
Preservation of Digital Resources in Select Libraries of Forestry Research and Education Institutions in India

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Abstract

The study addresses the imperative for library staff in India to enhance their digital preservation skills to ensure the longevity of information resources, particularly in forestry research and educational institutions. It focuses on three prominent institutes: Forest Research Institute, Indian Institute of Forest Management, and Dr. Yashwant Singh Parmar University of Horticulture & Forestry. Utilising a multi-method approach of interviews and questionnaires, the research explores the management, strategies, and challenges encountered in digital preservation practices. The findings aim to provide essential insights for improving forestry library practices, emphasising the importance of maintaining access to vital information for sustainable forest management. The paper highlights the necessity for librarians to adapt to new technologies and addresses the overarching social implication that access to information is fundamental to safeguarding forests for future generations.

Keywords

Information resources, Library services, User awareness, Resource utilisation, Academic libraries

Electronic access

The journal is available at www.jalis.in
DOI: 10.5281/zenodo.19436145



Journal of Advances in Library and Information Science
ISSN: 2277-2219 Vol. 15. No.2. 2026. pp.160-170

1. Introduction

The storage of digital information is easy nowadays, but the preservation of digitally stored information needs some skills, software, hardware, tool, techniques, funds and proper planning. The successful preservation of digitally stored information is digital preservation. It is not only for backing up desired content but also for proper caring and regular maintenance of the digital information that is stored in CDs, DVDs, and other discs. Digital preservation requires protocols to ensure that content, as well as software and hardware, is protected from media failures (Kelly, 1999).

Russell (2000) defines digital preservation as a process aimed at maintaining the usability, durability, and intellectual integrity of digital information. The need for digital preservation has been driven by the development of electronic devices like computers, Smartphone, and the internet. The preservation of rare books and research documents has grown significantly in the modern era. As a result, the cooperative strategy became essential. The idea of digital preservation entails having an adequate knowledge of the computer systems such as hardware and software that produce electronic documents in order to ensure their durability (Myntti & Zoom, 2018). The data processing began with punch cards in the 1880s, and in 1940, vacuum tube technology was introduced, which helped in developing the first electronic computers. Initially, the computers were majorly used for processing data. Significant endeavours were prompted by worries about the preservation of electronic records in the 1990s (Baucom, 2019). According to Garrett (1995) the 1996 "Preserving Digital Information" report, which focused on involving content creators and creating trustworthy digital archives, was the outcome of a task force established in 1994 by the Commission on Preservation and Access (CPA) and the Research Libraries Group (RLG).

Digital preservation has evolved globally through international collaborations and standardization efforts, with key initiatives such as the Consultative Committee for Space Data Systems (CCSDS), Preservation Metadata Implementation Strategies (PREMIS), and Preservation and Long-term Access through Networked Services (PLANETS). These projects, along with legal frameworks like the Digital Millennium Copyright Act (DMCA), have strengthened the foundation for sustainable and reliable digital repositories (Saracevic, 2016). In this

regard, need of the study and numerous research articles are reviewed as presented below:

2. Literature review

The integration of information and communication technologies is essential for managing information and knowledge within academic libraries, and librarians' engagement with knowledge management techniques and digital preservation is critical to meeting user needs in education and research. Despite the increased simplicity of preserving digital objects, many libraries lack experience in digital preservation, necessitating the acquisition of appropriate skills, knowledge, tools, and technologies. The development of the National Information Infrastructure (NII) and the Global Information Infrastructure (GII) signals a growing emphasis on digital preservation, supported by projects worldwide. Planning for digital preservation should be part of digitisation efforts, involving an initial assessment of materials and formats. Collaboration between librarians and IT professionals is vital to harness their mutual expertise. The demand for "hybrid librarians," proficient in programming and database management, is emerging as digital preservation evolves. Institutions, like California State University Library, prioritize long-term digital preservation amidst challenges such as limited resources and changing technology.

Research indicates that library professionals need to enhance their skills in creating digital repositories and content. Studies, including Gupta and Sahi (2018), reveal a lack of sufficient knowledge among librarians regarding technological tasks such as preserving digital datasets. While favorable attitudes toward Research Data Services (RDS) exist, many librarians are not adequately equipped. Regionally, there are significant disparities in digital preservation policies, with North America leading in comprehensive frameworks, while other areas often only express intent without substantive action. Studies show that many institutions, particularly in African and European regions, face barriers like inadequate resources and unclear standards.

Ahmad and Rafiq (2023) illustrate that while libraries in Pakistan are engaging in basic digital preservation practices, they still lack proficiency in advanced strategies due to financial and technological constraints. The need for robust institutional policies and technologically integrated strategies is further emphasized, noting that the COVID-19 pandemic has

underscored the necessity for adaptability. The shift toward proactive, policy-driven, and collaborative digital preservation practices is essential to ensure the relevance and accessibility of academic digital collections for future generations.

3. Need for the study

The educational and research institution cannot achieve its goals without the libraries. The establishment of libraries within educational and research institutions has supported teaching, learning, research, and other services. The study examines the current situation of digital preservation in forestry research institutional libraries, a topic that has received little attention from researchers. With the increasing integration of digital tools, techniques, hardware, software, and services in libraries, it is critical to conduct comprehensive research on their use. The goal of this study is to learn how libraries take care of their resources and keep them safe for future generations. The goal is to identify the problems libraries face with this process and offer suggestions for doing digital preservation well. This is important to ensure that useful information is protected for society and remains available to future generations.

4. Statement of the problem

The environmental issues have been a major concern for everyone. There has been a strong need to run the various programme for the students. It is important to study the role of libraries in forestry research and education, so as to provide the best resources and services to students, researchers, faculty, and scientists. In the era of ICT, users are dissatisfied with the library services provided by their institutions. The demands of users have been for quality information with advanced library services for accomplishment of their needs. As a result ICT serves as a powerful enabler and provides effective and efficient tools for all facets of knowledge management including capturing, sharing, and applying knowledge, new technologies have dramatically transformed the libraries too.

India's revised National Policy on forests in 1988 was a revision of the 1952 National Forest Policy (National Forest Commission, 2006). Since the National Forest Commission in its report published in 2006 has recommended that there is no need to change the National Forest Policy, 1988 (Ministry of Environment and Forests, 2009). National Policy on

Forests is needed to establish a framework for sustainable forest management. The objectives of a national forest policy are to maintain environmental stability, conserve natural heritage and biodiversity, and ensure the sustainable use of forest resources to meet the needs of present and future generations (National Forest Commission, 2006). Therefore, it is important to know how forestry libraries are managing their resources with digital preservation to meet the information needs of their users in forestry research and education. Also, to identify the obstacles to managing their resources for digital preservation, data were collected to investigate the objectives of the study.

5. Research objectives

The aim of this study is to examine how forestry libraries are managing their resources through digital preservation, the strategies used in the process, the practices of digital preservation, and the problems they face. Followings are the objectives of the present study:

- 1) To find out how the forestry libraries are managing their resources through digital preservation.
- 2) To assess the strategies used for efficient digital resource management by forestry libraries.
- 3) To examine the problems faced by forestry libraries in digital preservation.
- 4) To recommend suitable strategies for enhancing digital accessibility, usability, and service excellence in forestry libraries.

6. Scope of the study

The study has focused on libraries of Indian institutions that offer forestry education and research. The scope of the study includes libraries from the selected three institutes that provide forestry research and education in India. The first was Forest Research Institute (Deemed to be University), Dehradun, Uttaranchal; the second was Indian Institute of Forest Management, Bhopal, Madhya Pradesh and the third was Dr Yashwant Singh Parmar University of Horticulture & Forestry, Nauni-Solan, Himachal Pradesh. The select three institutions were on bases of having education and research programs. They are the oldest forestry research education institutes in India and have a good history.

Table 1.1 Forestry Research and Education Institute Libraries under Study

Institute	Forest Research Institute (Deemed to be University), Dehradun, Uttarakhand (FRI)	Indian Institute of Forest Management, Bhopal, Madhya Pradesh (IIFM)	Dr. Yashwant Singh Parmar University of Horticulture & Forestry Nauni-Solan, Himachal Pradesh (YSPUHF)
Library Name	National Forest Library and Information Centre (NFLIC)	Vidya Bharti Library (VBL)	Satyanand Stokes Library (SNS)
State	Uttarakhand	Madhya Pradesh	Himachal Pradesh
Establishment Year of the Library	1906	1989	1988
Accreditation	NAAC/ICFRE	National Board of Accreditation	Indian Council of Agriculture Research (ICAR)

Table 1.1 shows indicates that the National Forest Library and Information Centre was established in 1906 at the Forest Research Institute (FRI) (deemed to be a university) in Dehradun, Uttarakhand. The Satyanand Stokes Library was established in 1988 at Dr Yashwant Singh Parmar University of Horticulture & Forestry (YSPUHF), Solan, Himachal Pradesh, and the Vidya Bharti Library was established in 1989 at the Indian Institute of Forest Management (IIFM), Bhopal, Madhya Pradesh.

The National Assessment and Accreditation Council (NAAC) inspects and approves higher educational institutions (HEIs), including colleges, universities, and other authorised institutions, to determine their "quality status" based on NAAC's criteria for educational outcomes, procedures, curriculum coverage, teaching-learning processes, faculty, research, testing, learning resources, organisation, governance, financial stability, and related performance. It also assesses the quality of student services.

Additionally, the study made an effort to investigate the current state of NIRF (National Institutional Ranking Framework). According to the National Institutional Ranking Framework (NIRF), the YSPUHF will rank 17th in 2024 among all top 40 agricultural and allied sectors with UGC approval. NFLIC has obtained NAAC A accreditation. The Indian Institute of Forest Management, Bhopal (Madhya Pradesh), is not certified by the NAAC and does not have an NIRF ranking; nonetheless, the National Board of Accreditation accredits it.

6.1 Research methodology

A structured questionnaire was used to collect the data from librarians employed in libraries. The questionnaire included questions on digital preservation strategies, physical security protocols, current policies and procedures, and the challenges library professionals face.

The present study employed a multi-method approach, integrating both interviews and a standardised questionnaire. Librarians from chosen forestry research and educational institutions engaged in interviews and filled out questionnaires concerning matters related to digital preservation practices,

policies, and the challenges faced in this domain. This combined method enabled the collection of extensive information on digital preservation from the perspective of library professionals.

7. Data Analysis

The data collected from librarian’s explores the management, physical security of digital objects, problems, challenges, and strategies, focusing on how libraries are storing their digital records. The results of data analysis deals with digital preservation, highlighting how the library manages, maintains, and strategy and policy to ensure their long-term accessibility and usability. The results of data analysis are presented in the form of sections and tables as:

7.1 Digital Records Stored

Digital records can be stored in a variety of methods in libraries, including Compact Disc Read-Only Memory CD-ROM, Digital Versatile Disc (DVD), computer tape drive or hard disc, server file storage, and other databases. Table 1.2 display how forestry libraries the digital records stored:

Table 1.2 Digital Records Stored in Forestry Libraries

S. N.	Digital Records Stored In Libraries	National Forest Library and Information Centre (NFLIC),FRI	Vidhya Bharti Library (VBL), IIFM	Satyanand Stokes Library (SNS), YSPUHF
1	Stored on CD-ROM or DVD	√	√	√
2	Stored on tape drive or hard disk of computer with back up	×	√	√
3	Stored on a content management system, with backup	×	√	×
4	Stored as part of a digital preservation repository system	×	√	×
5	Stored on server file storage, with backup	√	√	√
6	Outsourced on contract to a service provider	√	√	√

Table 1.2 reveals that library (YSPUHF) stores its digital records on CD-ROMs, DVDs, tape drives, and computer hard disks with backup capabilities, as well as on server file storage with backups. Additionally, it was found that library (YSPUHF) employs outsourced staff to assist students. Conversely, FRI library have positively addressed the preservation of digital resources. In comparison, IIFM library does not use tape drives or computer hard disks for storage, lacks a content management system, and

does not have a digital preservation repository with backup capabilities.

7.2 Management of Digital Resources

The various activities of the library management of the digital resources, these has been discussed under various aspects such as, physical condition of the digital material, viruses, readability, etc.

Table 1.3: Management of Digital Resources

S. N.	Management of Digital Resources	National Forest Library and Information Centre (NFLIC),FRI	Vidhya Bharti Library (VBL), IIFM	Satyanand Stokes Library(SNS), YSPUHF
	Physical Condition Tested	√	√	√
	Checked for Viruses	√	√	√
	Checked for Readability of Digital Records	√	√	√
	Check Files Against Deposit Documentation	√	√	√
	Copied To Different Storage Media	√	√	√

Table 1.3 depicts the management of digital resources when finally received in the library, it is very essential to inspect out the physical condition tested or not, checked for viruses, readability of digital resources in the prospected outcome shows that all the libraries has a very well managed facility such as physical condition tested, checked for viruses, checked for readability of digital records, copied to different storage media, and inspection by the library professionals.

7.3 Digital Preservation Strategies

For the preservation of digital heritage, UNESCO's Guidelines (2003) group classify digital preservation strategies into four categories: Short-term, Medium-to Long-term, Investment Strategies and Alternative strategies as mentioned in Table 1.4

Table 1.4 Digital Preservation Strategies

Category	Strategy	Description
Short-term	Bit-stream Copying	Making exact duplicates of digital objects to prevent data loss.
	Refreshing	Copying data to new media of the same type without altering the bit-stream.
	Replication	Creating multiple copies to ensure data is not lost if one copy fails.
	Technology Preservation / Computer Museum	Maintaining old hardware/software environments for access to legacy data.
	Backwards Compatibility and Version Migration	Ensuring new systems can access and interpret data from older versions.
Medium/Long-term	Migration	Periodically moving data to current formats or systems to maintain accessibility.
	Viewers and Migration at the Point of Access	Using specialized viewers or migrating data only when it is accessed.
	Emulation	Re-creating old hardware/software environments virtually to access legacy data.
	Canonicalization	Creating standardized or canonical versions of data to simplify future access and migration.
Investment	Restricting Range of Formats and Standards	Limiting the variety of formats to simplify preservation efforts.
	Reliance on Standards	Using open and widely adopted standards to promote long-term accessibility.
	Data Abstraction and Structuring	Separating data from specific software/hardware and organizing it well for future use.
	Encapsulation	Storing data with all necessary metadata, software, and documentation for future use.
	Software Re-engineering	Updating or rewriting software to ensure continued accessibility of data.

	Universal Virtual Computer	Developing a universal environment that can run legacy software and access data.
Alternative	Analogue Backups	Creating physical copies (e.g., printouts, microfilm) as a backup to digital files.
	Digital Archaeology or Data Recovery	Using advanced techniques to recover data from obsolete or damaged digital media.

Source: Chadha, R. K. (2009).

Table 1.4 shows various digital preservation strategies exist, including Bitstream Copying, Technology Preservation, Replication, and LOCKSS (Lots of Copies Keeps Stuff Safe). Libraries select strategies based on their convenience and budget. Bitstream Copying involves creating an exact duplicate of a digital document in another computer's memory or establishing a backup location, ensuring data safety during the possibility of format or device failure. Technology Preservation entails safeguarding rare software and hardware needed to access outdated digital resources, such as floppy disks, antiquated computers, and old CD-ROM databases. This strategy is crucial when antique files cannot be accessed using contemporary technology. Replication preserves digital documents by storing multiple copies across various locations, such as hard drives, cloud storage, and other computing devices, thereby

enhancing long-term preservation and mitigating risks.

LOCKSS is a sophisticated replication-based system. It connects numerous libraries via a network, storing multiple copies of identical digital content at various locations. These copies undergo regular automated verification, and in the event of data corruption, they are automatically restored using an intact copy. There are various strategies followed by libraries to preserve digital documents. Many digital preservation methods have been offered, but none of them are appropriate for all data types, settings, or organizations. On the basis of Table 1.4, digital preservation strategies of two libraries, Vidhya Bharti Library (IIFM), Bhopal, and Satyanand Stokes Library (SNS), and YSPUHF were evaluated and found that both libraries are using short-term and medium/long-term preservation techniques, except the FRI library, as mentioned in Table 1.5.

Table 1.5 Digital Preservation Strategies in Forestry Libraries

S. N.	Digital Preservation Strategies	National Forest Library and Information Centre (NFLIC), FRI	Vidhya Bharti Library (VBL), IIFM	Satyanand Stokes Library(SNS), YSPUHF
1	Bitstream Copying	×	×	√
2	Technology Preservation	×	×	√
3	Replication	×	√	√
4	Migration	×	√	√

Table 1.5 shows the digital preservation strategies' used by various libraries. In this regard library of YSPUHF has implemented a number of strategies to preserve digital records, including bitstream copying, (The process of creating an exact duplicate of a digital entity is called bitstream copying, sometimes referred to as data backup) sometimes known as "backing up your data," (Malipatil, 2020) which is a method of creating a duplicate copy of a digital object. Library (YSPUHF) has preserved the technological environment that supports the system, including operating systems, original application software, media devices, and other such items, as part of its technology preservation strategy. The library

(YSPUHF) replication and migration strategy involves copying or converting data from one technology to another, whether hardware or software, while maintaining the data's key features. The OAIS regards replication to be a kind of migration; for example, LOCKSS (Lots of Copies Keeps Stuff Safe) has been given the exact form of replication, and the rest of the preservation strategies.

It has been found that NFLIC library have two digital preservation strategies which are replication and migration strategy. The study depicted that library of IIFM has not covered any strategy to preserve digital material due to the lack of technical knowledge. The digital resource management of all libraries involves

testing the physical condition of media, checking for viruses, ensuring readability, verifying files against deposit documentation, and copying data to different storage media for preservation. These practices ensure data security, integrity, and long-term accessibility across all three libraries. Further, study addresses (Table 1.5) the challenges faced by libraries and librarians in preserving digital documents.

7.4 Physical Security

The physical security of digital materials is as crucial as their digital protection. It involves safeguarding digital items from theft, user damage, and physical harm. Due to the significance of physical security, library staff sometimes neglects this aspect, leading to potential physical damage to digital objects. As noted by Fox and El-Sherbiny (2015), “Security weaknesses in digital libraries, combined with attacks or other failures, can result in unauthorized access to confidential information or loss of data integrity”. The following aspects regarding physical security are discussed in Table 1.7as:

Table 1.6 Physical Securities in Forestry Libraries

S. N.	Physical Security	National Forest Library and Information Centre (NFLIC), FRI	Vidhya Bharti Library (VBL), IIFM	Satyanand Stokes Library(SNS), YSPUHF
1	Number of Security personnel for library	N/A	1	No
2	Security Personnel for watching the movement of users and Staff		1	Yes
3	A number of Security personnel taking care of the use of digital contents, e-databases, compact disc, and e-resources, and the safe return of the same.		10	8

Table 1.6 reveals that libraries (IIFM) and (YSPUHF) lack dedicated security professionals for the physical protection of digital items. In these libraries, the responsibility for safeguarding digital objects falls solely on the library staff, with no separate security measures in place. In comparison, library (FRI) employ one staff member specifically to ensure the physical security of library resources. The library of IIFM stands out with a single security person, which may be enough depending on its size or needs, whereas FRI and YSPUHF libraries rely on alternate security measures. Monitoring user and staff movement is a key part of security, and both libraries

(IIFM) and (YSPUHF) have measures in place for this.

The lack of data for fire could suggest either that they have no personnel or that this task is managed differently (like through surveillance systems). The library of FRI in terms of security for Digital Objects encompasses a range of activities, including monitoring, detection, alerting, alarming, evacuation, and building management. The study reviews the fire safety procedures of select institutional libraries. The procedures used by institutional libraries have been discussed in Table 1.7 as:

Table 1.7 Provision of Fire Security for Digital Objects in Forestry Libraries

S. N.	Provision for Fire Security	National Forest Library and Information Centre (NFLIC), FRI	Vidhya Bharti Library (VBL), IIFM	Satyanand Stokes Library(SNS), YSPUHF
	Inspects the Library through the insurance company or other entity	×	√	√
	Are sensors mounted breaking and entering?	×	√	√
	Are any areas equipped with installed extinguishing	√	√	×

systems			
Is there an alarm system in the library building	√	√	√
Does the brigade regularly inspect the library	×	√	×
Is the system serviced and tested regularly	×	×	√
Do the brigade and /or police have emergency access to the library	×	×	√
Are the extinguishers are provided (Dry chemical)	√	√	√

Table 1.7 indicates that the library (YSPUHF) is well prepared for fire safety. In India, libraries adopt different fire security measures for digital assets, with only a few having their procedures reviewed by librarians. It has fire insurance, conducts regular inspections, and is equipped with break-in sensors, a regularly serviced fire alarm system, emergency access for the NFLIC brigade and police, and dry chemical fire extinguishers. However, it lacks a dedicated fire brigade team for regular inspections of the NFLIC library's extinguishing systems. Libraries (FRI) and (IIFM), on the other hand, have fire extinguishing devices but no emergency access for library of firefighters or police. The YSPUHF library also provides a library of fire safety training to faculty and students to prepare for emergencies.

9	poor planning	×	×	×
10	lack of software and hardware	×	×	×
11	Technical Knowledge	√	×	√
12	Digital Technology Challenges	√	√	√
13	Technological Obsolescence	×	√	√
14	Internet Bandwidth (Digital Divide)	√	√	×
15	Skills and Education	×	×	√

Table 1.8 Problems Faced in Digital Preservation by Librarians

S. N.	Issue Related to Digital Preservation	National Forest Library and Information Centre (NFLIC), FRI	Vidhya Bharti Library (VBL), IIFM	Satyand Stokes Library (SNS), YSPUHF
1	Lack of Infrastructure	√	√	√
2	Financial Constraints	√	√	√
3	Lack of technical Knowledge	√	√	√
4	Legal Barriers	√	√	√
5	Availing Preservation Policies	×	√	√
6	Media Deterioration	×	√	√
7	Power cuts and backup strategies	×	√	×
8	Concerns of authenticity and reliability	√	√	√

Table 1.8 highlights common issues across institutions, including inadequate infrastructure, concerns about authenticity and reliability, difficulties with digital technology, budget constraints, a lack of technical expertise, and legal issues. Additionally, the study notes that library staff of IIFM struggle with technological knowledge and limited internet bandwidth, often referred to as the "digital divide." The IIFM library staffs rely on the external private technical support due to a shortage of in-house technical expertise.

Meanwhile, the FRI library faces specific challenges in digital preservation, including power outages and insufficient backup plans due to the lack of a generator set. Library of YSPUHF has made some progress in digital preservation; there is still a need for further knowledge and training in this field. The study found that all three libraries face challenges in providing the necessary infrastructure for digital preservation and are constrained by financial limitations. Financial limitations are a common issue, affecting all three institutions. Infrastructure, finances, legal barriers, and digital technology are common challenges that affect all libraries. The many challenges libraries face include inadequate infrastructure, financial constraints, media deterioration, and technological obsolescence. The causes of these issues are insufficient support from funding agencies. Moreover, a lack of skilled personnel is another reason for this.

This skill gap arises because effective training initiatives are not being undertaken. Therefore, staff who are not effectively equipped to handle evolving digital technologies or preservation methods. Furthermore, a general lack of knowledge and expertise exacerbates issues like poor planning, unsuccessful preservation policies, and legal or technical barriers. The absence of reliable software, hardware, and internet bandwidth further complicates matters, ultimately discouraging the authenticity, reliability, and long-term sustainability of digital resources.

8. Findings and Suggestions of the Study

- a) The findings revealed that all the libraries have a very well-managed facility, such as physical condition testing, checking for viruses, checking for readability of digital records, copying to different storage media, and inspection by the library professionals.
 - b) Vidhya Bharti Library (IIFM), Bhopal, and Satyanand Stokes Library (SNS), YSPUHF, employ a combination of short-term and medium/long-term preservation strategies to manage their collections. This dual approach ensures that materials are protected against immediate risks while also safeguarding them for future access and use. In contrast, except for FRI libraries, most other libraries do not utilize both types of preservation techniques simultaneously. This demonstrates a more comprehensive and proactive preservation policy in Vidhya Bharti Library and Satyanand Stokes Library, enhancing the longevity and accessibility of their resources.
 - c) The investigation has lighted that the digital resource management of all libraries involves testing the physical condition of media, checking for viruses, ensuring readability, verifying files against deposit documentation, and copying data to different storage media for preservation. These practices ensure data security, integrity, and long-term accessibility across all three libraries.
 - d) The study discovered that all three libraries face challenges in providing the necessary infrastructure for digital preservation and have financial constraints. Financial limitations are common issue, affecting all three institutions. Infrastructure, finances, legal barriers, and digital technology are common challenges that are pervasive across all libraries.
- e) In these libraries, the responsibility for safeguarding digital objects falls solely on the library staff, with no separate security measures in place.
 - f) The study revealed that in comparison to other library, (FRI) employ one staff member specifically to ensure the physical security of library resources.
 - g) It has been found that the study library of IIFM stands out with a single security person, which may be enough depending on its size or needs.
 - h) The findings revealed that FRI and YSPUHF libraries rely on alternate security measures. Monitoring user and staff movement is a key part of security, and both libraries (IIFM) and (YSPUHF) have measures in place for it.
 - i) The study has demonstrated that library of FRI in terms of security for Digital Objects encompasses a range of activities, including monitoring, detection, alerting, alarming, evacuation, and building management.
 - j) The investigation has come to light that currently the library NFLIC and IIFM has installed extinguishing systems, but not in YSPUHF. Moreover, Fire suppression systems are critical for protecting library assets. The absence of such systems in YSPUHF poses a fire risk.
 - k) All three libraries (NFLIC, IIFM, and YSPUHF) have alarm systems installed which indicated a baseline level of emergency alert system across all libraries, which is a positive security measure.
 - l) All libraries (NFLIC, IIFM, and YSPUHF) were equipped with extinguishers. This is a positive finding, indicating that basic firefighting equipment is available in all libraries.
- The results of this study align with prior research, indicating that efficient digital preservation in libraries is challenged by inadequate infrastructure, financial limitations, and the lack of specialised systems. Gaur and Tripathi (2010) along with Nilesh and Verma (2012) highlighted similar issues. Gaur and Tripathi (2010) said that financial limits and ongoing maintenance were big problems, while Nilesh and Verma (2012) said that technical problems like software dependency and media instability were also big problems. Moreover,

investigations by Kulhavy et al. (2017) and Liu (2004) highlighted the challenges posed by substantial implementation expenses and legal concerns such as copyright. The practical difficulties noted correspond with those identified by Anyaoku and Echedom (2019), especially the absence of enduring policy frameworks despite the prevalent implementation of migration and refreshment strategies. The current investigation also revealed that while all libraries practise basic digital resource management and have essential security and emergency infrastructure, they still struggle with resource limitations and the absence of specialised security measures. These results support the idea that successful digital preservation requires more than just money; it needs full policy support, skilled workers, and technology that can adapt to address ongoing legal, technical, and infrastructural challenges.

9. Conclusion

The current study reveals that digital preservation is a prevalent concern among the three select libraries, which are deficient in critical infrastructure, including tape drives, content management systems, and digital preservation repositories. The study revealed that the IIFM Bhopal library lacks a digital preservation strategy owing to the non-insistence of digitisation initiatives. Also, it was noted that the IIFM library primarily relies on simple physical inspections and manual checks to ensure data accuracy. Some of the biggest problems with implementing digital preservation strategies are a lack of infrastructure, funding, and dedicated digital preservation systems. The study finds that trained and skilled library professionals are necessary to keep digital resources safe. It also says that library workers should be aware of the legal issues that arise when digitising resources, such as copyright laws, digital laws, and other rules.

The study strongly emphasises that rare resources need to be preserved digitally and that all funding agencies ought to provide funding for this. It suggests that library professionals take the initiative and learn the skills they need to keep digital resources safe so that rare documents are kept safe and knowledge can be transmitted down to future generations.

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