrupted access and preservation of digital content.
2. Findings revealed that the implementation of international digital preservation standards such as PREMIS, METS, and LOCKSS was generally low. It is recommended that institutions adopt these standards more deliberately by integrating them into policy frameworks and providing staff with the necessary training for their application.
3. The study showed that many libraries still rely on a limited range of preservation strategies, primarily migration and standard usage, while advanced methods like emulation and technology preservation are rarely practiced. University libraries should explore and adopt a broader mix of preservation techniques to safeguard content in diverse formats and platforms.
4. Lack of funding emerged as a major challenge affecting long-term digital preservation. It is recommended that university administrators and government bodies prioritize financial support for digital preservation initiatives, including the procurement of software, storage solutions, and skilled personnel required for sustainable repository management.

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