



Perceived Challenges and Strategies for Digital Preservation at the National Space Research and Development Agency (NASRDA), Nigeria

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ABSTRACT

This study examined the perceived challenges hindering digital preservation and the strategies for enhancing digital preservation at the National Space Research and Development Agency (NASRDA), Nigeria. A descriptive survey design was adopted. The population comprised 183 staff members drawn from the library, media, ICT, and registry units of NASRDA headquarters and two activity centres. The entire population was studied because it was small enough to manage without sampling. A structured questionnaire was used to collect data. The instrument produced an overall Cronbach's alpha coefficient of 0.99 across the 16 items. This high coefficient is interpreted cautiously because it may indicate substantial overlap among items rather than exceptionally high measurement quality. Data were analysed using frequency counts, percentages, mean scores, and standard deviation. All eleven challenge items were above the 2.50 cut-off, with mean scores ranging from 3.37 for inadequate funding to 2.89 for technophobia. The five proposed strategies were also above the cut-off, with training and development recording the highest mean (3.38) and policy and procedure development the lowest (3.19). The findings indicate that NASRDA staff perceive digital preservation as being affected by financial, institutional, technological, and human-capacity factors. The study concludes that improvement at NASRDA requires coordinated attention to funding, policy, infrastructure, staff competence, collaboration, and monitoring. The study recommends that NASRDA strengthen its digital preservation policy, provide sustained funding, upgrade preservation infrastructure, and organise regular staff training.

Keywords: Digital Preservation, Preservation Challenges, Preservation Strategies, NASRDA, Digital Repositories

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Introduction

NASRDA is Nigeria's main space agency, and it produces and manages large amounts of scientific data, including satellite imagery, geospatial information, environmental monitoring records, and research reports that support national planning and development. Because this information supports areas such as disaster management, climate monitoring, and agricultural planning, its loss or corruption would have consequences beyond the agency itself. The present study focuses specifically on NASRDA and examines staff perceptions of the challenges affecting digital preservation and the strategies they consider useful for addressing them. The wider literature provides context for interpreting the NASRDA case, but the findings of this study are not presented as representative of all Nigerian research institutions.

Existing studies on digital preservation in Nigeria have mostly focused on university libraries and general institutional repositories, with limited attention given to specialised scientific agencies such as NASRDA that manage technical and sensitive data. Few studies have looked closely at the specific challenges facing digital preservation within such agencies or examined, in detail, the strategies that staff themselves consider useful for improving preservation. This gap in the literature limits the evidence available for

planning preservation interventions in specialised scientific settings. This study therefore addresses that gap by examining the challenges hindering effective digital preservation at NASRDA and the strategies that staff consider useful for strengthening preservation. The findings are intended primarily to inform planning and policy at NASRDA, while the discussion identifies aspects that may be relevant for further research in other research institutions.

The situation described above is common among research institutions in developing countries, including Nigeria, where the National Space Research and Development Agency (NASRDA) operates. NASRDA is Nigeria's main space science agency, and it produces and manages large amounts of scientific data, including satellite imagery, geospatial information, environmental monitoring records, and research reports that support national planning and development. Because this information supports areas such as disaster management, climate monitoring, and agricultural planning, its loss or corruption would have consequences that extend beyond the agency itself. Like many other Nigerian institutions, NASRDA continues to generate digital data faster than it can build the systems, policies, and staff capacity needed to preserve that data properly. Agidi and Gbamwuan (2023) noted that Nigerian institutions responsible for keeping national records often face gaps in funding, staffing, and clear operational guidelines for digital preservation work. Okeke and Obi (2023) similarly found that many Nigerian institutions still lack proper policy frameworks to guide their digital preservation activities in a consistent manner. These findings suggest that the challenges facing NASRDA are not unique to the agency but reflect wider problems affecting research institutions across the country. Understanding these challenges clearly, and identifying strategies that can address them, is therefore useful for NASRDA and for other research institutions facing similar circumstances.

NASRDA generates and stores large volumes of digital information daily, ranging from satellite imagery and scientific datasets to administrative records, and these resources support national planning, scientific research, and long-term institutional memory. Protecting this information depends on more than the availability of digital storage systems, because equipment alone cannot guarantee that records will remain safe, accessible, and usable many years after they are created. Preliminary observations at NASRDA suggest that digital preservation work is affected by weak infrastructure, unstable power supply, and limited funding for preservation-related activities. These conditions raise concern about the agency's capacity to protect its digital records against loss, corruption, and technological obsolescence over the long term.

Statement of the Problem

Despite these concerns, there is limited detailed research examining the challenges affecting digital preservation at NASRDA and the strategies staff consider useful for addressing them. Without this information, institutional managers are left to plan improvements based on assumption rather than evidence gathered directly from staff involved in managing digital records. This study therefore examines the specific challenges hindering effective digital preservation at NASRDA and identifies the strategies that staff consider useful for improving preservation. The first author's employment at NASRDA provided valuable firsthand knowledge and access to the research setting. However, the author also recognises that this insider position could potentially influence the interpretation of the findings. Therefore, this positionality was taken into consideration when analysing and interpreting the results.

Beyond infrastructure and funding problems, there are also concerns about the absence of a clear digital preservation policy, inconsistent metadata practices, and gaps in the number of trained personnel available to manage preservation work at NASRDA. Without a formal policy, different units within the agency may follow different practices when handling digital records, which can create confusion about responsibility and reduce the reliability of preserved materials. Staff shortages and skill gaps further limit the agency's capacity to apply proper preservation methods, such as migration, refreshing, and secure backup procedures, consistently across its centres. These problems, taken together, suggest that NASRDA's digital preservation practices may not yet match the scale and sensitivity of the digital records it manages.

Research Objectives

The main purpose of this study was to examine the perceived challenges hindering effective digital preservation and the strategies for enhancing digital preservation at NASRDA. The specific objectives were to:

identify the strategies for enhancing digital preservation at NASRDA.

- i. ascertain the challenges hindering effective digital preservation of information resources at NASRDA.
- ii. identify the strategies for enhancing digital preservation practices at NASRDA and similar research institutions.

Research Questions

What strategies can be adopted to enhance digital preservation at NASRDA?

- i. What challenges hinder effective digital preservation of information resources at NASRDA?
- ii. What strategies can be adopted to enhance digital preservation practices at NASRDA and similar research institutions?

Literature Review

Concept of Digital Preservation in Research Institutions

Digital preservation refers to the policies, procedures, and activities that keep digital information accessible, understandable, and usable over long periods, regardless of changes in the technology originally used to create or store that information. Unlike paper records, digital files depend entirely on hardware, software, and file formats that change quickly, which means preservation work must be continuous rather than a one-time activity. For research institutions, digital preservation covers a wide range of materials, including research data, satellite images, administrative files, reports, and other records that support scientific work and institutional memory. Corrado and Moulaison (2014) explained that digital preservation activities in libraries, archives, and museums must combine technical actions, such as file migration and format checking, with organisational commitment, including funding and staff training. Masenya and Ngulube (2020) added that preservation sustainability depends on institutions treating digital preservation as an ongoing responsibility supported by policy and budget planning rather than as a side activity handled only when problems arise. For scientific agencies such as NASRDA, digital preservation carries added importance because the data generated, including geospatial and satellite records, often supports long-term national planning functions such as disaster management and environmental monitoring. Effective preservation of this kind of information, therefore, requires attention to technical processes, institutional policy, funding, and staff competence working together rather than treated separately.

Challenges of Digital Preservation in Research Institutions

Infrastructure and Technological Obsolescence

One of the most common challenges facing digital preservation in developing countries is the problem of technological obsolescence, which occurs when digital files become unreadable because the hardware, software, or file formats originally used to store them are no longer supported. Preservation work must therefore account for a cycle of hardware replacement and file format updates that many institutions struggle to plan for and fund. Masenya and Ngulube (2020) found that many academic libraries in South Africa struggle to sustain digital preservation programmes because of limited planning for technology changes over time. Awamleh and Hamad (2022) reported similar findings among academic libraries in Jordan, where staff identified outdated equipment and unstable systems as barriers to effective preservation work. In Nigeria, infrastructure problems are often more severe because institutions depend on unstable electricity supply and limited internet bandwidth, both of which affect the transfer, storage, and backup of large digital files such as satellite imagery and geospatial datasets. Adeyemi and Yusuf (2023) observed that research institutes handling geospatial data frequently experience difficulties

transferring and storing large files because of limited technical infrastructure. Where storage systems are inadequate, staff often resort to using external hard drives or low-capacity servers, which increases the risk that files will be lost, damaged, or become disorganised over time. These infrastructure-related problems show that even institutions with skilled staff cannot achieve reliable digital preservation without adequate hardware, power supply, and storage systems in place.

Funding, Policy, and Metadata Gaps

Funding limitations remain one of the strongest barriers to effective digital preservation because preservation work requires continuous investment in storage systems, software licences, staff training, and system maintenance rather than a single upfront cost. Okeke and Obi (2023) found that many Nigerian institutions rely on limited budget allocations that prioritise day-to-day operations over long-term preservation needs, leaving preservation activities poorly funded and inconsistently applied. Closely related to funding problems is the absence of clear digital preservation policies in many institutions, which leaves staff without formal guidance on how digital records should be created, stored, described, and protected. Ndegwa et al. (2022) reported that many university repositories in Kenya operate without comprehensive preservation policies, resulting in preservation activities that depend on the personal initiative of individual staff members rather than on institutional planning. Similar problems affect metadata practices, which involve the descriptive information that allows digital files to be found, understood, and managed properly over time. Salami and Ajibola (2022) found that many Nigerian university libraries struggle with inconsistent metadata creation because of limited training and the absence of standard metadata guidelines. Without proper metadata, digital records can become difficult to locate or verify even when the files themselves remain intact, which weakens the reliability of an institution's digital repository as a whole. These funding, policy, and metadata gaps often occur together, and addressing one problem without the others is unlikely to produce lasting improvement in preservation outcomes.

Human Capacity Challenges

Human capacity problems remain one of the most persistent obstacles to digital preservation because preservation activities, such as metadata creation, file migration, backup management, and cybersecurity monitoring, all depend on staff who understand how to carry them out correctly. Oluranti et al. (2023) found that many library personnel in Nigerian universities lack the specialised skills needed to manage the technical aspects of digital preservation work, even where they possess basic computer skills. Ibrahim and Lawal (2021) similarly reported that gaps in cybersecurity awareness among library staff expose digital collections to threats such as unauthorised access and data loss. These skill gaps are often made worse by limited professional development opportunities, since many institutions do not organise regular training programmes to keep staff updated on current preservation methods and tools. Aliyu et al. (2024) found that academic staff with stronger digital competence were better able to support research and information management activities within their institutions, which suggests that competence gaps directly affect the quality of preservation work carried out. For agencies such as NASRDA, which manage highly technical scientific data, these human capacity gaps deserve close attention because specialised skills are needed to handle formats such as satellite imagery and geospatial records that require more than basic computer knowledge to manage safely.

Strategies for Enhancing Digital Preservation Practices

Training and Capacity Building

Training and capacity building are widely recognised as central strategies for improving digital preservation practices because preservation work depends heavily on the knowledge and skills of the staff responsible for managing digital records. Regular training helps staff learn new preservation methods, understand emerging risks such as cybersecurity threats, and keep up with changes in technology that affect how digital files are stored and accessed. Adepoju and Olatunji (2025) found that librarians who received training on open-source preservation tools were better able to apply proper preservation techniques compared with those who had not received similar training. Bello and Danjuma (2024) similarly reported that staff digital competence was strongly linked to how well institutional repositories

were sustained over time, which supports the argument that continuous professional development improves preservation outcomes. For research institutions such as NASRDA, structured training programmes covering metadata standards, file migration procedures, and cybersecurity practices can help address the skill gaps identified in earlier sections of this study. Training works best when it is offered regularly rather than as a one-time event, since digital tools and threats continue to change, and staff need updated knowledge to keep pace with these changes.

Infrastructure Investment and Policy Development

Investment in infrastructure remains an important strategy for improving digital preservation because reliable storage systems, stable power supply, and secure data centres form the technical foundation on which all other preservation activities depend. Institutions that upgrade their storage and backup systems reduce the risk of losing digital records due to equipment failure or unstable power supply. Farouk (2024) found that institutions that invested steadily in digital infrastructure were better able to sustain their preservation programmes compared with those that depended on outdated equipment. Alongside infrastructure investment, the development of clear digital preservation policies gives institutions a formal framework for assigning responsibility, setting standards, and guiding staff on how digital records should be managed. Okeke and Obi (2023) argued that institutions with documented preservation policies are more likely to maintain consistent practices across departments than those without such policies. Combining infrastructure investment with policy development allows an institution to address both the technical and organisational sides of digital preservation, since new equipment achieves little without clear rules guiding how it should be used and maintained.

Collaboration, Monitoring, and Evaluation

Collaboration and knowledge sharing among staff, departments, and institutions offer another useful strategy for strengthening digital preservation because preservation work often involves knowledge and resources spread across different units within an organisation. Schellnack-Kelly and Modiba (2024) found that institutions that shared knowledge and resources across departments were better positioned to adopt new digital preservation techniques compared with institutions working in isolation. Makhafola et al. (2025) similarly observed that African academic libraries that took part in collaborative networks gained access to skills and practices that strengthened their own preservation programmes. Continuous monitoring and evaluation also support digital preservation by helping institutions track the condition of stored files, identify problems early, and measure whether preservation activities are producing the intended results. Regular checks on file formats, storage systems, and backup procedures allow institutions to detect early signs of deterioration or obsolescence before records are damaged beyond repair. Combined with training, infrastructure investment, and policy development, collaboration and continuous monitoring complete a set of strategies capable of addressing the technical, human, and organisational challenges facing digital preservation in research institutions such as NASRDA.

Theoretical Framework

Socio-Technical Systems Theory

Socio-Technical Systems Theory was developed by Eric Trist and Ken Bamforth in 1951 following their study of coal mining practices in Britain, where they observed that introducing new machinery without attention to the social relationships among workers reduced rather than improved performance. The theory holds that organisations function through two connected parts, the technical part, which covers tools, equipment, and processes, and the social part, which covers people, relationships, and working practices, and that both parts must work well together for an organisation to perform effectively. This theory applies directly to digital preservation because preservation outcomes depend on both technical systems, such as storage infrastructure and software, and human factors, such as staff skills, training, and cooperation. An institution that invests heavily in digital infrastructure without developing the competence of its staff is unlikely to achieve lasting preservation success, just as an institution with skilled staff but weak infrastructure will also struggle. This theory guides the present study because it explains why the challenges and strategies examined in this article, ranging from infrastructure and funding to

training and collaboration, need to be addressed together rather than separately for digital preservation to improve at NASRDA.

Competency Theory

Competency Theory was developed by David C. McClelland in 1973 through his work challenging the use of intelligence tests as the main measure of job performance. McClelland argued that observable skills, knowledge, and behaviour provide a more useful basis for understanding performance than general intelligence scores. Applied to digital preservation, the theory supports the view that staff performance depends on specific, learnable competencies, such as metadata creation, file migration, backup management, and cybersecurity practice. The theory therefore provides a useful framework for interpreting the importance of training and capacity building in the present study, particularly because staff development was the most strongly endorsed strategy at NASRDA.

Empirical Review

The empirical literature reviewed for this study covers four relevant studies. Ubogu et al. (2023) examined digital preservation challenges associated with the growth of big data in Nigerian university libraries and found that many institutions lacked coordinated approaches for managing large volumes of digital information. Cabero-Almenara et al. (2022) examined digital competence in higher education and reported that digital competence was associated with performance in tasks requiring digital tools. Odigie et al. (2024) examined metadata practices in Nigeria and reported that metadata practices influence the discoverability and usability of digital resources, recommending clear metadata guidelines. Bamgbose et al. (2025) examined factors influencing the trustworthiness of digital repositories in Nigerian university libraries and found that stable management structures are important for maintaining trustworthy and secure information systems. Collectively, these studies provide evidence that digital preservation is affected by technical, organisational, metadata, and human-capacity factors. However, the reviewed studies give limited attention to a specialised Nigerian scientific agency such as NASRDA. The present study contributes a case-specific account of the challenges and staff-endorsed strategies at NASRDA.

Methodology

Data for this study were collected in 2025 using a structured questionnaire. The questionnaire contained two substantive sections: eleven items on challenges hindering digital preservation and five items on strategies for improving preservation. Responses were measured on a four-point scale ranging from Strongly Agree to Strongly Disagree. The instrument was reviewed by two subject-matter experts in library and information science and one expert in measurement and evaluation for relevance, clarity, and appropriateness, and their suggestions were used to refine the instrument. Reliability was assessed through a pilot study involving 30 staff members of the Centre for Atmospheric Research (CAR), Anyigba, Kogi State, which was excluded from the main study. Cronbach's alpha was used to assess internal consistency, and reports an overall reliability coefficient of 0.99. The very high overall coefficient is interpreted cautiously.

The study analysed 183 usable responses. 183 questionnaires were distributed to the target population and the results are based on 183 usable questionnaires, giving a 100% usable response rate. The frequency totals reported for the questionnaire items also sum to 183, indicating that no item-level missing responses were retained in the reported analysis. Respondent characteristics are presented by unit type and study location in Table 1.

Researcher positionality: The first author is affiliated with NASRDA, the study setting. This insider position provided contextual familiarity with the agency but may also introduce potential researcher perspective. The study therefore reports the questionnaire-based findings as respondents' perceptions rather than as an independent audit of preservation practice.

Results

Respondent Characteristics

The study involved staff drawn from the library, media, ICT, and registry units across NASRDA headquarters, the Centre for Geodesy and Geodynamics (Toro), and the Zonal Advanced Space Technology Application Laboratory (Kano). The study provides the exact population distribution across these units and locations, and because the entire population of 183 staff was studied, the respondent distribution corresponds to the population distribution presented in Table 1.

Table 1. Distribution of Respondents by Unit Type and Study Location

Unit type	NASRDA Headquarters	Toro	Kano	Total	%
Library	33	14	13	60	32.8
Media	15	12	12	39	21.3
ICT	20	9	16	45	24.6
Registry	14	11	14	39	21.3
Total	82	46	55	183	100

Challenges Hindering Effective Digital Preservation of Information Resources at NASRDA

Respondents were presented with eleven possible challenges and asked to indicate their level of agreement on a four-point scale. The results are presented in Table 2.

Table 2. Mean Responses on the Challenges Hindering Effective Digital Preservation at NASRDA (N = 183)

S/N	Challenge Item	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly Disagree n (%)	M	SD	Decision
1	Inadequate funding	101 (55.2%)	60 (32.8%)	10 (5.5%)	12 (6.6%)	3.37	0.86	Agreed
2	Lack of digital preservation policy	99 (54.1%)	62 (33.9%)	10 (5.5%)	12 (6.6%)	3.36	0.86	Agreed
3	Poor maintenance culture	84 (45.9%)	73 (39.9%)	13 (7.1%)	13 (7.1%)	3.25	0.87	Agreed
4	Lack of infrastructure	86 (47.0%)	69 (37.7%)	14 (7.7%)	14 (7.7%)	3.24	0.89	Agreed
5	Inadequate power supply	76 (41.5%)	77 (42.1%)	14 (7.7%)	16 (8.7%)	3.16	0.90	Agreed
6	Inadequate professionals	82 (44.8%)	64 (35.0%)	20 (10.9%)	17 (9.3%)	3.15	0.95	Agreed
7	Technology obsolescence	78 (42.6%)	68 (37.2%)	19 (10.4%)	18 (9.8%)	3.13	0.95	Agreed
8	Data security concerns	73 (39.9%)	65 (35.5%)	22 (12.0%)	23 (12.6%)	3.03	1.01	Agreed
9	Scalability of systems and storage	69 (37.7%)	69 (37.7%)	24 (13.1%)	21 (11.5%)	3.02	0.98	Agreed
10	Legal and ethical challenges	65 (35.5%)	71 (38.8%)	26 (14.2%)	21 (11.5%)	2.98	0.98	Agreed
11	Technophobia	60 (32.8%)	67 (36.6%)	31 (16.9%)	25 (13.7%)	2.89	1.01	Agreed

Source: Field Study (data collected in 2025).

Table 2 shows that all eleven items scored above the cut-off mean of 2.50, indicating that respondents agreed that each listed factor hinders effective digital preservation at NASRDA. Inadequate funding recorded the highest mean score ($M = 3.37$), followed by lack of a digital preservation policy ($M = 3.36$) and poor maintenance culture ($M = 3.25$). Because the differences among several means are small and no inferential test of differences was conducted, the ordering is presented descriptively and should not be interpreted as evidence that one challenge is statistically more serious than another.

Lack of infrastructure ($M = 3.24$), inadequate power supply ($M = 3.16$), and inadequate professionals ($M = 3.15$) also recorded agreement. These responses indicate perceived technical and human-capacity

constraints at NASRDA. Technology obsolescence ($M = 3.13$) further points to concerns about the continuing suitability of hardware, software, and file formats. These findings are consistent with Masenya and Ngulube (2020) and Adeyemi and Yusuf (2023), who identified infrastructure and technical-capacity constraints in digital preservation contexts.

Data security concerns ($M = 3.03$), scalability of systems and storage ($M = 3.02$), legal and ethical challenges ($M = 2.98$), and technophobia ($M = 2.89$) also recorded agreement. These results indicate that respondents perceive security, growth in digital holdings, regulatory issues, and staff attitudes towards technology as relevant concerns at NASRDA. Taken together, the responses indicate that respondents perceive digital preservation as being affected by financial, institutional, technological, and human factors occurring together. The data do not, however, establish statistically significant differences in the severity of these challenges.

Strategies to Enhance Digital Preservation Practices at NASRDA

Following the identification of the challenges above, the study also sought respondents' views on strategies that could be adopted to strengthen digital preservation at NASRDA. The results are presented in Table 3.

Table 3. Mean Responses on Strategies for Enhancing Digital Preservation at NASRDA ($N = 183$)

S/N	Strategy Item	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly Disagree n (%)	M	SD	Decision
1	Training and development	98 (53.6%)	66 (36.1%)	10 (5.5%)	9 (4.9%)	3.38	0.80	Agreed
2	Collaboration and knowledge sharing	92 (50.3%)	65 (35.5%)	14 (7.7%)	12 (6.6%)	3.29	0.87	Agreed
3	Continuous monitoring and evaluation	90 (49.2%)	67 (36.6%)	14 (7.7%)	12 (6.6%)	3.28	0.87	Agreed
4	Investment in and upgrading of infrastructure	85 (46.4%)	65 (35.5%)	17 (9.3%)	16 (8.7%)	3.20	0.93	Agreed
5	Policy and procedure development	83 (45.4%)	67 (36.6%)	18 (9.8%)	15 (8.2%)	3.19	0.92	Agreed

Source: Field Study (data collected in 2025).

Table 3 shows that training and development recorded the highest mean score ($M = 3.38$), making it the strategy most strongly endorsed descriptively by respondents. This finding is consistent with the perceived challenge of inadequate professionals in Table 2 and with Adepoju and Olatunji (2025) and Bello and Danjuma (2024), who reported the importance of staff competence and professional development for digital preservation-related work.

Collaboration and knowledge sharing ($M = 3.29$) and continuous monitoring and evaluation ($M = 3.28$) also recorded agreement. Investment in infrastructure and resources ($M = 3.20$) and policy and procedure development ($M = 3.19$) likewise exceeded the cut-off. These strategies correspond conceptually with infrastructure and policy concerns identified in Table 2. However, the questionnaire presented the challenge and strategy lists as researcher-specified items, so the apparent correspondence between the two lists should be interpreted as a descriptive alignment rather than as an independently demonstrated respondent-generated mapping. All five strategies exceeded the 2.50 cut-off, indicating general agreement with each proposed strategy.

Discussion of Findings

The findings indicate that respondents perceive digital preservation at NASRDA as affected by financial, policy, infrastructure, technological, and human-capacity factors. Inadequate funding had the highest challenge mean ($M = 3.37$), while training and development had the highest strategy mean ($M = 3.38$). These rankings are descriptive; the study did not test whether the differences between item means were statistically significant. The observed alignment therefore provides useful descriptive evidence about

respondents' agreement with the proposed items, but it does not demonstrate that respondents independently generated or ranked solutions to each problem.

The support for training and development is consistent with Competency Theory, which emphasises specific and learnable knowledge and skills. In the context of NASRDA, this theoretical perspective provides a useful framework for interpreting the perceived importance of staff development. Socio-Technical Systems Theory similarly provides a framework for understanding why respondents endorsed a combination of technical and social measures. The findings therefore support an interpretation in which preservation improvement requires attention to both technical systems and the people who manage them, while recognising that the survey measured perceptions rather than audited preservation performance.

The findings are primarily relevant to NASRDA as a case study. Some of the challenges identified may also be relevant to other research institutions, but the single-agency design does not support generalisation to Nigerian research institutions as a whole. Further studies involving multiple scientific agencies would be needed to determine the wider applicability of these findings.

Conclusion

Findings from this study show that respondents at NASRDA perceive digital preservation to be hindered by funding shortages, policy gaps, poor maintenance culture, infrastructure limitations, technological obsolescence, security concerns, scalability issues, legal and ethical challenges, and human-capacity and attitudinal factors. All eleven challenge items exceeded the 2.50 acceptance threshold. Respondents also agreed with all five proposed strategies, with training and development receiving the highest descriptive mean ($M = 3.38$). The findings support the need for NASRDA to address financial, technical, institutional, and human-capacity factors together. Because the study measured perceptions rather than actual preservation performance, the conclusions should be understood as evidence about staff perceptions at NASRDA rather than as an audit of the agency's current preservation practices.

Recommendations

Based on the findings of this study, the following recommendations are made for NASRDA:

A formal digital preservation policy should be developed and enforced to guide consistent handling of digital records across all departments and centres.

Institutional funding for digital preservation should be increased and treated as a continuous budget item rather than an occasional expense.

Regular training programmes on metadata standards, file migration, and cybersecurity practices should be organised for staff who manage digital repositories.

Storage infrastructure, backup systems, and power supply should be upgraded to reduce the risk of data loss caused by equipment failure.

Collaboration and knowledge sharing across departments and with other institutions should be encouraged to spread good preservation practices.

Routine monitoring and evaluation systems should be put in place to track the condition of stored files and detect early signs of damage or obsolescence.

Awareness programmes should be organised to address technophobia and to clarify legal and ethical guidelines relating to digital records management.

Study Contribution

This study contributes case-specific evidence on perceived digital preservation challenges and strategies within a scientific research agency rather than a university library or general institutional repository. It extends the Nigerian literature by focusing on NASRDA and the types of technical and scientific information associated with its work. The contribution is therefore best understood as an evidence base for preservation planning at NASRDA and as a basis for further comparative research involving other specialised research institutions.

Limitations of the Study

This study was limited to the National Space Research and Development Agency (NASRDA) and does not include other space or research institutions in Nigeria. Access and Security Constraints: NASRDA handles sensitive and classified space-related data, which may limit the researcher's access to certain systems, documents, or preservation workflows. This restriction prevents a complete assessment of all digital preservation practices. The finding of this study therefore cannot be generalised to other research institutions.

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