

A Study of Digital Preservation Practices in Selected University Libraries in Bangladesh



Doctor of Philosophy

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A Study of Digital Preservation Practices in Selected University Libraries in Bangladesh



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Dedicated to
My Beloved Family

(FOR THEIR UNCONDITIONAL LOVE AND ENORMOUS SUPPORT)

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DECLARATION

I hereby declare that the thesis titled “**A Study of Digital Preservation Practices in Selected University Libraries in Bangladesh**” submitted to the University of Dhaka for the award of the degree of Doctor of Philosophy in Information Science and Library Management is of my own innovative work, which is the result of investigation. The entire research work was carried out by me under the supervision and guidance of **Dr. M. Nasiruddin Munshi**, Professor, Department of Information Science and Library Management, University of Dhaka.

I further declare that this thesis has not been submitted earlier in partial or in full by me for any degree or certificate to any university or institution. I also confirm that there is no plagiarism in this thesis.

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তথ্যবিজ্ঞান ও গ্রন্থাগার ব্যবস্থাপনা বিভাগ
ঢাকা বিশ্ববিদ্যালয়।

CERTIFICATE OF THE SUPERVISOR

I have the pleasure to certify that the thesis entitled "A Study of Digital Preservation Practices in Selected University Libraries in Bangladesh" submitted by Mohammad Shakaought Hossain Bhuiyan to the University of Dhaka for the award of the degree of Doctor of Philosophy is an original research work carried out by him under my supervision and guidance. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma. To the best of my knowledge, the researcher has properly cited all materials and sources that were used in this thesis.

Therefore, I recommend that this thesis be submitted to the Office of the Controller of Examinations at the University of Dhaka as part of the requirements for the degree of Doctor of Philosophy.

July 2025

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ABSTRACT

Preserving the library materials and making them accessible to the scholars and general users is very important for the university libraries. Therefore, the researcher decided to study on digital preservation practices in selected university libraries in Bangladesh. The purpose of the study was to investigate the existing condition of digital preservation practices in selected university libraries in Bangladesh. The study used a quantitative research approach based on the research objectives, and questionnaires were made for the users for 15 selected universities in Bangladesh. Data were collected through two sets of structured questionnaires for two distinct groups that were developed and refined with a pilot survey to ensure clarity and reliability. The population and sample were covered by librarians/library administrators, and library users from the 15 selected university libraries. In this study, the researcher has taken a non-probability sampling approach and chosen the purposive sampling method. The researcher distributed a total of 700 structured questionnaires among the teachers, students, and researchers of the selected university libraries. Out of 700 questionnaires, a total of 433 filled questionnaires were received with a response rate of 61.85%. For this study, collected data were analyzed using the IBM® SPSS® Statistics Version software. Ethical considerations, including informed consent and data confidentiality, were strictly followed to uphold the integrity of the research process. The findings from this study revealed that university libraries in Bangladesh were significantly affected by the changes to the digital environment. Most university libraries face many challenges that hinder the effective implementation of digital preservation. The challenges include absence of established standards and policies, inadequate funding, copyright and intellectual property rights issues, lack of skilled manpower, staff training and development, technology problems, lack of collaboration efforts, machine dependency, metadata, lack of equipment, insufficient staff, poor technology infrastructure, technological obsolescence, congested workspace, etc. The study also provides several recommendations, including infrastructure and access, skilled manpower and training, allocating sufficient budget and resources, addressing legal issues, providing software for digital preservation, developing policies for digital preservation, providing sufficient training for staff, adopting international standards, enhancing facilities and tools, taking administrative actions, providing legal deposit of e-content, etc. The result of the study contributes to the field by providing a detailed analysis of digital preservation practices in the context of Bangladeshi university libraries. The findings offer valuable insights

into the current state of digital preservation, the challenges faced by institutions, and user satisfaction with digital resources. The study's recommendations have practical implications for improving digital preservation strategies and can serve as a guide for other institutions facing similar challenges.

Keywords: Digitization, Digital Preservation, Digital Resources, Preservation Policy, Preservation Strategy, Technology obsolescence, University Library, Bangladesh.

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LIST OF ABBREVIATIONS

ACM	- Association for Computing Machinery
AGORA	- Access to Global Online Research in Agriculture
AIP	- Archival Information Package
ALA	- American Library Association
ANOVA	- Analysis of Variance
APA	- American Psychological Association
ARDI	- Access to Research for Development and Innovation
ARL	- Association of Research Libraries
ASCII	- American Standard Code for Information Interchange
AUST	- Ahsanullah University of Science and Technology
AUSTL	- Ahsanullah University of Science and Technology Library
AV	- Audio Visual
BAU	- Bangladesh Agricultural University
BAUL	- Bangladesh Agricultural University Library
BMP	- Bitmap Image file
BMU	- Bangladesh Medical University
BMUL	- Bangladesh Medical University Library
BNARS	- Botswana National Archives and Records Services
BRACU	- BRAC University
BRACUL	- BRAC University Library
CAS	- Current Awareness Service
CCD	- Charge Coupled Device

CCSD	- Consultative Committee for Space Data Systems
CD	- Compact Disc
CD-ROM	- Compact Disc-Read Only Memory
CD-RW	- Compact Disc-Rewritable
CDS/ISIS	- Computerized Documentation Service/Integrated Set of Information Systems
CESSDA	- Consortium of European Social Science Data Archives
CGI	- Common Gateway Interface
CLOCKSS	- Controlled Lots of Copies Keep Stuff Safe
CQL	- Contextual Query Language
CU	- University of Chittagong
CUL	- Chittagong University Library
DAM	- Digital Asset Management
DANS	- Data Archiving and Networked Services
DBMS	- Database Management System
DC	- Dublin Core
DCM	- Digital Content Management
DCMES	- Dublin Core Metadata Element Set
DCMI	- Dublin Core Metadata Initiative
DDC	- Dewey Decimal Classification
DELNET	- Developing Library Network
DES	- Data Encryption Standard
DESIDOC	- Defence Scientific Information and Documentation Centre
DIDL	- Digital Item Declaration Language

DIP	- Dissemination Information Package
DLF	- Digital Library Federation
DLI	- Digital Libraries Initiatives
DLMS	- Digital Library Management Software
DOAJ	- Directory of Open Access Journals
DOI	- Digital Object Identifier
DP	- Digital Preservation
DPC	- Digital Preservation Coalition
DPCM	- Digital Preservation Capability Maturity
DPE	- Digital Preservation Europe
DPI	- Dots Per Inch
DPN	- Digital Preservation Network
DPP	- Digital Preservation Policy
DRM	- Digital Rights Management
DROID	- Digital Record Object Identification
DU	- University of Dhaka
DUL	- Dhaka University Library
DVD	- Digital Versatile Disc
EAD	- Encoded Archival Description
EBSCO	- Elton Bryson Stephens Company
EDDS	- Electronic Document Delivery System
Email	- Electronic mail
ERPANET	- Electronic Resource Preservation and Access Network

ERM	- Electronic Resource Management
ET AL./et al.	- And others
ETDs	- Electronic Theses and Dissertations
EWU	- East West University
EWUL	- East West University Library
FEDORA	- Flexible Extensible Digital Object Repository Architecture
FOSS	- Free and Open Source Software
FRBR	- Functional Requirements for Bibliographic Records
FTP	- File Transfer Protocol
GAU	- Gazipur Agricultural University
GAUL	- Gazipur Agricultural University Library
GB	- Gigabyte
GEMS	- Greenstone Editor for Metadata Sets
GIF	- Graphic Interchange Format
GOALI	- Global Online Access to Legal Information
GSDL	- Greenstone Digital Library
HEQEP	- Higher Education Quality Enhancement Project
HIT	- Harare Institute of Technology
HRD	- Human Resource Development
HTML	- Hypertext Markup Language
HTTP	- Hypertext Transfer Protocol
IBM	- International Business Machines Corporation
ICA	- International Council on Archives

ICT	-	Information and Communication Technology
IEEE	-	Institute of Electrical and Electronics Engineers
IFLA	-	International Federation of Library Associations and Institutions
IGNCA	-	Indira Gandhi National Centre for the Arts
IIPC	-	International Internet Preservation Consortium
ILMS	-	Integrated Library Management System
INFLIBNET	-	Information and Library Network
IPR	-	Intellectual Property Rights
IR	-	Institutional Repository
IRC	-	Information Resource Centre
IRMT	-	International Records Management Trust
ISBD	-	International Standard Bibliographic Description
ISBN	-	International Standard Book Number
ISO	-	International Organization for Standardization
ISSN	-	International Standard Serial Number
IT	-	Information Technology
IUB	-	Independent University, Bangladesh
IUBL	-	Independent University, Bangladesh Library
JFIF	-	JPEG File Interchange Format
JPEG	-	Joint Photographic Experts Group
JSTOR	-	Journal Storage
JU	-	Jahangirnagar University
JUL	-	Jahangirnagar University Library

LAN	- Local Area Network
LIC	- Library and Information Centre
LiCoB	- The Library Consortium of Bangladesh
LIS	- Library and Information Science
LISA	- Library and Information Science Abstracts
LISTA	- Library, Information Science and Technology Abstracts
LOCKSS	- Lots of Copies Keep Stuff Safe
LOTAR	- Long Term Archiving and Retrieval
MAN	- Metropolitan Area Network
MARC	- Machine-Readable Cataloging
METS	- Metadata Encoding and Transmission Standard
MIT	- Massachusetts Institute of Technology
MODS	- Metadata Object Description Schema
MPEG	- Moving Picture Experts Group
MS-Word	- Microsoft Word
NAZ	- National Archives of Zimbabwe
NDIIPP	- National Digital Information Infrastructure and Preservation Program
NDLTD	- Networked Digital Library of Theses and Dissertations
NISO	- National Information Standards Organization
NLA	- Nigerian Library Association
NMM	- National Mission for Manuscripts
NNA	- Nigerian National Archives
NSU	- North South University

NSUL	- North South University Library
NUST	- Namibia University of Science and Technology
OA	- Open Access
OAI	- Open Archives Initiative
OAIR	- Open Access and Institutional Repository
OAIS	- Open Archival Information System
OARE	- Orbital Acceleration Research Experiment
OCLC	- Online Computer Library Center
OCR	- Optical Character Recognition
OPAC	- Online Public Access Catalog
OS	- Operating System
OSI	- Open Source Initiative
OSS	- Open Source Software
PAC	- Preservation and Conservation
PADI	- Preserving Access to Digital Information
PDF	- Portable Document Format
PDI	- Preservation Description Information
PhD	- Doctor of Philosophy
PHP	- Hypertext Preprocessor
PNG	- Portable Network Graphics
PREMIS	- Preservation Metadata: Implementation Strategies
PRISMA	- Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PURL	- Persistent Uniform resource Locator

RAM	- Random Access Memory
RAP	- Repository Access Protocol
RDA	- Resource Description and Access
RDF	- Resource Description Framework
RFID	- Radio Frequency Identification
RLG	- Research Libraries Group
RO	- Research Objective
ROAR	- Registry of Open Access Repositories
ROARMAP	- Registry of Open Access Repositories Mandates and Policies
RQ	- Research Question
RTF	- Rich Text Format
RU	- University of Rajshahi
RUL	- Rajshahi University Library
RXP	- Repository Exchange Package
SAU	- Sher-e-Bangla Agricultural University
SAUL	- Sher-e-Bangla Agricultural University Library
SAURES	- Sher-e-Bangla Agricultural University Research System
SCAPE	- Scalable Preservation Environments
SD	- Standard Deviation
SDI	- Selective Dissemination of Information
SGML	- Standard Generalized Markup Language
SIP	- Submission Information Package
SLR	- Systematic Literature Review

SMS	- Short Message Service
SOUL	- Software for University Libraries
SQL	- Structured Query Language
SPSS	- Statistical Package for the Social Sciences
STEM	- Science, Technology, Engineering and Mathematics
TAM	- Technology Acceptance Model
TCP/IP	- Transmission Control Protocol/Internet Protocol
TDR	- Trusted Digital Repository
TEI	- Text Encoding Initiative
TEEAL	- The Essential Electronic Agricultural Library
TFADI	- Task Force on Archiving of Digital Information
TIFF	- Tagged Image File Format
TRAC	- Trustworthy Repositories Audit and Certification
UDC	- Universal Decimal Classification
UDL	- UGC Digital Library
UNAM	- University of Namibia
UNESCO	- United Nations Educational, Scientific and Cultural Organization
UGC	- University Grants Commission
UK	- United Kingdom
URI	- Uniform Resource Identifier
URL	- Uniform Resource Locator
URN	- Uniform Resource Name
USA	- United States of America

USB	- Universal Serial Bus
VSAT	- Very Small Aperture Terminal
WAC	- Web Archiving Collaborations
WAN	- Wide Area Network
WDL	- World Digital Library
WHO	- World Health Organization
WIPO	- World Intellectual Property Organization
WWW	- World Wide Web
XML	- Extensible Markup Language
ZOU	- Zimbabwe Open University

CHAPTER ONE

INTRODUCTION

1.1 Prologue

With the rise of digital technologies, academic institutions have realized that digital preservation is essential (Masenya & Ngulube, 2021). Over the past ten years, the importance of digital preservation has grown significantly. While digitization dominated the first decade of the twenty-first century, digital preservation seems to have taken center stage in the second decade (Trehub, 2013; Trehub & Wilson, 2010). The technique of keeping information in a digital format is known as digital preservation. Information is shifting from print to non-print online, and it's now simple for the general public, particularly academics, to access information online anytime, anywhere (Shah & Gul, 2019). For the information society, digital preservation is a significant challenge. Digital documents are becoming more and more popular during this era of information exploration (Begum, 2015). Digital preservation assists us to store and keep our information resources protected for future purposes. In the academic library, digital preservation plays vital roles that make secure and give longevity to the information resources (Hazarika, 2020). "Digital preservation" refers to a collection of policies, practices, and methods designed to ensure the long-term accessibility of digital content (Dappert & Farquhar, 2009). The rapid advancement of information technology (IT) has forced information professionals to reevaluate how to receive, process, store, and retrieve information in a way that is easier for users. Digital preservation is one of the best methods for using an information management tool (Rahman & Mezbah-ul-Islam, 2012). One of the most important issues facing the scholarly community today is digital preservation (Anyaku et al., 2019). Digital content preservation is becoming more and more important for many different types of research and educational endeavors (Rahman & Mezbah-ul-Islam, 2012). Preservation and libraries are intimately related in the future, and new technologies will produce, gather, store, analyze, and retrieve information as well as distribute it globally (Papreja & Jain, 2014). From a preservation perspective, digital technology has several reform advantages over photocopying and microfilm, such as the capacity to create a better reproduction of a deteriorated original, the capacity to repeatedly reproduce digital images without sacrificing image quality, increased output and distribution flexibility, and the potential for storage and distribution cost savings

(Kenney et al. 2002). Preservation involves taking all necessary precautions to monitor and prevent deterioration. In contrast, conservation entails early curative treatment, accurate diagnosis of the deteriorated material, and appropriate measures to prevent future degradation (Kumbar, 2022). The idea of a library has evolved in the modern day, and libraries are becoming more digital. Information and communication technology (ICT) has transformed the way information is gathered, preserved, archived, and made accessible to the users. The term ‘digital preservation’ applies to the documents that are either “born digital” or stored online in online databases. One of the most pressing issues facing our digital information society is digital preservation. It is a recognized trend in all contemporary libraries and a crucial component of digital information management (Akter, 2013). Digital preservation is a collection of coordinated actions that guarantee the availability of digital materials for as long as they are required (Deegan & Tanner, 2006). Libraries play a vital role in education, research, reference, and leisure in any civilized culture (Sunil & Kumar, 2009). A library is a group of informational resources and associated materials that are accessible to members of a particular community for reference or borrowing. It provides access to material in both digital and physical forms, and it may be a live space, a virtual building, or both. Modern libraries are increasingly being misrepresented as places to have unfettered access to knowledge from a wide range of sources and in a number of media. Libraries are extending their services beyond the confines of a physical institution by providing electronically accessible content and librarian services for sorting and analyzing vast volumes of data using a variety of digital technologies. Academic libraries are dynamic hubs of knowledge that offer space, services, and resources necessary to meet the various demands of researchers, teachers, and students. University libraries serve as information hubs within academic institutions, designed to meet the research, education, and learning needs of their immediate user communities (Akanwa et al., 2023). The university library is an institution that provides reading rooms, book searches, book loans, and access to research documents for teachers, students, and researchers. The library is regarded as an essential component of a university. In terms of research and education, the university library plays an essential role in the advancement of academia. University libraries play a vital role in supporting the purposes of the universities they are a part of. Meeting the information and research requirements of the community is undoubtedly the job of a university library. The basic purpose of the university library is the expansion of knowledge. The university library

exists to serve the information needs of its users and supports teaching and research activities. Library resources refer to the variety of materials and services available to assist learning, research, and information requirements. Print books, electronic books, scholarly journals, newspapers, periodicals, multimedia content, internet databases, and more can all be considered among these resources. Additionally, services like interlibrary loans, computer access, study areas, workshops, and reference support may also be included in the list of library resources. Access to a variety of information sources and tools to support users' academic, professional, and personal endeavors is the goal of library resources. Digital preservation has its origin in the vast development of technology, the revolution of information, easy and fast access to information at any time from any part of the world, and the preservation of information for future generations. The performance of libraries has been significantly impacted by the introduction of new technological trends. These developments have completely changed how libraries run and serve their patrons (Okwu et al., 2024). The advancement of information technology (ICT) and artificial intelligence (AI) has significantly changed the functions and services provided by libraries (Sharma & Khan, 2024). The advent of e-resources, interlibrary networking, and library automation has brought a substantial change in the traditional library systems. This change has made the adoption of new techniques for the effective preservation of digital records inevitable in the contemporary digital era (Bhat & Hasan, 2024). Innovations in data and manuscript conservation and preservation are a result of technological advancement (Abdulkareem et al., 2012). In modern times, the idea of a library has changed, and the library is becoming a digital institution. Information and communication technology (ICT) has completely changed how data is collected, stored, archived, and made available to users. Every day, more and more resources are added to libraries that are "born digital" and obtained through a variety of channels, including e-books, e-journals, and other indexing and bibliographic databases that are subscribed to by publishers, suppliers, or aggregators in addition to those produced by the institutions. Due to these changes in standards, technologies, and user needs for information, the problems associated with digital content preservation continue. The fundamental concepts of digital preservation are using the correct technology at the right time.

1.2 Background of the Study

Library materials are growing daily with the addition of new resources that are "born digital" via various channels, including e-journals and e-books purchased from

publishers, vendors, or aggregators. Thus, the issue of the preservation of digital content still remains with the amendment of technologies, standards, and ever-changing user information needs. Based on the literature review, research gaps, raised questions, and social impacts, the study has proposed mainly to investigate the digital preservation practices in the academic libraries of Bangladesh. The study reflects a comprehensive background and current scenario of digital preservation practices in the university libraries of Bangladesh. The study measures the gaps between perceived and expected digital preservation practices in academic libraries in Bangladesh that will help the library authority in designing accurate strategic plans for improving the digital preservation system based on the users' expectations. The literature on the topic reveals that as yet no similar study has been conducted in Bangladesh; therefore, this groundbreaking work is anticipated to serve as the foundation for more research in the area. The findings of the study will help university libraries in Bangladesh get fresh insights on digital preservation. Based on the findings, the study will recommend some suggestions that will help the library authority to improve digital preservation practices.

The rapid growth of digital resources within academic libraries has heightened the need for robust and sustainable digital preservation strategies. With academic institutions increasingly relying on digital materials to support research, teaching, and learning, the preservation of these resources has become essential to ensuring their long-term accessibility and usability. However, the dynamic nature of technology, combined with evolving user expectations and information behaviors, presents significant challenges for libraries seeking to maintain high-quality digital collections. Additionally, the lack of standardized practices in digital preservation in many institutions, particularly within Bangladesh, has led to inconsistencies in how materials are stored, managed, and accessed over time. Addressing these challenges requires a nuanced understanding of both technical and administrative barriers to digital preservation, as well as a commitment to continuous development in line with international best practices. This study, therefore, aims not only to fill a critical research gap in Bangladesh but also to provide actionable insights that can drive policy improvements and establish a foundation for future advancements in the field of digital preservation within academic libraries. By exploring current practices, limitations, and potential strategies for enhancement, the study seeks to make a meaningful contribution to library science in Bangladesh and beyond.

1.3 Problem Statement

Currently, university libraries are facing challenges with how to preserve intellectual and cultural documents as this information is created in digital formats (Anyaku et al., 2019). The present challenge facing university libraries is their incapacity to offer long-term access to the electronic materials they produce. Libraries are being forced to create digital collections in order to better serve their users as a result of the increase in demand for digital content. However, several problems, such as media failure, hardware and software failure, technical obsolescence, malicious attacks, etc., pose a threat to their accessibility and preservation. Similarly, they are also vulnerable to mishaps and natural disasters like fires, earthquakes, floods, and human mistakes. To overcome these obstacles, libraries must employ preservation tactics such as migration, media refreshing, emulation, replication, normalization, development of dark archives, geographical distribution of backups, digital archeology, storage security measures, and firewalling, among others (Gbaje, 2011; Krtalic et al., 2016; Luan et al., 2010; Okoh & Sambo, 2014; Ruusalepp, 2003; Samiei, 2020; Shah & Gul, 2019; Walters et al., 2009; Zaste, 2016). The goal of digital preservation is to guarantee that digital content is available to the user community for a considerable amount of time and for future generations (Masenya & Ngulube, 2021). Sigauke & Nengomasha (2011) noted that digital information is extremely vulnerable to loss if preservation is not considered. Technological obsolescence and the deterioration of digital storage media are just two of the many risks that digital information faces (Li & Banach, 2011). Digital preservation plays an important role in university libraries, which makes information sources safe and long-lasting. To preserve digital scholarly documents, university libraries need to establish new best practices for preservation. Rahman & Mezbah-ul-Islam (2012) point out that digital preservation in university libraries in Bangladesh is hampered by the following challenges: The challenges are: lack of skilled staff, inappropriate budget, lack of national-level collaboration, nature of storage medium, media failure, poor technological infrastructure, lack of policies, and lack of awareness of digital preservation. These challenges have made digital preservation even more important. Globally, research institutions and archival organizations are actively organizing and creating policies for the digital preservation of their resources. But archival institutions and university libraries in Bangladesh are lagging behind in digital preservation practices (Rahman & Mezbah-ul-Islam, 2012). In Bangladesh, many university libraries are embracing the practice of e-collection, digitization, digital preservation, and management. University

libraries currently encounter a major challenge with digital preservation, complicating their efforts to sustain digital resources and data repositories. Due to the proliferation of digital resources and the reality of the digital revolution, digital preservation of library materials is essential in university libraries in Bangladesh. University libraries in Bangladesh are lagging behind in digital preservation practices due to lack of skilled professionals, negligence from the university authority, insufficient publications produced by researchers, and lack of instruments (Islam & Islam, 2021). Digital preservation is very essential for providing library materials to the present and forthcoming generations and for long-term preservation. It is also important to provide easy and quick access to the required library materials and preserve them from damage and harm to guarantee their long-term availability. However, to understand the importance of digital contents in libraries, it is pertinent to know if university libraries in Bangladesh have policies guiding digital preservation, their level of awareness of digital preservation, and what challenges exist in managing digital materials in libraries. A preliminary investigation by the researcher discovered that most of the research outputs in university libraries in Bangladesh have not been well preserved. Literature also reveals that there are only a few studies on digital preservation practices in university libraries in Bangladesh. It is one of the big gaps. Considering the above analysis, the researcher has decided to conduct the study on digital preservation practices in selected university libraries in Bangladesh.

Despite the growing reliance on digital resources, most university libraries in Bangladesh lack comprehensive strategies and standardized policies for ensuring long-term digital preservation. This absence of structured frameworks and guidelines limits their ability to sustain access to valuable academic content and resources over time, posing risks to knowledge continuity and accessibility. Additionally, insufficient funding and technical expertise further hinder libraries from implementing effective digital preservation practices. Thus, this study aims to address these gaps, offering insights into the current state of digital preservation in Bangladeshi university libraries and identifying strategies to overcome the existing challenges.

1.4 Rationale of the study

Based on the research objective, research questions, and research gap, the study has proposed to assess the digital preservation practices in selected university libraries in Bangladesh. The study also highlights the importance of digital preservation in the

selected university libraries in Bangladesh. Besides, the study also measures the gap between perceived and expected digital preservation practices in selected university libraries in Bangladesh that will help the librarians in designing an appropriate strategic plan to improve the digital preservation activities in their libraries. The findings of the study would be helpful for the authority of the university libraries and UGC in planning and organizing training, seminars, and workshops for library professionals regarding digital preservation activities. This study contributes to the field by providing a detailed analysis of digital preservation practices in the context of Bangladeshi university libraries. The findings offer valuable insights into the current state of digital preservation, the challenges faced by institutions, and user satisfaction with digital resources. The study's recommendations have practical and theoretical implications for improving digital preservation strategies and can serve as a guide for other institutions.

Furthermore, this study serves as a pioneering effort to examine digital preservation within the academic libraries of Bangladesh, where research on this topic remains limited. By identifying key areas for improvement and aligning preservation practices with user needs, the study aims to bridge gaps in service quality, ensuring that digital resources are not only preserved but also accessible and relevant for future generations. Ultimately, the insights gained will aid decision-makers in establishing more effective, resilient digital preservation frameworks that enhance both the sustainability and accessibility of academic resources in Bangladesh.

1.5 Research Objectives (ROs)

Based on the literature review, research gaps, raised questions, and social impact, the study has made the following five specific objectives:

- RO1.* To investigate the existing condition of digital preservation practices in selected university libraries in Bangladesh.
- RO2.* To find out the techniques and strategies used for current digital preservation practices in selected university libraries.
- RO3.* To examine user satisfaction with using digital preservation resources in selected university libraries.
- RO4.* To identify the challenges for digital preservation in selected university libraries.
- RO5.* To provide recommendations to overcome the existing challenges of digital preservation.

1.6 Research Questions (RQs)

Based on the research gap of the study, the following research questions were raised. The research questions guiding this study are:

- RQ1.* What is the existing condition of the digital preservation practices in selected university libraries of Bangladesh?
- RQ2.* Which techniques are used for preservation of digital resources in university libraries of Bangladesh?
- RQ3.* Are library users satisfied using the digitally preserved resources?
- RQ4.* What are the challenges or barriers for successful digital preservation in selected university libraries?
- RQ5.* Are there sufficient funding and skill staffs to carryout digital preservation activities in selected university libraries of Bangladesh?

1.7 Hypotheses:

Based on the research objectives and the research questions, the following five hypotheses have been formulated, grounded in the observed variables and findings.

- H1:* There is a difference in the types of materials selected for digital preservation between public and private university libraries.
- H2:* Public and private university libraries significantly differ in their adoption of digital preservation policies.
- H3:* The frequency of challenges faced by libraries in building institutional repositories differs between public and private university libraries.
- H4:* There is no difference in user satisfaction levels regarding digital preservation between public and private university libraries.
- H5:* Libraries using recognized digital preservation standards show higher levels of digital collection quality compared to those that do not use such standards.

1.8 Research Methodology

1.8.1 Instruments

Two different sets of structured questionnaires were utilized to collect quantitative data from two distinct groups: librarians/library administrators of libraries and library users.

❖ Questionnaire Set-1: This set is designed to collect quantitative data from librarians/library administrators of libraries of selected university libraries. It included sections covering general information about the university and university library, basic information about digital preservation, general information about digital preservation policy, digital preservation techniques, IR for digital preservation, manpower for digital preservation, copyright issues for digital preservation, and funding for digital preservation.

❖ Questionnaire Set-2: This set is intended to gather quantitative data from the library users of the selected university libraries. It included sections covering demographic information of the users, digital preservation and its use, users' needs, quality of digital preservation, and satisfaction level of users regarding digital preservation. The purpose of the study was clearly stated in the questionnaire, and the confidentiality of the respondent was ensured.

1.8.2 Population and Sampling

In Bangladesh, there are 55 public and 114 private universities (UGC, 2025). Among them, 10 public universities and 5 private universities were selected for the study. These universities were chosen based on their varying establishment years, categories (public and private), and geographical locations. Among the selected public universities, four old universities of Bangladesh established by the 1973 Act, one renowned engineering university, three self-styled agricultural universities, one medical university, and one science and technology university were selected for this study. The researcher has given priority to the public university as a sample for this study. In addition, the researchers also sampled five of the leading private universities in Bangladesh to compare the gap between public and private universities in digital preservation practices. These universities were purposively selected based on their digitization activities, digital preservation practices, institutional repository systems, and arranging and promoting professional training on digital preservation. Table 1 provides an overview of the selected universities for the study, including their names, establishment year, category, location, and specialization.

Table1.1: List of Selected University for the Study

SL. No.	Name of the University	Est. Year	Category	Website	Location	Specialization
01	University of Dhaka	1921	Publssic	https://www.du.ac.bd	Dhaka	General
02	University of Rajshahi	1953	Public	https://www.ru.ac.bd	Rajshahi	General
03	University of Chittagong	1966	Public	https://www.cu.ac.bd	Chittagong	General
04	Jahangirnagar University	1970	Public	https://www.juniv.edu	Savar	General
05	Bangladesh Agricultural University	1961	Public	https://www.bau.edu.bd	Mymensingh	Agricultural Science
06	Bangladesh University of Engineering and Technology	1962	Public	https://www.buet.ac.bd	Dhaka	Engineering
07	Shahjalal University of Science and Technology	1986	Public	https://www.sust.edu	Sylhet	STEM
08	Gazipur Agricultural University	1998	Public	https://gau.edu.bd	Gazipur	Agricultural Science
09	Bangladesh Medical University	1998	Public	https://bmu.ac.bd	Dhaka	Medical Science
10	Sher-e-Bangla Agricultural University	2001	Public	https://www.sau.edu.bd	Dhaka	Agricultural Science
11	North South University	1992	Private	https://www.northsouth.edu	Dhaka	General
12	Independent University, Bangladesh	1993	Private	https://iub.ac.bd	Dhaka	General
13	Ahsanulla University of Science and Technology	1995	Private	https://aust.edu	Dhaka	STEM
14	East West University	1996	Private	https://www.ewubd.edu	Dhaka	General
15	BRAC University	2001	Private	https://www.bracu.ac.bd	Dhaka	General

STEM= Science, Technology, Engineering and Mathematics

This table provides a point of reference for understanding the diversity of universities that are part of the research study. It includes various types of institutions and their respective library systems. The population for the study consisted of librarians or library administrators, teachers, students, and researchers of the selected university libraries. Purposive sampling method is considered for this study due to the large population size of the selected universities, to collect data from the current users of the selected libraries, and to make this study more convenient. Questionnaire set-1 was distributed among the librarians or library administrators of the selected university libraries. Besides, researchers visited 15 selected university libraries and distributed a sufficient number of structured questionnaire set-2 among the teachers, students, and researchers inside the libraries. After verifying the returning responses, only completely filled-up questionnaires were considered for analysis.

1.8.3 Statistical Procedure of Data Analysis

The study employed several statistical procedures for data analysis, utilizing SPSS software to ensure a comprehensive examination of the data set. In order to gain a better understanding of the general trends, descriptive analysis was used to list and explain the key characteristics of the data that was gathered, including measures of central tendency and variability. The differences between two independent groups were compared using the non-parametric Mann-Whitney U test, making it suitable for data that did not follow a normal distribution. A normality test was conducted to assess whether the data was normally distributed, which is essential for determining the appropriate statistical tests to apply. Additionally, non-parametric tests were incorporated as they do not assume a normal distribution, making them particularly useful for analyzing skewed or ordinal data. Together, these statistical methods provided robust insights into the study's findings, enhancing the accuracy and reliability of the results.

1.9 Significance of the Study

For the purpose of the present study, the researcher has identified the 10 public universities and 5 private universities in Bangladesh that have already initiated preservation activities. The aim of the study is to know the preservation practices of the selected university libraries in Bangladesh. The library is called the “heart of the university.” The university library possesses old documents in the form of manuscripts, artifacts, old newspapers, rare books, and such other materials apart from the print

media. These old documents bear important information about tradition, culture, literature, history, and religion, which has been written in the different scripts. From a cultural and historical perspective, manuscripts and other significant rare collections are extremely valuable and should be preserved.

If the selected university libraries in Bangladesh preserved their collections digitally, the general users and researchers would be greatly benefited. Selected academic librarians will benefit from the outcomes of the study. The findings can help the library staff create forward-thinking plans for using subscription information resources and research output. The selected library as a whole should benefit from the empirical data. That's why this study will have a significant contribution to the education and research sectors and overall the socio-economic development of Bangladesh.

Digital preservation in university libraries not only safeguards invaluable resources but also enhances accessibility to materials, enabling broader engagement with Bangladesh's rich heritage. By preserving these resources digitally, libraries can make unique and culturally significant collections available to a global audience, supporting both national and international research efforts. This study also addresses the challenges and limitations faced by academic libraries in Bangladesh, providing a pathway for improvements that could serve as a model for other institutions in similar contexts. Additionally, by identifying best practices in digital preservation, the study may inspire collaboration among academic libraries in Bangladesh, fostering resource-sharing initiatives that could increase efficiency and reduce costs. Ultimately, the study has the potential to contribute to a robust digital preservation framework that supports both academic progress and cultural continuity.

1.10 Operational Definition of Terms

For this research, the following operational definitions have been followed:

1.10.1 Library Resources: Library resources encompass a variety of print and non-print items, including textbooks, journals, indexes, newspapers, magazines, reports, the internet, videotapes, diskettes, and microforms. These resources serve as essential materials that facilitate key services in the teaching and learning process (Anhwere, et. al., 2018).

1.10.2 Digital Information Resources: Digital information resources include both born-digital and digitized items. If these resources are made available online or through the library's internal database, copyright regulations must be followed. Some resources will be permitted to offer information in full text for both the born-digital and digitized formats, while others will only be able to offer metadata. While certain resources will be restricted in their accessibility because of library policies, financial considerations, and authentication requirements, others will be freely available to everybody, anywhere in the globe (Islam, 2010).

1.10.3 Digitization: The process of converting a material into bits, such as a book, sound recording, image, or video, is known as digitization. The basic information units in computer systems are called bits. The process of converting data into these binary numbers is known as digitization. (Angadi, 2021).

1.10.4 Preservation: Preservation is the area of library and information science that deals with preserving or regaining access to records, papers, and artifacts by identifying, diagnosing, treating, and preventing damage and deterioration. It is important to distinguish it from conservation, which is the process of treating and repairing individual objects to prevent deterioration or return them to a useful condition. Sometimes, especially outside of the scholarly literature, conservation and preservation are used interchangeably (Iorver et al., 2022).

1.10.5 Digital Preservation: Digital preservation refers to all of the actions taken by a digital curator to guarantee that the digital content under their care is kept in formats that can be used for a long time and can be made available in meaningful ways for both present and future users, regardless of media failure or technological advancement. Digital content describes information that has been produced or transformed into digital format (Digital Preservation Coalition, 2006)

1.10.6 Institutional Repository: An institutional repository is an expansion of an academic institution's operations that supports the institution's research and development initiatives, safeguards intellectual property, and fosters scholarly communication among its users (Kaladhar et al., 2018).

1.10.7 Digital Archiving: Digital archiving is a repository of digital materials that a company or person desires to keep for a longer period of time. It stores collection of digital information such as documents, videos, pictures etc.

1.10.8 Copyright: A subset of intellectual property known as copyright safeguards original works of authorship in the fields of literature, science, and the arts. Books, music, theater, dance, photography, movies, paintings, drawings, and architecture are all included in this. All original works of authorship are protected by copyright, regardless of their literary or artistic value (UNESCO, 2025).

1.11 Scope and Limitation of the Study

This study examines digital preservation practices within a targeted selection of 10 public and 5 private universities out of the 169 universities in Bangladesh, emphasizing their approaches to safeguarding digital content. The chosen institutions represent various types and sizes within the academic sector, providing a focused but illustrative snapshot of current preservation efforts. Given that these universities are located across different regions, the study sheds light on the variations in resources and infrastructure that impact preservation activities. By narrowing the focus to this specific set of universities, the study aims to identify key practices, challenges, and trends that are likely reflective of the broader higher education landscape in Bangladesh, though they may not capture every nuance across all institutions. Additionally, the study explores how these selected libraries manage their unique collections and address the need for maintaining accessibility over time. The study faces certain limitations that may influence the comprehensiveness of the findings. One challenge was the notable knowledge gap among library staff regarding fundamental concepts of long-term digital preservation, resulting in a more limited depth of data collection than anticipated. Furthermore, due to the high population size within the 15 selected universities, a non-probability sampling approach, specifically purposive sampling, was employed to gather insights from library users efficiently and conveniently. However, this approach, combined with the exclusion of staff members and part-time faculty (who represent a small proportion of users), may restrict the representativeness of the data. Despite these constraints, the study offers valuable insights, but its findings should be interpreted with consideration of these factors, especially when generalizing to other university settings in Bangladesh.

1.12 Standard Followed

The American Psychological Association (APA) 7th edition has been used for bibliographical references in the study. . The following are a few examples:

1. Hussain, S., & Diwakar, R. K. (2024). Digital Preservation of Library Resources: Strategies, Challenges and Future Directions. *International Journal of Innovative Research in Technology*, 11 (2), 1817-1821. <https://doi.org/10.18535/ijirts>
2. Alghnimi, M., & Chaudhry, A. S. (2022). Status and practices of digitization in Kuwaiti academic libraries. *Malaysian Journal of Library and Information Science*, 27 (2), 115-129. <https://doi.org/10.22452/mjlis.vol27no2.7>
3. Masenya, T. M., & Ngulube, P. (2019). Digital preservation practices in academic libraries in South Africa in the wake of the digital revolution. *South African Journal of Information Management*. 21(1), 1-9. <https://doi.org/10.4102/sajim.V21i1.1011>

1.13 Organization of the Dissertation

The text of the dissertation has been arranged logically into the following seven main chapters, namely the introduction, literature review, research methodology, present scenario of digital preservation practices in selected university libraries, data analysis and interpretation of data, discussion and interpretative of findings, and challenges, recommendations, and conclusion. Moreover, each chapter of the dissertation contains an introduction and a conclusion. The dissertation consists of seven main chapters, including an appendix and a bibliography. The research process is schematically illustrated in figure 1.1.

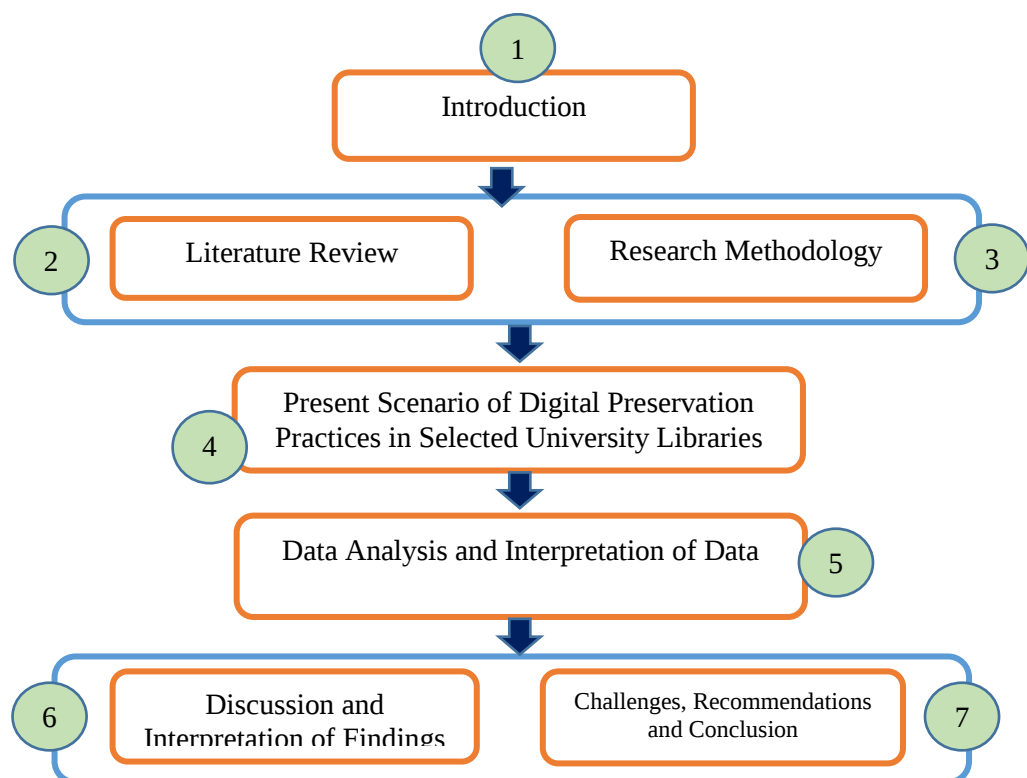


Figure: 1.1: Schematic illustration of chapters used in the study.

Chapter One: Introduction

This chapter provides an initial overview of the study and includes a prologue, background of the study, problem statement, rationale of the study, research objectives, research questions, research methods, instruments, population and sampling, statistical procedure, significance of the study, conceptual definition of terms, scope and limitations of the study, standard followed organization of the dissertation, and a chapter summary. The operational definitions encompassed library resources, digital information resources, digitization, preservation, digital preservation, digital archiving, and copyright. Ultimately, the chapter gives an accurate depiction of the thesis outline.

Chapter Two: Literature Review

This chapter presents a comprehensive analysis of the literature that has been previously undertaken in various locations and periods around the world. Specially, this includes a conceptual definition of digital preservation, digital preservation practices, digital preservation techniques and strategies, digital preservation issues and challenges, digital preservation policy, funding for digital preservation, copyright issues for digital preservation, satisfaction level of users regarding the digital preservation, institutional repository for digital preservation, manpower for digital preservation, content quality of digital preservation, users needs about digital preservation, summary of the literature review, research gap and uniqueness from the other study, and a chapter conclusion.

Chapter Three: Research Methodology

This chapter describes the methodology of the study, which is followed by the research design, research type, research site, justification for selecting the universities, population and sampling, instruments of data collection, response rate, data collection procedure, pilot survey, procedure of data analysis, ethical considerations, and a chapter conclusion.

Chapter Four: Present Scenario of Digital Preservation Practices in Selected University Libraries

This chapter describes the present condition of digital preservation practices in the selected university libraries in Bangladesh. The selected university libraries are: University of Dhaka, University of Rajshahi, University of Chittagong, Jahangirnagar University, Gazipur Agricultural University, Bangladesh University of Engineering and

Technology, Sher-e-Bangla Agricultural University, Bangladesh Medical University, Bangladesh Agricultural University, Shahjalal University of Science and Technology, North South University, East West University, BRAC University, Independent University, Bangladesh, and Ahsanullah University of Science and Technology.

Chapter Five: Analysis and Interpretation of Data

This chapter examined the demographic information of library administrators, the present status of university libraries in Bangladesh, basic information of digital preservation, digital preservation policy, digital preservation strategy and standard, institutional repository for digital preservation, manpower for digital preservation, copyright issue for digital preservation, funding for digital preservation, data analysis of library users, summary of the findings, and a chapter conclusion.

Chapter Six: Discussion and Interpretation of Findings

This chapter examined the overview of digital preservation practices in selected university libraries, processes and techniques used for digital preservation, satisfaction and familiarity with digital resources, challenges and barriers to digital preservation, recommendations for overcoming digital preservation challenges, and a chapter conclusion.

Chapter Seven: Challenges, Recommendations and Conclusion

This is the closing chapter of the study. This chapter provides some major challenges for digital preservation practices in university libraries and provides recommendations based on the study findings. In addition, this chapter highlights the contributions of study findings in the field of library and information professions. The chapter also provides potential areas for further research and a final conclusion of the study.

1.14 Conclusion

With the ever-increasing growth of digital information and the enormous growth and development of Information Technology (IT), library resources are being preserved in digital form to ensure their long-term access. The main objective of digital preservation in libraries is to guarantee that information with long-term significance is kept accessible for both current and future generations. Because of their tremendous cultural and

historical significance, manuscripts and significant rare collections in university libraries must be preserved.

If the selected university libraries in Bangladesh preserved their collections digitally, the general users and researchers will be greatly benefited. The results indicate that digital preservation in a few Bangladeshi university libraries is currently in a generally good position, with well-organized collections and generally high-quality content. Addressing technical and administrative challenges, improving infrastructure, and ensuring continuous training for library staff are critical to further enhance digital preservation activities. By implementing users' suggestions, selected university libraries in Bangladesh can significantly improve the accessibility, quality, and usefulness of their digital collections, better serving the academic community.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a comprehensive review of the existing literature on digital preservation, concentrating on practices, techniques, strategies, challenges, policies, funding, copyright issues, satisfaction levels, institutional repositories, manpower, and the quality of digital preservation content within university libraries. As libraries increasingly incorporate digital resources, the preservation of these materials has become essential for ensuring long-term access to valuable academic and cultural content. The literature review commences by defining digital preservation and examining both “born digital” materials and digitized analogue materials created specifically for preservation purposes. The chapter explores contemporary digital preservation practices and strategies, focusing on short-term, medium to long-term and alternative methods. Numerous studies underscore the significance of standards, investment strategies, and policy frameworks that facilitate effective digital preservation.

In addition to discussing preservation practices and strategies, this review examines the challenges encountered by institutions, including technical obsolescence, inadequate infrastructure, and funding limitations. By synthesizing the findings from this study, this chapter lays the groundwork for the current research. It assists in identifying knowledge gaps, contextualizing the digital preservation landscape in Bangladesh, and guiding the development of recommendations. The most notable studies related to digital preservation practices are listed in this chapter in chronological order.

2.2 Literature Review

A literature review is a useful tool for researchers to comprehend the present status of a certain field of study in order to spot and fill knowledge gaps (Arshed & Danson, 2015). In order to identify new issues and gaps in the field of study, a thorough evaluation of related literature has become a crucial component of any investigation. Additionally, it provides a foundation for the study's theoretical framework and results interpretation (Uddin, 1998). Every scientific research must include a literature review, which includes a thorough examination and synthesis of the body of knowledge already available on the subject of the investigation (Ebidor & Ikhida, 2024). A literature review is “an important

chapter in the thesis, where its purpose is to provide the background to and justification for the research undertaken” (Bruce, 1994: 218).

2.3 Conceptual Definition of Digital Preservation

According to Ahmad & Sharma (2020), digital preservation can be defined as “the conversion of analog information resources through the digitization process and also the inclusion of the born-digital resources available in the various digital file formats containing the various types of information.”

According to the American Library Association (ALA, 2018), “Digital preservation is also explained as a combination of policies, strategies, and actions to ensure that digital objects remain authentic and accessible to users and systems over a long period of time, regardless of the challenges of component and management failures.”

Noonan (2014) defined “digital preservation as the combination of policies, strategies, and actions to ensure access to and accurate rendering of authenticated reformatted and born-digital content over time regardless of the challenges of media failure and technological change.”

The Wikipedia (2014) defines “digital preservation as the series of managed activities necessary to ensure continued access to digital information for as long as necessary.”

McMilan et al. (2011) defined digital preservation as a means of preserving rare and/or fragile materials and minimizing their direct handling;

- Preservation of digital content with a license, such as journal articles;
- Preservation of locally produced digital content, usually from archives or special collections;
- Preservation of digitally born content, including official documents.

According to Russell (2009), “Digital preservation is a process by which digital data is preserved in digital form in order to ensure the usability, durability, and intellectual integrity of the information contained therein. A more precise definition is the storage, maintenance, and accessibility of digital objects over the long term, usually as a consequence of applying one or more strategies. These strategies may include technology preservation, technology emulation, or data migration.”

Digital preservation encompasses all the actions, procedures, plans, and regulations that are implemented to guarantee that digital material is continuously preserved for as long as it is required and beyond the scope of technical advancements (Fabunmi et al., 2009).

According to Meitei & Devi (2009), "a digital preservation is a digital archive of an institution's or organizations intellectual production. It allows people all around the world to access the organization's high caliber and range of scholarships through the internet."

Kirchhoff (2008) defines digital preservation as "a set of management guidelines and procedures required to guarantee content's long-term accessibility, discoverability, authenticity, and usability."

The Digital Preservation Coalition (2006) defines digital preservation as "all activities that are required to maintain access to digital materials beyond the limits of media failure or technological change. Those materials may be digital records created during the day-to-day business of an organization, i.e., "born-digital" materials created for a specific purpose (e.g., teaching resources) or the products of digitization projects".

According to Jantz & Giarlo (2005), "digital preservation is the controlled activities required for the long-term upkeep of a byte stream (including metadata) sufficient to recreate an appropriate facsimile of the original document and for the document's contents to remain accessible over time and through evolving technological capabilities."

The phrase "digital preservation" describes the preservation of both digitally developed materials and original digital resources, also referred to as "born digital" or "electronic record," which will never be available in print or analog format, and the development of digital substitutes for analog materials using imaging technologies for access and preservation (Hedstrom & Montgomery, 1998).

The Encyclopedia of Information Technology defines the term digital preservation as "the process of maintaining, in a condition suitable for use, materials produced in digital formats. Problems of physical preservation are compounded by the obsolescence of computer equipment, software, and storage media. It also refers to the practice of digitizing materials originally produced in non-digital formats (print, films, etc.) to prevent permanent loss due to deterioration of the physical medium."

According to Harrod's Librarians Glossary and Reference Book, "digital preservation is the method of keeping digital materials 'alive' so that they remain usable as technological advances render original hardware and software specifications obsolete."

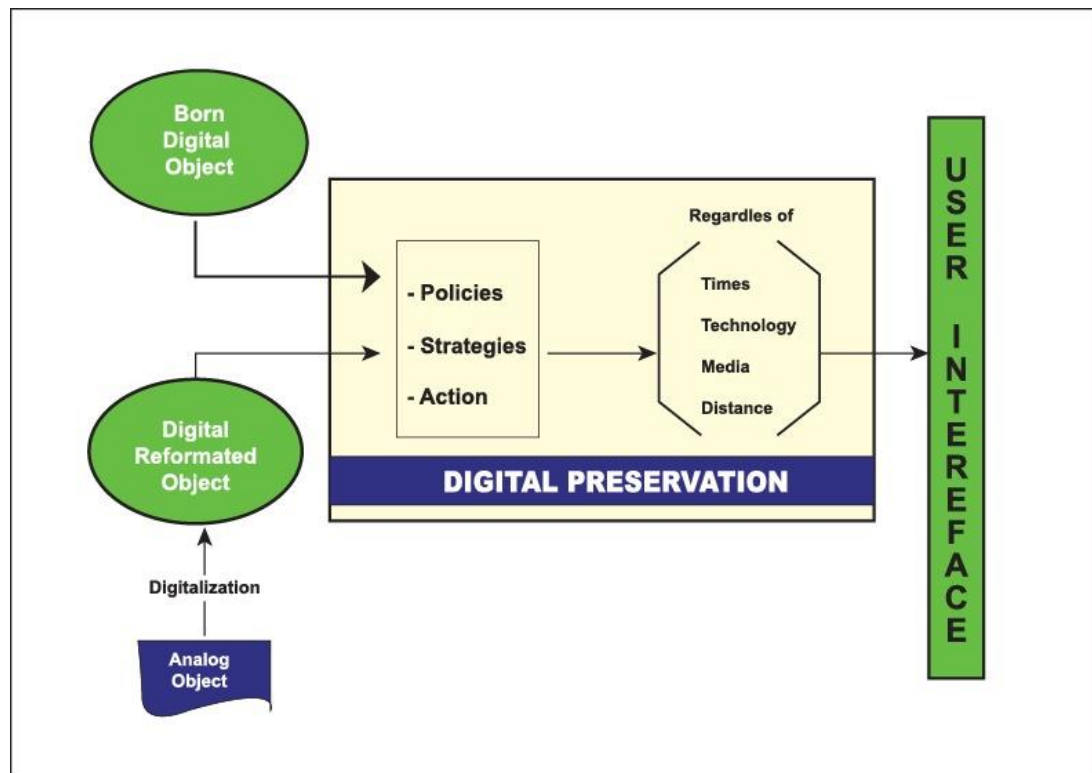


Figure-2.1: Overview of Digital Preservation

2.4 Digital Preservation Practices

2025

Nuraini (2025) conducted a study on assessing ancient manuscript conservation practices: a case study on local content preservation at the North Sumatra State Museum. The purpose of this study was to preserve the local content collections by investigating the old manuscripts using a qualitative technique and descriptive approach. Findings of the study revealed that conservation measures include applying lemongrass oil, preserving in shaded regions to reduce the danger of damage, and fumigating in order to get rid of pests and fungi. The study also showed that paper napkins and gel-based chemicals are used for additional protection, and that staff members are trained by professionals. The study concluded by identifying a few challenges, including a lack of proper tools and equipment, a shortage of skilled staff, a lack of funds, a lack of a set preservation timetable, and a lack of space.

2024

Abubakar et al. (2024) looked into the attitude of library staff towards the preservation practices of university libraries in Niger State, Nigeria. Enumeration methods were used, and data were collected by structured questionnaires for the study. The results of the study showed that library staff attitudes had a big impact on how well information resources were preserved in the libraries. Library staff attitude indicators: positive attitude ($\beta = 0.222$, $t(312) = 3.535$, $p < 0.05$) and negative attitude ($\beta = 0.094$, $t(312) = 1.516$, $p < 0.05$) effectively and significantly impacted information resource preservation practices. The findings of the study indicated that preservation practices in university libraries are impacted by the attitudes of library staff. Lastly, the study recommended that in order to foster favorable attitudes about the preservation of information resources, the administration of Niger State's university libraries should raise awareness through librarian training.

Ogunbodede & Onah (2024) carried out a study on the assessment of modern preservation practices at the library in order to assess the current preservation practices at the Federal University Otuoke Library, pinpoint implementation challenges, and make suggestions for improvement. The study used a qualitative research methodology, and data were gathered by interviewing five librarians from the electronic library about the pertinent questions of the study. Because of its tiny size, sampling was not necessary because the study included the entire population. The gathered data was analyzed using content analysis, and the findings were summarized into a comprehensive study report. The results of the study showed that although attempts have been made to create an institutional repository, the library currently uses its website as a preservation tool. Nevertheless, the institutional repository and other cutting-edge preservation methods present challenges for the library because of its limited funding and absence of administrative support. The study concludes by emphasizing how crucial it is to successfully handle financial limitations and secure administrative support in order to implement contemporary preservation techniques.

Jenifar et al. (2024) conducted a study on digital preservation methods for cultural heritage sites in India. The study highlights the main prospects and difficulties by comparing digital preservation projects in India and beyond. The study also looked at how stakeholder cooperation, government policies, and technological developments affect the uptake and effectiveness of digital preservation initiatives. The findings of this study advance knowledge of digital preservation techniques adapted to the particular

circumstances of Indian cultural heritage sites. In the end, this study recommends the inclusion of cutting-edge digital preservation techniques as essential parts of India's heritage conservation initiatives, guaranteeing the country's rich cultural legacy is continuously preserved and promoted for upcoming generations.

Akinola et al. (2024) investigated the digitization of theses and dissertations in three particular academic libraries in Oyo State, Nigeria. They stated that the archiving (long-term preservation) of undergraduate and graduate students' intellectual work in universities depends on the digital preservation of theses and dissertations (TDs). The study employed a descriptive survey research design. The questionnaire was the instrument employed to collect the data. 78 professional and paraprofessional librarians from the three Oyo State university libraries that were selected for the study participated. The study showed that university libraries are still in the early stages of developing their digital preservation systems for theses and dissertations. Furthermore, the study discovered that most participants strongly believed that influencing the organization's online ranking was the primary goal of TDs digital preservation. One popular digital archiving technique in university libraries was web archiving. Insufficient funding, a lack of policy, and a weak ICT infrastructure were found to be the main challenges to the successful digital preservation of theses in libraries. In conclusion, the study recommended that university library administration should be more dedicated to providing sufficient resources to fulfill the financial commitments of digital preservation initiatives.

In order to safeguard digital data throughout time, Bhat & Hasan (2024) looked at some of the basic components of digital preservation systems, including procedures, practices, and tools. This study highlighted the importance of digitally born documents by examining the principles, challenges, and solutions associated with digital preservation. This study also examined the planning and management strategies, practices, and guidelines for digital preservation. Additionally, this study provides some insights on addressing the difficulties associated with digital preservation in the context of a digital library system.

Abdullahi et al. (2024) carried out a study on digital preservation practices in academic libraries in the wake of the digital uprising. They stated that preservation of digital resources in educational institutions is essential due to the proliferation of digital resources and the reality of digital insurgency. The significant research gap highlights the importance of rigorously examining digital preservation strategies in Nigerian university

libraries. The study found that understanding the degree of digital materials' preservation in various circumstances is necessary to guarantee its availability to future generations.

Hamzat et al. (2024) looked on the conservation and preservation techniques employed in South-West Nigerian polytechnics for the management of academic board records. The study used the triangulation method for data collection. The findings of the study demonstrated that the most widely used preservation methods were photocopying, binding, and pesticide application. The protection and preservation of academic board records was the most available preservation practice to allow the free flow of air, where staff training was not available in sufficient quantity. The leading limitations were the unreasonable attitude of the staff in charge, insufficient funds, and inadequate infrastructure. Lastly, the study indicated that the administration of academic board records in polytechnics in southwest Nigeria requires the use of conservation and preservation techniques. Modern preservation techniques must be used in order to manage academic board records effectively and efficiently.

Malekani & Wema (2024) intended to assess ways of preserving information resources for current and future use by librarians of various libraries in Tanzania. The study collected data from 25 librarians from different libraries in Tanzania through focus group discussions. The results of the study reveal that the major formats available in libraries include print media, e-resources, miniatures, manuscripts and artworks. The activities carried out in the libraries associated with preservation include refresh, migration, digitization, proper shelving, collection testing, user orientation, photocopying, retrieval, data backup, environment control, binding, and monitoring of collections through CCTV. However, the challenges faced during conservation activities include poor efficiency of proper conservation activities among librarians, harsh environmental conditions such as high temperatures, and lack of written policies and guidelines on conservation of library resources. The study suggested that preservation activities were actually carried out in libraries, although the extent to which librarians undertook preservation activities differed from the nature of the library. The study also recommended the formulation of policies and guidelines on preservation activities for the conduct of preservation activities.

Mehla & Joshi (2024) highlighted the crucial role libraries play in safeguarding cultural heritage and valuable resources, ensuring they remain a lasting legacy for future generations. A well-structured questionnaire was developed and distributed to these libraries. The results of the study showed that there was no written policy in the selected

university libraries. The study also revealed that the majority of libraries primarily employ digitization, cleaning, and stain removal processes to protect the print items. The study found a number of challenges, such as a national or state-level policy, a lack of skilled personnel, and users' ignorance.

Owate & David-West (2024) looked into the digital preservation and curation of content created by Artificial Intelligence (AI) for university libraries to support long-term operations. According to the study, university libraries encounter a number of challenges in preserving and curating content generated by academic libraries, including legal and intellectual property concerns, ethical and bias concerns pertaining to fairness, accountability, and transparency, data privacy and security, and more. The study made the following recommendations: the government, working with university administration, should provide the infrastructure and facilities that are required, as well as renovate and modernize those that already exist, to make it possible to preserve and curate AI-generated content for academic libraries ongoing use as digital libraries.

Rao et al. (2024) stated that the digital era has completely changed how information is shared, which has driven businesses to look into new ways to share and preserve knowledge. They focused on the digital preservation initiatives of Andhra University and highlighted the digitization efforts of 10,034 electronic theses and 1,170 rare manuscripts contributed to Shodhganga, which is the reservoir of Indian theses. The study revealed that the highest number of 935 theses was contributed by the Department of Commerce and Management Studies, and the highest number of 4192 theses was contributed by the College of Arts and Commerce. The study also revealed that the largest number of palm leaf manuscripts, with 814, were in the Sanskrit language, and the Kavya subject occupied the highest number of palm leaf manuscripts, with 147. The study concluded that by digitizing rare manuscripts and electronic theses, the university provides accessibility for scholars around the world and ensures their longevity.

Ga'anda et al. (2024) investigated the awareness and preparedness of librarian's digital preservation practices at Gombe State University libraries, particularly the Federal University of Kashere library and Gombe State University library. Using the survey research method, quantitative research methodology was used for the objectives of this study. The study population consists of all 122 librarians from the university libraries under investigation. For this study, data collection was done using a structured questionnaire. The results of the study indicate that most librarians are knowledgeable about digital preservation practices. The study also revealed that, the libraries lack the

necessary infrastructure to preserve electronic information resources digitally. The study concluded that digital preservation is an important issue that should be given careful thought without hesitation because it is here to stay. The study also provided recommendations.

2023

According to Khan (2023), the Museum Library of Bhopal needs to digitize and digitally preserve its rare collections in order to conserve them and make them available to the public and academic community. The study revealed that the majority of manuscripts, rare books, and heritage collections were in high demand in libraries. As a result, it is recommended that these libraries digitize their most desired materials first. It is advised that online access be obtained for free or at a very low cost, as the majority of respondents supported open access via the internet for the usage of digital material. The study concluded that digitization will aid in the preservation of resources as well as the retrieval of rare collections, heritage collections, manuscripts, and other materials.

Khan & Shrivastava (2023) examined critical reductions in security practices, the presence of preservation strategies, staffing capabilities, and preservation boundaries in 9 selected libraries. Data were collected for the study through surveys, personal perceptions, and text searches. The study found that a portion of the selected libraries had a security strategy in place and some did not. The study concluded that the absence of resources and the absence of preservation techniques were significant impediments to proper protection exercises in libraries.

Rathnabahu (2023) examined the important preservation and conservation (PAC) efforts of library materials from the colonial era (1505 to 1948), the post-independence era (1948 to date), and the ancient period (3rd century BC to 5th century AD) in order to identify PAC gaps and issues in relation to Sri Lanka's current PAC practice. The study identified a gap between literature and existing literature, with only palm leaves being identified as a major library material for preservation and conservation. The study identified the primary issues as the lack of funding, policies, laws and regulations, training, and field-related research. Lastly, the study made clear that a distinct PAC unit was needed to manage the country's library material preservation efforts.

The security and preservation of information resources in Imo State University libraries were investigated by Akanwa et al. (2023). The study design chosen was a survey. To guide the study, three research questions and three hypotheses were developed.

professional and paraprofessional employees of university libraries in Imo State were the study's population. The study questions were analyzed using the mean and standard deviation, and the t-test of significance at the 0.05 alpha level was employed to assess all of the hypotheses. The findings of the study showed that information resources in the libraries are highly vulnerable to security threats and that this vulnerability is substantial; that the libraries' information resources are frequently preserved through the use of preservation techniques; and that the libraries' information resources are subject to a wide range of security threats, such as theft, vandalism, mutilation, natural disasters, cybercrimes, virus/worm attacks, web hacking, and more. The researchers consequently suggested, among other things, that librarians participate in programs for training, retraining, and instruction on how to use contemporary technology to reduce security risks and preserve information resources.

Tyagi (2023) examined the state of conservation and preservation of the local manuscript history at the Jain Vishva Bharati Institute (Deemed University) Central Library in Rajasthan, India. To collect information about the manuscript collections and the preservation and conservation methods currently in use, 9 staff members from the manuscripts section participated in a structured interview. The results of the study showed that in accordance with the National Mission for Manuscripts' standard operating standards, the preservation and conservation methods employed in the library were generally considered satisfactory. Additionally, the study helped to clarify the nature of manuscript collection as well as the preservation methods used for manuscripts.

Rafiq (2023) conducted a thorough literature analysis to examine the trends in digital preservation with regard to internal versus external processes. Several databases and indexing and abstracting services were consulted in order to find the relevant studies. The meta-analysis of the final studies confirms that when it comes to the preservation of their digital objects and collections, libraries, archives, and other cultural and memory organizations around the world strongly prefer internal efforts over those carried out by outside parties. The findings of the study support global management (in-house or outsourced) approaches to digital preservation by offering a comprehensive picture of how digital assets are kept safe in memory institutions around the globe.

Ahmad (2023) conducted research to evaluate the digital preservation practices for information resources at Pakistani university libraries. Findings of the research showed that these libraries generally and gradually implemented general digital preservation practices such as scanning digital collections for viruses, storing digital media in secure

locations that are resistant to fire, water, and theft, limiting unauthorized access, preserving optimal humidity and temperature, and testing the digital media's functionality. Out of all the technical practices, these libraries only ever used replication on a progressive basis. Metadata recording and media refreshing were the next in line. The study adds a full set of digital preservation practices that are categorized into general and technical types. Additionally, findings of the study highlight the necessity of institutional and national policies, financing sources, and skill development programs for library employees.

Oluwabunmi (2023) investigated preservation practices in public university libraries in South-West Nigeria. The findings of the study showed that libraries adopted minimal preservation practices, such as regular building maintenance and disaster control management implementation, more so than optimal preservation practices. Middling preservation practices included proper shelving, regular cleaning, and so on. Furthermore, the results showed that the majority of public university libraries in South-West Nigeria did not implement bulk de-acidification, which was recognized under ideal preservation practices. The results also showed that the lack of effective preservation procedures, insufficient skilled preservation administrators, and other factors were impeding the implementation of effective preservation practices, although the absence of partnerships with other institutions was not one of the impediments. The study suggested that, in keeping with their goal of expanding knowledge through teaching and research at these libraries, library management should give the required assistance to enhance preservation practices.

Pandya & Gohil (2023) examined the current preservation practices used by the university libraries. The analysis provides a critical description of the tactics used to put preservation approaches into effect as well as the reasons why old and rare materials deteriorate. The study revealed that pest control and the digitization of rare materials are two popular restoration techniques used by the majority of university libraries. According to the literature review, the study identified a primary research gap and area of investigation: the lack of efforts to examine the use of digitization and other restoration techniques in university libraries. The study mentioned that preservation practices vary from case to case. Lastly, the study suggested that this research will assist academics who work with preservationists in determining the elements of conservation and preservation practices at Indian university libraries, particularly with regard to rare vernacular literature.

2022

Mobufo et al. (2022) examined the preservation practice for information resources in seven public university libraries in Tanzania. The study found that disaster preparation plans, binding, digitization, and migration were highly cited techniques for good information resource preservation. The results showed that different preservation strategies are used by public university libraries for both print and digital information resources. Additionally, the study suggests that librarians should be trained in techniques that can be used to preserve information resources through the use of contemporary technology by policymakers and the Ministry of Education, Science, and Technology.

Islam et al. (2022) provided a model plan for creating an efficient digital maintenance system in university library premises using institutional repository software. This study examined digital maintenance practices for the long-term growth of academic outputs and digital publications from Bangladeshi universities. After looking into the university and its website, the researchers discovered that 89% of university libraries were either unfamiliar with the system or less reluctant to implement it, while just 11% of university libraries were actively involved in maintaining their digital resources. Researchers found that most university libraries were far behind in implementing a repository system for protecting their intellectual outputs since there were insufficient standards and an ideal model plan. As a result, this study provided a model plan that the university libraries in Bangladesh could use to quickly and efficiently set up a sustainable preservation system. The model plan of this study was developed by observation and a review of the relevant literature in the field. The aforementioned model plan is applicable to all university authorities for the sustainable preservation of their digital intellectual assets.

In an attempt to preserve significant data and information in archives, Zahara (2022) carried out a study to disseminate knowledge regarding the preservation of digital archives. This implies the preservation or maintenance of archives in digital format. According to the study, preservation is the process of keeping archives of media and content preserved so they can last longer.

Akintonde & Awujoola (2022) investigated the digital preservation practices and ICT skills of library employees in nine university libraries in southwest Nigeria. The study employed a descriptive survey approach, and 262 library employees from certain university libraries made up the study's population. A questionnaire was used as the data collection tool, and all staff members in the nine university libraries were included in the

sample. The results showed that digital preservation methods and computer abilities had a weakly significant positive connection ($n = 237$; $r = 0.288$, $p < 0.05$). The results also showed that digital preservation practices and computer control skills had a significant positive link ($n = 237$; $r = 0.364$, $p < 0.05$). Internet navigation abilities and digital preservation habits had a weakly significant positive connection ($n = 237$; $r = 0.255$, $p < 0.05$). Most respondents (3.29) indicated that the library regularly conducts general cleaning and dusting. Additionally, according to a significant majority of respondents (2.95), there is an integrated pest management system in place at the library. In order to make sure of the extended use of information resources in university libraries in South-West Nigeria, digital preservation techniques are important, and library staff members need to have sufficient skills.

Alghnimi & Chaudhry (2022) carried out a study on the status and practices of digitization in Kuwaiti academic libraries. They discovered that the majority of the present digitization projects concentrate on the digitization of academic publications, books, periodicals, dissertations and theses, photographs, and magazines. Additionally, they stated that they were only moderately satisfied with the digitization projects and that they thought it was very important to get the projects started. Finally, they noted that copyright issues, staff training, and funding were the main challenges for digitization projects.

2021

Sharma (2021) wanted to understand the digitization status and types of services offered to users in twenty-two heritage and modern libraries in the Jammu Province of India. The research results indicate that the majority of these libraries hold a distinctive collection of rare books and manuscripts that are significant historical records that should be preserved for upcoming generations. A few libraries have started digitization efforts in an effort to preserve the unique collection of materials. Lastly, the study suggested that in order to effectively serve users and safeguard knowledge for future generations, information scientists in the province of Jammu should always endeavor to advance the digitization process in libraries.

The conservation and preservation of information resources at some private university libraries in South-West Nigeria were investigated by Bashorun et al. (2021). Random sampling and survey research design were used in the study. The data was analyzed using frequency, mean, and standard deviation from semi-structured questionnaires using

the Statistical Package for Social Sciences (IBM-SPSS) version 20.0. The findings of the study showed that the biggest type of deterioration was a damaged book, followed by mutilation, vandalism, and brittle print library materials. Furthermore, the study found that several private university libraries have a poor and limited level of usage for digital preservation. The study came to the conclusion that while preservation and conservation methods are acknowledged in the chosen university libraries, there are a number of barriers preventing the proper application of digital preservation approaches. Formal training on the conservation and preservation of information resources for library employees was one of the suggestions made.

Islam & Islam (2021) provided an overview and analysis of the institutional publication preservation practices in Bangladeshi educational institutions libraries. Data were gathered from the IRs created at Bangladeshi university libraries. Findings of the study showed that DSpace was used by every responding university to manage its digital resources. According to the study, less than half (37%) are preserved by public universities, and more than half (63%) are preserved by private universities. The findings showed that the majority of the collection categories are either in PDF or JPEG format and include theses, research articles/works, reports, institutional journals, etc. The findings of the study will help university library workers comprehend the crucial concerns surrounding the permanence and practices of digital preservation. In order to establish IRS and offer long-term digital preservation for their institution's digital resources, librarians and information professionals in developing countries will benefit from the study.

Gautam (2021) concentrated on digital preservation practices employed by the Indian university libraries. The study finds that a number of technologies can be implemented to help achieve the goal of digital preservation, but the nature of the materials and the management environment must also be considered before implementing any digital preservation strategies. The study also discovered that documents preserved digitally are protected against loss, theft, and deterioration. It also provides an overview of technology techniques, tactics, and problems related to digital preservation for the Information Resource Center (IRC).

2020

Rahman & Islam (2020) conducted a study on building a model for digital content management in agricultural university libraries in Bangladesh. The goal of this study

was to develop a model for DCM in Bangladeshi agricultural university libraries. The model concentrated on identifying the resources and methods required for DCM, as well as the challenges and possibilities for DCM to enhance resource sharing across agricultural universities in Bangladesh. Surveys were used to gather information from 245 participants, who were teachers and pupils from seven public agricultural universities in Bangladesh in order to look into these concerns. The results of the study showed that there are a few obstacles to the implementation of DCM, including inconsistent power supply, bandwidth speed limitations, a deficiency of basic IT knowledge among some users, and a lack of digital resources, along with some recommendations for enhancing DCM in these libraries. The DCM model for agricultural university libraries in Bangladesh has been suggested and discussed based on the survey results and relevant literature.

Ahmad & Sharma (2020) stated that heritage materials must be digitized, preserved for future generations, and made available to a larger audience. They examined academic literature and conducted an analysis of it to determine how Indian institutions are using standards for digitization, access, and preservation in the digital process. The authors also investigated the feasibility of creating national guidelines for the retrieval of historical materials and sustained digital preservation across the nation.

Islam et al. (2020) investigated the overall digital preservation activities of some selected public university libraries in Bangladesh. They observed that Institutional Repositories (IRs) are utilized to preserve digital materials within public university libraries in Bangladesh. DSpace, which is an open-source software application, is employed to digitally preserve library resources. Additionally, the study noted several challenges to setting up IR software for open access digital preservation, and at the end of the study, they offered some suggestions.

Rahman (2020) emphasized the fundamental ideas of the digital library system and highlighted the functions and characteristics of institutional repositories and digital libraries. The study examined the main obstacles faced and the steps taken by Bangladesh's leading libraries to establish digital repositories for libraries. This study also emphasized the current state of consortiums and institutional repositories in Bangladesh's academic and special libraries. In conclusion, this study offers the necessary guidelines for Bangladeshi digital libraries and institutional repositories to be developed.

Pandey & Kumar (2020) examined the barriers to digital preservation and digitization of cultural heritage resources: a selective evaluation. The findings of the study showed that most digitization initiatives encounter challenges while trying to digitize and preserve historical and cultural objects. These challenges include a lack of technical infrastructure, inadequate finance, and a lack of national digital preservation policies. For librarians and project managers in charge of digitization, the results of the study will be extremely important for planning their projects.

Patra (2020) conducted a study on digital preservation in 21st century libraries: the implementation and usage and concentrated on the growing need among the library patrons for digital preservation and how to stay focused on accomplishing the same, the kind of path a librarian must take while overcoming all of the challenges that have been mentioned. The study examines the actions that must be taken to preserve digital content and shows how adding value to these actions might improve library services.

According to Hazarika (2020), digital preservation enables us to save and safeguard our information resources for use in the future. Additionally, he notes that digital preservation is crucial to the academic library's ability to safeguard and maintain its collection of information resources.

2019

Masenya & Ngulube (2019) conducted a study focused on digital preservation practices within academic libraries in South Africa. They reported that the lack of established standards, policies, and procedures; insufficient resources; and a shortage of expertise and training made it difficult for academic libraries to maintain and manage their digital resources. They also discovered challenges with insufficient funding and teamwork. In addition, they discovered that there was a risk of technical obsolescence due to inadequate technology infrastructure, rapidly evolving software and hardware, and legal issues.

Umana (2019) looked into the long-term digital preservation programs in institutional repositories (IRs) for digital resources in academic libraries in Namibia, such as the Namibia University of Science and Technology (NUST) and the University of Namibia (UNAM). The findings of the study demonstrated that the main preservation techniques used at NUST and UNAM are open file formats like PDF and short-term preservation techniques like routine backups, system/software upgrades, and maintenance. The study also found that employees had a serious lack of understanding of the idea of long-term

data preservation. Moreover, the study demonstrated that neither organization had given policies and guidelines enough consideration. The study further identified some challenges, including a lack of long-term preservation techniques, a lack of funding, a lack of IR policies to ensure long-term preservation, and a lack of training and expertise. The study suggests that information professionals should receive thorough training and instruction in long-term digital preservation. It also suggests that the two institutions create comprehensive information retention policies and investigate a range of long-term digital preservation strategies in order to guarantee future access to digital content stored in information repositories.

2018

Rahman (2018) investigated the DRM practices that are currently in use in Bangladeshi university libraries. More specifically, the study aimed to determine the current DRM preservation scenario, identify the DRM-related issues that archivists face in order to preserve material for a long time, identify the technologies and tools required for DRM, and investigate potential solutions to the challenges already faced. Data were gathered by survey methods with an organized questionnaire for the study. The results of the study showed that there are some obstacles to implementing DRM, including a lack of reliable preservation software, a scarcity of qualified IT staff, an inadequate budget, a shortage of digital records, and inadequate training for library staff. The study additionally offered some useful recommendations, such as the need for adequate funding, infrastructure development, hiring IT-knowledgeable staff, the ease of the Intellectual Property Act, the willingness of the authorities to adopt DRM, and frequent training of library staff to advance digital humanities in Bangladeshi university libraries.

Rahman (2018) outlined the current state of ETDs in Bangladesh, examined the shortcomings in their preservation, evaluated their needs and possibilities for future expansion, and identified issues that impede the smooth development of ETD environments. The study found that the majority of university libraries, both private and public/government, did not comply with the requirements for the electronic preservation of theses and dissertations. There are notable gaps in the production of electronic material because of inadequate research and field-based educational experiences. Open-source library software is used for managing existing ETDs, but there are no minimum standards or policies in practice. In most cases, content is maintained on IR-hosting ETD platforms, with DSpace serving as the primary software. Significant steps have been

made to improve the environment for both the creation and preservation of intellectual property for the nation's future scholars by both the public and private universities. The study highlighted a number of constraints on Bangladesh's ETD environment's growth, especially those pertaining to employment, infrastructure, and technology. Lastly, the study offers the recommendations that are required to make the situation better.

A study conducted by Anyaoku et al. (2018) found that most universities that responded offered long-term digital preservation through their Institutional Repository (IR). Remarkably, most institutional repositories have created policies for digital preservation that serve as guidelines for digital preservation of their contents. Lastly, the majority of respondents said that they needed the technical people with the necessary skills to handle and manage the institutional repository as well as long-term funding.

Tripathi (2018) explores the idea of digital preservation and talks about a number of problems with long-term preservation in digital format. The study makes an effort to investigate the various facets of preservation, particularly as they relate to digital objects—whether they are carried or digitalized. The results of the study showed that a number of approaches have been put out to address the problem of an object's long-term preservation, which may be utilized to formulate an organization's long-term preservation policy.

2017

Mahmood & Khan (2017) conducted a study on the digital preservation of rare manuscripts in Khuda Bakhsh Oriental Public Library, Patna. They talked about the significance of the digital preservation of manuscripts, as well as the initiatives that have been made in this area and the needs for preservation. They also covered the preservation of knowledge in various formats. The study focuses on the collection and investigates the processes utilized in the digital preservation of manuscripts at the Patna-based Khuda Bakhsh Oriental Public Library. The study also covers the benefits of keeping manuscripts in digital format. The study recommended that in order to meet the needs of digital preservation of manuscripts, staff members should receive more specialized education and training. The study also suggested that the library implement new ICT-related tools and techniques.

Osunrinde & Adetuna (2017) studied the preservation and conservation practices across all staff categories in academic libraries in Southwest Nigeria. They found that library security is the most widely utilized metric for preservation and conservation procedures.

The main factors endangering conservation of library resources are dust and particulate matter. They discovered that dusting, cleaning, and appropriate shelving are the most often used preservation procedures used by libraries. For the preservation of digital resources, they advised using technologically enabled preservation strategies.

2016

Kari & Baro (2016) conducted a study on digital preservation practices in university libraries: a survey of institutional repository in Nigeria. According to the study, half of the Institutional Repositories (IRs) in Nigeria transfer information, and the majority of IRs utilize DSpace software to manage their digital contents. The study also showed that long-term digital preservation is offered by the majority of responding universities. Unfortunately, the majority of IRs does not have a digital preservation policy that would direct the process of preserving digital assets digitally. The study also revealed that most respondents said they do not have long-term funding and technical people with the requisite expertise to manage and control the institutional repository. The research findings will be useful to information workers, especially librarians in developing countries who intend to establish institutional repositories and offer electronic resources in their institutions for long-term digital preservation.

According to Seo (2016), academic library digital preservation specialists virtually all have the same opinion about fundamental guidelines and regulations. The study also discovered that the most common barriers to preservation are a lack of funding and a lack of willingness; the majority of librarians want to be trained and educated in the establishment of preservation planning and policy; and that securing authenticity and integrity is an important function of digital preservation. Policy and expertise are the most important key components for digital preservation. The majority of librarians believe that academic libraries do not have adequate digital preservation. As a result, academic libraries must create pertinent business processes and policies for digital preservation in addition to strengthening their digital preservation capabilities.

Bakhshi (2016) examined the collection and the preservation strategies used by the Indira Gandhi National Centre for the Arts (IGNCA), particularly the digital preservation of its cultural heritage resources. The study's findings revealed that IGNCA has a vast collection of cultural heritage resources, including digital photos, motion picture films, LP records, audio spools, audio and video tapes, microfilms, microfiches, manuscripts, digital photos, and digital audio and video files. A significant portion of the collection

has been digitally preserved and made accessible by the center. Additionally, a digital library called KALASAMPADA is created with historical materials that may be accessed online. This study is the first of its kind in its sector and looks at the digitization and digital preservation methods of a leading Indian institute for the arts and cultural heritage.

2015

Ilo (2015) investigated the barriers to using ICT in academic libraries for the collection, preservation, and accessibility of indigenous knowledge. These barriers include a lack of finance, inadequate ICT skills, and the attitudes of indigenous communities. The study suggested that librarians need to acquire ICT skills in order to be knowledgeable about best practices, work with donor agencies and multinational organizations to generate funds, and respect indigenous copyright issues.

2014

Thakare (2014) carried out a study on digital preservation: a library perspective. The study discussed the concept and practical use of digital preservation. The study concluded that with proper planning, resource allocation, and technological applications, the digital content can be preserved for future access.

Perry (2014) asserts that traditional preservation techniques are rapidly being replaced by digitization and digital preservation in libraries, archives, and other cultural heritage organizations. This study aims to clarify the concepts and identify some common issues related to the preservation procedures through a review of the recent literature. About various metadata standards, collaborative strategies, and preservation approaches are also discussed in this study.

Rouither (2014) stated that digital preservation and digitization are quickly taking over as the standard for library preservation. He also mentioned in the study that yet there is still much confusion about the meaning of preservation and how to use preserved materials. The study also discussed different preservation methods, techniques, and metadata schemas.

Qutab et al. (2014) carried out a study on conservation and preservation practices of intellectual heritage in Pakistan. The findings of the study provide a more comprehensive picture of the state of manuscripts and the management of their conservation and

preservation at the national level to ensure the continued existence of the nation's intellectual legacy. In some institutions, the condition of manuscripts and conservation procedures is acceptable. But in others, things are dire and immediate action is needed. The only conservation that was regularly done was preventive; curation and restoration were quite uncommon. However, even though none of the digitization techniques were satisfactory, it is still important that the process of digitization has begun. Ultimately, the study suggested that planning, benchmarking, appropriate training, and awareness are necessary.

2013

Akter (2013) stated that digital preservation is the current trend in all libraries and is recognized as an important part of managing information in digital format. Researcher also found that many libraries are faced with the challenge of preserving their library resources.

Rafiq & Ameen (2013) carried out research on digitization in university libraries of Pakistan. The goal of the research was to examine the current digitization techniques used by Pakistani university libraries. The research revealed that Pakistani university libraries were just beginning to implement digitization techniques. Libraries were digitizing at a rate of one-third. The top three priorities for digitization was to improve access, preserve, and enable web access. In terms of types of materials, theses and dissertations were determined to be the most important to digitize. The social sciences were the most targeted area for digitization, although there were differences in the selection criteria utilized for library materials. The findings of the research will be beneficial for university libraries, funding bodies, and the higher education commission of Pakistan, as well as other nations with similar social and economic conditions.

Nieze & James (2013) examined programs aimed at increasing the capacity of preservation techniques in Nigerian universities. Using a self-created questionnaire and the descriptive approach, the researcher chose four university libraries at random. Both librarians and non-librarians participated in the study as respondents. 120 copies of the questionnaire were distributed in total, but only 112 were collected and examined. The study found that capacity building for preservation is not offered in Nigerian universities. The study suggested frequent training and retraining to help all employees grow and to make any university stand out from the competition.

2008

Olatokun (2008) noted that although some libraries accept and apply digital preservation approaches, these techniques are still not being used successfully. The study also found that the main barrier to successful conservation and preservation initiatives in university libraries was the shortage of funds. The author was advised to enhance preservation and conservation procedures in libraries in accordance with the findings.

2.5 Digital Preservation Techniques**2024**

Hussain & Diwakar (2024) looked at the methods, challenges, and potential features of digital preservation in a library environment. Several preservation techniques are examined in the study, including collaboration, storage choices, information management, emulation, and migration. The study also examines the challenges that libraries face, such as a lack of expertise, financial constraints, ethical and legal issues, and technology obsolescence. Additionally, the study examines recent advancements and potential future directions, such as the use of block chain technology, artificial intelligence, online archiving, community-driven strategies, sustainable funding models, and training and education initiatives.

2020

Saka et al. (2020) looked into how accessibility to digital resources and preservation techniques affected the research output of lecturers and librarians at Federal University libraries in Northern Nigeria. The study is guided by three research questions and objectives, respectively, to capture the kinds of digital resources and preservation strategies employed, as well as access technologies that facilitated the use of digital resources for improved research output by librarians and lecturers. The findings of the study indicated that top on the list for digital resources, preservation techniques, and access tools are e-journal articles, digitization, and library catalogues used in the research output of academic staff in federal university libraries in Northern Nigeria. The study concluded that digitalization is the contemporary approach to preserving paper-based items in libraries and that e-journal articles provide a forum for compiling recent research findings. The library catalogue facilitates easy access to information resources.

Yadav (2020) investigated the various conservation and preservation methods for both digital and conventional manuscripts found in selected libraries in New Delhi. With the exception of NAI, NMML, and CAL, the study discovered that the selected libraries are not totally adequate to manage the manuscript resources on their own. Preservation methods in the selected libraries are not very successful, and some of them don't even use techniques because of a shortage of funding and qualified staff.

2018

Makwae & Ogoti (2018) examine the different techniques employed in selected university libraries in Kenya to preserve and conserve library materials. The findings of the study revealed that even though the university libraries had preservation policies, the conservation and preservation methods they had implemented were not being used successfully. Additional findings revealed that while some libraries have adopted and implemented digital preservation techniques, they are still not effectively used. The study concluded with suggestions for improving conservation and preservation practices in libraries.

According to Shimray & Ramaiah (2018), digital preservation is the process of conserving uncommon and sensitive materials and artifacts by digitizing those utilizing devices like computers, electronic devices, smart phones, digital cameras, recorders, and digital displays. It is necessary to carefully analyze all considerations, including cost-benefit, while examining digital preservation strategies. Digital asset preservation can be achieved through a variety of methods, each with specific benefits and drawbacks. This study encompasses every method utilized in the sector for digital preservation.

2017

Sadiku et al. (2017) stated that the process of digital preservation involves developing practical strategies to guarantee the long-term preservation of digital resources. Digital preservation employs techniques and tools that guarantee the durability of digital content. Its primary goal is to guarantee the durability and utility of digital resources.

2016

Kavishe (2016) presented the findings of a study on the preservation strategies and methods used by the University of Kwazulu-Natal libraries to ensure the long-term availability and accessibility of Electronic Information Resources (EIR). Findings of the

study showed that respondents' ICT knowledge and proficiency with relation to the preservation of electronic information resources are at an intermediate level. The study also showed that the respondents require instruction in emulation, migration, and metadata procedures. The initiative provides helpful research data that can assist the participating university libraries in maintaining electronic information resources for the best possible user experience. From the findings of the study, other universities in related situations can also benefit.

2014

Kolle et al. (2014) stated that libraries are now considering digital or electronic resources that allow for quick, simple, and fast searches of a large amount of material due to the advancements in information and communication technology. They explain the notion of digital information resource preservation, the reasons behind it, and various methods that library professionals can use to keep digital information resources intact.

2.6 Digital Preservation Strategies

2025

Hudayu et al. (2025) examine strategies for preserving library materials while accounting for the constraints of limited human resources, tools, and time. The study used a descriptive qualitative approach through interviews, observation, and documentation. The findings of the study demonstrate that the library has implemented three main strategies: removing out-of-date library materials, gathering collection data, and practicing preserving conservation. This strategy aims to separate old collections from new collections, record the condition of library materials, and carry out physical maintenance to extend the useful life of the collections.

2024

Farouk (2024) carried out a study in Egypt on digital preservation strategies for North African cultural heritage. The objective of the study was to look into North Africa's digital preservation strategies for cultural assets. Findings of the study showed that effective policy frameworks addressing copyright and intellectual property issues, robust technological infrastructure, collaborative efforts between stakeholders, the development of local professionals' skills in metadata management and digital curation, and public engagement through cultural education and virtual exhibitions are all important

components of digital preservation strategies for cultural heritage in North Africa. The study additionally suggested the establishment of thorough rules for digital preservation that cover a wide range of cultural heritage resources such as visual arts, oral histories, archaeological artifacts, and manuscripts. Encourage the creation of comprehensive national and regional digital preservation policies that are backed by long-term financial sources and public-private collaborations.

Obande et al. (2024) stated that libraries and archives utilize a range of strategies and instruments to guarantee the durability and accessibility of digital content. To protect digital resources from technological obsolescence, these organizations use digital preservation strategies like migration, emulation, and normalization. The authors also noted that in order to efficiently organize and retrieve digital content, these institutions use strong metadata standards and digital asset management systems. Libraries and archives may fulfill their vital role in protecting and giving future generation's access to digital content by implementing these strategies and technology.

Arif et al. (2024) looked into digital preservation and digitization strategies for theses and dissertations, using Quaid-I-Azam University in Pakistan as a case study. The goal of this study was to provide an overview of the steps, guidelines, and techniques utilized in the Quaid-I-Azam University of Pakistan's Central Library to digitize and preserve the collection of theses and dissertations (TDs). The study's findings provide a brief overview of the economical approach that made use of internal knowledge to preserve TDs digitally. As a result, a knowledge repository was created and currently serves as host to a significant collection of about 25,857 electronic theses and dissertations that have been made available online since August 2023. This project scanned over 15,000 print TDs, totaling approximately 1,399,244 pages, and digitally preserved about 9,387 TDs on CDs/DVDs. The results indicated major obstacles to the project's successful completion, such as administrative, financial, technological, and copyright concerns.

Singh (2024) investigates the various strategies, tools, and best practices for digital preservation. This comprehensive study attempts to offer insights into the changing field of digital preservation and its vital role in preserving our collective memory, covering everything from the principles of data integrity to sophisticated emulation techniques. This study provides guidance for both researchers and practitioners, providing light on the complex aspects of digital preservation by exploring issues including metadata management, migration, emulation, and the Open Archival Information System (OAIS) reference model. This study highlights the necessity for continued innovation and

collaboration to address the complex issues of preserving digital content for future generations through an analysis of current research and industry practices.

According to Pasqui (2024), public institutions and foundations dedicated to the curation and preservation of cultural heritage have been developing methods, strategies, and procedures for the long-term digital preservation of digital resources for more than 20 years. The study revealed that more awareness is needed at the institutional levels of policy and decision-making in order to develop strategies for digital preservation and to initiate services that ensure the long-term access and reuse of digital contents and data. In conclusion, this study recommended that “digital preservation by design” be promoted as a new fundamental guideline that should be implemented from the very beginning of every endeavor and project in the contexts of academic, scientific, and cultural heritage.

Pasqui (2024) examined a few new themes and developments that reflect the dynamic nature of the field of digital preservation. He said that for current digital preservation services, dynamically created digital content and open science to meet the ability, accessibility, compatibility, and reuse of digital materials are posing new obstacles. To ensure that digital resources and data are used for a long time, digital curation and preservation are closely related and happen simultaneously. The study concluded by recommending the promotion of "digital preservation by design" as a new fundamental concept to be followed from the initial stages of every project and initiative in the contexts of academic, scientific, and cultural heritage.

Musisi & Mutwiri (2024) evaluated the digital preservation strategies implemented for the institutional repository of the Kaimosi Friends University College. A descriptive research design was employed for this study. Data was collected by structured questionnaires and interviews. According to the study's findings, information migration (51.2%), technology preservation (60.5%), and backup (60.5%) were the most common digital preservation techniques used in the institutional repository. The study concludes by recommending Kaimosi Friends University College to continue using the most popular digital preservation techniques, including data transfer, backup, and technology preservation.

2023

Alhaji et al. (2023) focused on investigating a number of digital preservation techniques used by university libraries to offer long-term access to content at the Federal University Library Gashua in Yobe State, Nigeria. A descriptive survey research design was used in

the study. The study comprised 24 librarians from the Federal University library in Gashua as respondents. Two trained research assistants helped collect the data, and the instruments were administered and collected in two weeks. The study's findings demonstrated the many methods used in the Federal University Library Gashua's preservation plans, obstacles, and actions for digital information resources. The study's conclusions provide insight on several crucial facets of digital preservation in this context for effective service delivery. The study's suggested conclusions include the following: Because of new technology, library staff should be knowledgeable about managing and preserving digital materials.

Through a series of workshops, cost assessments, and planning exercises, the preservation management team re-evaluated and re-imagined its work as Nadal & Engle (2023) described. This resulted in an innovative strategy to address urgent operational demands and adjust to agency priorities during strategic planning cycles, all the while advancing extensive preservation standards. The results of this study led to the development of new plans for the workforce and financial resources required to sustain a wide range of long-term alternatives for using the collections. The theory and strategy used in this study to address the organizational and financial sustainability of a large-scale preservation initiative are described in depth. The digital preservation strategy is the foundational platform for the digital preservation policy and procedure. An appropriately considered documentation method for the preservation of digital materials is called a digital preservation strategy. It is necessary to carefully consider their cost-benefit and metadata creation when making this choice.

2022

Ahmed (2022) carried out a study to evaluate the preparedness of libraries for digital preservation initiatives in terms of funding, technology, personnel, policies, and procedures. According to the study, there was a lower degree of preparedness for digital preservation policies and procedures ($M = 1.79$, $SD = 1.039$), training opportunities ($M = 1.98$, $SD = 0.944$), and skilled staff ($M = 2.07$, $SD = 1.110$). The only area in which libraries were well-prepared was the availability of funding for the purchase of technological infrastructure ($M = 2.59$, $SD = 1.364$). The study has practical consequences for university libraries and library administrators as well as theoretical implications for scholars.

Friday & Eze (2022) looked at the strategies for solving challenges in the digital preservation of ETDs in public university libraries in South-East Nigeria. The study employed a descriptive survey research design. There were 256 librarians in the study population, but only 68 librarians who worked with institutional or digital repositories were included. Data was gathered using a self-constructed questionnaire. The mean and standard deviation were used to analyze the gathered data. The study found that inadequate funding, inadequate ICT infrastructure, a lack of competent staff, a poor power supply, a lack of a staff development program, and a digital preservation policy were the major barriers in preserving e-theses and dissertations in those libraries. The study also found that although outsourcing ICT was not a solution to the problems, the following tactics worked well for keeping e-theses and dissertations in libraries: creating a policy for digital preservation, taking part in staff development and continuing education programs, setting up an institutional repository, signing contracts, working together, outsourcing money, evaluating organizational and community needs, and consulting experts. Eventually, the study discovered that the most effective ways to overcome the challenges of preserving e-theses and dissertations in libraries were to create a digital preservation policy, participate in staff development programs, establish an institutional repository, enter into agreements, pursue continuing education, collaborate, assess organizational needs, seek guidance from experts, and develop a digital preservation policy. In contrast, outsourcing ICT and funding and lobbying management for assistance were ineffective strategies. The study concluded that as university libraries are unable to achieve sustainable digital preservation efforts on their own, government and university administration should be more dedicated to promoting the cause of digital preservation in university libraries.

2020

Tsvuura (2020) looked at the regulatory and legal frameworks for state universities management of the digitization of their documents and archives. The study focused on the digitization of archives and records at two specially chosen state universities in Zimbabwe: Harare Institute of Technology (HIT) and Zimbabwe Open University (ZOU). The study was inspired by Zimbabwe's statutory and regulatory requirements, the state universities exponential increase in digital records and archiving, and the records personnel's incapacity to manage digital records and archives. The conclusion of the study demonstrated that both respondents and participants understood the roles that

records management plays in their respective institutions and that both state universities are actively creating rules and regulations for the digitalization of records and archives in their business transactions. The findings of the study also showed that untrained staff members were being used by the two state universities to digitize their archives and documents. Rules, regulations, guidelines, and protocols were not followed. This led to serious risks and threats to the authenticity, security, and integrity of the material. The study recommended the creation, implementation, and enforcement of legal and regulatory frameworks to facilitate the digitization of documents and archives at Zimbabwe's public universities.

Samiei (2020) described the digital preservation strategies that the International Internet Preservation Consortium (IIPC) has implemented. The findings of the study showed that 90.91 percent of digital libraries use procedures for permanent identifiers, information movement, refreshment, and backup supply. In addition to these tactics, 90.91 percent of the national libraries maintain preservation backup copies on mass storage devices and offer daily backups. The 100 percent community under investigation employs firewalls and antivirus software as well as regular updates to prevent malware from infiltrating their digital library system. 10 percent utilize the information verification mechanism to implement the mechanism to regular users' access to their libraries' digital resources, while the remaining 90 percent apply the verification and access control management mechanisms.

Mubofu (2020) made an effort to record how academic libraries maintain their information resources. The study proceeds by outlining the justification for information resource preservation in academic libraries following the introduction. A clear explanation of the policy, funding, skilled labor, infrastructure, and management support—among the factors to be taken into account while conserving information resources—was provided. The study suggests that universities offering library science degrees should consider requiring a course on preservation. This would ensure that all librarians have the necessary knowledge and skills to safeguard the library's information resources. The study also suggests that all libraries should implement contemporary preservation techniques in order to securely maintain the information resources for both the present and the coming generations.

2019

Nworie (2019) evaluated the digital material preservation strategies currently in place in South-East Nigerian university libraries using the UNESCO Digital Guidelines. The study found that university librarians don't seem to know about the UNESCO principles for digital preservation. Fortunately, they followed their preservation instincts and put preservation techniques into place for their digital materials that came very close to meeting the requirements. Moreover, there was no appreciable variation in the preservation strategies. The study makes the strong recommendation that South-East Nigerian university librarians use the UNESCO digital preservation principles as a working reference when it comes to safeguarding the digital resources preserved in their libraries.

The digital preservation strategies used by two particular university libraries in Jakarta and Bandung, Indonesia, are to be described by Rachman (2019). Results of the study show that in an attempt to save their digital collection and data, responding libraries have undertaken digital preservation initiatives. The study also suggests that a preservation policy be implemented in place of the current nonexistent government digital preservation policy.

2018

Magama (2018) investigated digital record preservation strategies in the Masvingo province of Zimbabwe. The study found that a lack of appropriate laws, standards, policy guidelines, funding, suitable infrastructure, and expertise was preventing government agencies in the province of Masvingo from ensuring the long-term preservation and protection of digital information. The study also offers a number of suggestions, such as creating rules and regulations for preservation, offering ongoing instruction, and allocating funds to help preserve digital information; the adoption of Trusted Digital Repositories (TDRs) that follow Open Archival Information System (OAIS) standards; and close collaboration between record-creating agencies, the National Archives of Zimbabwe (NAZ), information technology (IT) experts, and academic institutions in addressing digital preservation challenges. The study also stated that as a temporary measure for preserving digital information in the absence of infrastructure, the NAZ should take legal obligations into account when utilizing cloud computing.

2016

Moseti (2016) conducted the first study of its kind to examine the methods used by Kenyan universities to preserve their academic materials. Several case studies were developed utilizing the survey method. A convenient sample of 370 postgraduate students and 350 academic staff members from six Kenyan universities were given questionnaires to complete in order to gather the data. Data was gathered from the librarians at these universities through in-person interviews. The study discovered that although university scholars were actively involved in protecting their digital data, they did not utilize the institution's digital repositories, servers, or archives to the fullest extent. A lack of understanding of the significance of digital repositories for digital preservation was largely responsible for this. The study also shows that even with institutional repositories, there is still a lot of work to be done to raise awareness and acceptance of digital repositories and to include best practices for digital preservation into routine archive management tasks.

2014

According to Papreja & Jain (2014), digital information is vulnerable due to the quick changes that are always occurring in hardware and software. The difficulty lies in maintaining electronic data that is readable and usable in the event that the original software needed to interpret it is no longer available. Digital preservation strategies are generally determined by the needs and limitations of established repositories that are looking for ways and solutions that are both practical and accessible. In the future, research and development of digital preservation strategies and technologies must also take into account user expectations for more capable and adaptable tools for utilizing and analyzing saved digital resources.

Pal (2014) discussed various issues associated with digital preservation and different strategies of digital preservation. She mentions the different digital preservation strategies, such as migration, emulation, encapsulation, etc. Finally, she concluded that libraries should have strategic plans and policies for building technological infrastructure and identifying formats for easier migration of digital information.

2011

Gbaje (2011) said that a digital preservation strategy is a way to maintain long-term access to digital assets that have been stored. Furthermore, he emphasized the need for

strategy in controlling the risk carried on by the quick obsolescence of software and hardware.

2010

Das et al. (2010) emphasized the significance of digital preservation, the strategies and challenges involved, and the initiatives undertaken by the Viva-Bharati library to preserve its unique collections. They investigated the aspects, challenges, and processes of digitization as they relate to the preservation of intellectual and cultural heritage.

Luan (2010) mentioned that scientists and curators began developing long-term digital preservation techniques and systems in the 1990s in order to ensure the survival of digital data. This study gives an overview of the current primary preservation strategies. Finally, this study creates two processes that allow data to be manipulated and accessed throughout time. A few newly arising issues for preservation strategies are briefly discussed at the conclusion of the study.

2009

In view of the widespread adoption of open-source applications for information management systems and libraries in the current global digital information ecosystem, Meitei & Devi (2009) highlight the benefits and advantages of open source software in digital preservation. The study also touches on a few significant open-source software repository systems and digital preservation initiatives in India.

2.7 Digital Preservation Challenges

2024

Njuguna & Kimote (2024) explored the complex area of digital preservation, focusing on how the range of formats and sources required a basic modification in digital preservation techniques. The study is expected to provide a comprehensive understanding of the obstacles faced by digital preservation programs and explore useful tactics and resources to overcome these obstacles. By highlighting challenges and offering practical solutions for long-term preservation, this study advances the understanding of digital preservation.

2023

Agidi (2023) looks at the present condition of the Nigerian National Archives (NNA). The researchers' find that Nigeria's archival structures and records are currently in appalling condition and urgently need to be saved through digitization programs after closely examining archival materials in the National Archives of Ibadan (NAI) and National Archives Kaduna (NAK). The study examines a few advantages of digitizing Nigeria's historical records, such as durability, visibility, and ease of access. The study highlights several obstacles to digital transformation, such as inadequate financial resources, unstable electricity supply, and an enormous lack of digital frameworks. For technical and financial support, the study recommends collaborating with international organizations such as the United Nations for Educational, Scientific, and Cultural Organizations (UNESCO) and the International Council on Archives (ICA).

Gandotra (2023) conducted a study on the challenges of preservation in digital libraries. He emphasized that digital preservation is essential for ensuring the long-term accessibility and usability of digital collections. The study offers a summary of the difficulties in preserving digital content in digital libraries. These challenges include the constantly changing nature of technology and file formats, making sure digital content is authentic and intact, controlling the expenses and resources needed for preservation efforts, dealing with copyright and access control concerns, and developing long-term preservation plans that can change with the times. In order to preserve our digital legacy and make sure that valuable digital materials are accessible to future generations, we must overcome these challenges.

In their study, Verma & Sharma (2023) examined the idea of digital preservation, focusing on the challenges and best practices related to preserving digital materials in library environments. The study investigated the variety of technologies and tools used to preserve and conserve digital materials, as well as the significance of preserving digital collections to guarantee their availability for future generations. The study also emphasizes the value of partnerships and cooperation in the protection of digital cultural heritage and the role that libraries play in these areas. The conclusion of the study highlights how the sector is always changing and how libraries must continue to evolve in order to meet new problems and new technology. In general, the study helps scholars, librarians, and library professionals to understand the challenges and best practices associated with digital conservation and preservation in libraries.

The challenges Pakistani university libraries experienced in implementing preservation programs was examined by Ahmed et al. (2023). In order to measure the phenomenon, a questionnaire was created, pilot tested, and then distributed to 70 libraries affiliated with public universities and degree-awarding institutions. The study findings indicate that the primary obstacles impeding the adoption of digital preservation techniques in Pakistani university libraries are the absence of institutional/national policies, financial and technological resources, and administrative support. The results of this innovative study highlight the need for Pakistan to create a national policy for digital preservation. The findings highlight significant challenges to digital preservation and offer recommendations for developing knowledge-based systems that can satisfy library users' constant informational needs.

2022

Awamleh (2022) looked into the advantages, significance, needs, and challenges of digital preservation in academic libraries in Jordan. The study mentioned that there is an urgent need for librarians to acquire new skills connected to digital preservation as well as to raise knowledge of the current trends in the collaboration between academic libraries and research groups. The findings of the study indicate that Jordanian university libraries possess a limited awareness of the advantages and significance of digital preservation, along with the challenges and requirements of implementing this process. The study highlighted how crucial it is to raise awareness among academic libraries, particularly those in Jordan, of the numerous and significant advantages of digital reservation in order to preserve access to knowledge over the long term. The results of the study will give other academic libraries guidance on how to organize and create preservation procedures that will preserve access to library materials.

Nalluri (2022) discusses the overview of technology techniques and plans for digital preservation at the Information Resource Centre (IRC). The study also describes primary goals, procedures, and technological concerns related to digital material preservation. Lastly, the study presents the digital preservation project process. The goal of digital preservation can be facilitated by implementing a number of technologies, as the article finds. However, the management environment and the nature of the resources must also be considered before implementing digital preservation strategies. Additionally, it is discovered that digital document preservation protects documents from deterioration, theft, and loss.

2021

Shah et al. (2021) conducted a study to identify the challenges and suggest possible solutions for the preservation of electronic theses and dissertations (ETDs) at Bangladeshi public university libraries. The outcome of the study made clear that ETDs are promoting university dynamics. Common metadata format, standardized preservation and distribution policy, networked central database, ICT infrastructure, and sufficient skilled employees were some of the main challenges to the efficient creation of ETDs.

Shah et al. (2021) investigated the problems and difficulties associated with digital content preservation. During the digital preservation process, the most important problems and difficulties were identified as the nature of the contents, storing the data, maintaining trust in the data, handling the data flood, technological obsolescence, media fragility, inexperience, copyright and intellectual property rights issues, etc. According to the study findings, ICT resources should be available in libraries, archives, and information centers. Besides, staff members should be qualified to administer and preserve digital materials. Additionally, enough money should be allocated for the acquisition and preservation of digital objects.

Parmar & Rawat (2021) focused on the challenges associated with digital preservation and offered appropriate strategies to be used. They discovered that retrieving and preserving digital material presents significant hurdles due to legal, technological, ethical, and environmental factors. As a result, information technology professionals and librarians now have greater responsibilities. For a modern library, developing a well-organized digital preservation strategy is essential. Additionally, the study highlights the suggested approach for digital preservation strategy design.

2017

Sambo et al. (2017) look into the challenges with digital preservation in Nigerian libraries. The outcome of the study showed that even though librarians in Nigerian libraries are aware of digital preservation techniques, problems with digital preservation still exist. The study found several significant barriers to digital preservation, including outdated equipment and software, a lack of standards and backup, a lack of strategy and policy, a lack of funds, a slack attitude among librarians, and a lack of legal rights to preserve content. Among those who offered recommendations to preserve and protect those challenges related to digital preservation in libraries were the Nigerian Library Association (NLA), the Librarians Registration Council of Nigeria (LRCN), university

administration, and library stakeholders. These recommendations included establishing a uniform policy, giving librarians the training they need, negotiating with the government for more funding, and making sure the funding allocated to libraries is used efficiently to digitize library resources for future use.

San et al. (2017) look into how Malaysian copyright laws affect the digitization of collections in the academic libraries in this country. The study discusses the principles of copyright law that are directly related to digitization, the conditions under which digitization is exempt from copyright infringement, the potential for libraries to be held accountable for copyright infringement, and the options available to academic libraries for initiating digitization projects legally. The results of the study add to the amount of information now available about how university libraries may digitize their holdings while adhering to copyright regulations. There are two suggestions made. Academic libraries have the option to digitize items in order to meet the needs of individuals who are visually or hearing challenged. Secondly, in some circumstances, digitization might only proceed following the acquisition of a license or a copyright transfer from the copyright holder.

Vij (2017) noted that digital preservation poses a new challenge for libraries and archives as they work to preserve the legacy of materials in traditional formats. However, because of the vast volume of digital information generated, the strategies, methods, and technologies currently available for long-term preservation of digital information are not only not cost-effective, but they are also not always technically practical for large-scale preservation. In his study, he also discusses the types of information resources, the current state of digital preservation, and the needs of both users and caregivers, and makes suggestions, including constraints and recommendations, for the need for research in storage media, migration, transformation, and overall management strategies.

2016

Adu & Ngulube (2016) examined the current challenges of digital preservation in sub-Saharan Africa, focusing specifically on Ghana. The findings of the study are that the main risks to digital preservation include funding, privacy and security standards, skill development, and technology obsolescence. Lastly, the study suggests that ministries and agencies can meet many of the issues of digital preservation by implementing backup, updating, metadata, and migration procedures.

Hasan (2016) describes the methods and techniques the Aligarh Muslim University's Maulana Azad Central Library employs to preserve rare documents. He looks at the latest actions and plans this library has taken to protect its valuable manuscript collection for future generations. The utilization of the technology and software that are accessible for digitization is also covered by the author.

Jaswal (2016) provides a thorough analysis of the digitization process, its issues, challenges, and limitations by focusing on how Pakistan's environmental, political, and economic conditions, as well as man-made threats like terrorism, are threatening libraries and documentary heritage and putting them in danger of being lost. Talking about the operational and practical issues associated with digitization in a setting where archival digitization is not a usual practice. This study gives some practical recommendations for removing obstacles and bottlenecks. The study provides practical recommendations and numerous innovative suggestions for local librarians to preserve the unique materials and decaying archives kept in their libraries through cooperative and collaborative digitization initiatives. It is an excellent example for educating Pakistan's future digitizers.

2015

Ifijeh (2015) highlights the pressing need to address the declining condition of newspapers in Nigerian university libraries and discusses important preservation issues pertaining to newspapers. The study also looks at the binding preservation technique used by academic libraries and notes that it is insufficient. The study suggests that Nigerian academic libraries use the digitization technique to preserve newspapers. The study mentions several obstacles to digitization, including the digital divide, inadequate finance, insufficient technology infrastructure, lack of experience, and copyright restrictions. The study also offers suggestions.

Perrin et al. (2015) conducted a case study on digital preservation challenges with an ETD collection. They looked at possible problems that could occur years after the switch from a physical to an electronic collection and offered documentation solutions that can improve the efficacy of ETD healing and preservation.

Jimada & Aduku (2015) investigated the obstacles that prevent digital information resources from being successfully preserved in federal university libraries in Nigeria's North Western States. Purposive sampling and the qualitative research approach were employed for the study, and the tools used to gather data were observation and interview.

According to the study, the primary barriers to the effective preservation of digital information resources were a lack of a policy for digital preservation, a lack of power, unskilled professionals, technological obsolescence, a culture of poor maintenance, technophobia, deterioration of storage media, a lack of funding, technological advancements, and inadequate infrastructure. The study made the following recommendations: create a policy for digital preservation; supply backup generators and inverters; recruit appropriate personnel; imitate file formats; and replace storage media.

2014

According to Pandey et al. (2014), digitization is becoming a common practice in academic libraries and is a new trend in managing library materials, particularly historical ones. It is also a global phenomenon. They illustrate the methodology and processes of digitization as well as the justifications for digitization. They also highlighted the issues and challenges involved in the process of digitization.

2013

Mahamad (2013) evaluated the technological, organizational, and legal concerns for digital preservation. According to the research, libraries need modern hardware and software in terms of technology. For organizational issues, there are two major challenges faced by the libraries, which are staff and cost. Copyright is a significant legal concern for all libraries.

2012

Abdulkareem (2012) highlighted the ideas of digital preservation and digital conservation strategies required for the preservation of language manuscripts, with a focus on the challenges facing Nigeria's information and education systems and the digital preservation of manuscripts. Strategies like encapsulation, migration, restoration, and technology emulation were found to be feasible. Furthermore, the study explored the challenges facing the use of these and other strategies. Lastly, the study suggests strategies for resolving the challenges to efficient knowledge and data preservation.

Rahman & Islam (2012) tried to articulate present digital preservation practice in Bangladesh. They focused on the core concept of preserving information in the digital environment. They also identified major issues and challenges of digital preservation

practice in Bangladesh. They revealed that there is ample opportunity for future research for implementing digitization in Bangladesh.

2009

Das et al. (2009) conducted a study on digitization, strategies, and issues of digital preservation: an insight into the Visva-Bharati Library. The authors attempted to draw attention to the significance of digital preservation, its methods and problems, and the steps the Visva-Bharati Library has done to preserve its rare items.

2.8 Digital Preservation Policy

2024

Bhat et al. (2024) explored the preservation policies and methods used in three South Asian libraries: University of Kashmir, Islamic University of Science and Technology, and Central University of Kashmir. The study's objectives were to look into the preservation policies, plans, and divisions of a few chosen libraries; to find out what preservation techniques are currently being used there; to identify staff members who are in charge of maintaining library materials; and to find out which local, national, and international staff members attended capacity-building programs related to preservation. The study revealed that manuscripts are typically given priority for preservation; binding (sewing) and fumigation (solid fumigation) are commonly used techniques in preservation; and professionals are typically involved in handling preservation. Nevertheless, none of the libraries have preservation policies, which are essential for the methodical and scientific preservation of the library's collection. Libraries frequently host conferences and seminars on preservation to address the ever-changing landscape of information management and preservation. It is intended that stakeholders will continue to find gaps in the system and increase preservation capability.

2023

Rafiq (2023) pointed out that having policies in place is crucial to the execution of programs for digital preservation. The study gives a clear overview of how equipped libraries and other organizations are globally in terms of having policies in place for digital preservation. The study of the data confirms that libraries and other organizations appear to understand the significance of rules for carrying out digital preservation programs. The majority of the study shows the passive organizational attitude toward the

development of such policies, despite certain studies highlighting the availability of digital preservation policies in a significant number of organizations. The data mapping confirms that research done globally and in North America indicates a good state of affairs with regard to the accessibility of digital preservation regulations.

2022

Krishnappa & Kumber (2022) highlighted the preservation practices and guidelines used by the university libraries in Karnataka. The study assesses the quantity of materials stored at the library, opinions regarding when they are bound, the extent of preservation techniques used there, written or unwritten policies governing the preservation of the library's resources, opinions regarding various preservation activities conducted at the library, the extent of problems caused by different factors, the extent of use of digital preservation techniques, and information regarding whether the library has formal preservation policies. Finally, the study concludes with several appropriate recommendations.

In a study, Iwhiwhu & Adomi (2022) investigated the presence and application of preservation policies pertaining to the provision of information in a selected South-South Nigerian university library. In order to ensure information provision, the study seeks to ascertain whether preservation policies are available and how they are used in the execution of preservation actions. The study found that the chosen university libraries under investigation did not have a formal preservation policy that directs preservation efforts. Despite the fact that some university library staff members are aware of the preservation policy and participate in preservation-related activities, these procedures were not recorded. Delivery of information resources is impacted by both insufficient preservation facilities and a shortage of personnel assigned to manage preservation efforts. The study suggests that in order to formulate a documented preservation policy, it is important to be aware of the documentation of preservation actions. It is essential for libraries to get involved in planning training sessions, conferences, seminars, orientation programs for new employees and patrons, preservation education, library week, and the establishment of a preservation unit where librarians may learn more about preservation efforts.

Ndegwa et al. (2022) explored digital preservation strategies and policies to determine how well Kenyan institutional repositories could support the long-term preservation of digital content. They collected data by conducting in-person interviews with 19

respondents from three public universities, selected based on their Open OAR and ROARMAP registrations, as well as the quantity of items in their repositories. Further data was gathered by examining documents, including open access mandates and policies, and university websites. The results of the study revealed that universities were poorly prepared to support long-term digital preservation. The policies were inadequate, and there was a lack of planning to help implement the policies. The study concluded that although IRs had to take responsibility for digital preservation, there was a lack of clearly defined action from their plans and policies. The study has also given recommendations, including the identification of targets for digital preservation, which will pave the way for multi-stakeholder involvement in policy formulation and the policy-making process.

Barrueco & Termens (2022) conducted a study of the literature on institutional repositories adoption of digital preservation policies, strategies, and activities. A total of 21 publications from worldwide refereed journals published from 2009 to 2020 were reviewed for this study using a systematic literature review methodology. The study discovered that there is a very small amount of research output on this subject. The limited quantity of published articles suggests that repository administrators have been preoccupied with other issues rather than making sure the assets they hold would be accessible in the long run. The literature review did not uncover any conclusive information regarding the digital preservation practices being used by institutional repositories. The study would enable managers to enhance preservation methods through developing best practices and making recommendations.

2020

In order to better understand how Indian institutions apply guidelines for digitization, access, and preservation in the digital process, Ahmed & Sharma (2020) examine and study academic literature. The study also investigates the viability of creating national guidelines for the retrieval and sustainable digital archiving of historical materials throughout the nation.

In the context of Botswana's public sector, Motlhasedi (2020) examined the legal and policy framework that supports digital archive curation as well as the difficulties that come with it. The results of the study showed that although there is a framework of laws and policies for the curation of digital archives, it is not very strong. The study also found that there are barriers to accessing archives, such as insufficient financing,

improper infrastructure, a lack of qualified staff, and time limits that prevent greater access. Thus, the researchers believe that the knowledge gained from this study will help to clarify the existing situation regarding the curation of digital archives and offer recommendations for the future for Botswana National Archives and Records Services (BNARS).

2019

Shah (2019) conducted a study on LOCKSS, CLOCKSS & PORTICO: A Look into Digital Preservation Policies. According to the study, access to digital information must be protected for the benefit of both the current and future generations, as it is more vulnerable to loss and damage than print materials. Currently, several programs and regulations are in place to ensure that digital data is preserved for a long time. Digital content is intended to be protected and preserved for future use and access through the three primary digital preservation programs, such as LOCKSS, CLOCKSS, and PORTICO. Lastly, this study provides a summary of the origins of these three initiatives as well as the ways in which these policies work with publishers and libraries to preserve digital information over the long term.

2017

Dressler (2017) looked at current digital preservation guidelines and evaluated their content at Association of Research Libraries (ARL) member institutions. The study reviewed the advantages and disadvantages of digital preservation policies at ARL member institutions in an effort to highlight the present status of these policies. According to the study's call for policies, out of the ARL institutions that answered (58 percent response rate), 32 (or 26% of the institutions) already have a digital preservation policy in place. Overall, 23 out of 40 institutions without a policy currently in place say that work is being done or will be done to finish one in the upcoming year (2016-2017). At this point, a request for a more thorough investigation and examination of the policies can be made. Throughout the investigation, it was found that many digital preservation policies were in the middle of the spectrum, with some being unsuccessful (Colorado State University, University of Texas, York University) and others being effective (University of Houston, University of Florida, and York University). A lot of organizations offered a useful model for digital preservation, but they were confused about who would handle the labor and how it would be done.

Pereira & Borges (2017) carried out a study to confirm that digital preservation policies were being followed in the institutional repositories (IRs) of federal universities in Brazil. The study's findings indicated that, although some repositories mention in their institutional information policies a desire to protect digital content, the institutional repositories (IRs) of these universities lack documented digital preservation policies.

2015

Nnenna & Emenike (2015) talked about how the development of information and communication technology (ICT) made it necessary for library holdings to exist in both traditional and digital formats; transforming analog library holdings into digital format is undoubtedly a monumental undertaking. These problems are examined, and potential remedies are suggested in this study.

2014

Sawant (2014) studied the methods used for conservation and preservation in Mumbai's university libraries. The study found that almost all libraries lacked a formal preservation and conservation policy. The main obstacles to preservation and conservation practices included a lack of written preservation policy, a lack of skilled manpower, and a lack of enough funding. University authorities and policymakers must be convinced to allocate staff and funds for libraries' long-term existence as well as preservation.

2013

Gbaje (2013) focused on the frameworks established by Nigeria's national information centers to preserve digital materials as well as their coverage of digital preservation policies and availability. According to the study, a National Information Center needs a digital preservation policy in order to ensure the accessibility and reuse of its digital information. Without one, managing digital information actively will be difficult and may even lead to the loss of critically important digital information. Findings of the study revealed that the National Library of Nigeria and the National Bureau of Statistics both have digital preservation policies. Unfortunately, the policies that are currently in place do not cover enough ground to ensure the long-term preservation of digital material. Similarly, the study found that one of the difficulties in adopting the digital preservation strategy into practice is the National Information Centers' lack of institutional support. Finally, this study highlights the shortcomings of the current digital

preservation policy and suggests a national policy that will serve as a guide for successful digital preservation initiatives at any National Information Center.

2012

Based on the building components, Katre (2012) compared the digital preservation programs in the United States and India. These consist of a single fundamental legislative framework, a national digital preservation initiative, digital preservation technology, practice manuals and standards, digital repository infrastructure, audit and certification processes, and national digital preservation laws. The study was also conducted on a selection of digital preservation rules from the UK, USA, Canada, and Australia. The study suggested that institutional digital preservation of electronic data is the missing element in the Indian context, and they should be given priority attention. The preservation policy is a mandatory requirement for the audit certification of trustworthy digital repositories.

2006

Samantaray (2006) conducted a study on the preservation and management of digital resources: policies, issues, and challenges. The study covered policy development, problems, access concerns, technology obsolescence, and potential solutions related to digital resource management and preservation. The study also came to the conclusion that adopting the right technologies and developing a long-term plan are necessary for the management, access, and preservation of digital resources.

2.9 Funding for Digital Preservation

2025

Jalaludin et al. (2025) examined the digital preservation initiatives in digital libraries. 50 articles were chosen from a total of 681 articles found in Emerald Insight, Scopus, Web of Science, and Science Direct. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement was used to define the inclusion and exclusion criteria. The study's conclusions showed that, of the 50 articles, 44% mention obstacles and constraints to increasing the accessibility of resources and strengthening the application of digital preservation. These include a lack of qualified personnel, a lack of funds, poor policies, a lack of research, ambiguous tactics, and privacy issues.

2023

Ahmed et al. (2023) investigate barriers faced by Pakistani university libraries to implement digital preservation programs. The findings of the study demonstrated that insufficient institutional and national policies, administrative support, and financial and technological resources are the main obstacles preventing Pakistani university libraries from implementing digital preservation techniques. In conclusion, the study highlights the need for Pakistan to develop a national policy for digital preservation.

2019

Osimetha (2019) looked at how most institutions still struggle to preserve digital information resources and pay for new purchases due to a lack of funding. The study also found that maintenance culture is another issue that makes it difficult for most institutions to stay within their budget lines.

2014

Sawant (2014) discussed the main constraints to preservation practices. These include a lack of finance, a lack of skilled personnel, and a lack of a clear preservation policy. The study concluded that higher authorities and policymakers should be persuaded to allocate funds and personnel not only for preservation but also, apparently, for the long-term viability of libraries.

2.10 Copyright Issues for Digital Preservation**2024**

Hussain & Diwakar (2024) examined the relationship between copyright law issues and digital preservation approaches. This study explores a number of copyright and digital preservation-related issues, with a primary focus on the practical and legal implications for organizations that preserve digital content. The study also emphasizes the necessity of clear policies that support copyright holders and preservation activities. To make digital preservation smooth, safe, easy and effective was the main aim of this study.

2023

Ram (2023) focuses on the importance of copyright, copyright problems in libraries for digital preservation, how copyright fails in libraries, and Indian copyright laws. The

study encompasses a variety of topics, including digital preservation initiatives in India, formats for preservation, problems with digital resource preservation, challenges with accessing digital information, technological obsolescence, potential remedies, and the advantages of digital preservation. The study comes to the conclusion that adequate technology adoption and a long-term plan is required for digital preservation in order to manage and access digital resources.

2022

Papi (2022) looks into the legal concerns regarding the digital preservation and archiving of newspapers in the US Congress, Australia, and Iran's national libraries. In this study, the United States' and Australia's copyright laws, the 1968 Iranian copyright laws, the proposed Iranian bill of literary and cultural property, and the UNESCO guidelines for digital preservation and archiving are analyzed. The findings of the study showed that the preservation of significant historical materials in libraries and archival centers, figuring out the legal framework for copyright for digital preservation, digital archiving content, temporary and permanent storage, creating backup copies of digital resources, publishing newspaper articles (due to employment), reproducing newspaper articles for profit and non-profit purposes, protecting newspaper articles under copyright law, exempting newspapers from the copyright law for libraries and archival centers, and similar measures. According to the results obtained from the analysis and research, some suggestions have been made to pay attention to the issues of copyright protection and digital archiving in libraries and to amend the law.

2021

Shah et al. (2021) investigated the issues and challenges associated with digital content preservation. The study found that the most important issues and difficulties encountered during digital preservation include the type of data being preserved, preserving data trust, managing the data flood, technological obsolescence, media fragility, a lack of expertise, copyright and intellectual property rights concerns, etc. The study also concluded that ICT facilities should be available in libraries, archives, and information centers, and that staff members possess the skills needed to administer and preserve digital data. Additionally, a sufficient fund needs to be set out for the procurement and preservation of digital artifacts.

2011

Evens & Hautekeete (2011) conducted a study on challenges of digital preservation for cultural heritage institutions. Digitization, metadata indexes, intellectual property rights management, and commercial models are the four main issues that this study found to be preventing the sustainability of digital preservation in cultural institutions. This study also shows that the majority of organizations have inadequate digital preservation practices and that degradation and technical obsolescence affect archives.

2.11 Satisfaction Level of Users regarding the Digital Preservation**2024**

Hurum et al. (2024) investigate the user opinion, satisfaction level, and challenges towards institutional repositories. The mean analysis on opinion towards the benefits of an institutional repository reveals that “It promotes self-archiving 24*7” has the highest mean score, while concerning the satisfaction level of users “I am satisfied with membership facility” has the highest mean score, and vis-à-vis overall problems “Electricity problem” has the highest mean score. The results of the study indicates that age has a significant difference with library facility ($p=.001$), retrieval ($p=.000$), searching and browsing facility ($p=.001$), usability ($p=.012$), and copyright issue ($p=.002$). Concerning respondent’s designation, there is a significant difference in the library facility ($p=0.027$), retrieval ($p=0.001$), usability ($p=0.005$), awareness problem ($p=0.005$), and copyright issues ($p=0.001$). This study bridged the gap in the literature by identifying a number of variables influencing users' perceptions, levels of satisfaction, and general issues.

2022

Onwuekwe et al. (2022) conducted a study at Oko Polytechnic in Anambra State on the preservation of information resources and user satisfaction with library use. The findings of the study showed that Oko Polytechnic uses the following methods to preserve its information resources: binding, lamination and restoration, dusting and stain removal, fumigation, environmental condition monitoring and control, copying and saving to CDs or flash drives, de-acidification, and re-recording. According to the study, Oko Polytechnic users are more satisfied when they use the library's preserved information resources because: Online information is easily accessible and increases user satisfaction; offline library information is always available, which increases user satisfaction; and

information material is treated and restored to make it more attractive and useful. The study also revealed that Oko Polytechnic's library faces many challenges to information resource preservation and user satisfaction, including: inadequate funding, inadequate equipment and materials, inadequate manpower and poor infrastructure, a lack of maintenance culture, poor resource handling by humans, a lack of preservation and conservation policies, unfavorable government economic policies, a tropical climate, poor paper and ink quality, and inadequate storage space. The study concluded with the following recommendations: The library management should strive hard to promote the library's services and products to the user community and use fee-based library services to generate additional funds; the library management should approach nongovernmental organizations and school alumni associations for funding to provide their library with sufficient and current information resources.

2.12 Institutional Repository for Digital Preservation

2024

Wardiyono et al. (2024) examined the digital preservation in Indonesian institutional repositories for future communities. The findings of the study showed a lack of comprehensible data to draw definite conclusions about digital preservation practices due to limited publications. The study also revealed that the repositories faced challenges mostly related to technical issues, organization and policy, and the sustainability of the resources for future communities as they worked toward the mission and achieved the goals.

2022

Posigha & Idjai (2022) examine the evolution of various institutional repository policies and their role in shaping the growth of institutional repositories within Nigerian university libraries. The study revealed some policies regarding IR for the implementation and management of content in institutional repositories. The study also found several challenges that repository managers and librarians encounter when creating and executing IRs in Nigerian universities. Among the challenges are lack of funding, inadequate facilities, lack of IR-related policies, the difficulty of gathering content from different contributors, copyright concerns, no mandatory self-archiving policy, and contributors' disinterest in submitting to IR.

Ndegwa et al. (2022) investigated digital preservation policies and procedures in order to evaluate Kenyan institutional repositories' capacity to support long-term preservation of digital resources. The study showed that the organizations lacked the necessary infrastructure to facilitate prolonged digital preservation. Policies were insufficient, and there were no plans established for assisting them are implemented. The study also found that even though the IRs was supposed to preserve digital content, their strategies and policies lacked concrete measures. The study offers some recommendations, such as defining objectives for digital preservation that will direct the creation of policies and involving several stakeholders in the process.

2020

Islam et al. (2020) evaluated digital preservation practices of institutional repositories in a few chosen public university libraries of Bangladesh. The study found that university libraries in Bangladesh carry out digital preservation activities through institutional repositories. The study also found that Bangladeshi university libraries have been using DSpace, an open source institutional repository software, for digital preservation due to its user-friendly and effective modules. The study provided several recommendations for addressing challenges and highlighted specific difficulties associated with the implementation of institutional repository (IR) software for open access in digital preservation.

2018

Saini (2018) conducted a study on understanding the role of institutional repositories in digital preservation in academic libraries. According to the researcher, the institutional repository (IR) is a novel type of repository that can hold a large amount of data in a small amount of space and preserve it over time. The initiative has started looking for answers to the pressing issues that academic libraries face, particularly with regard to organizing, setting up, and preserving digital IR preservation. The study also found that when library managers are required to produce IRs, define IR policies, inspire faculty, create budget projections, and other tasks, they frequently become confused. The study also attempted to provide a knowledge of digital preservation and a number of theoretical elements pertaining to the establishment and upkeep of an IR in an academic setting.

Bangani (2018) investigates the history, implementation, and content of institutional repositories (IRs) in public universities in South Africa. The study found a few of the

local, national, and worldwide forces that make it possible for institutional repositories to be established and continue to exist. Lastly, an effort is made to ascertain IRs' future. The conclusions of the study showed that South African universities hosted IR among the first globally. The most prevalent and influential content in public university collections in South Africa is electronic theses and dissertations (ETDs). The results also showed that the majority of the nation's universities have ratified the Budapest Open Access Initiative and the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities. A large number of them lack an open access policy.

2.13 Manpower for Digital Preservation

2025

Hamzat et al. (2025) examined the conservation and preservation strategies used at Nigerian polytechnics to maintain academic board records. The study's conclusions showed that the most widely used preservation methods were photocopying, binding, and pesticide application. The most available conservation practices were the security and shelving of academic board records, which allowed for a free flow of air. Besides, staff training was not adequately available. The study also revealed that the top three obstacles were poor infrastructure, insufficient funding, and the nonchalant attitude of the personnel in charge.

Armilla & Abangan (2025) explore the difficulties and strategies in digitizing library resources of academic libraries in Davao region. The findings of the study showed that the challenges included technological and infrastructure barriers in digitization, skills and knowledge gaps in digitization, and preservation concerns. These challenges were resolved by implementing strategies including new digital preservation techniques, professional development and training, and improvements to the technology infrastructure. Based on the results, the study recommended that academic librarians are advised to face and overcome challenges in the digital sphere by putting in place a clear plan backed by strong administrative assistance.

2.14 Quality of Digital Preservation Content

2021

Shah et al. (2021) identify the major problems related to the preservation of these unique contents. The study identifies longevity, selection, quality, integrity, and accessibility as

essential guidelines for preserving digital content. The study also discovered that various factors were crucial challenges in the digital preservation process. These factors include the nature of the contents, the preservation of data, the maintenance of trust in the data, the management of data streams, technological obsolescence, media fragility, a lack of expertise, and issue related to copyright and intellectual property rights.

2018

Halim (2018) examines the quality of the digital library collection of Airlangga University. This study used a quantitative descriptive method with 100 respondents. The study's findings indicated that the quality of Airlangga University's digital library collection is excellent, achieving an overall score of 87.32%. This score reflects evaluations of collection content (86.72%), access to the collection (93.33%), and information retrieval (81.93%).

2011

Korenkova & Hagerfors (2011) conducted a study on the quality criteria for digital information in long-term digital preservation. The study revealed a lack of knowledge about how to ensure the quality of maintained digital materials, indicating that guiding quality guidelines need to be established.

2.15 Users Needs about Digital Collection

2023

Akinlolu et al. (2023) investigated how postgraduate students at a few southwest Nigerian universities used digital libraries and digital preservation techniques. In order to improve the quality and availability of digital resources and make it easier for users to access resources from other institutions, the study found that libraries should make investing in digital preservation techniques a top priority. They should also collaborate with other organizations and stakeholders to exchange best practices, establish shared standards, and promote digital resource interoperability.

2016

Nwanapayi (2016) investigated the nature of information resources in university libraries and the effects of digital preservation. The study concluded that academic libraries

should start training staff and using good housekeeping practices for digital preservation in order to satisfy the worldwide standard for the long-term digital preservation of information resources, which includes both print and non-print materials.

2010

Chowdhury (2010) investigated the similarities between digital preservation and digital library research concerning the context of information and user concerns. The methodology of the study consists of an examination of a few chosen works of literature and reports of studies that are specifically concerned with digital preservation. The study found that the issues of gathering, preserving, and utilizing user- and context-related data are faced by the digital preservation research community, just like by the community of digital libraries.

2.16 Summary of Literature Review

This chapter provided an analysis of literature conducted on the topic of digital preservation practices in university libraries. The analysis of the literature was therefore addressed according to the five objectives of the study, which helped in contextualizing and identifying gaps that this study intended to satisfy. Emphasis was placed on the following areas, which were part of this study's objectives: definition of digital preservation, existing condition of digital preservation practices, process and techniques of digital preservation, user satisfaction with using digital preservation resources, issues and challenges for digital preservation, digital preservation policies and other empirical studies done in different countries worldwide, including Bangladeshi university libraries. The literature reviewed observed that maximum public and private university libraries in Bangladesh where digital preservations are made through Institutional Repository (IRs). Besides, only a few public and private libraries preserved their vital resources through the digitization process. The researcher also found that the maximum selected university libraries in Bangladesh are faced with various challenges to preserve their library resources. Here mention that copyright and intellectual property issues, shortage of funding, lack of IT personnel, staff training, lack of technical infrastructure, lack of outdated software and hardware, lack of backup and standards, and lack of national digital preservation policies are the main challenges for successful digital preservation. Literature review also reveals that more awareness is needed at the institutional levels of policy and decision-making in order to develop strategies for digital preservation.

The literature on digital preservation is vast, reflecting the complexity and multifaceted nature of the subject. Definitions of digital preservation vary, but a common theme is the emphasis on maintaining long-term access to digital materials, whether born-digital or digitized from analog formats. Digital preservation encompasses a range of activities, from the storage and maintenance of digital objects to the application of specific strategies such as technology preservation, emulation, and data migration. The review also underscores the importance of digital preservation policies, which provide a framework for implementing preservation initiatives and ensuring the consistent and responsible use of resources.

Digital preservation practices are diverse and context-dependent. Studies highlight the importance of institutional repositories, stakeholder cooperation, and technological infrastructure in preserving digital content. In different regions, such as India, Bangladesh, and North Africa, researchers have identified both the prospects and challenges of digital preservation, pointing to the need for tailored strategies that consider local circumstances and resource availability.

Digital preservation strategies are crucial for safeguarding digital content against technological obsolescence and other risks. Techniques such as migration, emulation, and normalization are commonly employed by libraries and archives. The literature also emphasizes the need for strong metadata standards and digital asset management systems to facilitate the organization and retrieval of digital content. Moreover, the development of national and regional policies is highlighted as essential for supporting digital preservation efforts, particularly in regions with limited resources.

The literature also discusses the significant issues and challenges associated with digital preservation, such as the rapid pace of technological change, the need for sustainable funding, and the importance of legal frameworks. Additionally, the review points to the necessity of building capacity among professionals and raising awareness of digital preservation's importance in academic libraries and other institutions.

2.17 Research Gap and Uniqueness of the Study

Despite the progress made in digital preservation research, significant gaps exist, particularly in the context of university libraries in Bangladesh. The literature review reveals a scarcity of studies that thoroughly examine the current state of digital preservation practices within these institutions, as well as the processes and techniques they employ. Additionally, user satisfaction with digital resources and the specific

challenges faced by these libraries, including issues related to funding and staff expertise, are underexplored areas. These gaps align closely with the research objectives and questions, underscoring the need to investigate the existing conditions, processes, and challenges of digital preservation in Bangladeshi university libraries. Addressing these gaps will provide valuable insights and recommendations to enhance the effectiveness of digital preservation efforts in these libraries, ultimately contributing to the sustainability and accessibility of digital resources in the academic sector.

Despite the growing body of literature on digital preservation, there remain significant gaps in understanding specific practices, challenges, and outcomes within the context of university libraries in Bangladesh. Most studies have primarily focused on digital preservation in developed countries, with limited research addressing the unique challenges faced by developing nations with resource constraints. Furthermore, while existing literature provides various preservation strategies, the practical application of these methods in Bangladeshi university libraries remains largely unexplored.

Additionally, there is a lack of research on how institutional policies, funding limitations, and technological infrastructure influence the effectiveness of digital preservation in these libraries. Few studies have examined user perspectives on digital preservation or the alignment between users' needs and the preservation practices currently implemented. This research aims to bridge these gaps by investigating the current digital preservation practices in selected Bangladeshi university libraries, assessing user satisfaction, and providing actionable recommendations tailored to this specific context.

The literature review revealed that so many studies have been conducted on digital preservation practices in university libraries in different countries around the world. (Such as: Abdullahi et al., 2024; Ahmad & Rafiq, 2024; Akinlolu et al., 2023; Akter, 2013; Anyaoku et al., 2019; Masenya & Ngulube, 2019). But only a few relevant studies have been done in the context of Bangladeshi university libraries. Islam & Islam (2021) examined the preservation practice of digital publications in selected university libraries of Bangladesh. Rahman & Mezbah-ul-Islam (2012) conducted a study on issues and challenges for sustainable digital preservation practices in Bangladesh. Islam et al. (2020) focused on digital preservation through institutional repositories in university libraries of Bangladesh. Razzak et al. (2022) examined the convergence and divergence factors in the digital preservation of libraries, archives, and museum materials in Bangladesh. Islam et al. (2020) conducted a study on the digital preservation activities of institutional repositories in some selected public university libraries in Bangladesh.

Rahman & Rahman (2015) focused on digital resources management in libraries: a step towards digital Bangladesh. Since this is the first full-fledged study on digital preservation practices in university libraries in Bangladesh and the gap has been bridged with relevant studies in other countries, including Bangladesh, that's why this study is different from other studies.

2.18 Conclusion

The review of literature in this chapter illustrates the critical role of digital preservation in ensuring the longevity and accessibility of digital content. As digital materials continue to proliferate, the need for effective preservation strategies, robust policies, and a deep understanding of the challenges involved becomes increasingly important. Digital preservation is not merely a technical challenge but also a strategic imperative that requires collaboration, innovation, and sustained effort across institutions and regions. This chapter sets the stage for further exploration of digital preservation practices and policies, offering insights that will inform the development of effective digital preservation initiatives in the future.

This chapter has provided a detailed overview of the literature related to digital preservation, including key definitions, practices, strategies, and theoretical models that inform the field. It highlights the importance of preserving digital content, especially within academic libraries that serve as vital information centers. The challenges identified, such as technological obsolescence, resource limitations, and policy gaps, underline the complexities of maintaining long-term digital accessibility. This review underscores the necessity for research focused on the specific needs and circumstances of developing regions, where digital preservation is hindered by unique structural and resource-related challenges. The following chapters will build on this foundation, exploring empirical findings and offering targeted recommendations to support the advancement of digital preservation practices in Bangladeshi university libraries.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology taken to answer the study's objectives and questions regarding digital preservation practices within selected university libraries in Bangladesh. Research methodology is the process of designing a strategy for solving a research problem. The underlying theoretical paradigm, the research purpose, and the research questions determine the choice of the research methodology (Ngulube, 2015). Research methodology is the process by which researchers describe, elaborate, and forecast the phenomenon they are studying. It also refers to the methodical approach used to address a research topic (Rajasekar et al., 2006). This study is quantitative in nature, and the research objectives and questions are shown in **Table 3.1**. This chapter will highlight the research sites and the lists of universities that were taken as a sample shown in **Table 3.2**. The population for the study is shown in **Table 3.3**. **Table 3.4** provides an overview of the response rates from each university. This chapter covers the research design, research site, research method, study population, sample size, sampling technique, data collection methods, data analysis, validity and reliability of the instruments, type of triangulation method used, and form of ethics applied in this study in order to guide the research process.

In this chapter, the research methodology essential to achieving the study's objectives is discussed in detail. The chosen research design, specifically aligned with the study's objectives and research questions, provides a structured approach to investigate digital preservation practices. The research site encompasses selected university libraries in Bangladesh, giving geographical and institutional context to the study. Quantitative methods were utilized to gather data, each chosen to best capture the complex dynamics of digital preservation efforts. The study population was identified based on relevant demographics, with a sample size determined using established sampling techniques to ensure representativeness and reliability. Data was collected through two sets of structured questionnaires to address specific research objectives. Analytical methods included

statistical techniques processed with software to interpret findings effectively. To enhance the credibility of results, measures for ensuring validity and reliability of research instruments were implemented, providing a solid foundation for the findings. The study incorporated a triangulation method, combining multiple perspectives and data sources to achieve a comprehensive understanding. Ethical considerations were also strictly adhered to, safeguarding participants' rights and confidentiality throughout the research process.

By systematically addressing these components, this chapter aims to provide a clear and thorough framework that underpins the research process. The selected methodology will not only facilitate the investigation into digital preservation practices but also contribute to the broader discourse on enhancing library services within academic institutions in Bangladesh. Ultimately, this methodology serves as the foundation upon which the research findings are built, ensuring that the study's outcomes are both reliable and meaningful.

3.2 Research Design

Blanche et al. (2006) define research design as a framework for strategic action that serves as a bridge between the research questions and the actual study execution. To achieve research objectives, quantitative methods were applied in this study. An attempt has been made to collect quantitative data from the primary sources of information. There are two sets of structured questionnaires used to collect primary data from the librarians/library administrators, teachers, students, and researchers of the selected university libraries. Initially, a number of secondary sources (e.g., journal articles, research papers, conference proceedings, theses, relevant textbooks, etc.) were reviewed to know what has been written on digital preservation practices in the academic libraries and its impact on user satisfaction. The collected data were analyzed using statistical software and other appropriate statistical methods. Additionally, this research design was used to offer a variety of perspectives for understanding the phenomenon being studied.

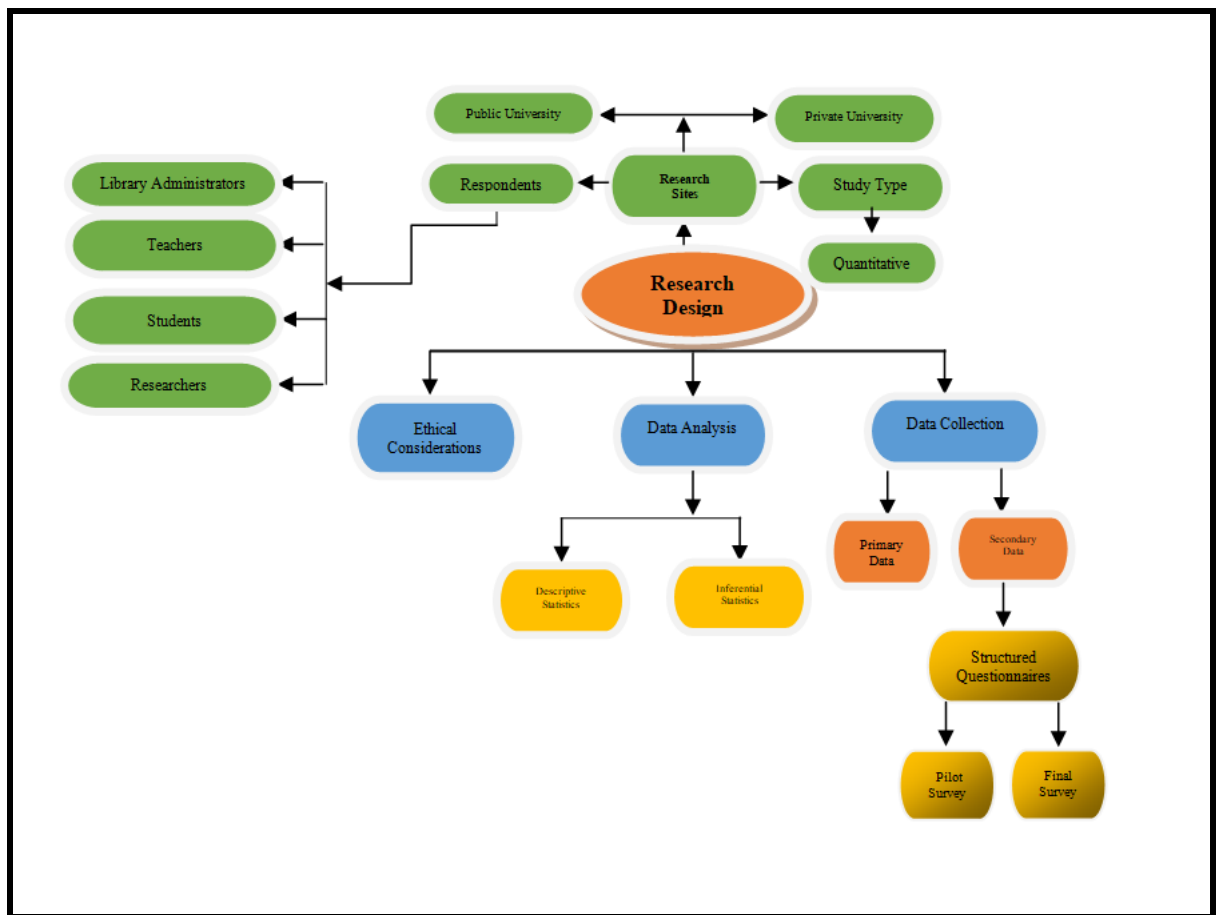


Figure 3.1: Structure of Research Design

3.3 Research Type

There are three types of research: qualitative, quantitative, and mixed. By drawing new, important differences from an in-depth examination of the issue under study, qualitative research is an iterative process that improves understanding for the scientific community (Aspers & Corte, 2021). In quantitative research, 28 measures are used, which are predicted on the idea that the object of the study is measurable. Quantitative research aims to measure and gather data, examine it for trends and connections, and validate the actions performed (Watson, 2015). Taherdoost (2022) states that mixed-method approaches integrate qualitative and quantitative approaches based on the goals of the study and the nature of the research problem in an attempt to increase understanding of the topic under investigation. This study used quantitative methods, for which a questionnaire with closed-ended questions was designed.

3.4 Research Sites

In Bangladesh, there are 55 public and 114 private universities (UGC, 2025). The study focuses on 10 public and 5 private universities in Bangladesh, selected from among the 55 public and 114 private universities. The area locations of the selected university libraries were different parts of Bangladesh. These universities were chosen based on their digital resources, digital databases, digital preservation practices, institutional repositories, digital archives, and digital information services. All the universities have been purposively selected for the study.

Table 3.2: Research Site of the Study

SL. No.	University Name	Acronym	Est.	Category	Location	Specialization
01	University of Dhaka	DU	1921	Public	Dhaka	General
02	University of Rajshahi	RU	1953	Public	Rajshahi	General
03	University of Chittagong	CU	1966	Public	Chittagong	General
04	Jahangirnagar University	JU	1970	Public	Savar	General
05	Bangladesh Agricultural University	BAU	1961	Public	Mymensingh	Agricultural Science
06	Bangladesh University of Engineering and Technology	BUET	1962	Public	Dhaka	Engineering
07	Shahjalal University of Science and Technology	SUST	1986	Public	Sylhet	STEM
08	Sher-e-Bangla Agricultural University	SAU	2001	Public	Dhaka	Agricultural Science
09	Bangladesh Medical University	BMU	1998	Public	Dhaka	Medical Science

10	Gazipur Agricultural University	GAU	1998	Public	Gazipur	Agricultural Science
11	North South University	NSU	1992	Private	Dhaka	General
12	East West University	EWU	1996	Private	Dhaka	General
13	BRAC University	BRACU	2001	Private	Dhaka	General
14	Independent University, Bangladesh	IUB	1993	Private	Dhaka	General
15	Ahsanullah University of Science and Technology	AUST	1995	Private	Dhaka	STEM

STEM=Science, Technology, Engineering and Mathematics

3.5 Justification for Selecting 10 Public and 5 Private Universities

The primary objective of this study was to investigate the digital preservation practices in university libraries in Bangladesh, considering both public and private institutions. To achieve this, the researcher selected 10 public universities from the 55 existing public universities in the country. The selection was made to ensure diversity in institutional characteristics, academic focus, and digital preservation initiatives. Among the selected public universities, four are the oldest general universities with well-established library systems, one is the most prominent engineering university known for its advanced technological infrastructure, one is the country's largest medical university with extensive research output, three are leading agricultural universities contributing significantly to agricultural education and research, and one is a renowned science and technology university focusing on innovation and digital resources. The inclusion of these universities ensures a balanced representation of public institutions with varying levels of digital preservation maturity.

In addition to public universities, the study also incorporated five private universities to compare digital preservation practices between public and private institutions. The selection was made purposively from the 114 private universities in Bangladesh, ensuring that only

the most prominent institutions were included. Among the five selected private universities, four are the oldest general universities with well-developed academic and research environments, and one is a leading science and technology university with a strong emphasis on digital resource management. This selection allowed the researcher to examine potential variations in digital preservation strategies, challenges, and institutional capabilities between public and private universities.

The rationale behind this selection was to determine whether notable differences exist between public and private university libraries in terms of digital preservation, based on their respective policies, infrastructures, and resource allocations. By analyzing the mean values and comparative data from these institutions, the study aimed to provide insights into the strengths and weaknesses of digital preservation efforts in both sectors. This comparative approach enhances the study's reliability and contributes to the broader understanding of digital preservation practices in university libraries across Bangladesh.

3.6 Population of this Study

Shukla (2020) defines a population as a collection of all the units that have the variable attribute being studied in common and for whom broader inferences can be drawn from the study. The entire society that a sample for the study is to be drawn from is referred to as the "population." It is a collection of individuals or incidents from which the study's sample was drawn and findings were drawn (Bless & Higson-Smith, 2006). Population comprises groups, individuals, humans, products, events, and even organizations (Welman et al., 2005). The population for this study comprises teachers, students, and researchers from the 15 selected university libraries. The study does not include staff members and part-time faculty members because they comprise a small percentage of library users. The total population of the study from 15 selected public and private universities was 225029, where active library users were 19820. The number of active users is confirmed by the librarian of each selected university library.

Table 3.3: Population of the Study.

SL. No.	Name of the University	Population			Active Users	Category	Respondents
		Teachers	Students	Total Users			
01.	DU	2311	37428	39739	2600	Public	22
02.	RU	1300	26370	27670	2200	Public	29
03.	CU	1008	28000	29008	1950	Public	36
04.	JU	764	15088	15852	1600	Public	22
05.	BUET	722	6900	7622	1450	Public	13
06.	BAU	587	6199	6786	1100	Public	32
07.	SAU	322	4804	5126	900	Public	30
08.	GAU	250	1818	2068	450	Public	17
09.	BMU	505	4900	5405	1050	Public	20
10.	SUST	530	10000	10530	1200	Public	33
11.	NSU	504	28000	28504	1700	<i>Private</i>	36
12.	EWU	295	12614	12909	1200	<i>Private</i>	36
13.	IUB	250	11500	11750	820	<i>Private</i>	36
14.	BRACU	560	13550	14110	1050	<i>Private</i>	35
15.	AUST	450	7500	7950	900	<i>Private</i>	36
	Total	10358	214671	225029	19820	15	433

3.7 Sampling Procedure

To make sure that the subjects chosen are representative of the entire population, sampling is a process by which participants are chosen from the target population (Schaefer, 1998). Sampling is intended to ensure that a sufficient number of elements for the entire population

are taken into account when drawing conclusions. (Cavana et al., 2001). The non-probability sampling methodology allows for subjective or judgment sampling since it uses non-randomized ways to pick a sample. Convenience sampling, purposeful sampling, quota sampling, and snowball sampling are the four non-probability sampling techniques (Showkat & Parveen, 2017). The purposive sampling method was considered for this study due to the huge population size of the 15 selected universities, collecting data from the current users of the selected university libraries, and making this study more convenient. Gentles et al. (2015) pointed out that “purposive sampling has logic and power in selecting data-rich cases for in-depth study. For the purpose of research, data-rich cases are those that provide a wealth of information concerning centrally important issues; studying these examples leads to greater understanding and new insights.” This study used the purposive sampling technique to select suitable respondents and for collecting data from the respondents. Responses are taken only from the librarians/library administrators, teachers, students, and researchers of the sample universities, not from every staff member. Purposive sampling, as described by Blanche et al. (2006), is a sampling technique that is frequently used to construct small, relevant samples in quantitative research or case studies. It is based on the careful selection of instances that are characteristic of the population being investigated. Therefore, the purposive sampling approach was best suited for this study since it enabled the researcher to find participants who had the necessary information, skills, and experience to advance the field of digital preservation in the selected university libraries in Bangladesh.

There is a growing need for an efficient way to determine sample size in empirical research due to the necessity of a representative statistical sample. For calculating sample size without doing any calculations, behavioral and social science researchers commonly use the Krejcie and Morgan table. It can be applied to any defined population, indicating that for populations of one million or more, a sample size of 384 is adequate. Because of this, 384 have been used as a sample size that is frequently mentioned in scholarly publications and research (Krejcie & Morgan, 1970; Memon et al., 2020). If the total population was 75,000 or more, a research study would need a minimum sample size of 384 respondents (Sekaran & Bougie, 2010). As suggested by Roscoe (1975), "sample sizes larger than 30 and less than

500" are suitable for most research activities. The sample size of 433, including 334 teachers, 74 students, and 25 researchers, where 173 were from public universities and 260 were from private universities, is suitable for this study, which has fulfilled the Krejcie & Morgan, Sekaran, and Roscoe requirements.

3.8 Instruments Used for Data Collection

Research instruments are tools used to collect research data for a specific study. In library and information work, questionnaire surveys are the most popular research approach and can be a rich and reliable source of research data (Slater, 1990). Based on the research design and methods, two sets of structured questionnaires were designed to collect data to answer the research questions. Questionnaires were designed with three interrelated objectives in mind:

- To improve the relevance and accuracy of collected data;
- To increase the number of intended respondents;
- To facilitate the collection and analysis of data.

Questionnaire Set-1 is constructed for collecting quantitative data from the librarian/head of library of the 15 selected university libraries regarding the study. The data consists of general information about the university, the library, digital resources, digital preservation practices, the digital preservation process, preservation rules and guidelines, copyright laws, staff training, budget allocation, etc.

Questionnaire Set-2 is designed for collecting quantitative data from library users of the selected university libraries to assess the users satisfaction about digital preservation based on five variables named demographic information of the users, digital preservation and its use, users' needs, quality of digital preservation, and suggestions about digital preservation. The questionnaire and the study's purpose will be briefly but completely stated. Respondent secrecy will be confirmed by wishing the respondents not to identify themselves anywhere in the form. After verifying the returning responses, only the completely filled-up questionnaire will be considered for analysis.

3.8.1 Questionnaire Set-1 for Librarians/Library Administrators

Questionnaire set-1 consists of a total of 61 questions. A total of 15 structured questionnaires were distributed to the librarians and library administrators of 15 selected university libraries. The questions were used to collect data related to 9 sections. Section 1 was about the general information of the university; Section 2 was about the general information of the university library; Section 3 was about the basic information of digital preservation; Section 4 was about the general information of digital preservation policy; Section 5 was about the digital preservation techniques and strategies; Section 6 was about the institutional repository for digital preservation; Section 7 was about the manpower for digital preservation; Section 8 was about the copyright issues for digital preservation; and Section 9 was about the funding for digital preservation.

Section 1 contains five questions: the name of the university, year of establishment, category of the university, number of students, and number of teachers at the university.

Section 2 contains seven questions: name of the library, establishment year of the library, library committee, library hours, seating capacity of the library, collections of the library, and manpower of the library.

Section 3 contains eight questions: digital preservation program, starting year of the program, materials for digital preservation, digitization process, documents for digitization, source for digitization process, digital preservation project, and name of the digitization project.

Section 4 contains six questions about the digital preservation policy, rules, standards, and guidelines for digitization, digital preservation strategies, and digital preservation standards.

Section 5 contains nine questions about the varieties of preservation techniques, varieties of file formats, and the scanning systems.

Section 6 contains twelve questions about the IR for digital preservation, establishment year of IR, URL of IR, software used for IR, materials kept in IR, number of collections in IR, IR policy, staff training for IR, training on IR for research scholars, satisfaction about IR, and problems about IR.

Section 7 contains six questions about staff involvement with digital preservation and staff training with digital preservation.

Section 8 contains four questions about the copyright issues for digital preservation.

Section 9 contains four questions about the fund's involvement with digital preservation and challenges for digital preservation.

3.8.2 Questionnaire Set-2 for Library Users

Questionnaire set-2 consists of a total of 21 questions. A total of 700 structured questionnaires were distributed to the teachers, students, and researchers (library users) of 15 selected university libraries. The questions were used to collect data related to 5 sections. Section 1 was about demographic information of the users; Section 2 was about digital preservation and its use; Section 3 was about the user's needs; Section 4 was about the quality of digital preservation content; and Section 5 was about the satisfaction level of users about digital preservation.

Section 1 contains seven questions about the name of the university, category of the university, gender, types of users, status of users, age group, and users' library use.

Section 2 contains three questions about familiarity with digital collections, searching for digital collections, and items of access to the digital collections.

Section 3 contains six questions about availability of digital collections, the organization of digital collections, help from library staff finding digital collections, print facilities for digital collections, and users feeling barriers or challenges using digital collections in libraries.

Section 4 contains four questions about the quality of the digital preservation content, rating the quality level of digital collections, resolution of digital content, and rating the level of usefulness of digital collections.

Section 5 contains one question about the rating level of users' satisfaction regarding digital preservation practices.

3.8.3 Justification for conducting a user survey in this study is outlined below:

The third objective of this study was to investigate user satisfaction regarding the use of digital preservation resources in selected university libraries. A user survey was carried out to assess this objective. In this study, a structured questionnaire, referred to as set-2, has been designed to collect quantitative data from library users across 15 selected university libraries. User surveys in this study of digital preservation practices in university libraries are essential for several reasons, such as understanding user needs and behavior, user satisfaction, evaluating effectiveness, identifying gaps and challenges, and supporting comprehensive analysis.

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3.9 Response Rate

A total of 700 copies of the questionnaire were distributed to users of the chosen university libraries. A total of 433 respondents completed the questionnaire and returned it to the scholar. Out of 700 distributed questionnaires, 433 were returned, resulting in a response rate of 61.85%, which is sufficient for analysis. The table below details the distribution and return rates by university. The number of copies of the questionnaire that were distributed and returned by each university, as well as the calculated percentage of the response rate, is shown in the following table.

Table 3.4: Response Rate of the Distributed Copies of Questionnaires from Each University.

SL. NO.	Name of the University	Questionnaire Distributed	Questionnaire Returned	Percentage
01	University of Dhaka	48	22	45.83
02	University of Rajshahi	48	29	60.41
03	University of Chittagong	48	36	75.00
04	Jahangirnagar University	48	22	45.83
05	Bangladesh University of Engineering and Technology	45	13	28.88
06	Bangladesh Agricultural University	48	32	66.66
07	Shahjalal University of Science and Technology	48	33	68.75

08	Bangladesh Medical University	48	20	41.66
09	Shar-e-Bangla Agricultural University	48	30	62.50
10	Gazipur Agricultural University	46	17	36.95
11	North South University	45	36	80.00
12	East West University	45	36	80.00
13	BRAC University	45	35	77.77
14	Independent University, Bangladesh	45	36	80.00
15	Ahsanullah University of Science and Technology	45	36	80.00
	Total	700	433	61.85

At the DU, users were given 48 copies of the total structured questionnaire; 22 of these copies were successfully returned, resulting in a response rate of 45.83%. Out of the 48 copies of the questionnaire distributed in the RU, 29 were successfully completed and returned, resulting in a response rate of 60.41%. The CU distributed 48 copies of the questionnaire, and 36 were returned, resulting in a 75% response rate. The JU distributed 48 copies of the questionnaire in total; 22 of those copies were satisfactorily completed and returned, resulting in a 45.83% response rate. At the BUET, 45 copies of the questionnaire were distributed, and 13 copies were returned, amounting to a 28.88% response rate. The BAU distributed 48 copies of the questionnaire, of which 32 were filled out and returned, yielding a 66.66% response rate. The structured questionnaire was delivered in 48 copies to the SUST; 33 copies were successfully completed and returned, generating a 68.75% response rate. The copies of the questionnaire were distributed at the BMU; there were 48 copies, and 20 copies were returned with a 41.66% response rate. The questionnaire was distributed in 48 copies at SAU, 30 of which were filled out and returned, yielding a 62.50% response rate. The GAU distributed 46 copies of the questionnaire, 17 of which were returned, yielding a 36.95% response rate. At the NSU, 45 copies were distributed, and 36 copies were successfully filled and returned, and the response rate was 80%. The questionnaire was distributed in 45 copies at the EWU, and 36 copies were returned, yielding an 80% response rate. The BRACU received 45 copies of the questionnaire, 35 of

which were filled out and returned, yielding a 77.77% response rate. At IUB, the researcher distributed 45 copies of the structured questionnaire in total, 36 of which were completed and returned, yielding an 80% response rate. The questionnaire was distributed in 45 copies at the AUST, and 36 copies were filled out and returned, yielding an 80% response rate. A total of 433 responses were received for the study, which accounts for 61.85%.

3.10 Data Collection Procedure

Data was collected from the 15 selected university libraries, including 10 public university libraries and 5 private university libraries. Primary and secondary sources of information were used to collect raw data and conceptual and textual data for the present study.

3.10.1 Primary Data Collection

3.10.1.1 Structured Questionnaire

Since the study is quantitative in nature, the researcher created 2 sets of structured questionnaires with multiple closed-ended questions in order to gather primary data. The structured questionnaires collected primary data from the librarians/library administrators and library users from the 15 selected university libraries. The researcher visited 15 selected university libraries and distributed the structured questionnaire set-1 among the librarians/library administrators. Out of the 15 questionnaires that were sent out, 15 have been returned, and all of them were fully filled out by librarians and library administrators with information about the university, the library, basic information about digital preservation, general information about digital preservation policy, information about digital preservation techniques, the institutional repository for digital preservation, copyright issues for digital preservation, and information about funding for digital preservation.

Besides, the researcher distributed a total of 700 copies of the structured questionnaire set-2 among the teachers, students, and researchers inside the selected university libraries. The questions were used to collect data through 5 sections regarding the demographic information of the users, the digital preservation and its use, the user's needs, the quality of digital preservation, and the satisfaction level of users about digital preservation.

In total, 433 (61.85%) questionnaires were returned from 334 teachers, 74 students, and 25 researchers. As stated by Mugenda & Mugenda (2003), "Response rates of 50 percent are adequate, 60 percent are good, and above 70 percent are rated very well." Therefore, a response rate of 61.85% was considered appropriate to achieve the goals of the study.

3.11 Secondary Data Collection

In addition to primary sources, data from secondary sources has also been used at various points in the text for descriptive purposes. For secondary data, initially, a number of secondary sources (e.g., journal articles, research papers, conference proceedings, theses, UGC annual reports, websites, relevant text and reference books, etc.) were reviewed to identify what has been written on digital preservation practices in the academic libraries and its impact on user satisfaction.

3.12 Pilot Survey

Before commencing proper data collection, all data collection instruments designed for this study were tested on a small scale in a few selected university libraries in Bangladesh. A pilot survey was done before finalizing the questionnaires among 50 (11.54% of the total samples) library users from two public and one private university library in Bangladesh. Among the surveyed, 3 libraries were DU, BUET, and NSU. Of the respondents, thirty (60%) came from public universities, and twenty (40%) came from private universities. Students made up thirty-five (70%), teachers eleven (22%), and researchers four (8%). Thirty (60%) respondents were male, and twenty (40%) respondents were female. Based on the data obtained by the questionnaire, further changes were made to its format, content, and order for final use in the study. The purpose of this pre-examination exercise was to remove the invalid questions and correct the confusing language or words appropriately. As a result, the data collection tools were fine-tuned to adapt to as wide a range of respondents as possible, thereby perfecting the potential for issued questionnaires to carry a high rate of return. Mugenda (2008) stated that 1% to 10% of the real sample size would be needed for a successful pilot study.

3.13 Procedure of Data Analysis

The IBM® SPSS® Statistics Version 25 software was employed to analyze the data for this study in order to produce precise, representative insights from the data collected through questionnaires. Each response was carefully coded and entered into the software for statistical analysis. There are two categories of statistical analysis: inferential and descriptive. Descriptive statistics use numerical data to explain a phenomenon. On the other hand, inferential statistics concentrate on estimating the outcome or assuming that an event is true or untrue based on the available data. The following techniques were applied to understand the data structure, distribution, and relationships between variables, with the aim of presenting clear, actionable findings.

3.13.1 Descriptive Data Analysis

Descriptive analysis serves as a foundational tool in data analysis by summarizing and providing an overview of the data set. In this study, descriptive statistics such as the mean and standard deviation were used to understand the central tendencies and dispersion of responses, offering insights into general trends in the data. Additionally, measures of distribution shape, like skewness and kurtosis, were employed to assess the symmetry and peakedness of the data. These descriptive measures provided a baseline understanding of respondent characteristics, library usage patterns, and other key variables before further analysis.

3.13.2 Inferential Data Analysis

For inferential analysis, the researcher applied the following non-parametric methods.

3.13.2.1 Mann-Whitney U Test

The Mann-Whitney U test, a nonparametric test for comparing two independent groups, was employed to determine if significant differences existed between specific groups, such as gender-based differences in library usage. This test was chosen because it does not assume normal distribution, making it suitable for analyzing ordinal data or non-normally

distributed continuous data. The Mann-Whitney U test enabled the study to accurately compare medians between groups and provided robust insights even with potentially skewed data.

3.13.2.2 Non-Parametric Test

Given the nature of the data, nonparametric tests were essential in this analysis, as they are designed to work with data that do not necessarily meet the assumptions required for parametric tests, such as normality. Nonparametric tests are particularly useful for ordinal data, skewed distributions, or small sample sizes. Using these tests enabled more reliable results when assessing relationships and differences within the data, ensuring that the conclusions drawn were not biased by distributional assumptions.

3.13.2.3 Data Normality Test

To assess whether the data followed a normal distribution, normality tests were conducted. These tests help to determine the appropriate statistical techniques to apply, as normality assumptions are required for many parametric analyses. In this study, tests like the Shapiro-Wilk or Kolmogorov-Smirnov tests were likely used to gauge whether the data could be considered normally distributed. Understanding the data's distribution was essential for selecting the appropriate statistical tests, ensuring that the analyses were accurate and suitable for the data's characteristics.

3.13.2.4 Data Representation: Tables and Graphs

Finally, tables and graphs were employed to visualize the study's findings effectively. Visual representation made it easier to interpret and communicate the data patterns, making complex statistical results accessible to a broader audience. These visual aids supported the presentation of descriptive statistics, comparisons between groups, and distribution characteristics, providing a clear and structured summary of key insights.

By combining these data analysis techniques, the study was able to provide both a comprehensive overview of library usage patterns and insights into specific areas of interest.

Each technique contributed to understanding the dataset's characteristics, identifying trends, and deriving conclusions that address the study's research questions.

3.14 Ethical Considerations

Research ethics are a set of standards that are used to identify professional and moral attitudes and actions related to research (Marianne, 2014). Thus, it is important to follow research codes and ethics by making sure that participants are fully informed about the study and its goals through voluntarily informed consent forms, as well as by protecting their privacy and confidentiality by not disclosing their names (Flick, 2020). Regarding ethical consideration, in this study the printed questionnaires were distributed by physically visiting each selected university librarian and library user. Respondents' misunderstanding of the questionnaire has been resolved by providing precise answers to all of their inquiries. To generate more accurate outcomes, respondents were requested to complete all of the questions contained in the questionnaire. Data were collected very carefully. After collecting data, it was systematically input into the IBM® SPSS® Statistics 25 software, and the discrepancies were eliminated by re-examination. From the ethical point of view, avoiding bias and using appropriate methods, from collecting data to imputing data in the software, was accomplished according to the rules and regulations.

3.15 Conclusion

In summary, this chapter has detailed the research methodology employed to investigate digital preservation practices within selected university libraries in Bangladesh. The study utilizes a quantitative methods approach to provide a comprehensive analysis of the digital preservation landscape. The research design integrates structured questionnaires tailored for both librarians and library users, ensuring a well-rounded perspective on the current practices, processes, and user satisfaction related to digital preservation. By focusing on 15 universities with notable digital resources and preservation practices, the study aims to offer valuable insights into the effectiveness and challenges of these practices.

The purposive sampling technique was chosen to ensure that the data collected is relevant and representative of the target population, which includes librarians, teachers, students, and

researchers. The sample size of 433 respondents was determined to be adequate for statistical analysis, providing a robust basis for the study's findings. Data collection instruments and procedures have been carefully designed to enhance data accuracy and relevance. With a response rate of 61.85%, the collected data is considered sufficient for drawing meaningful conclusions about the state of digital preservation in the selected university libraries.

Overall, the methodology outlined in this chapter provides a solid foundation for addressing the research objectives and questions. The quantitative methods approach, coupled with a strategic sampling process and rigorous data analysis techniques, ensures that the study will yield valuable insights and recommendations for improving digital preservation practices in academic libraries in Bangladesh.

CHAPTER FOUR

PRESENT SCENARIO OF DIGITAL PRESERVATION PRACTICES IN SELECTED UNIVERSITY LIBRARIES

4.1 Introduction

The initial objective of this study was assessing the level of digital preservation practices in the selected university libraries in Bangladesh. The researchers selected a total of 10 public universities and 5 private universities for this study. In this chapter, the researcher highlighted the present condition of digital preservation practices in 15 selected university libraries. The researcher has presented the current scenario of digital preservation by physically visiting each university, talking to the librarian, and analyzing the automation and institutional repository software. Through this chapter, the researcher has tried to highlight the current state of digital preservation conditions in 15 selected universities. The analysis highlights the initiatives, software platforms used, types of materials preserved, and accessibility features of their digital repositories. It also aims to identify the key trends, achievements, and challenges in the ongoing efforts toward sustainable digital preservation.

4.2 Dhaka University (DU) Library

The Dhaka University Library was established alongside the founding of Dhaka University in 1921. Currently, this library operates from three distinct buildings. The total area of the library, encompassing all three buildings, is 82,000 square feet. The Dhaka University Library is recognized as the largest academic library in Bangladesh. The library is currently operated through 13 separate sections. The DU library currently boasts a collection that includes 715,000 copies of books, 50,000 titles of e-books, 79,200 copies of print journals, and 10,400 titles of e-journals. In terms of individual collections, the number of manuscripts in the Dhaka University library is about 30,000, which is remarkable in this subcontinent. The website of the DU library is <https://www.library.du.ac.bd>.

4.2.1 Digitization and Digital Preservation Practices at DU Library

Although the digitization effort began as a project under HEQEP in 2015, it was intended to continue the long-term digitization work using its own personnel, taking into account the extensive range of library resources involved.

DU Institutional Repository: Dhaka University Institutional Repository started its journey in June 2013. The primary objective of the DU institutional repository is to increase the use, visibility, and impact of the university's own research publications through its digital archive. This digital archive contains full-text documents generated by the university, including master's, MPhil, and PhD theses; various internship reports; journal articles; proceedings of the conference; and research outputs from various departments, institutes, and research centers within the university. Since 2013, a total of 4071 documents have been uploaded to the DU institutional repository as of 07 April 2025. Among them, the faculty-wise number of theses is 3508 (Table 4.1), and the institute-wise number of theses is 527 (Table 4.2). The web address of the DU repository is <http://reposit.library.du.ac.bd>.

Table 4.1 Faculty Wise Number of Theses Preserved in the DU Repository

SL. No.	Name of Faculty	Number of Theses
01.	Faculty of Arts	1244
02.	Faculty of Social Sciences	646
03.	Faculty of Science	236
04.	Faculty of Biological Science	859
05.	Faculty of Law	27
06.	Faculty of Business Studies	271
07.	Faculty of Engineering and Technology	63
08.	Faculty of Medicine	11
09.	Faculty of Pharmacy	57
10.	Faculty of Earth and Environmental Sciences	41
11.	Faculty of Fine Art	12
12.	Faculty of Post Graduate Medical Sciences and Research	41
	Total	3,508

Table 4.2 Institute-Wise Number of Theses Preserved in the DU Repository

SL. No.	Name of Faculty	Number of Theses
01.	Bangladesh Institute of Health Sciences	08
02.	Institute of Business Administration	59
03.	Institute of Disaster Management and Vulnerability Studies	19
04.	Institute of Education and Research	116
05.	Institute of Energy	35
06.	Institute of Health Economics	09
07.	Institute of Information Technology	05
08.	Institute of Modern Languages	10
09.	Institute of Nutrition and Food Science	156
10.	Institute of Social Welfare and Research	101
11	Institute of Statistical Research and Training	09
	Total	527

Digitization of Manuscripts: More than 30,000 rare manuscripts are preserved in the DU library. The manuscripts are written in Bengali, Sanskrit, Arabic, Persian, Prakrit, Maithili, and Devanagari languages. The manuscripts are served to domestic and foreign researchers, teachers and students through digitization services. Since 2016, DU library authority has started the digitization process of manuscripts under digital preservation. About 6,000 manuscripts have already been digitized. The digitized manuscripts are preserved on the library's internal server and customized software called “DocuDex”.

Digitization of Old Newspaper: The DU library has taken a significant step towards modernization by digitizing its old and daily newspapers. Since 2017, the newspaper has been scanned by the ATIZ Book Drive Mark-2 scanner machine. Among the old newspapers, at least 100 titles have been digitally preserved, from the first newspaper “Dhaka Prakash”, published in the Bengali language in Dhaka in 1863, to the present time. Some of the notable ones are Daily Azad, Purbadesh, Sangbad, Bamabodhini, Monthly Mohammadi, Monthly Saogat, Muslim Chronicle, Bengal Harkara, Satyagrahi, Sadhana, Shikha, Amritbazar, Durbin, etc. In addition, there are 10 contemporary daily

newspapers being digitized. Among them are The Bangladesh Observer, Daily Prothom Alo, Daily Star, Daily Inqulab, Daily Jugantor, Daily Janakantha, Daily Samakal, Daily Sangram, Daily Kaler Kontha, etc.

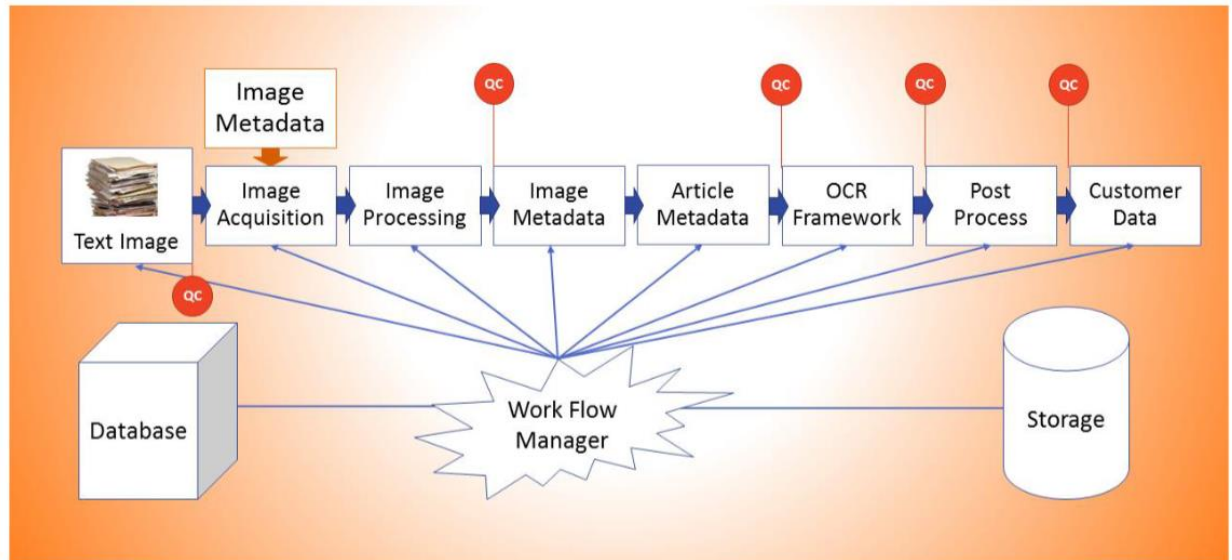


Figure 4.1: Newspaper Scanning Process/Workflow

Digitization of Rare Books: The DU library houses many rare books that have been digitally preserved, opening new avenues for research. Many rare books and documents were preserved by microfilming in the Dhaka University Library. Users were served by microfilm readers. However, due to this technology being very old, it has not been possible to provide proper service to users in recent times. 2,500 microfilm reels and 1,000 box microfiche stored in the DU library have been digitized using state-of-the-art technology, where the number of pages is more than 1.5 million.

4.3 Rajshahi University (RU) Library

Rajshahi University is one of the largest universities in the country, established in 1953 in the northern part of Bangladesh. The university is situated on 753 acres of land in Motihar, Rajshahi, which is very close to the mighty river Padma. Since the inception of Rajshahi University, the library has been established, which is known as the Rajshahi University Central Library. The RU Central Library is situated in a 3-storey modern library building with 55,000 square feet of floor space, which is designed to be user-friendly. The library has a collection of more than 400,000 books, 50,000 journal volumes and periodicals, e-journals (UGC e-journals, LiCoB journals, Research4Life,

RU journals, and TEEAL journals), and e-books (UGC e-books and LiCoB e-books). The RU Library website is <http://library.ru.ac.bd>.

4.3.1 Digitization Practices at RU Library

RU Institutional Repository: RU library repository established in 2013. The objective RU repository is to make the university's research papers more widely known, utilized, and applied by means of the institution's own digital archive. This repository consists of full-text Masters, MPhil, and PhD theses produced by the departments/institutes of the university. The repository currently contains approximately 1,000 theses.

Digitization of Old Newspapers: Old newspapers are very important for teachers, students, and researchers to use for research purposes. Rajshahi University Library Authority has already completed the digitization of 1081 old newspapers from the years 1949 to 1982. The names of some notable newspapers are Ananda Bazar, Azad, Banglar Bani, Dainik Shadesh, Dainik Samaj, Dainik Bangla, Don, and Banglar Mukhopatra, etc.

Digitization of Manuscripts: The Varendra Research Museum, established in 1910 in the city of Rajshahi, is the first museum in Bangladesh. The museum is currently managed by Rajshahi University. There are about 6,000 manuscripts in this museum, out of which 3,646 are written in Sanskrit and the rest in the Bengali language. RU library authorities have already digitized several manuscripts. The remaining manuscripts are in the process of digitization.

4.4 Chittagong University (CU) Library

Chittagong University Central Library was established in 1966. Although the library was established in a room with only 300 books, in 1968 the library moved to a temporary building of 1200 square feet with 14,000 books. The library moved into its own three-story modern building in 1990. The library currently has 56,700 square feet of floor space. The CU library currently boasts a collection that includes 350,000 copies of books, 35,000 bound volumes of journals, more than 60,000 rare books, 1,300 thesis papers, 1,800 research papers, more than 4,000 Braille books, and around 1,500 CDs on different topics. The collection is increasing every year. The library started its library automation journey in 2017. In 2025, the library started the digital preservation of rare books, manuscripts, old newspapers, etc. The library also installed DSpace software for thesis/dissertation preservation in 2025. The website of the CU library is <https://library.cu.ac.bd>.

4.5 Jahangirnagar University (JU) Library

Jahangirnagar University Library was established in 1971. The library was established to support the teaching and learning process by providing the necessary educational materials. The library is located behind the monument of “Sangshaptak” and near the main academic building. The library has been housed in a 5-story building of its own, having 250,000 square feet of floor space. The seating capacity of the library is 5,000 at a time. JU Library has a collection of 120,000 books, 14,000 journals, 22,000 online journals, and 36 databases. The Jahangirnagar University Library's website can be found at <https://library.juniv.edu>.

4.5.1 The Initiative of Digital Preservation Practices at JU Library

The digital preservation program was initiated at JU library in 2022. The library employs Clear Scanner and OCR software for the digitization process. The program was established with the following objectives: (a) to digitally preserve published research papers authored by the university's teachers, students, and researchers.(b) To archive documents produced by the university. (c) To ensure the digital preservation of rare collections and old historical newspapers.

JU Institutional Repository: The process of uploading MPhil and PhD theses, as well as rare collections and old newspapers for digital preservation, is currently in progress at the JU Institutional Repository. Over 250 MPhil and PhD theses have been preserved in the repository. A few rare collections and old newspapers have already been digitally preserved. Additionally, more than 35 journals published by the university have been preserved through the Journal Management System.

4.6 Bangladesh Medical University (BMU) Library

Bangladesh Medical University (BMU), formerly known as Bangabandhu Sheikh Mujib Medical University (BSMMU), was founded in 1998 and is the first public medical university in Bangladesh. It is also known as the leading postgraduate medical institution in Bangladesh. This university is located in Shahbag, Dhaka. This university has a well-furnished, modern academic library located at Block #A, which comprises 22,000 square feet of space on the 4th and 5th floors of the university's academic building. With its well-appointed reading room, the library can hold more than 850 users at a time. The library is open daily from 8:00 am to 10:00 pm. except weekends and government holidays.

There are more than 35,000 volumes of book in the BMU library comprising the fields of medicine, research, health, and related biomedical and allied health care disciplines; 5,800 volumes of bound local and foreign journals; more than 1,500 copies of WHO (World Health Organization) publications; 1,000 copies of theses and dissertations; more than 800 copies of news clippings; and 700 copies of BMU research reports.

The databases from AGORA, OARE, GOALI, HINARI, and ARDI include the full text of over 40,000 electronic resources. Approximately 500 copies of theses have already been digitized for digital preservation. Additionally, more than 500 copies of research reports have been digitized for the same purpose. The BMU library website is <https://bmu.ac.bd>.

4.7 Bangladesh University of Engineering and Technology (BUET) Library

Bangladesh University of Engineering and Technology (BUET) are the most renowned, most prestigious, and pioneer university in the field of engineering and technology in Bangladesh. From the very beginning, the university has been practicing library facilities since 1876 with a collection of only seven thousand technical books. Now the library has been housed in a 4-story building of its own, having 19,775 square feet of floor space. The library has a collection of 149,562 items, of which 18,631 are bound periodicals of 218 titles and online journals are more than 20 thousand. The BUET library website is <https://lib.buet.ac.bd>.

The digital preservation of the BUET library means to convert the physical and digital collection of the library into digital format and store it online or electronically and make it available to the readers. Its main objective is to ensure easy access to information to facilitate research, education, and knowledge dissemination. The digital preservation program of the BUET library started in 2010, when they started using the DSpace platform to create a digital repository.

Table 4.3: Original Timeline of Digital Preservation at BUET Library

Year	Activities
2009-2010	Initial initiatives were taken to create digital archiving and institutional repositories.
2011	Establishment of institutional repositories and uploading of thesis and research reports on experimental basis.
2012-2014	Maximum number of thesis, project reports and research reports are added.

2015 to Present	Online Catalogue (OPAC), e-resource access and regular updates are ensured. Website of BUET library and institutional repository are more active.
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4.7.1 Key aspects of digital preservation of BUET library

- i. **Institutional Repository (IR):** Institutional Repository is a platform of BUET. Students and faculty members of BUET preserve their theses, research reports, journals, conference paper, etc.
- ii. **Online Catalogue:** Through the Online Public Access Catalogue (OPAC), users can search the list of books, journals, newspapers, etc. in the BUET library.
- iii. **E-Resource and Subscription:** Access to online journals and conference papers through IEEE Xplore, ScienceDirect, SpringerLink, etc.
- iv. **Digital Preservation of Rare Collection:** Digital preservation of old and rare collections and maps.
- v. **Library Management Software:** Manage and maintain the entire library through KOHA or Integrated Library System (ILS).

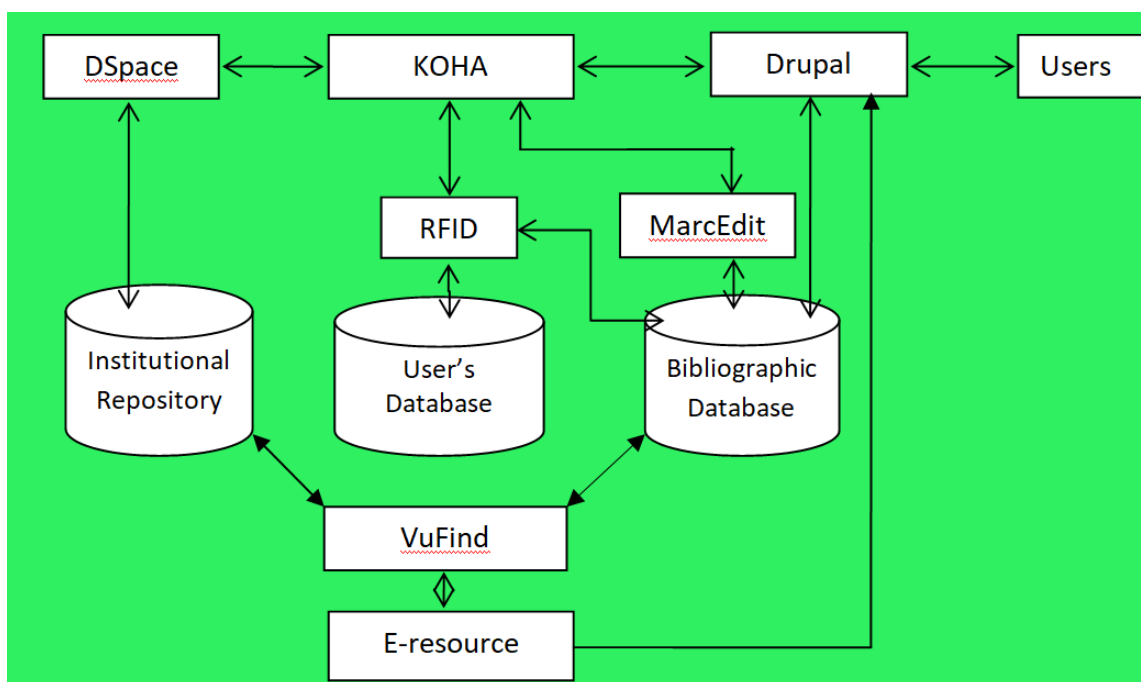


Figure 4.2: Integration of Library Systems

BUET Institutional Repository: BUET library is running an institutional repository using DSpace software, where university research and teaching tools are preserved. This repository contains a total of 14,409 publication items, divided into 4 communities. This collection includes theses, research reports, journal articles, syllabi, prospectuses, etc.

Table 4.4: Department of Wise Number of Theses Preserved in the BUET Repository

SL. No.	Name of Department	No. of Theses
01.	Department of Architecture	136
02.	Department of Biomedical Engineering	09
03.	Department of Chemical Engineering	138
04.	Department of Chemistry	258
05.	Department of Civil Engineering	950
06.	Department of Computer Science and Engineering	404
07.	Department of Electrical and Electronic Engineering	792
08.	Department of Industrial and Production Engineering	435
09.	Department of Materials and Metallurgical Engineering	159
10.	Department of Mathematics	215
11.	Department of Mechanical Engineering	371
12.	Department of Nonmaterial and Ceramic Engineering	18
13.	Department of Naval Architecture and Marine Engineering	30
14.	Department of Petroleum and Mineral Resources Engineering	82
15.	Department of Physics	402
16.	Department of Urban and Regional Planning	319
17.	Department of Water Resources Engineering	352
	Total	5,070

Online Public Access Catalogue (OPAC): BUET library operates an online cataloguing system through which readers can find the library's collections. Through this system, it is possible to search for books, theses, research reports, etc.

E-Resources and Subscriptions: BUET library provides subscriptions to various electronic resources, including IEEE Xplore, ScienceDirect, SpringerLink, etc. These resources provide important information for teachers, students, and researchers.

4.8 Sher-e-Bangla Agricultural University (SAU) Library

Sher-e-Bangla Agricultural University is the oldest agricultural institution in Bangladesh. Originally founded as the Bengal Agricultural Institute (BAI) on December 11, 1938, it was renamed Sher-e-Bangla Agricultural University in 2001 after being promoted to a university. Sher-e-Bangla Agricultural University (SAU) is situated in the heart of the capital city, Dhaka, and stands on 86.92 acres of picturesque land covered by green plantations. The SAU library website is <https://saulibrary.edu.bd>.

The library created by the Bangladesh Agricultural Institute (BAI) was inaugurated in 2001 as the Sher-e-Bangla Agricultural University (SAU) Library. The SAU Library is located in a 6-story modern building with an area of 38,880 square feet. The SAU Library is a fully automated, modern library that utilizes RFID technology. It boasts a collection of 45,448 books, 3540 hard copies of theses, 5,000 journals, and 12,110 titles of e-journals, including JSTOR, AGORA, HINARI, and OARE. Additionally, there are 32,000 journals available through LiCoB, alongside 2,182 e-books and online books from MyLibrary/Pearsons, Taylor & Francis, and Wiley Online Library. Besides, 3,819 titles from Research4Life.

In 2012, with financial support from the World Bank, Sher-e-Bangla Agricultural University launched a digital preservation program through a project titled “Digital Archive on Agricultural Thesis & Journals (DAATJ).” This initiative successfully preserved a total of 8,315 MS and PhD theses and 17,679 journal articles digitally within the DAATJ project from five agricultural universities in Bangladesh. These five agricultural universities are Sher-e-Bangla Agricultural University, Bangladesh Agricultural University, Gazipur Agricultural University, Patuakhali Science and Technology University, and Sylhet Agricultural University.

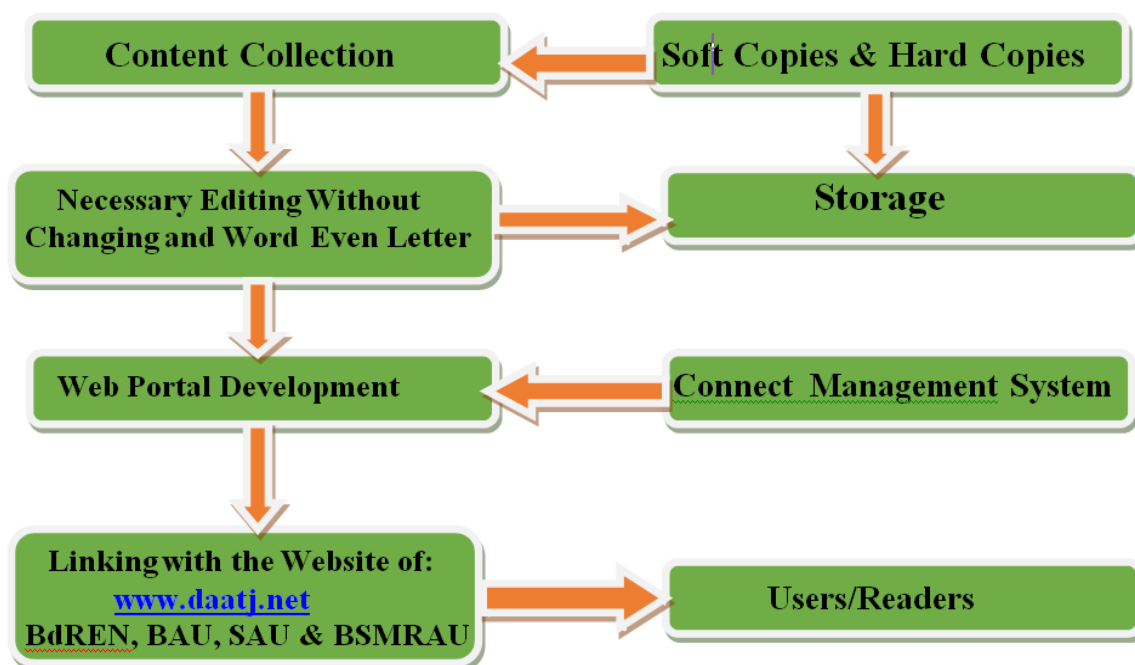


Figure 4.3: Working Procedures of DAATJ

SAU Institutional Repository: In 2016, the digital preservation program started again with the installation of SAU Institutional Repositories through DSpace software. The items uploaded for digital preservation in the institutional repository are biennial research reports, curriculum, faculty publications, internship reports, journals, MS theses, PhD theses, SAURES proceedings, etc. A total of 4,528 documents were uploaded in institutional repositories for digital preservation.

Table 4.5 Faculty Wise Number of MS Theses preserved in the SAU Repository

SL. No.	Name of Faculty	Number of Theses
01.	Faculty of Agribusiness Management	293
02.	Faculty of Agriculture	3,417
03.	Faculty of Animal Science & Veterinary Medicine	134
04.	Faculty of Fisheries, Aquaculture and Marine Science	-
	Total	3,844

4.9 Gazipur Agricultural University (GAU) Library

Gazipur Agricultural University (GAU), renamed from Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), is a public agricultural university in Bangladesh, established in 1998 on 187 acres of land in Salna, Gazipur. It was the first Graduate Agricultural Institute in Bangladesh, emphasizing research and extension. The university library has a separate building with 14,418 square feet of floor space. The library is extensive and offers a selection of agricultural and social science-related books and journals from domestic as well as foreign publishers.

The current collection of the GAU library includes 25,000 books, 20,000 journals, 2,640 e-books, 6,700 e-journals, 3,300 theses, and 164,000 e-articles provided by TEEAL. The GAU library website is <https://gau.edu.bd>.

A total of 887 MS and PhD theses have been digitally preserved in the “Digital Archive on Agricultural Thesis and Journals (DAATJ)” archive, which consists of five agricultural universities from Bangladesh.

4.10 Bangladesh Agricultural University (BAU) Library

Bangladesh Agricultural University (BAU) was established in 1961, having a total area of 485 hectares of land. The university is situated 4 kilometers away from the divisional town of Mymensingh. This university is the nation’s premier institution for agricultural education, research, and innovation. The BAU library was established in 1961 with the inception of the university itself. From the very beginning, The BAU library started as a small collection of 5,000 books from the East Pakistan College of Veterinary Science and Animal Husbandry, which was established at the time to study and research agriculture and related fields. At present BAU library is a 3-story modern building with a total area of 66,000 square feet. The number of collections in the BAU library is more than 185,950 books, 36,400 bound journals, and 44,000 e-book titles from UDL, LiCoB, and Research4Life. BAU Library Website: <https://library.bau.edu.bd>

The BAU library started its digital preservation activities in 2012 with the establishment of a Digital Archive on Agricultural Thesis & Journals (DAATJ). A total of 2,837 MS and PhD theses from Bangladesh Agricultural University have been digitally preserved in the DAATJ archive. The URL of DAATJ is <https://saulibrary.edu.bd/daatj/>.

After that, the library started an institutional repository (<https://dspace.bau.edu.bd>) named BAU Repository. A total of 1,789 MS theses and 250 PhD theses have been

uploaded to the institutional repository for digital preservation. The work of uploading the thesis to the institutional repository is in progress.

Table 4.6: Faculty Wise Number of MS Theses Preserved in the BAU Repository

Sl. No.	Name of Faculty	Number of Theses
01.	Faculty of Agriculture	706
02.	Faculty of Veterinary Science	302
03.	Faculty of Agricultural Economics and Rural Sociology	192
04.	Faculty of Animal Husbandry	165
05.	Faculty of Agricultural Engineering & Technology	109
06.	Faculty of Fisheries	315
Total		1,789

4.11 Shahjalal University of Science and Technology (SUST) Library

The first Science and Technology University was established in 1991 in Sylhet Division of Bangladesh. Shahjalal University of Science and Technology (SUST) were established in 1991 at Jalalabad, Sylhet, with only 3 departments. The University Library has been established since the inception of the University. The main objectives of the SUST library were:

- To increase knowledge and understanding by conducting scientific and technological research and teaching.
- To serve as a hub for technological innovation, knowledge creation, and transfer among academia, industry, and society.

The SUST library has a separate library building known for its triangle shape with 40,000 square feet of floor space. At present the library has a total collection of 75,000 books, 6,000 hard copy journals, and 37,500 e-books. Through the LiCoB Consortium, the SUST library has been subscribing to over 25,000 e-journals, e-books, and other resources. In addition, the library has been subscribing to IEEE, ACM, JSTOR, and Emerald e-journals and resources. KOHA software has been used to computerize the SUST library by creating a database in MARC 21 format. Since September 2013, the library has been computerized and offering computerized library services. Using the

following URL, library resources can be searched online from anywhere:
<http://library.sust.edu>

SUST Library has introduced the institutional repository for digital preservation from 2024. Under the digital preservation program, SUST Library has completed the uploading of about 500 master's and PhD theses and various types of reports. The work of uploading digitized rare collections and old newspapers to the institutional repository is underway.

4.12 North South University (NSU) Library

The North South University (NSU) library is the first RFID-based automated university library, established in 1992. It features six floors and spans over 83,850 square feet, accommodating more than 950 users at a time in its well-furnished reading room. NSU Library stands as one of the most resource-rich academic libraries among private universities in Bangladesh. The library features a significant collection of over 51,000 printed books and more than 2,400 theses and dissertations. In terms of digital resources, the library offers access to an impressive 102,931 online e-books and around 98,000 online journals. These resources are made available through institutional subscriptions and consortia, ensuring that faculty members, researchers, and students have seamless access to global scholarly content. NSU Library Website: <https://library.northsouth.edu>.

Despite this large digital collection, NSU Library does not yet have an institutional repository (IR) that captures and preserves its intellectual output, such as faculty publications, student theses, conference proceedings, and other academic materials in a structured digital environment. The absence of a dedicated digital preservation system, such as DSpace or Greenstone, leaves a gap in the long-term archiving and discoverability of NSU's academic assets. This highlights an opportunity for the library to implement a sustainable digital preservation platform that aligns with international best practices. NSU Library launched its digital repository in 2003 using its own software, NSU-LMS. It preserves over 21,500 articles and around 2,000 books, including works by NSU faculty and students, and 160 subscribed journals. The repository also contains digitized theses, reports, and news clippings. Access is currently restricted to registered NSU members through individual login credentials. Unlike many institutions, NSU has not used open-source platforms like DSpace or Greenstone. However, the university has recently decided to adopt open-source software for digital preservation and plans to make its institutional repository open access in the near future.

4.13 East West University (EWU) Library

East West University (EWU) has a well-resourced library called the Dr. S. R. Lasker Library, which was established in 1996. The library currently boasts a collection that includes 31,700 copies of books, 120,000 titles of e-books, 167 titles of print journals, 3,005 copies of theses, 58,000 titles of online journals, 3,225 titles of digital library collections, 37 e-resource databases, and 3,613 titles of institutional repository collections. The East West University Library's website can be found at <https://lib.edubd.edu>.

EWU Library has demonstrated a strong commitment to digital preservation since its early stages. In 2010, it began its digital journey by adopting Greenstone Digital Library Software due to its simplicity, flexibility, and user-friendly interface for both staff and users. This initiative was a significant step forward in managing and preserving the university's digital assets. Subsequently, the library upgraded its digital preservation strategy by implementing DSpace, open-source institutional repository software widely used worldwide for digital archiving.

Currently, the EWU Institutional Repository hosts 14 distinct communities encompassing nearly 4,000 publications. These include audio-video collections, news clippings, Bangla language resources, e-books, and thesis collections. Alongside DSpace, the Greenstone platform is still in use to preserve and provide access to a diverse range of collections, including multimedia, virtual books, and image libraries. Although the last update recorded was in January 2014, the dual-software system reflects EWU Library's continued emphasis on both access and preservation, serving as a model of hybrid digital preservation practices in Bangladesh.

4.14 BRAC University (BRACU) Library

The Ayesha Abed Library at BRAC University was established in 2001. The BRACU library features two floors with a total floor space of 29,030 square feet. Currently, the collection of the Ayesha Abed Library at BRACU includes 52,000 books, 45,000 e-books, 57,000 online journals and databases, 25,800 conference proceedings, and 16 daily printed newspapers and magazines. The BRACU library's website can be found at <https://library.bracu.ac.bd>.

BRACU library has established itself as a digitally advanced institution, well aligned with the university's mission to provide quality education and research opportunities.

Since its founding in 2001, the university has focused on innovation and excellence, mirrored in its library services. BRACU institutional repository (<https://dspace.bracu.ac.bd>), hosted on DSpace, currently maintains 26 communities with over 20,889 digital publications. These collections include theses, dissertations, internship reports, research reports, journal articles, conference papers, and other scholarly works.

The development of BRAC University's new campus in Savar, with modern facilities including a technologically equipped central library, indicates a further enhancement of its digital infrastructure. The library's robust institutional repository not only ensures long-term preservation of the university's intellectual outputs but also increases global visibility and citation of these works. BRAC University Library stands out as a leader among private universities in implementing comprehensive digital preservation strategies that support academic research and institutional memory.

4.15 Independent University, Bangladesh (IUB) Library

Independent University, Bangladesh (IUB) library started its glorious journey in 1993. The library consists of four meticulously designed floors with 22,360 square feet. The present collection of the IUB library consists of 30,000 printed books, 250,000 e-books, 25,000 online journals, and 2,617 audiovisual materials. The website of the IUB library is <https://library.iub.edu.bd>.

The IUB library is recognized for its academic strength and support for research and lifelong learning. The library provides access to a wide range of digital and print resources and has developed its institutional repository using DSpace. As of now, the IUB Library Repository hosts 14 communities with approximately 500 digital items. Although the number of items is relatively low compared to some other institutions, it marks a significant effort toward preserving academic content in a structured digital format.

The library offers access to numerous online journals and databases to support teaching and research activities. However, the limited volume in its repository suggests the need for increased content acquisition and upload, especially of student theses, faculty publications, and institutional reports. Strengthening the repository and updating metadata standards could enhance IUB Library's contribution to digital preservation and provide greater accessibility to its academic output.

4.16 Ahsanullah University of Science and Technology (AUST) Library

AUST established the Kazi Fazlur Rahman Library in 1995. The library features 7,730 square feet of floor space, providing users with a spacious environment for study. The current collection includes 28,500 books, 52,000 e-books, and 52 titles of e-journals. The website of the AUST library is <https://www.aust.edu/library>.

The Kazi Fazlur Rahman Library of AUST has made commendable progress in providing academic support through both physical and digital means. With the shift to its permanent campus, the library adopted an open-shelf system, increased study space for users, and focused on improving its digital services. The introduction of DSpace for managing digital content marks a significant step toward digital preservation and institutional archiving.

The current repository hosts community collections under faculties such as Architecture and Planning, Business and Social Sciences, Education, and Engineering. Recently added resources include textbooks, course materials, and subject-specific documents on topics like differential equations, wet processing in textiles, and geology. While the repository is still in its early stages with around 14 digital items, the infrastructure and system in place provide a solid foundation for future growth. Continued content development and awareness among faculty and students can enhance the utility and sustainability of digital preservation practices at AUST Library.

4.17 Current digital preservation practices among public university libraries are discussed in a comparative manner:

Digital preservation in public university libraries encompasses the maintenance and assurance of long-term access to digital resources, such as rare collections, research data, theses, institutional repositories, and multimedia content. The practices employed can differ significantly from one university to another, influenced by factors such as funding, institutional priorities, technological infrastructure, and available expertise.

DU leads the way in digital preservation initiatives, boasting a well-established digital library system within the country. DU has established institutional repositories and has digitized theses and research papers. Besides the institutional repositories, DU has been digitizing rare manuscripts since 2016 and old newspapers since 2017. DU has advanced infrastructure for digital preservation efforts. RU is at the moderate level in the field of digital preservation. Digital repositories for these and scholarly works exist but require improvement in accessibility and maintenance. Technological infrastructure is growing

IT support with ongoing digitization projects. CU is in the initial stage of digital preservation. DSpace software has been installed in 2025 for preserving theses and scholarly publications. JU is making progress in digital preservation efforts. JU has institutional repositories and digitized collections including rare manuscripts and theses. Digital preservation practices at BUET have been progressively developing to ensure the long-term accessibility and usability of digital resources. BUET has advanced IT infrastructure support for active digital preservation efforts. SAU started its digital preservation activities with World Bank finances in 2012 with preserving theses. SAU has institutional repositories where theses and academic publications are being preserved. BMU is in the nutshell stage in digital preservation practices. BAU started its digital preservation activities in 2012 with the establishment of a Digital Archive on Agricultural Thesis & Journals (DAATJ). BAU has an institutional repository for preserving theses. GAU has digital archive for preserving theses. SUST has introduced the institutional repository for digital preservation from 2024. The work of uploading digitized rare collections and old newspapers to the institutional repository is underway.

4.18 Current digital preservation practices among private university libraries are discussed in a comparative manner:

NSU is one of the leading private universities with relatively advanced IT infrastructure. NSU employ systematic digital preservation for academic materials and research data. This university uses digital repositories and integrates with national and international database. EWU has invested in digital libraries and electronic resources. This university's digital preservation mainly focuses on digitizing library collections and maintaining e-journals and theses. This university is working towards compliance with digital preservation standards. BRACU maintains digital repositories for research outputs and student theses. BRACU also emphasize open access and digital scholarship. IUB has an active digitization of library resources and institutional research. IUB employs digital backup and data management strategies. AUST is in developmental stages for digital preservation activities focusing mostly on digital copies of academic documents and limited repository services.

4.19 Comparison between Public and Private University Libraries Initiatives

The digital preservation practices of public and private university libraries in Bangladesh exhibit both similarities and notable differences in terms of approach, resource allocation, and technological adoption.

Public universities like Dhaka University, BUET, and BAU have generally initiated digital preservation under national or international projects such as HEQEP or DAATJ, with a focus on academic theses, dissertations, and institutional research. DSpace is the most widely used open-source software in public institutions, with repositories featuring thousands of documents. Libraries at universities such as Sher-e-Bangla Agricultural University and Bangladesh Agricultural University have preserved significant volumes of agricultural research outputs. Other institutions like JU and CU are gradually expanding their digital collections, including rare manuscripts and journals. These repositories are largely open access and aim to enhance global visibility of institutional research.

In contrast, **private university libraries** such as BRAC University, East West University, and North South University have often taken independent initiatives toward digital preservation. While many, like EWU and BRAC, use open-source software such as DSpace and Greenstone, others like NSU, initially developed in-house systems (e.g., NSU-LMS) for storing faculty and student publications. NSU's repository was initially closed-access, accessible only to registered members, but has recently shifted toward open access using open-source platforms. The volume of digitized materials in private universities is comparatively smaller than some public universities, but they emphasize technological integration, user-friendly interfaces, and diversified collections including multimedia content.

Overall, public universities focus more on research archiving, while private universities emphasize institutional branding, teaching materials, and user experience in digital preservation initiatives.

4.20 Conclusion

The present review reveals a dynamic and evolving landscape of digital preservation in Bangladeshi university libraries. Both public and private institutions have made commendable progress in digitizing and preserving their academic resources, although the scale and scope of these efforts vary. Public universities tend to have broader

collections with a focus on research output, driven by national initiatives and open access goals. Private universities, on the other hand, have developed more customized and often technologically advanced platforms, albeit with smaller-scale collections. Despite these differences, all institutions recognize the strategic importance of digital preservation in supporting academic excellence, research dissemination, and institutional memory. The chapter underscores the need for continued investment, policy development, and capacity building to ensure sustainable and interoperable digital preservation systems across the higher education sector in Bangladesh.

CHAPTER FIVE

ANALYSIS AND INTERPRETATION OF DATA

5.1 Introduction

This chapter investigates the core of the study, presenting a meticulous analysis of the collected data and unveiling the key findings. Through a systematic approach, the researcher scrutinizes the responses gathered from the selected university libraries in Bangladesh, shedding light on the prevailing conditions of digital preservation practices. Data analysis commences with a comprehensive examination of the demographic information of respondents, providing valuable insights into the profile of participants involved in the study. This foundational understanding sets the stage for a deeper exploration of the digital preservation landscape within the academic library sphere of Bangladesh.

The findings are meticulously presented, addressing each research question with precision and depth. **RQ-1** explores the existing conditions of digital preservation practices, unveiling the current state of affairs within the selected university libraries. **RQ-2** elucidates the processes and techniques utilized for the preservation of digital resources, offering a nuanced understanding of the strategies employed in safeguarding valuable digital assets. Moreover, **RQ-3** probes into user satisfaction with digitally preserved resources, capturing the perspectives and experiences of library patrons. **RQ-4** delves into the challenges and barriers impeding successful digital preservation efforts, highlighting the obstacles encountered by university libraries in Bangladesh. Additionally, **RQ-5** investigates the availability of sufficient funding and skilled staff to carry out digital preservation activities, providing crucial insights into the resource allocation and workforce dynamics within the realm of digital preservation.

Through rigorous analysis and interpretation, this chapter illuminates the intricacies of digital preservation practices in selected university libraries in Bangladesh. By juxtaposing empirical findings with existing literature and theoretical frameworks, the researcher offers a nuanced understanding of the multifaceted challenges and opportunities inherent in digital preservation endeavors.

The presentation of findings is structured to facilitate a coherent narrative, guiding readers through a journey of discovery and insight. Each subsection is meticulously crafted to distill complex data into actionable insights, empowering stakeholders within the academic library community to make informed decisions and implement effective strategies for enhancing digital preservation practices.

In essence, this chapter serves as a cornerstone of the study, offering a comprehensive analysis of the data gleaned from the field and providing a robust foundation for subsequent discussions and recommendations. As the narrative unfolds, readers are invited to immerse themselves in the rich tapestry of digital preservation practices, gaining a deeper appreciation for the challenges and opportunities that define this dynamic landscape.

5.2 Demographic Information of Library Administrators

Table 5.1 and Figure 5.1 present the demographic information of library administrators, categorized by their professional roles and the type of university they are affiliated with (public or private). The table provides a detailed breakdown of the number and percentage of administrators in each professional role within both public and private universities, as well as the total count and percentage across all institutions.

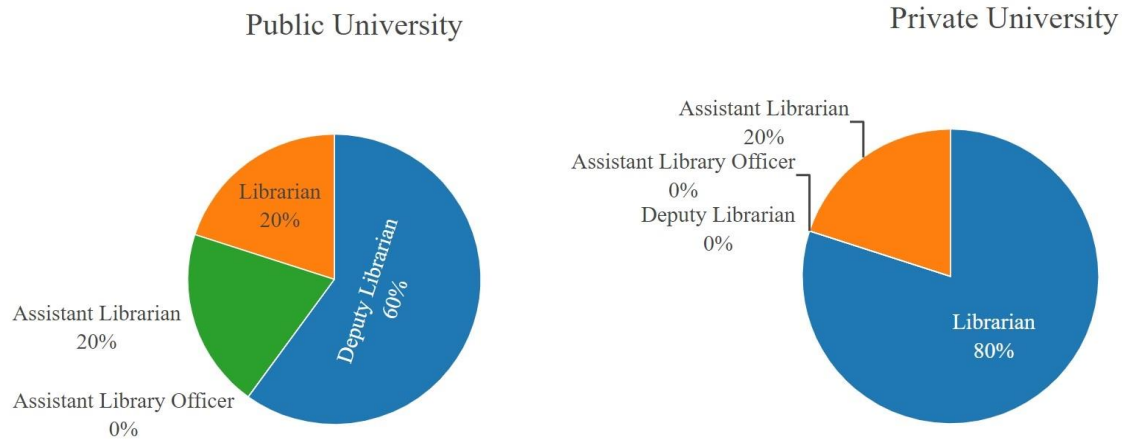
In total, the table encompasses data from 15 library administrators, with 10 representing public universities and 5 representing private universities. The professional roles included in the analysis are Librarian, Deputy Librarian, Assistant Librarian, and Assistant Library Officer.

Among public university administrators, the distribution of roles is as follows: Librarians account for 20% (2 administrators), Deputy Librarians make up the majority at 60% (6 administrators), and Assistant Librarians constitute the remaining 20% (2 administrators). However, there are no Assistant Library Officers in public university libraries.

In contrast, private university libraries exhibit a different distribution of roles: Librarians represent 80% (4 administrators) of the total, while Deputy Librarians and Assistant Library Officers are absent. Additionally, one Assistant Librarian is reported, constituting 20% of the total administrators in private university libraries.

Table 5.1: Demographic Information of Library Administrators

Professionals	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Librarian	2	20.0	4	80.0	6	40.0
Deputy Librarian	6	60.0	0	0	6	40.0
Assistant Librarian	2	20.0	1	20	3	20.0
Assistant Library Officer	0	0	0	0	0	0

T=Total**Figure 5.1: Demographic Information of Library Administrators**

5.3 Present Status of the Selected University Libraries in Bangladesh

5.3.1 General Information of the University and University Library

Table 5.2 provides general information about selected universities in Bangladesh, including their establishment year, category (public or private), number of students, and number of teachers. The table lists fifteen universities along with their respective details. The subsequent columns provide quantitative data regarding the size of the student and teacher populations within each university. The number of students enrolled at each institution is listed in the fifth column, reflecting the scale of the student body and the university's capacity for educational provision. The sixth column indicates the number of teachers employed by each university, highlighting the staffing resources available for academic instruction and support.

Overall, Table 5.2 offers a comprehensive overview of key institutional characteristics of selected universities in Bangladesh, facilitating comparative analysis and understanding of their respective profiles within the higher education landscape. The data presented in the table serves as a foundational resource for assessing the scale, scope, and academic infrastructure of each university, thereby contributing to a nuanced understanding of their organizational dynamics and educational missions.

Table 5.2: Name of university, Establishment Year, University Category, Student and Teacher State

SL. No.	Name of University	Est. Year	Category	No. of Student	No. of Teacher
1.	AUST	1995	Private	7363	440
2.	BAU	1961	Public	6199	587
3.	BRACU	2001	Private	13544	556
4.	BMU	1998	Public	5000	500
5.	GAU	1998	Public	1800	250
6.	BUET	1962	Public	5500	550
7.	CU	1966	Public	28000	1000
8.	DU	1921	Public	30000	1800
9.	EWU	1996	Private	12614	325
10.	IUB	1993	Private	11500	250
11.	JU	1970	Public	12517	718
12.	NSU	1992	Private	28083	1043
13.	RU	1953	Public	38000	1300
14.	SAU	2001	Public	4804	322
15.	SUST	1989	Public	11000	580

Table 5.3 presents information regarding the state of the library committee, opening and closing hours of libraries, and seating capacity in selected universities in Bangladesh. The table lists fifteen universities along with details related to their respective libraries.

The key result from Table 5.3 regarding the library committee status across the selected universities in Bangladesh indicates that all libraries surveyed have an active library committee in place. The study reveals that while most libraries open between 8:00 AM and 9:00 AM, closing times vary, with some libraries closing as early as 6:00 PM and others extending their hours until 10:00 PM. Additionally, there is considerable diversity in seating capacity, ranging from 250 to 1200 seats. Notably, larger universities such as DU and RU boast higher seating capacities of 1200 and 1000 seats, respectively, reflecting their larger student populations and the need for extensive study spaces. Conversely, smaller universities like GAU and BAU have lower seating capacities of 250 seats, indicating more limited resources for student study and research activities. This disparity underscores the importance of understanding the infrastructure and resources available within university libraries to support student learning and academic success.

Table 5.3: State of Library Committee, Library Opening & Closing Hour and Seating Capacity

SL. No.	Name of University	Library committee	Opening hour	Closing hour	Seating capacity
1.	AUST Library	Yes	8.00 AM	6.00 PM	302
2.	BMU Library	Yes	8.00 AM	9.00 PM	750
3.	BAU Library	Yes	8.00 AM	8.30 PM	250
4.	BRACU Library	Yes	9.00 AM	10.00 PM	650
5.	GAU Library	Yes	9.00 AM	8.00 PM	250
6.	BUET Library	Yes	9.00 AM	10.00 PM	270
7.	EWU Library	Yes	8.30 AM	10.00 PM	350
8.	IUB Library	Yes	9.00 AM	9.00 PM	500
9.	JU Library	Yes	9.00 AM	9.30 PM	800
10.	NSU Library	Yes	8.00 AM	9.30 PM	950

11.	SUST Library	Yes	8.00 AM	9.30 PM	350
12.	SAU Library	Yes	8.00 AM	9.00 PM	500
13.	CU Library	Yes	8.30 AM	9.00 PM	500
14.	DU Library	Yes	8.00 AM	10.00 PM	1200
15.	RU Library	Yes	9.00 AM	8.00 PM	1000

5.3.2 Library Resources

Table 5.4 provides an overview of the library resources available in selected universities in Bangladesh, including printed books, e-books, printed journals, and online journals/databases. The data reveals significant variation in the quantity of library resources across the universities surveyed. For printed books, the range spans from 27,845 in AUST to 650,000 in DU. Similarly, the number of e-books varies widely, from none reported in JU to 250,000 in IUB.

Moreover, the quantity of printed journals also exhibits diversity, with BAU reporting the highest number at 2,123, while universities like JU and SUST report 2,500 and 3,000 printed journals, respectively. Furthermore, the number of online journals and databases ranges from 03 reported in AUST to 120,000 in SUST.

Table 5.4: Library Resources

SL. No.	Name of University	Printed books	E-books	Printed journal	Online Journal/database
1.	AUST	27845	0	4	3 database
2.	BMU	27405	0	5308	20398
3.	BAU	210000	4287	2123	34500
4.	BRACU	51700	85547	30	55840
5.	GAU	25000	64000	275	67000
6.	BUET	140149	28200	215	50500

7.	EWU	31395	59600	610	58000
8.	IUB	28000	250000	20	27 database
9.	JU	115792	0	2500	0
10.	NSU	48885	50000	1800	72247
11.	SUST	80000	45000	3000	120000
12.	SAU	45082	4220	138	12120
13.	CU	350000	5000	150	40000
14.	DU	650000	50000	78965	16000
15.	RU	234993	40000	80000	20 database

Table 5.5 and Figure 5.2 present a comparative analysis of university category-wise library resources, categorized into four items: printed books, e-books, printed journals, and online journals/databases. The data indicates that for each resource item—printed books, e-books, printed journals, and online journals/databases—both public and private universities have an equal representation, reporting the presence of these resources. Additionally, the percentages for both public and private universities are 100%, indicating that all universities within each category reported the existence of these resources.

Table 5.5: University Category Wise Library Resources

SL. No.	Items	Public		Private		Total	
		T	%	T	%	T	%
1.	Printed books	10	100	5	100	15	100
2.	E-books	10	100	5	100	15	100
3.	Printed journals	10	100	5	100	15	100
4.	Online journal/database	10	100	5	100	15	100
Overall			100		100		100

T=Total

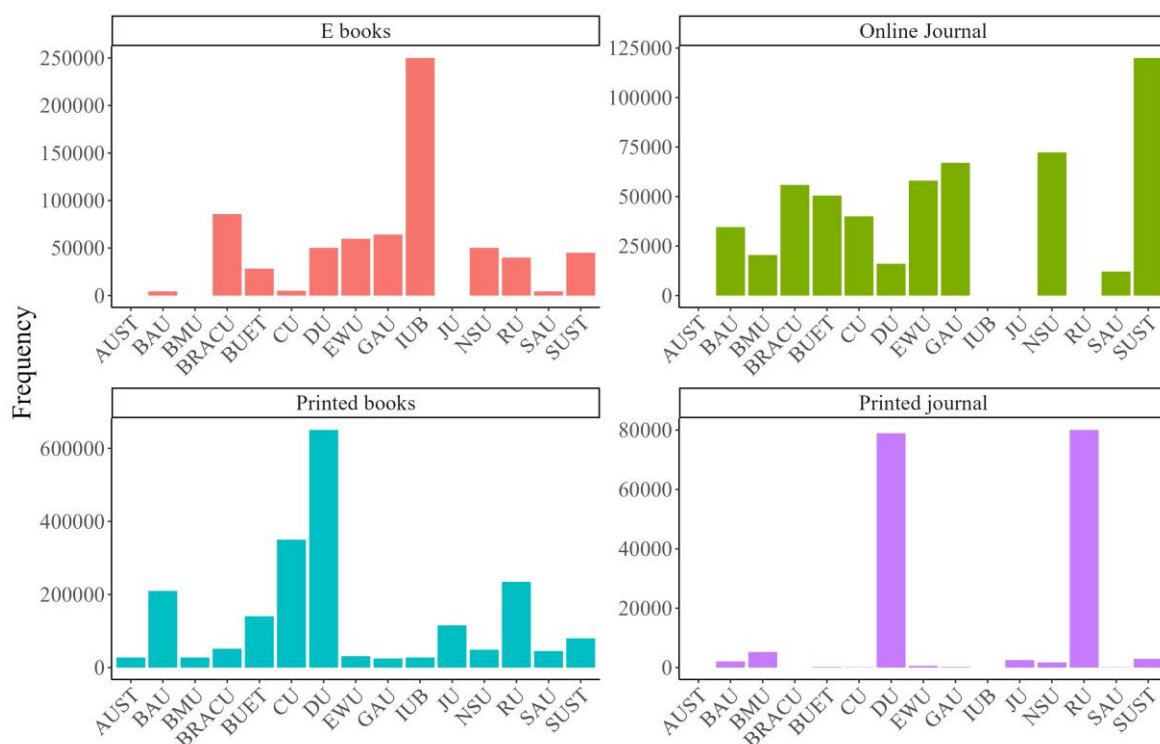


Figure 5.2: Library Resources

5.3.3 Library Manpower State

Table 5.6 and Figure 5.3 provide information about the library manpower in selected universities in Bangladesh. The data reveals significant variation in the size of library manpower across the universities surveyed. For example, DU reports the highest number of library personnel with 212 staff members, while other universities such as AUST and GAU report lower numbers with 07 and 15 staff members, respectively.

Table 5.6: Library Manpower

SL. No.	Name of University	Manpower
1.	Ahsanullah University of Science and Technology	07
2.	Bangladesh Medical University	26
3.	Bangladesh Agricultural University	58
4.	BRAC University	20

5.	Gazipur Agricultural University	15
6.	Bangladesh University of Engineering and Technology	46
7.	East West University	20
8.	Independent University, Bangladesh	17
9.	Jahangirnagar University	43
10.	North South University	28
11.	Sahjalal University of Science and Technology	40
12.	Sher-e-Bangla Agricultural University	22
13.	University of Chittagong	70
14.	University of Dhaka	212
15.	University of Rajshahi	72

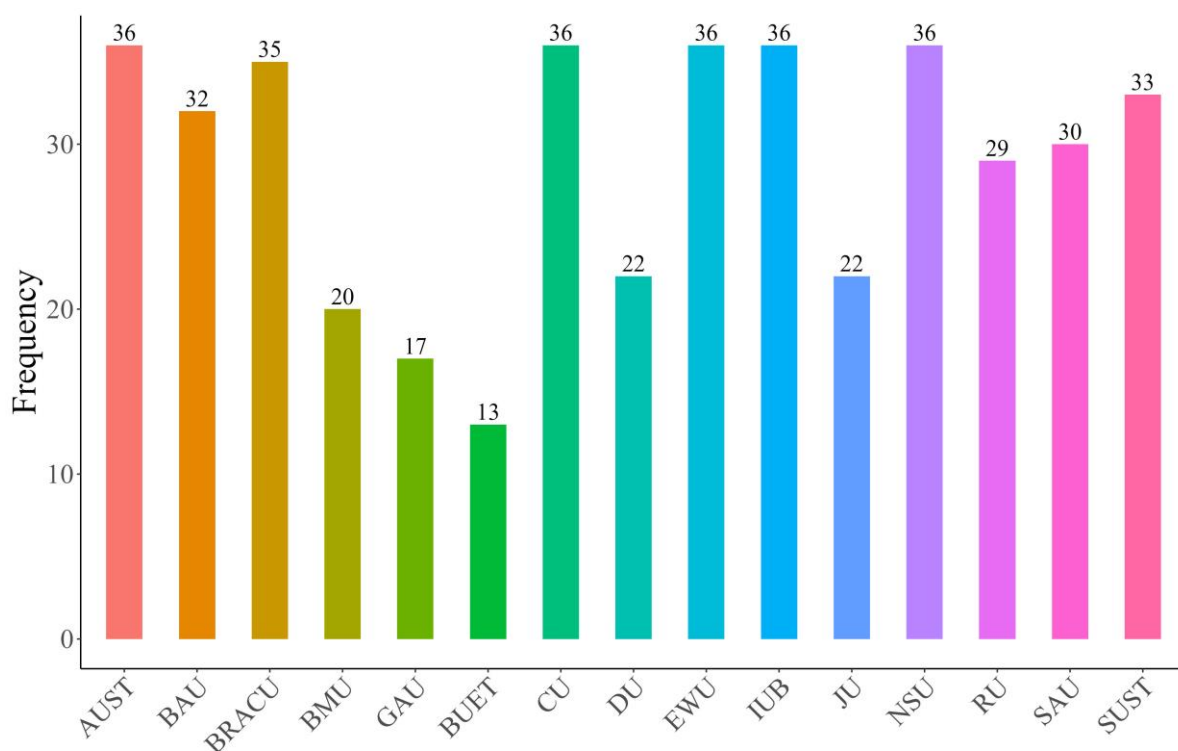


Figure 5.3: Library Manpower

5.4 Existing Condition of Digital Preservation Practices

Table 5.7 and Figure 5.4 presents the existing condition regarding the state of digital preservation programs in selected universities in Bangladesh. Among the universities with digital preservation programs, this constitutes 93.3% of the total surveyed. Conversely, universities without a digital preservation program account for 6.7% of the total. Furthermore, the table provides a breakdown of the presence of digital preservation programs based on university category. Among public universities, 9 out of 10 (or 90.0%) report having a digital preservation program. Similarly, among private universities, all 5 universities (or 100%) have implemented such programs.

Table 5.7: Digital Preservation Program State

	Frequency	Percent	University	Frequency	Percent
Yes	14	93.3	Public	09	64.3
No	1	6.7	Private	05	35.7
Total	15	100	Total	14	100

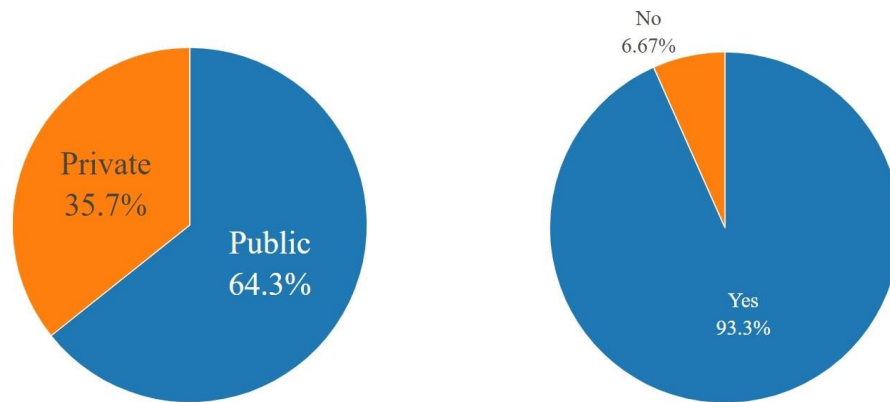


Figure 5.4: Digital Preservation Program State

5.4.1 Commencement of Digital Preservation Program

Table 5.8 provides information about the commencement year of the digital preservation programs in selected universities in Bangladesh. The data reveals variability in the timing of the commencement of digital preservation programs across the universities surveyed. Some

universities, such as AUST, BMU, and GAU, initiated their programs after 2020. Others, such as BAU, BUET, and EWU, commenced their programs between 2011 and 2015. Additionally, universities like SAU and BRACU began their programs between 2006 and 2010. However, it's noteworthy that CU does not have a specified commencement year for its digital preservation program.

Table 5.8: Commencement Year of Digital Preservation Program

SL. No.	Name of University	Year of Commencement
1.	AUST	After 2020
2.	BMU	After 2020
3.	BAU	2011-2015
4.	BRACU	2006-2010
5.	GAU	After 2020
6.	BUET	2011-2015
7.	EWU	2011-2015
8.	IUB	2011-2015
9.	JU	After 2020
10.	NSU	2011-2015
11.	SUST	2011-2015
12.	SAU	2006-2010
13.	CU	N/A
14.	DU	2011-2015
15.	RU	2011-2015

5.4.2 Materials Selected for the Digital Preservation

Table 5.9 and Figure 5.5 reveals a diverse array of materials selected for digital preservation across selected universities in Bangladesh. Notably, thesis and dissertation materials emerge as the most prioritized category, with an overwhelming majority of both public (90.0%) and private (100%) universities opting for their preservation, resulting in an overall outcome of 93.33%. Following closely behind are institutional records and annual reports, with public universities displaying notable interest alongside a unanimous selection from private institutions, resulting in a total outcome of 53.33% and 46.66%. However, journal and monograph materials show a considerable discrepancy, with private universities demonstrating a higher interest compared to their public counterparts. Meanwhile, old newspapers, rare collections, and manuscripts also garner attention, albeit to a lesser extent, showcasing a diverse range of preservation priorities within the higher education sector of Bangladesh. Government publications, maps, collections of liberation war, and images are considered the lowest (13.33%) prioritized categories as digital preservation types.

Based on the overall outcome, the ranking of the items is as follows: Thesis and dissertation (1), institutional records (2), annual reports (3), rare collection (4), journal and monograph (5), manuscripts (6), old newspapers (7), government publications (8), maps (9), collection of liberation war (10), and images (11). Therefore, based on the overall result, private universities rank higher (54.0%) in terms of the proportion of materials selected for digital preservation compared to public universities (28.0%), while the total average is 36.66%.

Table 5.9: Types of Materials Selected for Digital Preservation

Items	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Thesis and dissertation	9	90.0	5	100	14	93.33
Rare collection	4	40.0	2	40.0	6	40.0
Government publications	1	10.0	1	20.0	2	13.33
Manuscripts	2	20.0	2	40.0	4	26.66
Journal and monograph	2	20.0	3	60.0	5	33.33
Maps	1	10.0	1	20.0	2	13.33

Collection of liberation war	1	10.0	1	20.0	2	13.33
Old newspapers	2	20.0	1	20.0	3	20.0
Annual reports	2	20.0	5	100	7	46.66
Institutional records	3	30.0	5	100	8	53.33
Images	1	10.0	1	20.0	2	13.33
Overall		28.0		54.0		36.66

T=Total

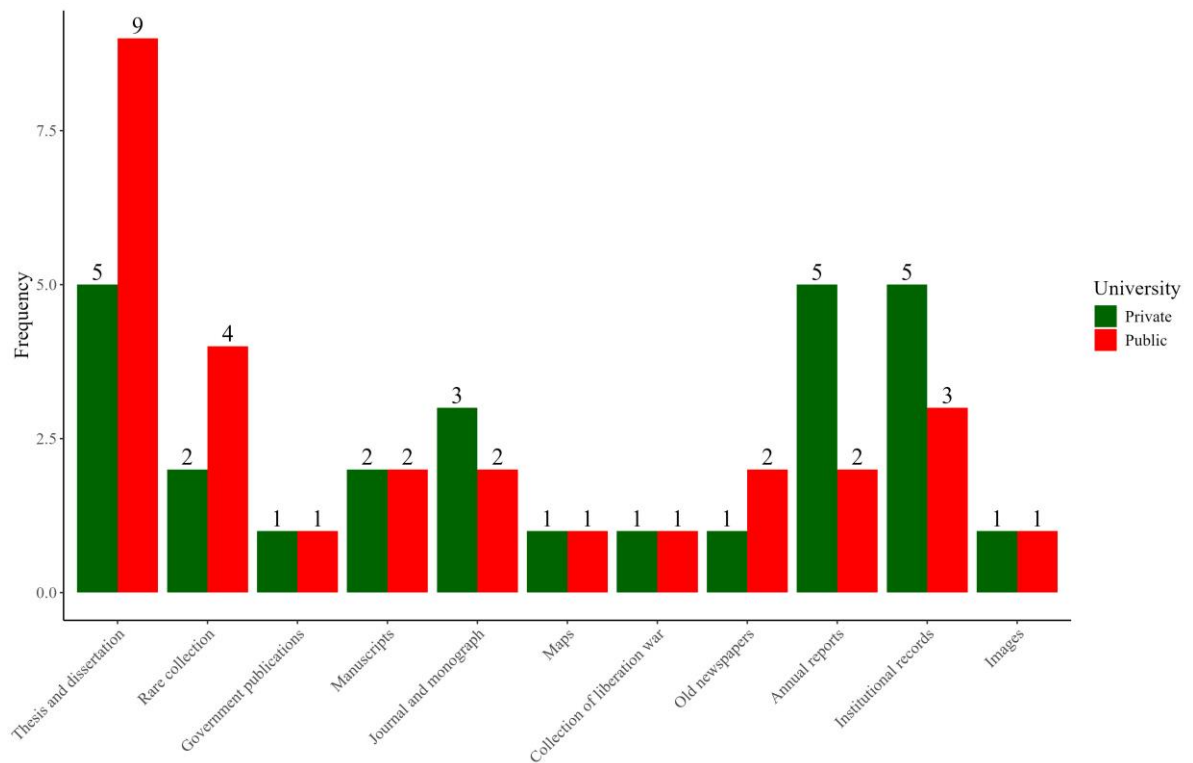


Figure 5.5: Types of Materials Selected for Digital Preservation

5.4.3 Who carries out the Digitization Process?

Table 5.10 and Figure 5.6 provides a cross-tabulation of who carries out the digital preservation (DP) process in their university libraries, categorized by public and private ownership. The first row indicates that in total, 12 university libraries (50.0%) state that the library authority is responsible for carrying out the digital preservation process. Among

these, 7 universities (58.3%) are public, and 5 universities (41.7%) are private. This represents 85.7% of the total cases. The second row shows that 2 universities (14.3%) state that both the library authority and outsourcing are involved in the digital preservation process. Both cases are from public universities, representing 22.2% of the public university cases. However, there are no instances of private universities outsourcing their digital preservation efforts.

Overall, among the total of 14 universities surveyed, 9 public universities (64.3%) report that the library authority is responsible for digital preservation, while 5 private university libraries (35.7%) mention a combination of library authority and outsourcing. This represents 100.0% of the cases surveyed.

Table 5.10: Who Carries Digital Preservation University Category Cross Tabulation

			University Category		Total
			Public	Private	
Who Carries DP	The library authority	Count	7	5	12
		% within Who Carries DP	58.3%	41.7%	100.0%
		% within University Category	77.8%	100.0%	85.7%
		% of Total	50.0%	35.7%	85.7%
	Both library authority and outsourcing	Count	2	0	2
		% within Who Carries DP	100.0%	0.0%	100.0%
		% within University Category	22.2%	0.0%	14.3%
		% of Total	14.3%	0.0%	14.3%
Total		Count	9	5	14
		% within Who Carries DP	64.3%	35.7%	100.0%
		% within University Category	100.0%	100.0%	100.0%
		% of Total	64.3%	35.7%	100.0%

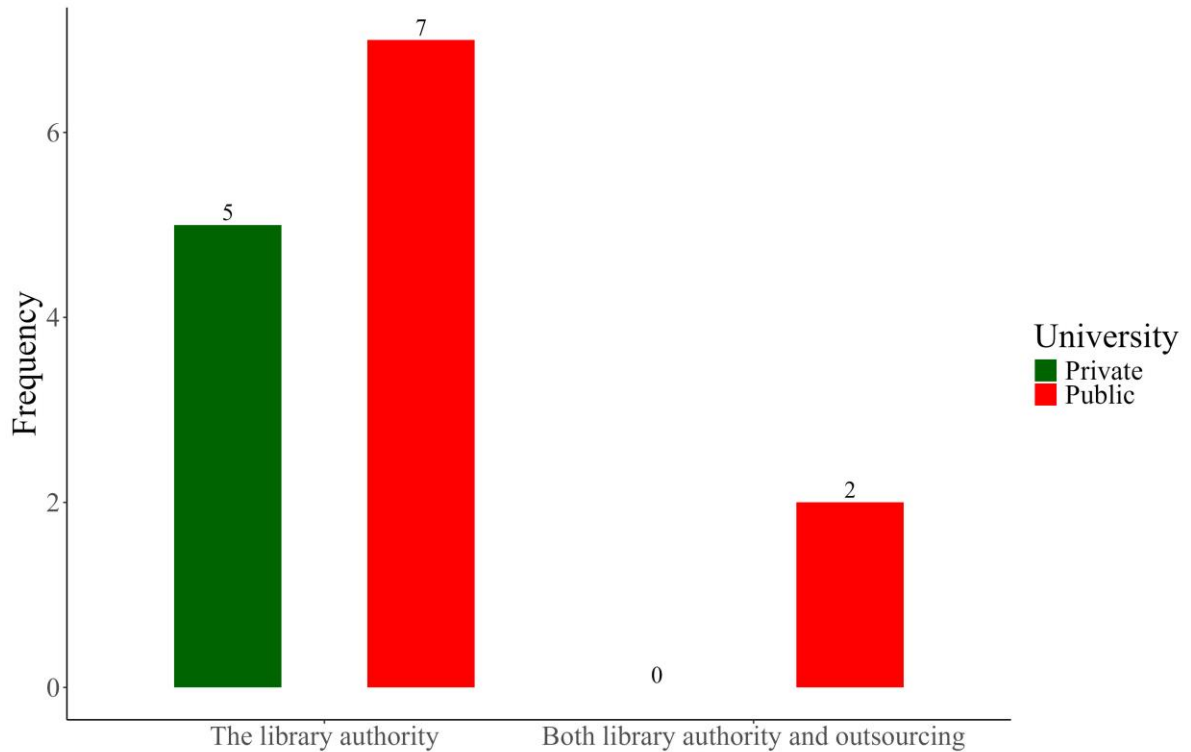


Figure 5.6: Who Carries Digital Preservation University Category Cross Tabulation

5.4.4 Who Prepares the Documents for Digitization in the Library?

Table 5.11 presents a cross-tabulation of who prepares the documents for digitization in university libraries, categorized by university ownership (public and private). According to the first row, 12 universities (50.0% of the total) report that library staff are responsible for preparing documents for digitization. Among these, 7 universities (58.3%) are public, and 5 universities (41.7%) are private. This accounts for 85.7% of the total cases surveyed. In the second row, 2 universities (14.3%) state that both library staff and an outsourcing agency are involved in preparing documents for digitization. Both of these cases are from public universities, representing 22.2% of public university cases. No instances are reported from private universities involving both library staff and outsourcing agencies.

Overall, among the total of 14 universities surveyed, 9 universities (64.3%) report that library staff are responsible for preparing documents for digitization, while 5 universities (35.7%) mention a combination of library staff and outsourcing agencies.

Table 5.11: Preparation of Documents for Digitization: University Category Cross Tabulation

			University Category		Total
			Public	Private	
Who Prepare documents for digitization in the library?	Library staff	Count	7	5	12
		% within Who Prepare doc digitization	58.3%	41.7%	100.0%
		% within University Category	77.8%	100.0%	85.7%
		% of Total	50.0%	35.7%	85.7%
	Both library staff and outsourcing agency	Count	2	0	2
		% within Who Prepare doc digitization	100.0%	0.0%	100.0%
		% within University Category	22.2%	0.0%	14.3%
		% of Total	14.3%	0.0%	14.3%
Total		Count	9	5	14
		% within Who Prepare doc digitization	64.3%	35.7%	100.0%
		% within University Category	100.0%	100.0%	100.0%
		% of Total	64.3%	35.7%	100.0%

5.4.5 Digitization Source

Table 5.12 and Figure 5.7 presents the types of sources from where the digitization process is carried out, categorized by university ownership (public and private). Among the public universities, 40.0% indicate that the digitization process is carried out from original sources, while 20.0% report using born-digital sources. Additionally, 40.0% of public universities mention utilizing both original and born-digital sources for digitization. In contrast, among

private universities, 20.0% state using original sources, while none report using born-digital sources. However, larger proportions (80.0%) of private universities utilize both original and born-digital sources for the digitization process. Overall, across all universities surveyed, 33.3% indicate using original sources, 13.3% mention born-digital sources, and 53.3% utilize both original and born-digital sources for digitization.

Table 5.12: Source Types from Where the Digitization Process Carried Out

Source Type	Public(10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Original	4	40.0	1	20.0	5	33.3
Born digital	2	20.0	0	0.0	2	13.3
Both original and born-digital	4	40.0	4	80.0	8	53.3

T= Total

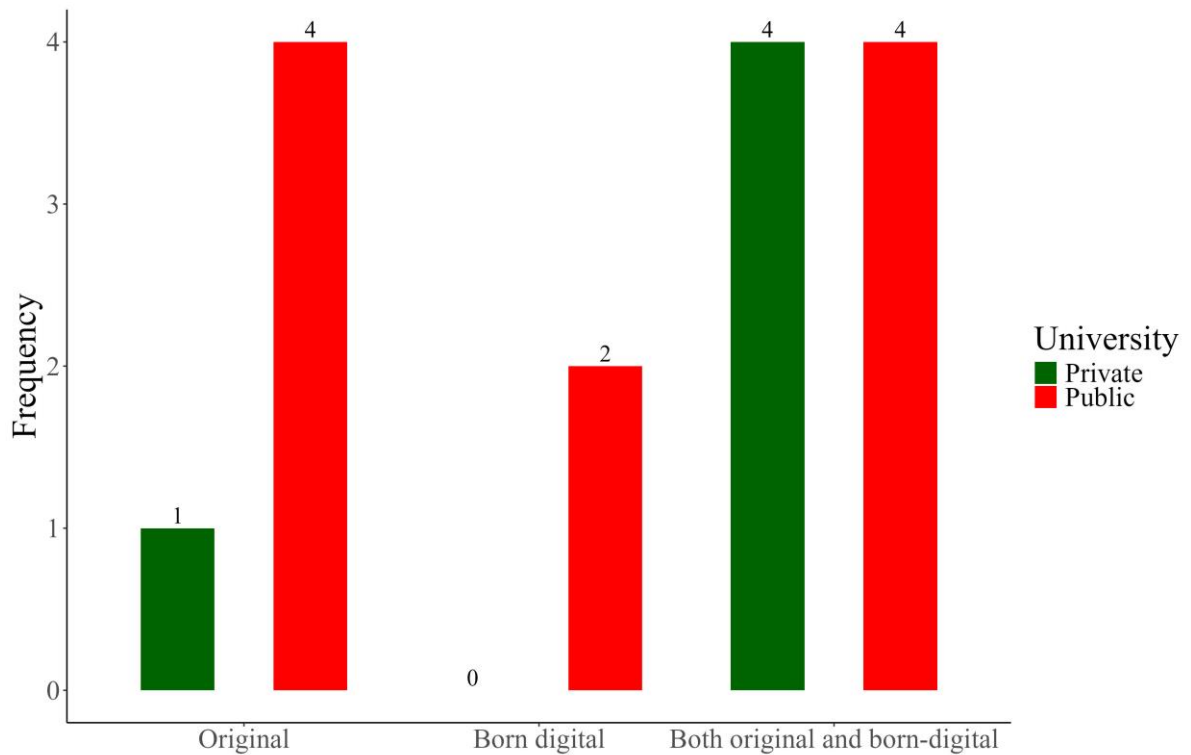


Figure 5.7: Source Types from Where the Digitization Process Carried Out

5.4.6 Research Project Dealing with Digital Preservation

Table 5.13 presents data on research projects dealing with digital preservation. Among the respondents, 6 out of 14 (40.0%) indicated that they have been involved in research projects dealing with digital preservation, while 8 respondents (53.3%) reported not being engaged in such projects. In this case, 42.9% of respondents have worked on research projects related to digital preservation. The cumulative percent column shows the cumulative percentage of responses up to each row. By the end of the table, 42.9% of respondents have indicated involvement in research projects dealing with digital preservation.

Table 5.13: Research Project Dealt with Digital Preservation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6	40.0	42.9	42.9
	No	8	53.3	57.1	100.0
	Total	14	93.3	100.0	
Missing System		1	6.7		
Total		15	100.0		

5.4.7 Digital Preservation Project in University Libraries

The respondents of university library administrators were asked to share the Digital Preservation Project (DPP) name. The responses provided by the university library administrators shed light on various digital preservation projects undertaken by different universities.

- i. BRACU Institutional Repository Project: This project, run by BRAC University, focuses on establishing an institutional repository to preserve and provide access to the university's scholarly output and other digital materials. Institutional repositories serve as important platforms for archiving and disseminating academic research and institutional publications.
- ii. COLTEL Project at University of Rajshahi: The COLTEL project at the University of Rajshahi aims to address digital preservation challenges specific to the university's

- context. While the exact nature of the project is not specified, it likely involves initiatives to preserve and manage digital content related to teaching, learning, and research within the university.
- iii. **Digitization of Old Newspapers, Manuscripts, and Rare Collection Project at Dhaka University Library:** This project conducted at Dhaka University library focuses on digitizing historical newspapers, manuscripts, and rare collections. By digitizing these materials, the university ensures their long-term preservation and facilitates access for researchers and scholars interested in studying Bangladesh's cultural and historical heritage.
 - iv. **Manuscript Digitization Project (MDP) at University of Chittagong:** The manuscript digitization project at the University of Chittagong aims to digitize and preserve valuable manuscript collections held by the university. Digitizing manuscripts helps prevent physical degradation and loss while making these important cultural artifacts more accessible to a wider audience.
 - v. **SUST IR Project at Shahjalal University of Science and Technology:** The Institutional Repository (IR) project at Shahjalal University of Science and Technology focuses on establishing and maintaining a digital repository to preserve and provide access to the scholarly output of the university's faculty, researchers, and students. IRs plays a crucial role in digital preservation by ensuring the long-term accessibility and visibility of academic research outputs.

Overall, these digital preservation projects demonstrate the commitment of university libraries in Bangladesh to safeguarding and providing access to valuable digital resources, thereby contributing to the preservation of cultural heritage and scholarly knowledge.

5.5 Digital Preservation Policy

Table 5.14 and Figure 5.8 present a cross-tabulation of the state of digital preservation policy in university libraries, categorized by university ownership (public and private). Among the public universities surveyed (totaling 10), 60.0% indicate that they have a digital preservation policy, while 40.0% report not having one. In comparison, a higher percentage (80.0%) of private universities (totaling 5) state that they have a DP policy, with only 20.0%

reporting not having one. The percentage within the university category column shows the proportion of responses within each university category. Within public universities, 60.0% have a DP policy while 40.0% do not. In private universities, 80.0% have a DP policy, and 20.0% do not. Among all universities (totaling 15), 66.7% have a DP policy, while 33.3% do not.

This table reveals differences in the presence of digital preservation policies between public and private universities, with a higher percentage of private universities reporting the existence of such policies.

Table 5.14: State of Digital Preservation Policy in the Library

			University Category		Total (15)
			Public (10)	Private (5)	
Does have DP Policy?	Yes	Count	6	4	10
		% within University Category	60.0%	80.0%	66.7%
	No	Count	4	1	5
		% within University Category	40.0%	20.0%	33.3%

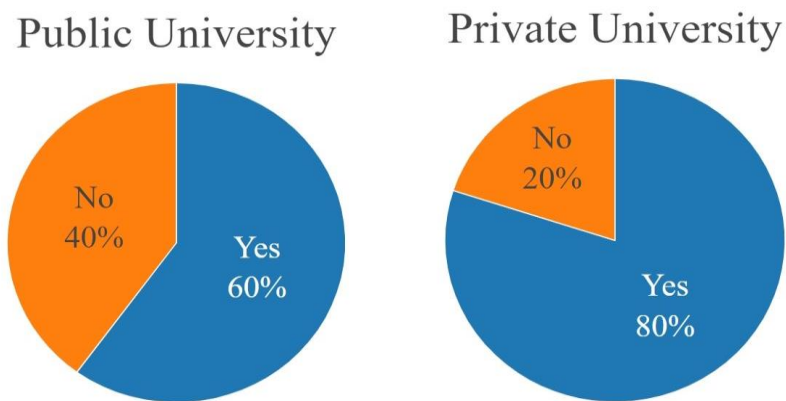


Figure 5.8: State of Digital Preservation Policy in the Library

Table 5.15 presents a cross-tabulation regarding whether university libraries follow their digital preservation policies, categorized by university ownership (public and private). Among the public universities surveyed (totaling 10), 40.0% indicate that they follow their digital preservation policies, while 60.0% report not following them. In contrast, a higher

percentage (80.0%) of private universities (totaling 5) state that they follow their digital preservation policies, with only 20.0% reporting not follows them. Within public universities, 40.0% follow their digital preservation policies, while 60.0% do not. In private universities, 80.0% follow their digital preservation policies, and 20.0% do not. Among all universities (totaling 15), 53.3% indicate that they follow their digital preservation policies, while 46.7% report not following them.

This table highlights differences in adherence to digital preservation policies between public and private universities, with a higher percentage of private universities reporting adherence to their policies.

Table 5.15: Does the Library Follow Policy?

			University Category		Total (15)
			Public (10)	Private (5)	
Does library follow policy?	Yes	Count	4	4	8
		% within University Category	40.0%	80.0%	53.3%
	No	Count	6	1	7
		% within University Category	60.0%	20.0%	46.7%

Among the public universities surveyed (totaling 10), 40.0% indicate that they follow their own policy for digital preservation, while 80.0% of private universities (totaling 5) report following their own policy. No libraries, either public or private, report following the NMM, IFLA, or UNESCO guidelines for digital preservation. The total row provides the overall count and percentage for each policy category across all universities surveyed. Among all universities (totaling 15), 53.33% follow their own policy for digital preservation, while none follow the NMM, IFLA, or UNESCO guidelines (Table 5.16).

Table 5.16: Which Policy Does the Library Follow?

	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Own policy	4	40.0	4	80.0	8	53.33
NMM	0	0	0	0	0	0
IFLA	0	0	0	0	0	0
UNESCO guideline	0	0	0	0	0	0
Overall		10.0		20.0		13.33

T= Total

Table 5.17 outlines the intentions of university libraries regarding the development or adoption of digital preservation policies. Among the surveyed libraries, 33.3% express a plan to develop their own digital preservation policy; while an equal percentage (33.3%) indicate a plan to follow existing standards in digital preservation. The valid percent column represents the proportion of responses within each category, indicating that 50.0% of libraries have a plan to develop their own policy, and 50.0% plan to follow existing standards. In the first category, 50.0% of responses indicate a plan to develop a policy. By the second category, which includes libraries planning to follow standards, the cumulative percent reaches 100.0%.

This table suggests that an equal proportion of surveyed university libraries are considering either developing their own digital preservation policy or adopting existing standards for digital preservation.

Table 5.17: Plan to Develop or Follow Digital Preservation Policy

	Frequency	Percent	Valid Percent	Cumulative Percent
Have a plan to develop	5	33.3	50.0	50.0
Have a plan to follow standard	5	33.3	50.0	100.0
Total	10	66.7	100.0	

5.6 Preservation Strategy and Standard

Table 5.18 presents the preservation strategies employed by university libraries categorized by their affiliation. For public universities, scanning is the most commonly utilized preservation strategy, with 80.0% employing this method. Metadata creation follows, with 40.0% of public universities utilizing this strategy. One public university reported having no preservation strategy. Among private universities, scanning and metadata creation are both prevalent, each being employed by 80.0% of the surveyed institutions. One private university reported using replication as a preservation strategy.

Overall, scanning is the most widely adopted preservation strategy, with 80.0% of all surveyed libraries utilizing this method. Metadata creation is also prominent, being employed by 53.33% of all surveyed institutions. Other strategies, such as migration and replication, are less common, each being employed by only one university. Additionally, one university reported having no preservation strategy in place.

Table 5.18: University Category Wise Preservation Strategies

Strategy	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Migration	0	0	1	20.0	1	6.66
Replication	0	0	1	20.0	1	6.66
Scanning	8	80.0	4	80.0	12	80.0
Metadata creation	4	40.0	4	80.0	8	53.33
No preservation strategy	1	10.0	0	0	1	6.66
Overall		13.0		40.0		10.22

T=Total

5.6.1 Digital Preservation Standard

Among public universities, MARC is the most commonly employed preservation standard, utilized by 60.0% of the surveyed institutions. Dublin Core follows closely, being employed by 50.0% of public universities. Other standards, such as METS and ISBD are less prevalent, each being employed by 20.0% of public universities. Additionally, 30.0% of

public universities reported having no preservation strategy in place. In contrast, among private universities, Dublin Core is the dominant preservation standard, employed by 100% of the surveyed institutions. MARC is also utilized but to a lesser extent, being employed by 40.0% of private universities. Both METS and ISBD are utilized by 20.0% of private universities. No private university reported having no preservation strategy.

Overall, Dublin Core emerges as the most widely adopted preservation standard, being employed by 66.66% of all surveyed libraries. MARC is the next most prevalent, employed by 53.33% of all surveyed institutions. METS and ISBD are less commonly employed, each being utilized by 20.0% of all surveyed libraries. Additionally, 20.0% of all surveyed libraries reported having no preservation strategy in place (Table 5.19 and Figure 5.9).

Table 5.19: University Category Wise Preservation Standard

Preservation Standard	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
MARC	6	60.0	2	40.0	8	53.33
Dublin Core	5	50.0	5	100	10	66.66
METS	2	20.0	1	20.0	3	20.0
ISBD	2	20.0	1	20.0	3	20.0
No preservation strategy	3	30.0	0	0	3	20.0
Overall		36.0		36.0		36.0

T=Total

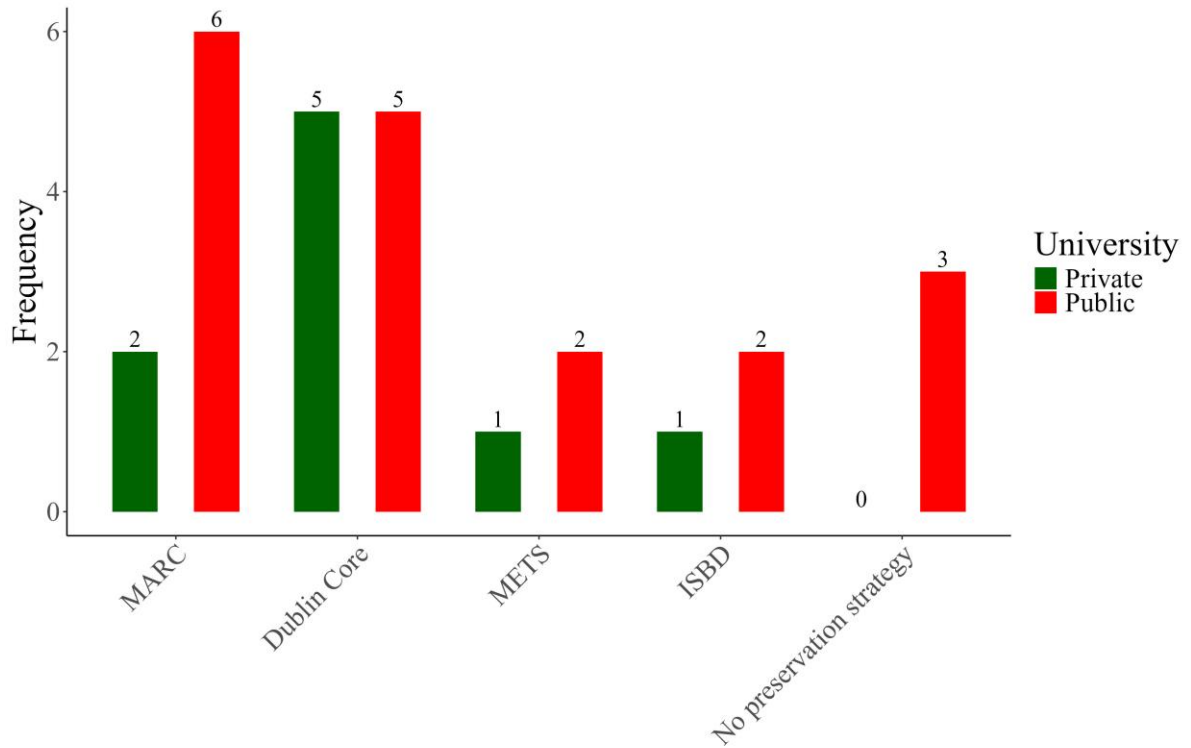


Figure 5.9: University Category Wise Preservation Standard

5.6.2 Digital Preservation Techniques

The study found that, among public universities, scanning is the most prevalent preservation technique, employed by 80.0% of the surveyed institutions. Migration is also commonly used, with a reported utilization rate of 30.0%. Reformatting and microfilming are less common techniques, each being employed by 20.0% and 10.0% of public universities, respectively. Emulation was not reported as being utilized by any public university. In private universities, scanning emerges as the predominant preservation technique, being employed by 100% of the surveyed institutions. Migration is also utilized by 40.0% of private universities. Reformatting is employed by 20.0% of private universities, while microfilming was not reported as being utilized by any private university. Similarly, emulation was not reported as being utilized by any private university.

Overall, scanning is the most widely adopted preservation technique, being employed by 86.66% of all surveyed libraries. Migration is the next most prevalent, utilized by 33.33% of all surveyed institutions. Reformatting and microfilming are less commonly employed, each

being utilized by 20.0% and 6.66% of all surveyed libraries, respectively. Emulation was not reported as being utilized by any surveyed institution (Table 5.20 and Figure 5.10).

Table 5.20: University Category Wise Preservation Techniques

Preservation Technique	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Migration	3	30.0	2	40.0	5	33.33
Emulation	0	0	0	0	0	0
Scanning	8	80.0	5	100	13	86.66
Reformatting	2	20.0	1	20.0	3	20.0
Microfilming	1	10.0	0	0	1	6.66
Overall		28.0		32.0		29.33

T=Total

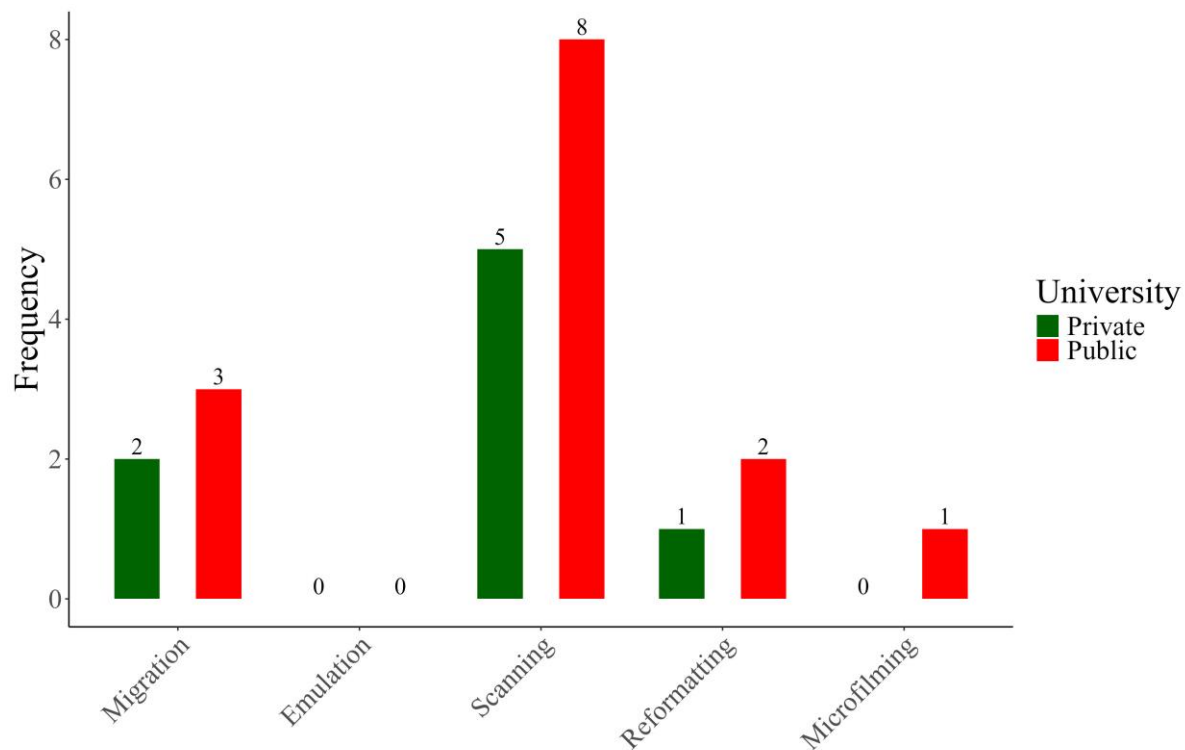


Figure 5.10: University Category Wise Preservation Techniques

5.6.3 Types of Scanning Materials

Table 5.21 illustrates the types of materials being scanned in the migration technique, categorized by university affiliation: Among public universities, 70.0% reported scanning non-book materials, while 10.0% reported scanning books. None of the public universities reported scanning both book and non-book materials in the migration technique. In private universities, 60.0% reported scanning either book and non-book materials, while none reported scanning only books or non-book materials. Overall, 46.6% of all surveyed libraries reported scanning non-book materials, while 20.0% reported scanning both book and non-book materials. Only 6.66% reported scanning books exclusively.

Table 5.21: University Category Wise Scanning Material in Migration Technique

Materials	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Book	1	10.0	0	0	1	6.66
Non-book	7	70.0	0	0	7	46.6
Both book and non-book	0	0	3	60.0	3	20.0
Overall		26.66		20.0		24.42

T=Total

5.6.4 Types of File Format for Migration Technique

Table 5.22 presents the types of file formats utilized for the migration technique, classified by university category: In public universities, 30.0% reported using software configuration exclusively, while 40.0% used both hardware and software configurations. Only 10.0% reported utilizing hardware configuration alone. Among private universities, 40.0% utilized software configuration alone, and 60.0% utilized both hardware and software configurations. None reported using only hardware configuration. Overall, 33.33% of all surveyed libraries reported using software configuration exclusively, while 46.6% reported using both hardware and software configurations. Only 6.66% reported using hardware configuration exclusively.

Table 5.22: University Category Wise File Format for Migration Technique

Type of file format	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Hardware configuration	1	10.0	0	0	1	6.66
Software configuration	3	30.0	2	40.0	5	33.33
Both hardware and software configuration	4	40.0	3	60.	7	46.6
Overall		26.66		33.33		28.86

T=Total

5.6.5 File Convert in Migration Technique

Table 5.23 and Figure 5.11 illustrates the types of file conversions employed in the migration technique, categorized by university type: Among public universities, 50.0% reported converting from Microsoft Word to PDF, while 10.0% converted from PDF to PDF and another 10.0% converted from TIFF to PDF. None reported converting from Microsoft Word to TIFF. In private universities, the majority (60.0%) converted from Microsoft Word to PDF, while 20.0% converted from TIFF to PDF, and 20.0% converted from Microsoft Word to TIFF. Overall, the most common conversion was from Microsoft Word to PDF, with 53.33% of all reported conversions. Conversions from PDF to PDF and TIFF to PDF accounted for 26.66% and 20.0% of the total conversions, respectively.

Table 5.23: University Category Wise File Convert in Migration Technique

Conversion	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
PDF to PDF	1	10.0	3	60.0	4	26.66
Microsoft word to PDF	5	50.0	3	60.0	8	53.33
Tiff to PDF	1	10.0	2	40.0	3	20.0
Microsoft word to Tiff	0	0	1	20.0	1	6.66
Overall		17.5		45.0		26.66

T=Total

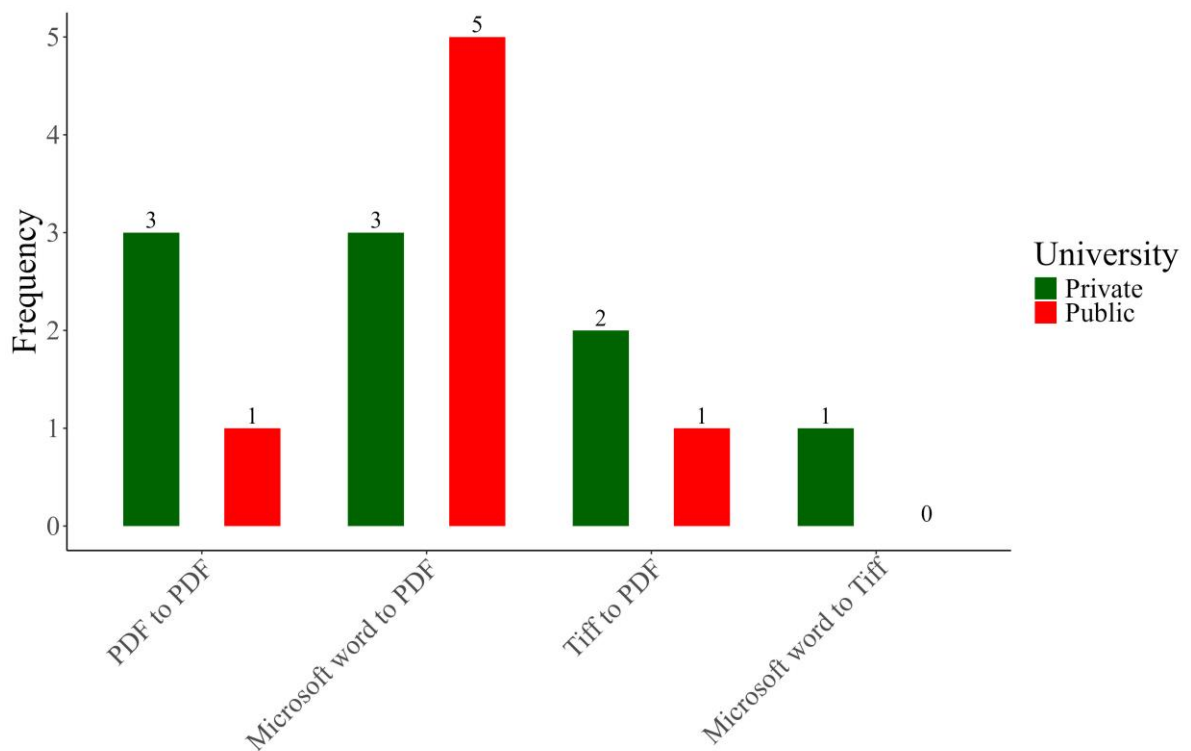


Figure 5.11: University Category Wise File Convert in Migration Technique

5.6.6 Types of Scanner

Table 5.24 outlines the types of scanners utilized in university libraries, categorized by public and private institutions: Among public universities, 60.0% reported using flatbed scanners, while 20.0% reported using Book Eye scanners. In private universities, a higher percentage (80.0%) utilized flatbed scanners, with no reported use of Book Eye scanners. Overall, flatbed scanners were the most commonly used type, accounting for 66.66% of all reported scanner types. Book Eye scanners were utilized to a lesser extent, representing 13.33% of the total reported scanner usage. There were no reported instances of drum scanners or handheld scanners across both public and private universities.

Table 5.24: University Category Wise Use of Scanner

Type of scanner	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Flatbed Scanner	6	60.0	4	80.0	10	66.66
Drum Scanner	0	0	0	0	0	0
Handheld Scanner	0	0	0	0	0	0
Book Eye	2	20.0	0	0	2	13.33
Overall		20		20		19.99

*T=Total***5.6.7 Preparing the Resource for Scanning**

Table 5.25 illustrates the methods employed by universities to prepare resources for scanning, categorized by public and private institutions: In both public and private universities, the most common approach, adopted by 60.0% of each, is to separate different material types before scanning. Conversely, a smaller percentage of universities, 40.0% overall, opt to keep the materials together in the workflow. Overall, preparing resources by separating different material types is the dominant method, representing 60.0% of the total reported practices, while keeping materials together in the workflow accounts for 40.0%.

Table 5.25: University Category Wise Preparing the Resources for Scanning

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Separate different material type	6	60.0	3	60.0	9	60.0
Keep them together in workflow	2	40.0	1	20.0	3	20.0
Overall		50.0		40.0		40.0

*T=Total***5.6.8 Resolution of Scanner**

Table 5.26 presents the resolution settings used by universities' scanners, categorized by public and private institutions: Among public universities, 40.0% utilize a resolution of 300, while 20.0% each employ resolutions of 600 and 1200. In private universities, the majority

(60.0%) utilize a resolution of 600, while 40.0% use a resolution of 1200, and 20.0% use 300. Additionally, 20.0% of private universities use a resolution of 4800x9600, while this option is not reported among public universities. Overall, the most common resolution setting reported is 600, accounting for 33.33% of the total reported practices, followed by resolutions of 300 and 1200, each representing 26.66%.

Table 5.26: University Category Wise Resolution of Scanner

Source Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Resolution 200	0	0	0	0	0	0
Resolution 300	4	40.0	1	20	5	33.33
Resolution 600	2	20.0	3	60.0	5	33.33
Resolution 1200	2	20.0	2	40.0	4	26.66
Resolution 4800x9600	0	0	1	20.0	1	6.66

T=Total

5.6.9 File Format of Reproduced Text File

Table 5.27 outlines the file formats utilized for reproduced text files across public and private universities: In both public and private universities, the predominant file format used is .PDF, with 80.0% utilization in each category. .JPG is also commonly employed, with 40.0% usage in both public and private universities. Additionally, .RTF and .TIFF formats are used, with 10.0% and 20.0% utilization in public universities and 20.0% and 40.0% utilization in private universities, respectively. Overall, .PDF files constitute the majority, accounting for 80.0% of the total reported practices, followed by .JPG files at 40.0%.

Table 5.27: University Category Wise File Format of Reproduced Text File

File format	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
.PDF	8	80.0	4	80.0	12	80.0
.RTF	1	10.0	1	20.0	2	13.33
.TIFF	0	0	1	20.0	2	13.33
.JPG	4	40.	2	40.0	6	40.0
Overall		32.5		40.0		36.66

T=Total

5.6.10 File Format of Reproduced Image File

Table 5.28 illustrates the file formats utilized for reproduced image files across public and private universities: The most common file format used in both public and private universities is JPG, with 80.0% utilization in each category. PNG format is also frequently employed, with 10.0% usage in public universities and a higher percentage of 60.0% in private universities. Additionally, BMP and TIFF formats are utilized, with 10.0% and 20.0% utilization in public universities, and 20.0% and 40.0% utilization in private universities, respectively. Overall, JPG files constitute the majority, accounting for 80.0% of the total reported practices, followed by PNG files at 26.66%.

Table 5.28: University Category Wise File Format of Reproduced Image File

File format	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
JPG	8	80.0	4	80.0	12	80.0
PNG	1	10.0	3	60.0	4	26.66
BMP	1	10.0	1	20.0	2	13.33
TIFF	0	20.0	1	40.0	1	6.66

T=Total

5.7 Institutional Repository for Digital Preservation

Table 5.29 and Figure 5.12 provide insights into the status of Institutional Repositories (IR) for digital preservation across public and private universities: Among public universities, 90.0% have established an institutional repository for digital preservation, while only 10.0% do not have one. In contrast, all private universities included in the study (100.0%) have implemented an institutional repository for digital preservation. Overall, the majority of universities, comprising 93.3% of the total surveyed, have an institutional repository in place for digital preservation, while a small percentage, 6.7%, do not.

Table 5.29: University Category Wise Institutional Repository (IR) State

IR State	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	9	90.0	5	100	14	93.3
No	1	10.0	0	0	1	6.7

T =Total

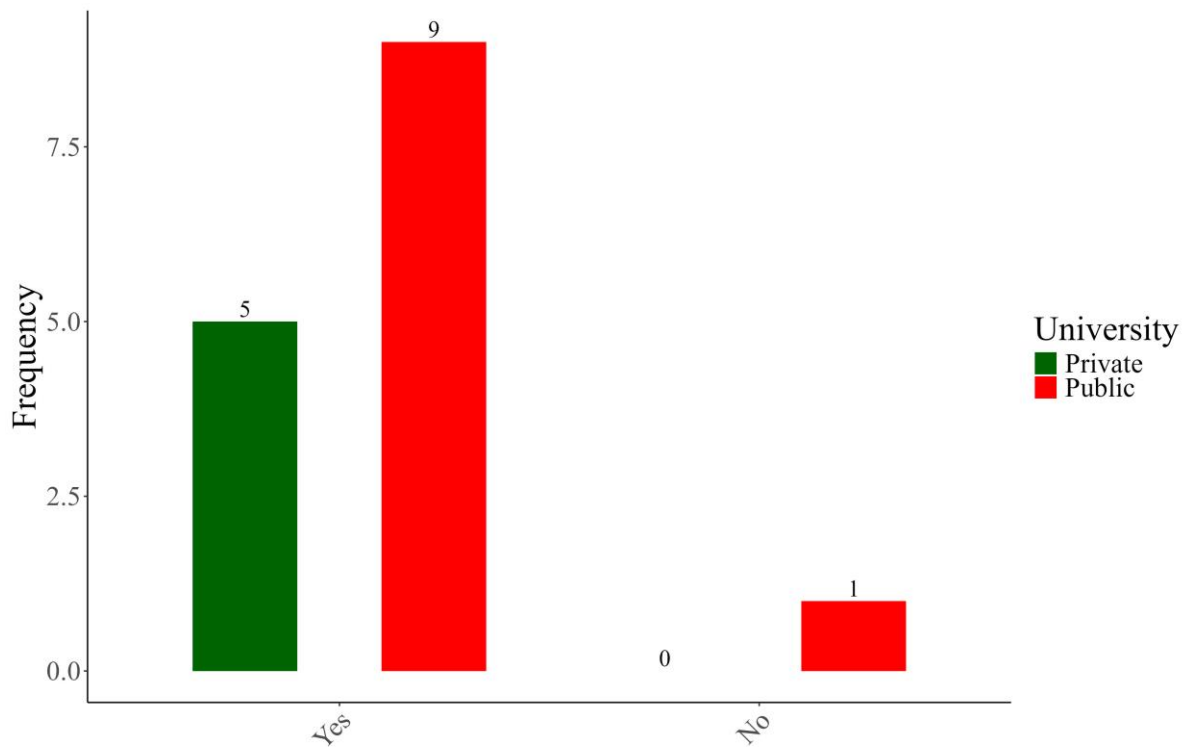


Figure 5.12: University Category Wise Institutional Repository (IR) State

Table 5.30 outlines the Institutional Repository (IR) software utilized by various universities along with the respective establishment years of their IR systems. Most universities employ DSpace for their IR platforms, with establishment years ranging from as early as 2007 for institutions like BRACU to as recent as 2024 for JU. The adoption of DSpace, an open-source digital repository system, underscores a common approach among universities in Bangladesh towards managing and preserving their digital assets. Notably, some universities, such as the CU, lack data on their IR software and establishment year. Overall, the prevalence of DSpace across these institutions reflects a concerted effort to establish robust digital preservation infrastructures to manage scholarly works and research outputs effectively.

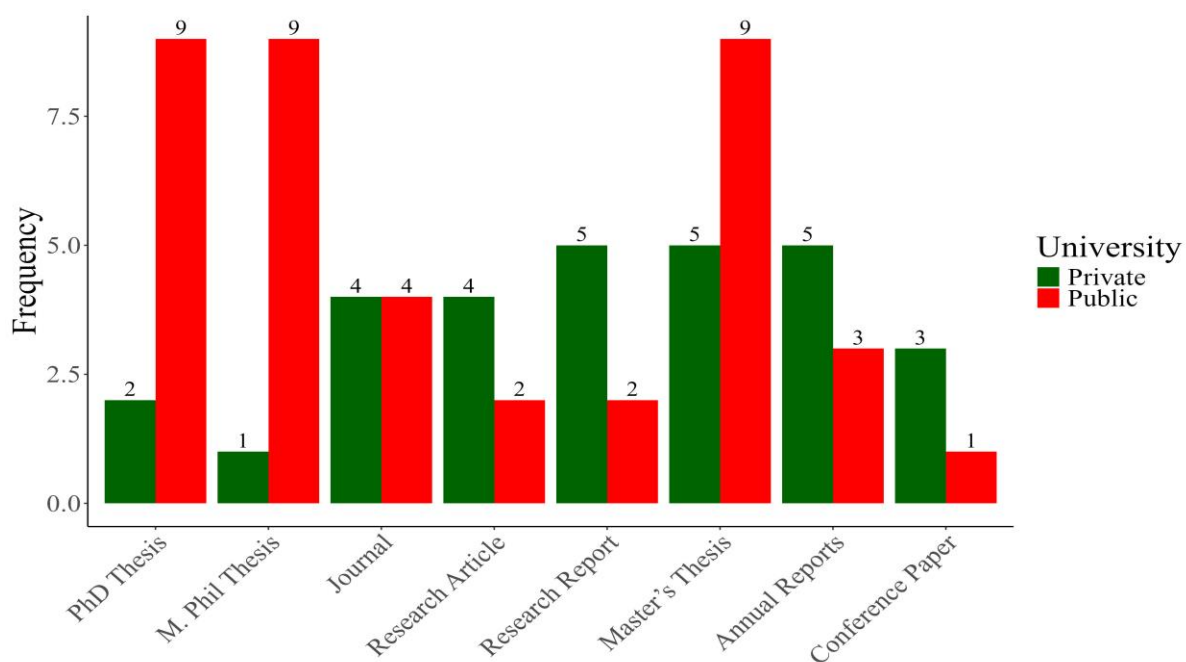
Table 5.30: Institutional Repository Software and Establishment Year of IR

SL. No.	Name of University	IR Software	Est. Year of IR
1.	AUST	DSpace	2021
2.	BMU	DSpace	2015
3.	BAU	DSpace	2011
4.	BRACU	DSpace	2007
5.	GAU	DSpace	2011
6.	BUET	DSpace	2014
7.	EWU	DSpace	2014
8.	IUB	DSpace	2013
9.	JU	DSpace	2024
10.	NSU	DSpace	2023
11.	SUST	DSpace	2023
12.	SAU	DSpace	2016
13.	CU	N/A	N/A
14.	DU	DSpace	2013
15.	RU	DSpace	2013

Table 5.31 and Figure 5.13 provide insights into the types of materials stored in Institutional Repositories (IR) categorized by university type. According to the study, across the public and private universities, master's theses stand out with the highest presence, accounting for 93.33% and 90% and 100% in public and private universities, respectively. Following closely are PhD theses and MPhil theses, with 73.33% and 66.66% prevalence in public universities, and 40% and 20% in private universities, respectively. However, conference papers exhibit a lower prevalence across both types of universities, with 26.66% in private universities and 10% in public universities. In terms of university categories, public universities tend to have a higher overall presence of materials in their IRs, accounting for 48.75% of the total presence, compared to private universities, which represent 72.50%.

Table 5.31: University Category Wise Types of Materials Kept in IR

Resources	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
PhD Thesis	9	90.0	2	40.0	11	73.33
M. Phil Thesis	9	90.0	1	20.0	10	66.66
Journal	4	40.0	4	80.0	8	53.33
Research Article	2	20.0	4	80.0	6	40.00
Research Report	2	20.0	5	100	7	46.66
Master's Thesis	9	90.0	5	100	14	93.33
Annual Reports	3	30.0	5	100	8	53.33
Conference Paper	1	10.0	3	60.0	4	26.66
Overall		48.75		72.50		56.66

T=Total**Figure 5.13: University Category Wise Types of Materials Kept in IR**

5.7.1 Institutional Repository Policy, Collection and Training

Table 5.32 illustrates the existence of Institutional Repository (IR) policies in university libraries, categorized by public and private institutions. Among public universities, 50% have established IR policies, while 50% do not. In contrast, among private universities, a higher percentage, 80%, have implemented IR policies, with only 10% lacking such policies. Overall, 60% of the universities surveyed have IR policies, indicating a significant presence of structured guidelines and regulations governing the operation of institutional repositories in these academic institutions.

Table 5.32: Institutional Repository (IR) Policy in University Libraries

IR Policy	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	5	50.0	4	80.0	9	60.0
No	5	50.0	1	10.0	6	40.0

T=Total

Table 5.33 outlines the distribution of Institutional Repository (IR) collections across university IRs, segmented by public and private institutions. In the public university category, 20% of IRs contains collections below 500 items, while 20% have collections ranging from 1501 to 2000 items, and 40% possess collections exceeding 2000 items. Meanwhile, in private universities, 40% have collections below 500 items, and 60% also have collections exceeding 2000 items. Overall, the majority of universities IRs (46.66%) maintain collections surpassing 2000 items, indicating a substantial volume of digital assets preserved within these repositories.

Table 5.33: Distribution of Institutional Repository Collection in University IR

Collection	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Below 500	2	20.0	2	40.0	4	26.6
701 - 1000	1	10.	0	0	1	6.66
1001 - 1500	0	0	0	0	0	0
1501 - 2000	2	20.0	0	0	2	13.33
Above 2000	4	40.0	3	60.0	7	46.66

T=Total

5.7.2 Training on Institutional Repository for Library Staff and Research Scholars

Table 5.34 presents data on Institutional Repository (IR) training for library staff across university libraries, categorized by public and private institutions. In public universities, 80% of libraries provide IR training for their staff, while all private university libraries (100%) offer such training. Overall, the majority of university libraries (86.67%) conduct IR training sessions for their staff, indicating a proactive approach towards enhancing their capacity in managing institutional repositories.

Table 5.34: Training on Institutional Repository for Library Staff in University Libraries

Source Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	8	80.0	5	100	13	86.67
No	2	20.0	0	0	2	13.33

T=Total

Table 5.35 illustrates the provision of Institutional Repository (IR) training for research scholars in university libraries, classified by public and private institutions. Among public universities, 50% offer IR training for research scholars, while 60% of private universities provide such training. Overall, 53.33% of university libraries offer IR training programs for research scholars, indicating a concerted effort across both public and private sectors to equip scholars with the necessary skills for utilizing institutional repositories effectively.

Table 5.35: Training on Institutional Repository for Research Scholars in University Libraries

Source Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	5	50.0	3	60.0	8	53.33
No	5	50.0	2	40.0	7	46.67

T=Total

5.7.3 Rating of Existing IR collections

Table 5.36 depicts the ratings provided by library staff regarding the adequacy of existing Institutional Repository (IR) collections. Among the responses, 26.7% rated the collections

as "Adequate," while 20.0% found them "Slightly adequate" and another 20.0% considered them "Almost adequate." Conversely, 13.3% rated the collections as "Poor," and an equal percentage found them "Inadequate." Overall, the ratings indicate varying perceptions among library staff regarding the sufficiency of the IR collections, with a significant portion expressing concerns about adequacy.

Table 5.36: Rating by Library Staff Regarding Institutional Repository Collection

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Adequate	4	26.7	28.6	28.6
	Slightly adequate	3	20.0	21.4	50.0
	Almost adequate	3	20.0	21.4	71.4
	Poor	2	13.3	14.3	85.7
	Inadequate	2	13.3	14.3	100.0
	Total	14	93.3	100.0	
Missing System		1	6.7		
Total		15	100.0		

5.7.4 Satisfaction Level of Library Administrators towards IR

Table 5.37 illustrates the satisfaction level of library administrators toward the Institutional Repository (IR). Among the respondents, 20.0% expressed being "Very satisfied" with the IR, while 40.0% indicated being "Satisfied." Additionally, 6.7% reported feeling "Neither satisfied nor dissatisfied." On the other hand, 20.0% expressed being "Dissatisfied" with the IR. Notably, one respondent (6.7%) mentioned feeling "Very dissatisfied." Overall, the satisfaction levels vary among library administrators, with a significant portion expressing satisfaction, but also notable dissatisfaction.

Table 5.37: Satisfaction Level of Library Administrators toward Institutional Repository

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very satisfied	3	20.0	21.4	21.4
	Satisfied	6	40.0	42.9	64.3
	Neither	1	6.7	7.1	71.4
	Dissatisfied	3	20.0	21.4	92.9
	Very dissatisfied	1	6.7	7.1	100.0
	Total	14	93.3	100.0	
Missing System		1	6.7		
Total		15	100.0		

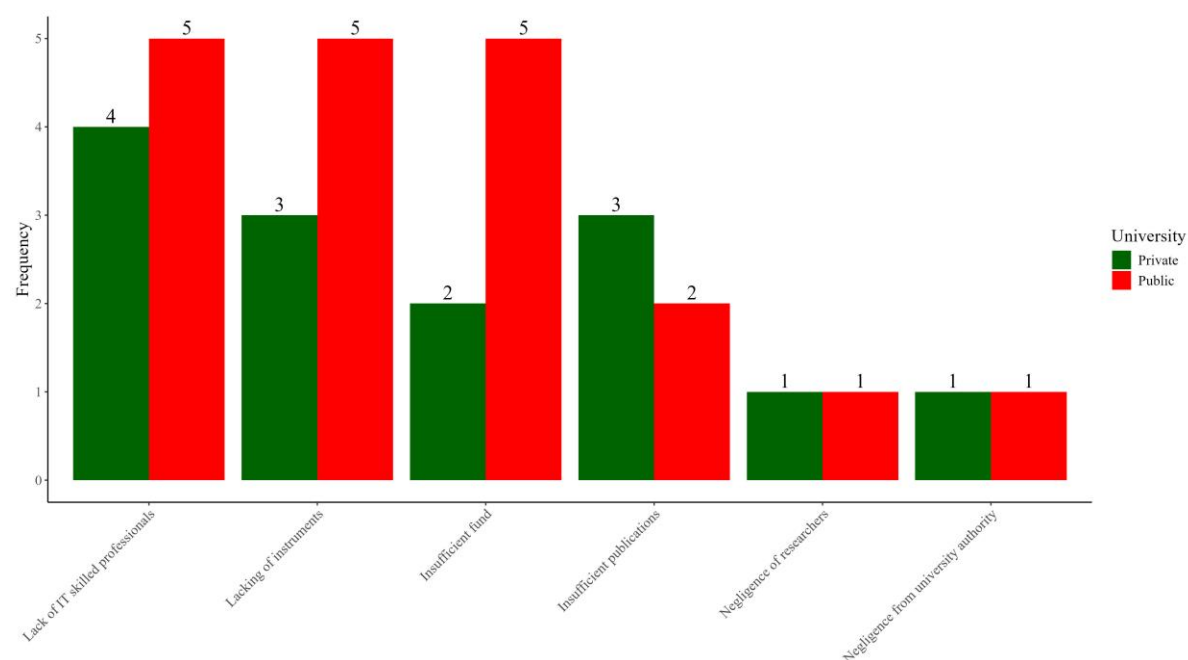
5.7.5 Problems in Building IR

Table 5.38 and Figure 5.14 outline the challenges faced by library staff in building Institutional Repositories (IR). Among the issues highlighted, "Lack of IT skilled professionals" emerged as a significant concern, with 50.0% of respondents from public universities and 80.0% from private universities citing this problem. Similarly, "Lacking of instruments" and "Insufficient fund" were reported as prominent obstacles, with 50.0% and 50.0% of respondents from public universities, respectively, and 60.0% and 40.0% from private universities, respectively, mentioning these challenges. "Insufficient publications" was identified as a problem by 20.0% of respondents from public universities and 60.0% from private universities. Additionally, "Negligence of researchers" and "Negligence from university authority" were cited by a smaller proportion of respondents. Overall, the challenges varied, but common themes included resource constraints and a lack of necessary expertise.

Table 5.38: Problems Faced by Library Staff for Building Institutional Repository

Problems	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Lack of IT skilled professionals	5	50.0	4	80.0	9	60.0
Lacking of instruments	5	50.0	3	60.0	8	53.33
Insufficient fund	5	50.0	2	40.0	7	46.66
Insufficient publications	2	20.0	3	60.0	5	33.33
Negligence of researchers	1	10.0	1	20.0	1	6.66
Negligence from university authority	1	10.0	1	20.0	1	6.66

T=Total

**Figure 5.14: Problems Faced by Library Staff for Building IR**

5.8 Manpower for Digital Preservation

Table 5.39 and Figure 5.15 present the level of involvement of library staff in Digital Preservation (DP). It shows that a majority of library staff, 80.0% in public universities and 100% in private universities, are engaged in DP on a full-time basis. Additionally, a smaller proportion of staff, 10.0% in public universities, is involved in DP on a part-time basis.

Overall, the data indicates a significant commitment from library staff towards DP activities, with the majority being dedicated to these tasks on a full-time basis.

Table 5.39: State of Involvement of Library Staff in Digital Preservation

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Full Time	8	80.0	5	100	13	86.66
Part Time	1	10.0	0	0	2	13.33

T=Total

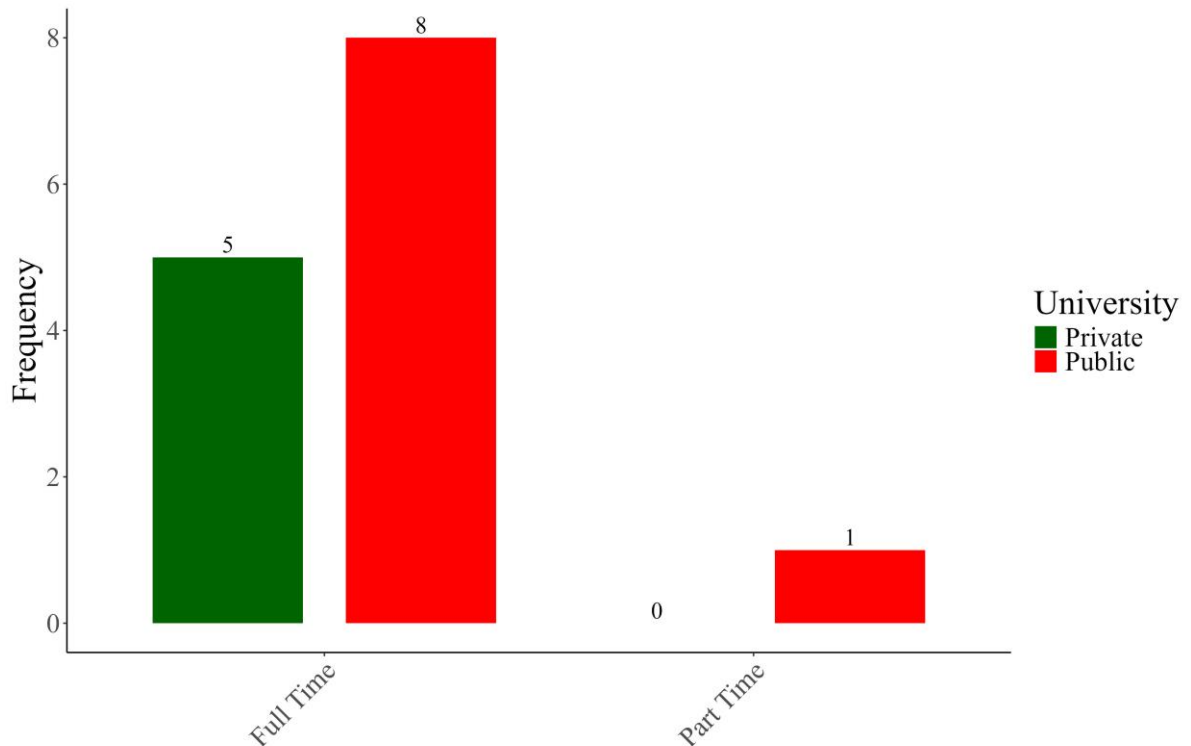


Figure 5.15: State of Involvement of Library Staff in Digital Preservation

5.8.1 Sufficiency of Professionals in Digital Preservation

Table 5.40 presents the sufficiency of staff in digital preservation across public and private universities. In public universities, 80.0% of respondents reported that their staff levels for digital preservation were sufficient, while 20.0% also indicated insufficiency. In private universities, 100% of respondents reported having sufficient staff for digital preservation. Overall, 86.66% of respondents across both public and private universities expressed that

their staff levels for digital preservation were sufficient. The data suggests that while a majority of respondents' reported sufficient staff for digital preservation, there is still a notable proportion that perceives a lack of staffing in this area.

Table 5.40: Sufficiency of Staff in Digital Preservation

Sufficiency	Public(10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Sufficient	8	80.0	5	100	13	86.66
Insufficient	2	20.0	0	0	2	13.33

T=Total

5.8.2 Sufficiency of Skilled Professionals

Table 5.41 presents the sufficiency of skilled staff in digital preservation across public and private universities. In public universities, 40.0% of respondents reported that their skilled staff for DP was sufficient, while 100.0% also indicated sufficiency in private universities. However, in public universities, 100% of respondents reported having insufficient skilled staff for DP. Overall, the data suggests that while a majority of respondents reported sufficient skilled staff for DP, there is still a notable proportion that perceives a lack of skilled staffing in this area.

Table 5.41: Sufficiency of Skilled Professionals in Digital Preservation

Source Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Sufficient	4	40.0	5	100	9	60.0
Insufficient	6	60.0	0	0	6	40.0

T=Total

5.8.3 Training Facility for Staff in Digital Preservation Activities

Table 5.42 and Figure 5.16 illustrate the availability of training facilities for staff in digital preservation across public and private universities. Among public universities, 70.0% of respondents reported having training facilities for staff in digital preservation, while all respondents (100%) from private universities indicated the presence of such facilities.

Conversely, 30.0% of respondents from public universities reported the absence of training facilities, while none of the respondents from private universities reported a lack thereof. Overall, the data indicates a higher prevalence of training facilities for digital preservation staff in private universities compared to public ones.

Table 5.42 Training Facility for Staff for Digital Preservation

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	7	70.0	5	100	12	80.0
No	3	30.0	0	0	3	20.0

T=Total

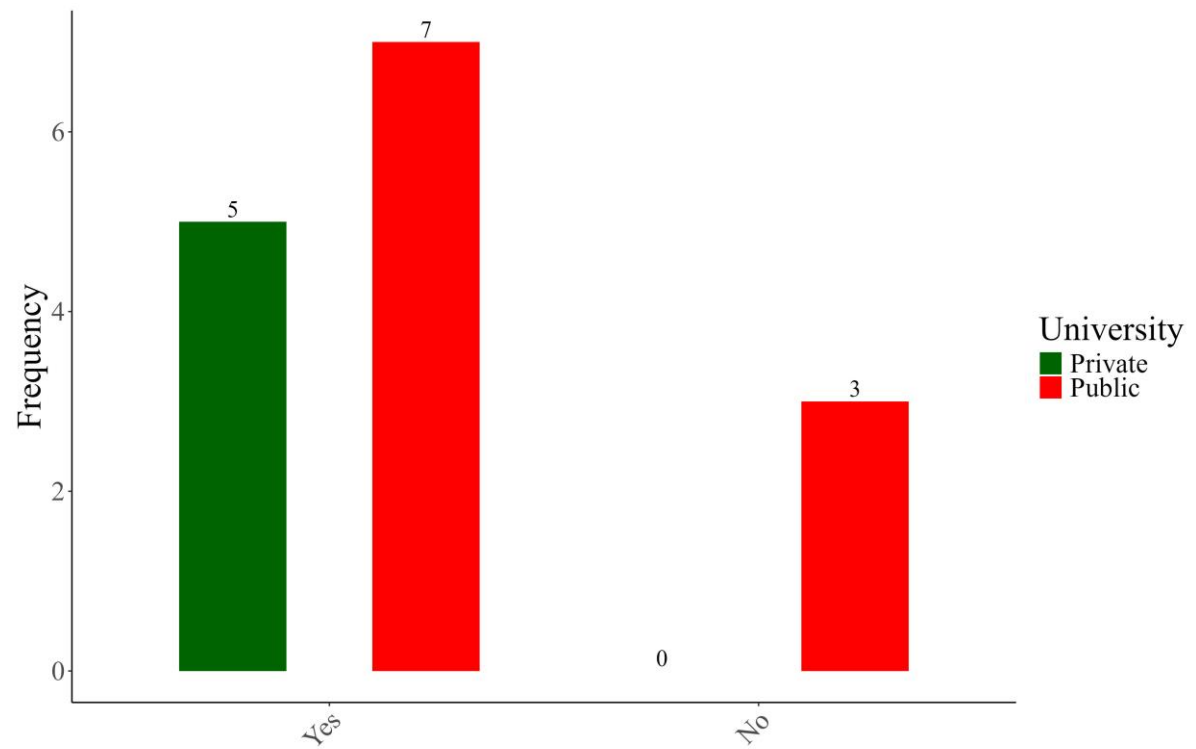


Figure 5.16: Training Facility for Staff for Digital Preservation

Table 5.43 depicts the extent to which library staff receives training for digital preservation across public and private universities. Among respondents from public universities, 80.0% reported receiving training, while all respondents (100%) from private universities indicated that their staff had received training. Conversely, 20.0% of respondents from public

universities reported that their staff had not received training, whereas none of the respondents from private universities reported a lack of training. Overall, the data suggests a higher rate of training provision for digital preservation among staff in private universities compared to public ones.

Table 5.43: Receiving Training by Library Staff for Digital Preservation

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	8	80.0	5	100	13	86.67
No	2	20.0	0	0	2	13.33

T=Total

The study found the different types of training attended by library staff in both public and private universities. Among the reported training programs, three staff from public universities received certificates in DSpace and Digital Librarianship programs, while one staff member attended a training session arranged by BALID. On the other hand, in private universities, one staff member participated in a workshop on digital library software usage and use, while another attended regular in-house training sessions. Additionally, private university staff received training in areas such as metadata preparation, DSpace, Greenstone, and ILS_Koha, among others. Overall, the data illustrates a diverse range of training programs attended by library staff in both public and private universities, with a slightly higher number of training opportunities reported in private institutions (Table 5.44).

Table 5.44: Training Name Attained by Library Staff

Training Name	Public	Private
03 staff have got certificates on DSpace and Digital Librarianship program	1	0
Attended training arranged by BALID	1	0
Digital library software usage and use	0	1
Making e-books	1	0
Metadata preparation, Widespread training on DSpace	1	0

Regular conduct in-house training sessions for the staff	0	1
Scanning, Data entry, Backup, Server maintenance	1	0
Training of e-book preparation arranged by BANSDOC	1	0
Training on DSpace and Metadata	0	1
Training on DSpace, Greenstone	0	1
Workshop on ILS_Koha and Greenstone, 10 days course on ILS and Digital Library Software	0	1
Total	6	5

5.9 Copyright Issue for Digital Preservation

Table 5.45 and Figure 5.17 present data regarding the digitization of copyright materials in university libraries, categorized by public and private institutions. Among the public universities, 40% reported digitizing copyrighted materials, while in private universities; this figure was slightly higher at 60%. However, the majority of both public and private universities indicated that they had not digitized copyrighted materials, with 60% and 40%, respectively.

Table 5.45: Digitization of Copyright Materials in University Libraries

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	4	40.0	3	60.0	7	24.66
No	6	60.0	2	40.0	8	53.33

T=Total

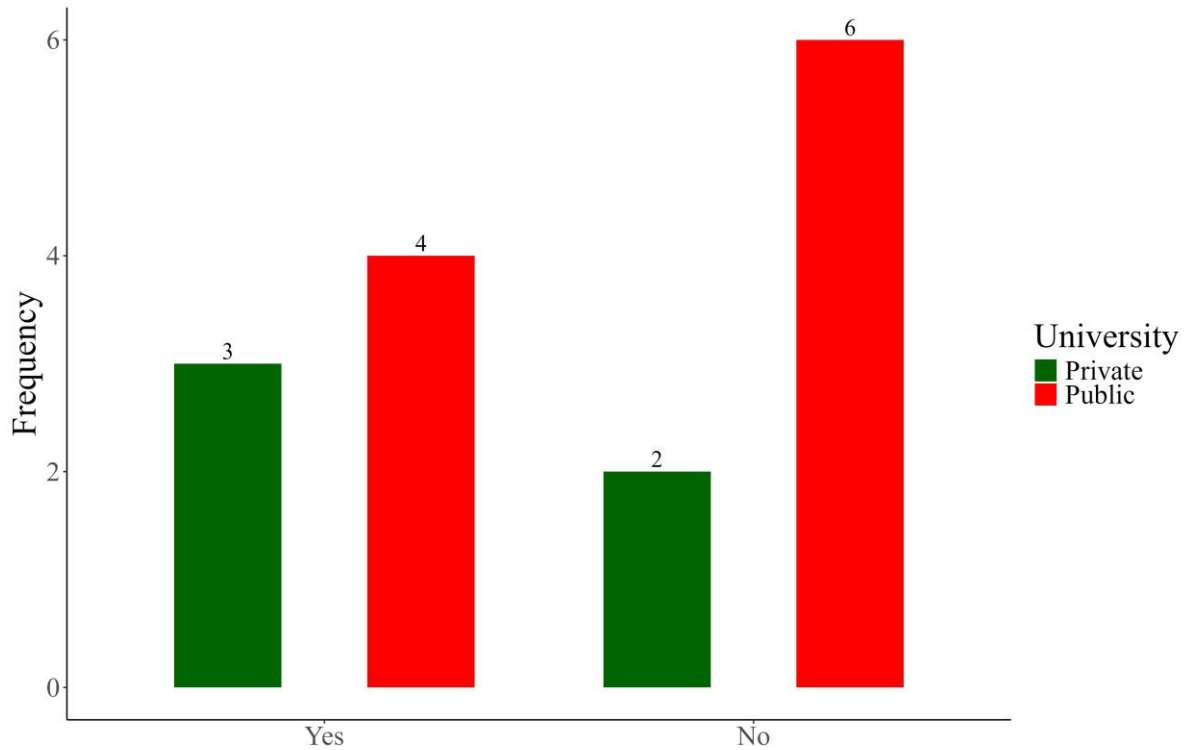


Figure 5.17: Digitization of Copyright Materials in University Libraries

Table 5.46 presents data on the digitization of copyright materials categorized by the type of agreement or legal provision followed by public and private universities. Among public institutions, 20% reported digitizing copyrighted materials with owner agreements, while 10% digitized materials under legal provisions for libraries. Similarly, in private universities, 20% digitized materials with owner agreements. However, no private universities reported digitizing materials under legal provisions. Additionally, 10% of public universities and no private universities digitized copyrighted materials without formalities.

Table 5.46: Digitization of Copyright Materials

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
With owner agreement	2	20.0	1	20.0	3	20.0
Under legal provisions for libraries	1	10.0	0	0	1	6.66
Without formalities	1	10.0	0	0	1	6.66

T=Total

Table 5.47 outlines the process of obtaining copyright licenses from suppliers or vendors in both public and private universities. Among public institutions, 20% reported acquiring copyright licenses, while 80% indicated not obtaining them. Similarly, among private universities, 20% obtained copyright licenses, while the remaining 80% did not.

Table 5.47: Getting Copyright Licenses from the Supplier/Vendor

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	2	20.0	1	20.0	3	20.0
No	8	80.0	4	80.0	8	53.33

T=Total

Table 5.48 presents data regarding the ownership of copyright in digitization efforts across public and private universities. Among public institutions, 30% reported owning the copyright, while 70% indicated not owning it. Conversely, in private universities, 100% stated not owning the copyright, with none reporting ownership.

Table 5.48: Owning the Copyright in Digitization

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	3	30.0	0	0	3	20.0
No	7	70.0	5	100	12	86.67

T=Total

5.10 Funding for Digital Preservation

Table 5.49 and Figure 5.18 illustrate the ownership of funds allocated for digital preservation efforts, categorized by public and private universities. Among public institutions, 40% reported owning the funds, while 60% indicated not owning them. Conversely, in private universities, all respondents (100%) reported ownership of the funds.

Table 5.49: Owning the Fund for Digital Preservation

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	4	40.0	5	100	9	60.0
No	6	60.0	0	0	6	20.0

T=Total

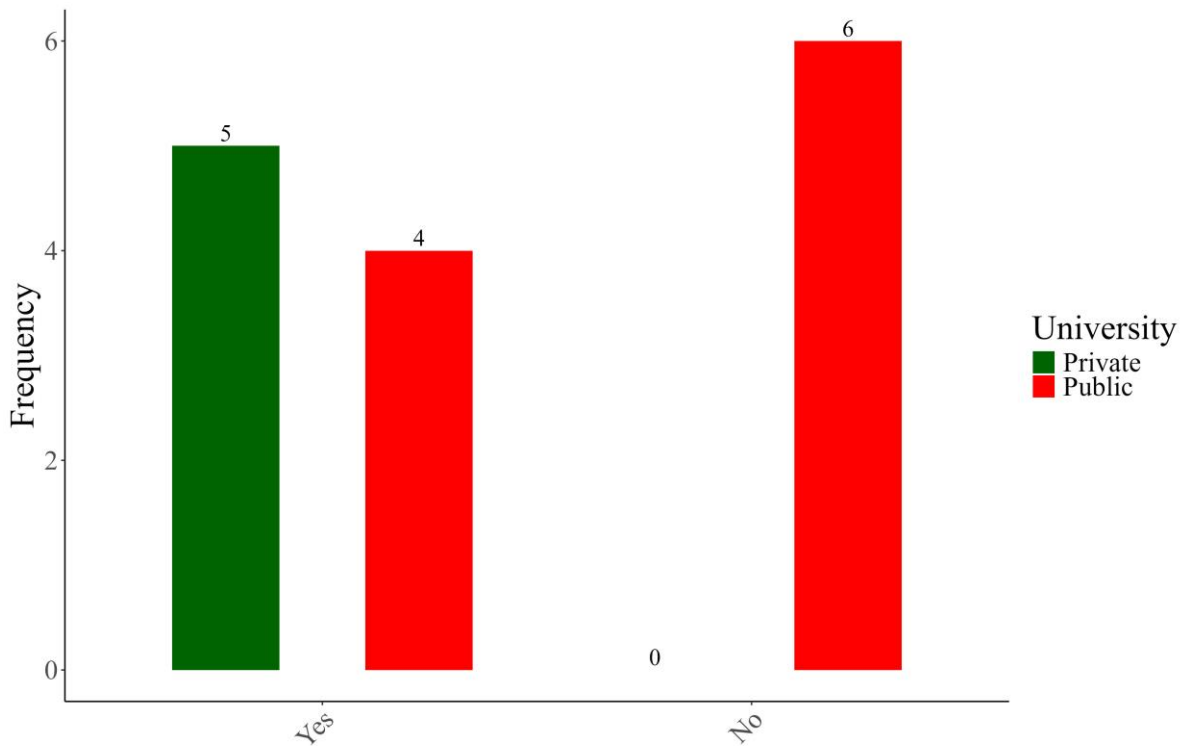


Figure 5.18: Owing of Fund for Digital Preservation

Table 5.50 presents data on the allocation of funds for digital preservation from other projects and their perceived adequacy, segmented by public and private universities. In public institutions, 20% reported receiving funds from other projects, while 80% did not. Among private universities, 40% indicated receiving such funds, and 60% did not. Regarding the adequacy of the funds, 30% of respondents from public universities found them adequate, while 70% did not. Conversely, in private universities, 80% considered the funds adequate, and 20% did not.

Table 5.50: Fund for Digital Preservation from other Projects and its Adequacy

Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Yes	2	20.0	2	40.0	4	26.66
No	8	80.0	3	60.0	11	73.33
Adequacy of Fund						
Yes	3	30.0	4	80.0	7	46.66
No	7	70.0	1	20.0	8	53.33

T=Total

Table 5.51 and Figure 5.19 outlines the challenges faced by libraries in digital preservation efforts, categorized by public and private universities. Among the challenges reported, copyright issues were prevalent, with 60% of public and 80% of private institutions identifying this as a major obstacle. Funding was also a significant concern, particularly for public universities, with 80% reporting it as a challenge compared to 20% in private institutions. Other notable challenges included hardware or equipment constraints, insufficient staff, lack of skilled personnel, and issues with staff time management. Overall, public universities faced slightly more challenges (40.66%) compared to private institutions (30%), with an average of 37.32% across both categories.

Table 5.51: Challenges Faced by Library for Digital Preservation

Source Type	Public (10)		Private (5)		Total (15)	
	T	%	T	%	T	%
Copyright	6	60.0	4	80.0	10	66.66
Funding	8	80.0	1	20.0	9	60.0
Hardware or equipment	6	60.0	1	20.0	7	46.66
Metadata	0	0	2	40.0	2	13.33
Optical Character Recognition	4	40.0	2	40.0	6	40.0
Preparing materials	1	10.0	2	40.0	3	20.0
Quality control	5	50.0	3	60.0	8	53.33
Selecting materials	4	40.0	2	40.0	6	40.0
Software	1	10.0	0	0	1	6.66
Insufficient staff	6	60.0	1	20.0	7	46.66
Lack of skilled person	7	70.0	0	0	7	46.66
Staff time management	3	30.0	4	80.0	7	46.66
Lack of staff training facility	6	60.0	1	10.0	7	46.66
Congested workspace	2	20.0	0	0	2	13.33
Lack of air conditioning facility	2	20.0	0	0	2	13.33
Overall		40.66		30.0		37.32

T=Total

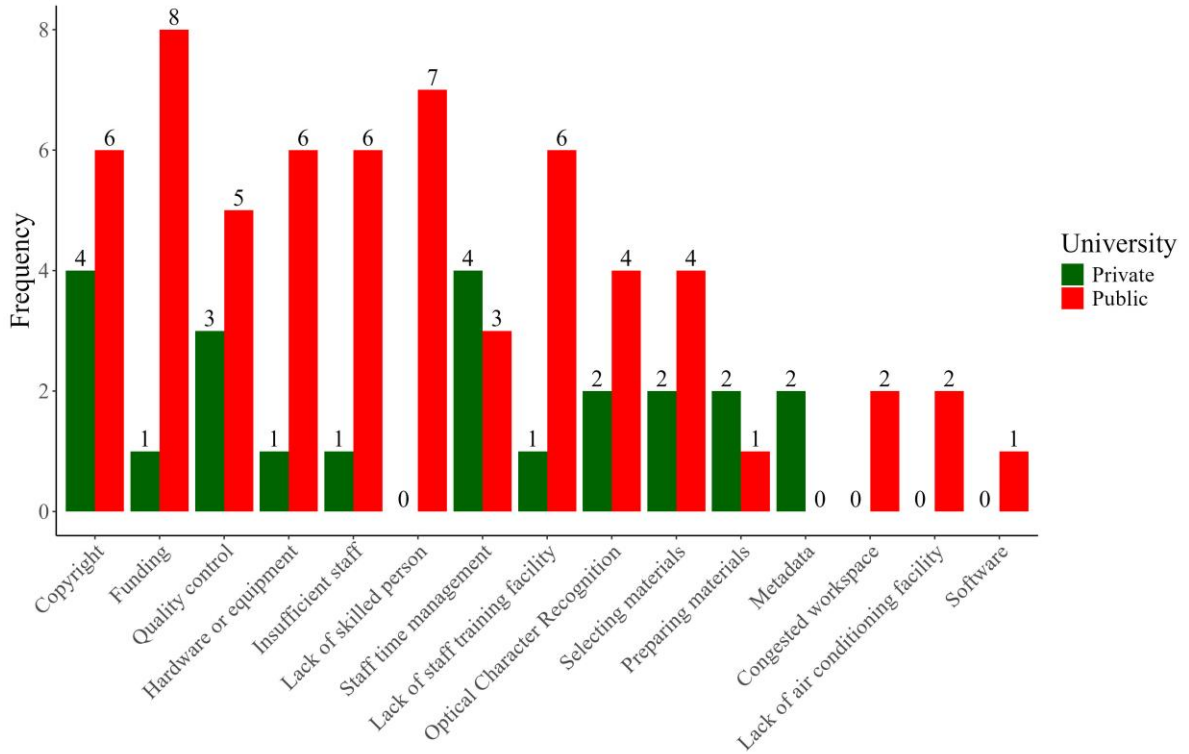


Figure 5.19: Challenges Faced by Library for Digital Preservation

5.11 Data Analysis of Library Userss

5.11.1 Demographic Information of Respondents (Users)

Table 5.52 and Figures 5.20 (A), 5.20 (B), 5.20 (C), 5.20 (D), 5.20 (E), and Figure 5.20 (F) provides a detailed breakdown of the demographic information of the respondents participating in the study, totaling 433 individuals. The respondents are categorized based on their user category, university affiliation, professional status, university category (public or private), gender, and age group.

In terms of user category, the majority of respondents are teachers, constituting 77.1% of the sample, followed by students at 17.1% and researchers at 5.8%. Regarding university affiliation, the distribution is varied across different institutions, with AUST, CU, and EWU having the highest representation, each comprising 8.3% of the sample. The professional status of the respondents spans various roles within academia, with professors, post-graduate students, and undergraduate students being the most prominent categories, at 6.7%, 37.0%, and 40.9%, respectively. Moreover, the majority of respondents are affiliated with private

universities, accounting for 60.0% of the sample, while 40.0% are associated with public universities. In terms of gender distribution, male respondents outnumber female respondents, comprising 62.4% and 37.6% of the sample, respectively. Additionally, the age distribution reveals that the majority of respondents fall within the age range of 20-29 years, constituting 71.6% of the sample, followed by respondents aged 30-39 years at 9.7% and under 20 years at 5.3%.

Overall, Table 5.52 and Figure 5.20 provide a comprehensive overview of the demographic characteristics of the respondents, offering valuable insights into the composition of the sample population and facilitating a deeper understanding of the study's findings.

Table 5.52: Demographic Information of Respondents (N=433)

Category	Category of Respondents	Number of Respondents	Valid%
User Category	Student	74	17.1
	Teacher	334	77.1
	Researcher	25	5.8
University	AUST	36	8.3
	BAU	32	7.4
	BRACU	35	8.1
	BMU	20	4.6
	GAU	17	3.9
	BUET	13	3.0
	CU	36	8.3
	DU	22	5.1
	EWU	36	8.3
	IUB	36	8.3
	JU	22	5.1

	NSU	36	8.3
	RU	29	6.7
	SAU	30	6.9
	SUST	33	7.6
Status	Professor	29	6.7
	Associate Professor	25	5.8
	Assistant Professor	9	2.1
	Sr. Lecturer	4	.9
	Lecturer	9	2.1
	PhD Researcher	9	2.1
	M.Phil Researcher	11	2.5
	Post-Graduate Student	160	37.0
	Under-Graduate Student	177	40.9
University Category	Private	260	60.0
	Public	173	40.0
Gender	Male	270	62.4
	Female	163	37.6
Age	Under 20 years	23	5.3
	20-29 years	310	71.6
	30-39 years	42	9.7
	40-49 years	38	8.8
	50-59 years	19	4.4
	60 and above	1	.2

Abbreviation is used for the name of the universities

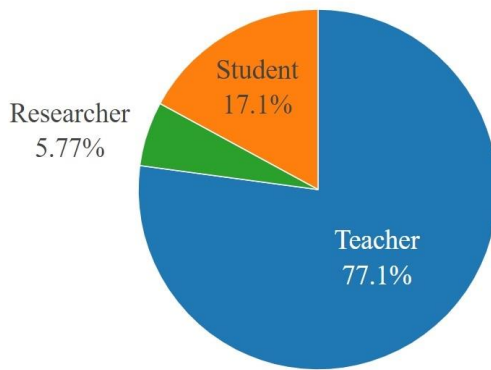


Figure 5.20 (A): User Categories

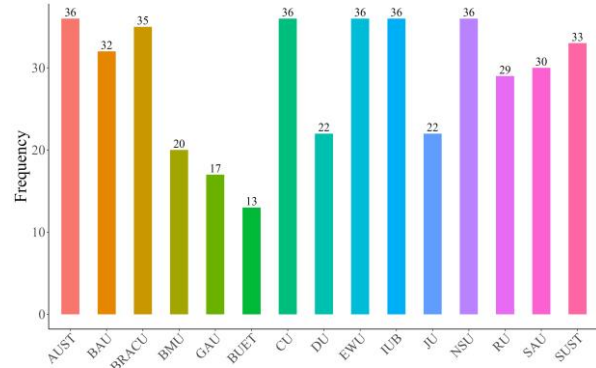


Figure 5.20 (B): University Name

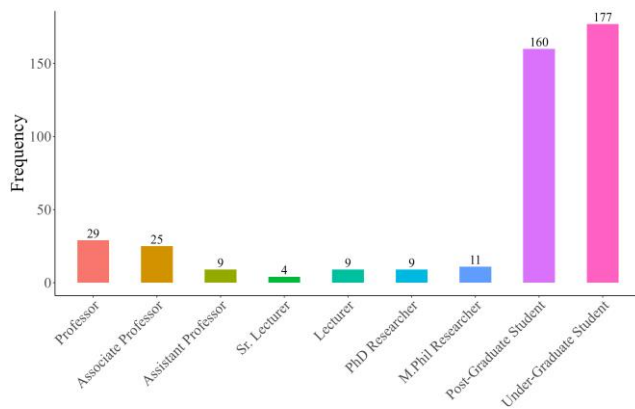


Figure 5.20 (C): Respondent's Status

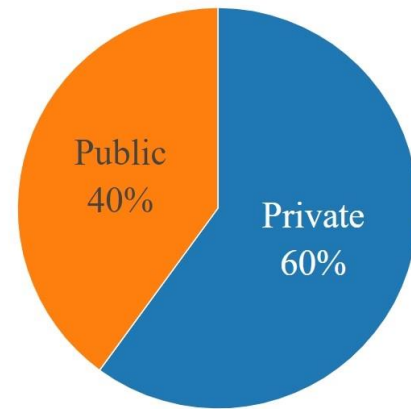


Figure 5.20 (D): University Category

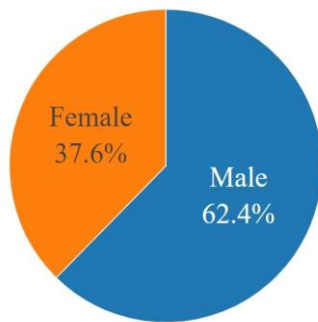


Figure 5.20 (E): Respondent's Gender

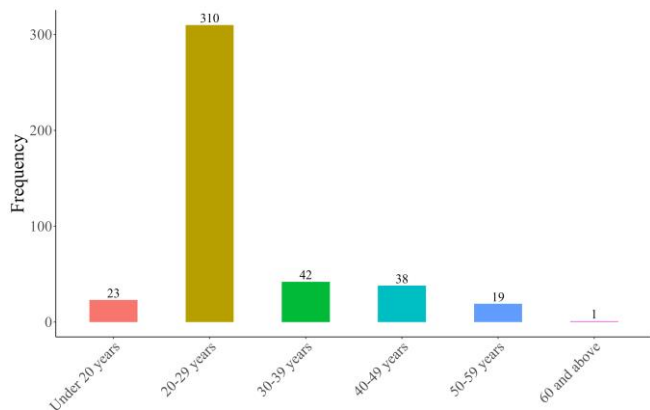


Figure 5.20 (F): Respondent's Age

5.11.2 Frequency of Library Use by University Category

Table 5.53 and Figure 5.21 present a detailed breakdown of the frequency of library use among users from public and private universities, totaling 433 respondents. Among these, 44.6% of users visit the library daily, with 130 users from public universities and 63 from private universities. Additionally, 24.0% of users visit twice a week, with an equal count of 52 users from both public and private universities. Weekly library visits account for 13.2% of the total, with 23 users from public universities and 34 from private universities. A small percentage, 1.2%, of users visit fortnightly, comprising 5 users from public universities. Furthermore, monthly visits constitute 0.9% of the total, with 3 users from public universities and 1 from private universities. Finally, occasional library use represents 16.2% of the total, with 47 users from public universities and 23 from private universities. Overall, the data suggests varying patterns of library use among users from public and private universities.

Table 5.53: Frequency of Library Use by Library Users: University Category Cross Tabulation

Frequency of library use			University Category		Total
			Public (173)	Private (260)	
	Daily	Count	130	63	193
		% within Frequency of library use	67.4%	32.6%	100.0%
		% within University category	50.0%	36.4%	44.6%
		% of Total	30.0%	14.5%	44.6%
	Twice a week	Count	52	52	104
		% within Frequency of library use	50.0%	50.0%	100.0%
		% within University category	20.0%	30.1%	24.0%
		% of Total	12.0%	12.0%	24.0%
	Weekly	Count	23	34	57
		% within Frequency of library use	40.4%	59.6%	100.0%

		% within University category	8.8%	19.7%	13.2%
		% of Total	5.3%	7.9%	13.2%
	Fortnightly	Count	5	0	5
		% within Frequency of library use	100.0%	0.0%	100.0%
		% within University category	1.9%	0.0%	1.2%
		% of Total	1.2%	0.0%	1.2%
	Monthly	Count	3	1	4
		% within Frequency of library use	75.0%	25.0%	100.0%
		% within University category	1.2%	0.6%	0.9%
		% of Total	0.7%	0.2%	0.9%
	Occasionally	Count	47	23	70
		% within Frequency of library use	67.1%	32.9%	100.0%
		% within University category	18.1%	13.3%	16.2%
		% of Total	10.9%	5.3%	16.2%
	Total	Count	260	173	433
		% within Frequency of library use	60.0%	40.0%	100.0%
		% within University category	100.0%	100.0%	100.0%
		% of Total	60.0%	40.0%	100.0%

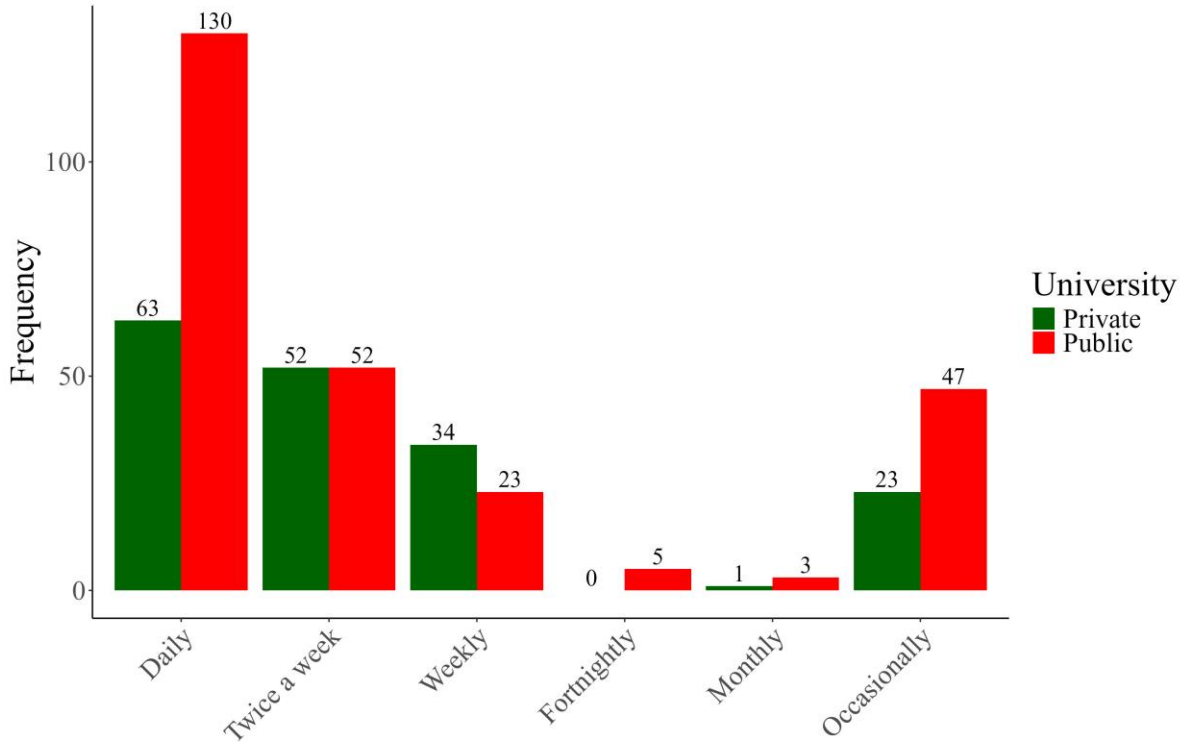


Figure 5.21: Frequency of Library Use by Users: University Category Cross Tabulation

5.11.3 Frequency of Library Use by Gender Category

Table 5.54 and Figure 5.22 present a cross-tabulation of the frequency of library use by gender, encompassing a total of 433 respondents. Among male users, 59.1% visit the library daily, constituting 114 individuals, while 40.9% of female users visit daily, totaling 79 individuals. For twice-a-week library visits, 66.3% of males and 33.7% of females partake, with 69 and 35 individuals, respectively. Weekly library visits are observed in 61.4% of males and 38.6% of females, comprising 35 and 22 individuals, respectively. A small proportion of respondents, 1.2%, visit fortnightly, all of whom are male. Additionally, monthly library visits are undertaken by 25.0% of male users and 75.0% of female users, accounting for 1 and 3 individuals, respectively. Finally, occasional library visits are made by 65.7% of male users and 34.3% of female users, with 46 and 24 individuals, respectively. Overall, the data indicates differences in the frequency of library use between male and female respondents, highlighting variations in their visitation patterns.

Table 5.54: Frequency of Library Use: Gender Cross Tabulation

Frequency of Library Use			Gender		Total
			Male (270)	Female (163)	
	Daily	Count	114	79	193
		% within Frequency of library use	59.1%	40.9%	100.0%
		% within Gender	42.2%	48.5%	44.6%
		% of Total	26.3%	18.2%	44.6%
	Twice a week	Count	69	35	104
		% within Frequency of library use	66.3%	33.7%	100.0%
		% within Gender	25.6%	21.5%	24.0%
		% of Total	15.9%	8.1%	24.0%
	Weekly	Count	35	22	57
		% within Frequency of library use	61.4%	38.6%	100.0%
		% within Gender	13.0%	13.5%	13.2%
		% of Total	8.1%	5.1%	13.2%
	Fortnightly	Count	5	0	5
		% within Frequency of library use	100.0%	0.0%	100.0%
		% within Gender	1.9%	0.0%	1.2%
		% of Total	1.2%	0.0%	1.2%
	Monthly	Count	1	3	4
		% within Frequency of library use	25.0%	75.0%	100.0%
		% within Gender	0.4%	1.8%	0.9%
		% of Total	0.2%	0.7%	0.9%
	Occasionally	Count	46	24	70

		% within Frequency of library use	65.7%	34.3%	100.0%
		% within Gender	17.0%	14.7%	16.2%
		% of Total	10.6%	5.5%	16.2%
Total	Count	270	163	433	
	% within Frequency of library use	62.4%	37.6%	100.0%	
	% within Gender	100.0%	100.0%	100.0%	
	% of Total	62.4%	37.6%	100.0%	

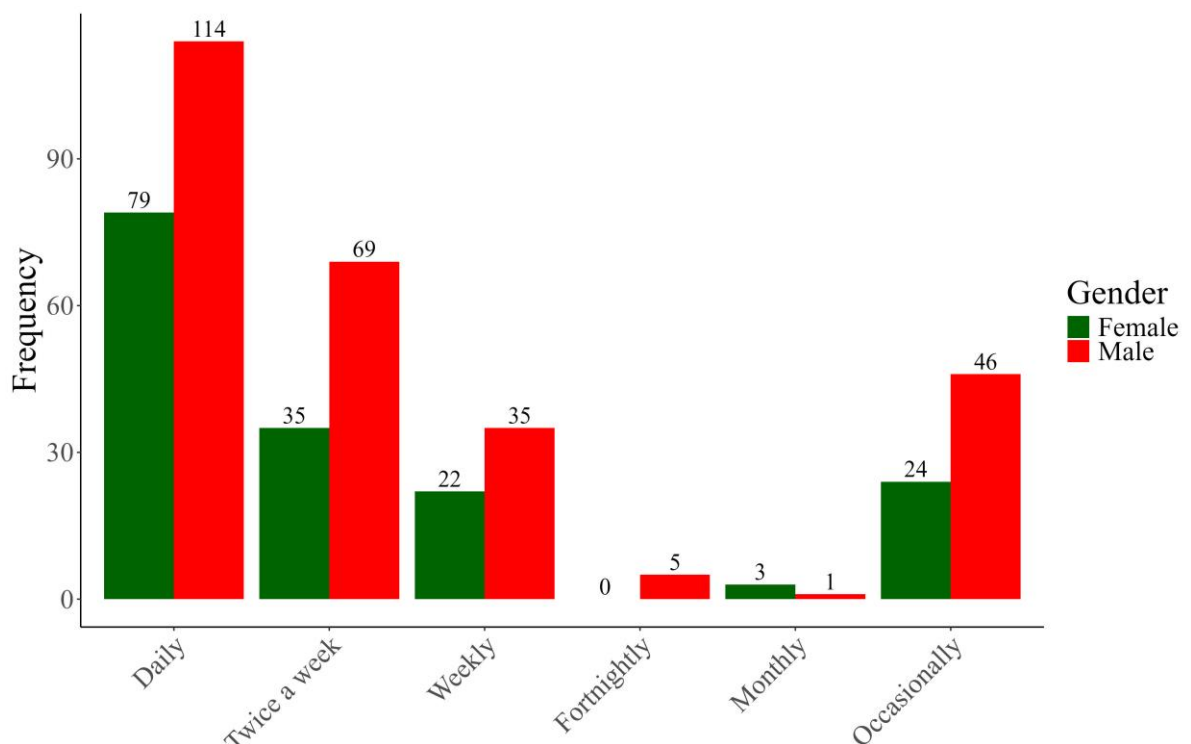


Figure 5.22: Frequency of Library Use: Gender Cross Tabulation

5.11.4 Statistical Methods

5.11.4.1 Data Distribution Test

Two statistical metrics that shed light on the distributional structure of a data set are skewness and kurtosis. Skewness measures the asymmetry of the distribution. Skewness values of 0 indicate a perfectly symmetrical distribution. In this case, both male and female

frequency of library uses data exhibit positive skewness. For male respondents, the skewness value is 1.160, indicating that the distribution is moderately positively skewed. Similarly, for female respondents, the skewness value is slightly higher at 1.295, suggesting a slightly more pronounced positive skewness. Kurtosis measures the peakedness or flatness of the distribution relative to a normal distribution. A kurtosis value of 0 indicates a normal distribution. Both male and female frequency of library use data exhibit kurtosis values greater than 0. For male respondents, the kurtosis value is -.083, suggesting a slightly flat distribution compared to a normal distribution. Conversely, for female respondents, the kurtosis value is .276, indicating a distribution that is slightly more peaked than a normal distribution.

Overall, the skewness and kurtosis values suggest that the frequency of library use data for both male and female respondents deviates slightly from a normal distribution, with positive Skewness indicating a right-leaning tail and kurtosis values suggesting slightly non-normal distributions (Table 5.55).

Table 5.55: Data Distribution Test: Descriptive Analysis

Gender			Statistic	Std. Error
Male	Mean		2.44	.109
	95% Confidence Interval for Mean	Lower Bound	2.22	
		Upper Bound	2.65	
	5% Trimmed Mean		2.32	
	Median		2.00	
	Variance		3.206	
	Std. Deviation		1.791	
	Minimum		1	
	Maximum		6	
	Range		5	
	Inter quartile Range		2	

	Skewness		1.160	.148
	Kurtosis		-.083	.295
Female	Mean		2.29	.137
	95% Confidence Interval for Mean	Lower Bound	2.02	
		Upper Bound	2.57	
	5% Trimmed Mean		2.16	
	Median		2.00	
	Variance		3.073	
	Std. Deviation		1.753	
	Minimum		1	
	Maximum		6	
	Range		5	
	Inter quartile Range		2	
	Skewness		1.295	.190
	Kurtosis		.276	.378

5.11.4.2 Data Distribution Normality Test

Table 5.56 presents the results of tests of normality conducted on the frequency of library use data for male and female respondents using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Additionally, the Lilliefors significance correction method was applied. For male respondents, the Kolmogorov-Smirnov test yielded a statistic of 0.274 with 270 degrees of freedom, resulting in a p-value of .000. Similarly, the Shapiro-Wilk test produced a statistic of 0.736 with 270 degrees of freedom, resulting in a p-value of .000. These results indicate that the frequency of library use data for male respondents deviates significantly from a normal distribution. For female respondents, the Kolmogorov-Smirnov test resulted in a statistic of 0.266 with 163 degrees of freedom, leading to a p-value of .000. Likewise, the Shapiro-Wilk test yielded a statistic of 0.712 with 163 degrees of freedom, resulting in a p-

value of .000. These results indicate that the frequency of library use data for female respondents also significantly deviates from a normal distribution.

Overall, the tests of normality indicate that the frequency of library use data for both male and female respondents does not follow a normal distribution, as evidenced by the low p-values obtained from both the Kolmogorov-Smirnov and Shapiro-Wilk tests, even after applying the Lilliefors significance correction.

Table 5.56: Tests of Normality

	Gender	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
Frequency of library use	Male	.274	270	.000	.736	270	.000
	Female	.266	163	.000	.712	163	.000
a. Lilliefors Significance Correction							

5.11.4.3 Non Parametric Test

The descriptive statistics summarize the frequency of library use and gender distribution within the sample. On average, respondents reported a library use frequency of 2.38, with a standard deviation of 1.776. Most respondents were male, with a mean gender value of 1.38 and a standard deviation of 0.485. The minimum and maximum values for both variables indicate the range of responses within the data set (Table 5.57).

Table 5.57: Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Frequency of library use	433	2.38	1.776	1	6
Gender	433	1.38	.485	1	2

N= Number

5.11.4.4 Mann-Whitney Test

The Mann-Whitney test was conducted to compare the ranks of frequency of library use between male and female respondents. The mean rank for male respondents was 221.80,

with a sum of ranks equal to 59885.00. Female respondents had a slightly lower mean rank of 209.06, with a sum of ranks of 34076.00. This suggests that male respondents tended to have higher ranks in terms of frequency of library use compared to female respondents (Table 5.58).

Table 5.58: Mann-Whitney Test: Ranks

	Gender	N	Mean Rank	Sum of Ranks
Frequency of library use	Male	270	221.80	59885.00
	Female	163	209.06	34076.00
	Total	433		

N = Number

The Mann-Whitney U test yielded a U value of 20710.000 and a Wilcoxon W value of 34076.000 for the frequency of library use. The calculated Z-statistic was -1.087 with an asymptotic significance (2-tailed) of .277. This indicates that there was no statistically significant difference in the frequency of library use between male and female respondents (Table 5.59).

Table 5.59: Mann-Whitney Test Statistics

	Frequency of library use
Mann-Whitney U	20710.000
Wilcoxon W	34076.000
Z	-1.087
Asymptotic Significance (2 –tailed)	.277
a. Grouping Variable: Gender	

5.11.5 Familiarity with Digital Collection

Table 5.60 illustrates the familiarity of users with digital collections based on their university category. Out of the total 433 respondents, 87.1% (377 users) are familiar with digital collections, while 12.9% (56 users) are not. Among users from public universities,

81.9% (213 users) are familiar with digital collections, and 18.1% (47 users) are not. In contrast, a higher percentage of users from private universities, 94.8% (164 users), are familiar with digital collections, with only 5.2% (9 users) not familiar. Public university users make up 60% of the total sample, with 49.2% of those familiar with digital collections coming from public universities. On the other hand, private university users constitute 40% of the total sample, and 43.5% of those familiar with digital collections are from private universities. Additionally, 83.9% of users who are not familiar with digital collections are from public universities, while 16.1% are from private universities. This data highlights that a greater proportion of private university users are familiar with digital collections compared to their public university counterparts.

Table 5.60: Familiarity of Users with Digital Collection by University Categories

		University Category		Total
		Public	Private	
Yes	Count	213	164	377
	Count	56.5%	43.5%	100.0%
	% within Familiar with digital collection	81.9%	94.8%	87.1%
	% within University category	49.2%	37.9%	87.1%
No	Count	47	9	56
	% within Familiar with digital collection	83.9%	16.1%	100.0%
	% within University category	18.1%	5.2%	12.9%
	% of Total	10.9%	2.1%	12.9%
Total	Count	260	173	433
	% within Familiar with digital collection	60.0%	40.0%	100.0%
	% within University category	100.0%	100.0%	100.0%
	% of Total	60.0%	40.0%	100.0%

5.11.6 Types of Digital Collection Searched by Users

Table 5.61 and Figure 5.23 provide insights into the types of digital collections searched by users from selected university libraries, categorized by whether the university is public or private. Among the various types of digital collections, doctoral theses are searched by 99 users, with 82.8% (82 users) from public universities and 17.2% (17 users) from private universities, making up 5.9% of the total sample. MPhil theses are searched by 72 users, with 80.6% (58 users) from public universities and 19.4% (14 users) from private universities, representing 4.3% of the total. Master's theses are the most searched, with 235 users, where 62.6% (147 users) are from public universities and 37.4% (88 users) from private universities, accounting for 14.1% of the total. Rare books are searched by 208 users, with a more balanced distribution of 49.0% (102 users) from public universities and 51.0% (106 users) from private universities, representing 12.5% of the total.

Microfilm is less commonly searched, with 20 users, 60.0% (12 users) from public universities and 40.0% (8 users) from private universities, making up 1.2% of the total. Synopses are searched by 48 users, with 68.8% (33 users) from public universities and 31.3% (15 users) from private universities, representing 2.9% of the total. Research reports are searched by 223 users, with 55.2% (123 users) from public universities and 44.8% (100 users) from private universities, accounting for 13.4% of the total. Annual reports are searched by 65 users, with 58.5% (38 users) from public universities and 41.5% (27 users) from private universities, representing 3.9% of the total. Journal articles are searched by 219 users, with 61.2% (134 users) from public universities and 38.8% (85 users) from private universities, making up 13.1% of the total. Conference papers are searched by 104 users, with 57.7% (60 users) from public universities and 42.3% (44 users) from private universities, representing 6.2% of the total.

Manuscripts are searched by 51 users, with 68.6% (35 users) from public universities and 31.4% (16 users) from private universities, making up 3.1% of the total. Maps are searched by 54 users, with 70.4% (38 users) from public universities and 29.6% (16 users) from private universities, representing 3.2% of the total. Newspapers are searched by 206 users, with 68.9% (142 users) from public universities and 31.1% (64 users) from private universities, making up 12.4% of the total.

Lastly, photographs are searched by 64 users, with 71.9% (46 users) from public universities and 28.1% (18 users) from private universities, representing 3.8% of the total. This data indicates that users from both public and private universities actively search a variety of digital collections, with certain types being more popular in public universities compared to private ones.

Table 5.61: Types of Collection Searched by Users of Selected University Libraries

		University Category		Total
		Public	Private	
Doctoral Thesis	Count	82	17	99
	% within type of collection	82.8%	17.2%	
	% within University category	7.8%	2.8%	
	% of Total	4.9%	1.0%	5.9%
MPhil Thesis	Count	58	14	72
	% within type of collection	80.6%	19.4%	
	% within University category	5.5%	2.3%	
	% of Total	3.5%	0.8%	4.3%
Master's Thesis	Count	147	88	235
	% within type of collection	62.6%	37.4%	
	% within University category	14.0%	14.2%	
	% of Total	8.8%	5.3%	14.1%
Rare book	Count	102	106	208
	% within type of collection	49.0%	51.0%	
	% within University category	9.7%	17.2%	
	% of Total	6.1%	6.4%	12.5%
Microfilm	Count	12	8	20
	% within type of collection	60.0%	40.0%	

	% within University category	1.1%	1.3%	
	% of Total	0.7%	0.5%	1.2%
Synopsis	Count	33	15	48
	% within type of collection	68.8%	31.3%	
	% within University category	3.1%	2.4%	
	% of Total	2.0%	0.9%	2.9%
Research Report	Count	123	100	223
	% within type of collection	55.2%	44.8%	
	% within University category	11.7%	16.2%	
	% of Total	7.4%	6.0%	13.4%
Annual Report	Count	38	27	65
	% within type of collection	58.5%	41.5%	
	% within University category	3.6%	4.4%	
	% of Total	2.3%	1.6%	3.9%
Journal Article	Count	134	85	219
	% within type of collection	61.2%	38.8%	
	% within University category	12.8%	13.8%	
	% of Total	8.0%	5.1%	13.1%
Conference Paper	Count	60	44	104
	% within type of collection	57.7%	42.3%	
	% within University category	5.7%	7.1%	
	% of Total	3.6%	2.6%	6.2%
Manuscript	Count	35	16	51
	% within type of collection	68.6%	31.4%	
	% within University category	3.3%	2.6%	

	% of Total	2.1%	1.0%	3.1%
Map	Count	38	16	54
	% within type of collection	70.4%	29.6%	
	% within University category	3.6%	2.6%	
	% of Total	2.3%	1.0%	3.2%
Newspaper	Count	142	64	206
	% within type of collection	68.9%	31.1%	
	% within University category	13.5%	10.4%	
	% of Total	8.5%	3.8%	12.4%
Photograph	Count	46	18	64
	% within type of collection	71.9%	28.1%	
	% within University category	4.4%	2.9%	
	% of Total	2.8%	1.1%	3.8%

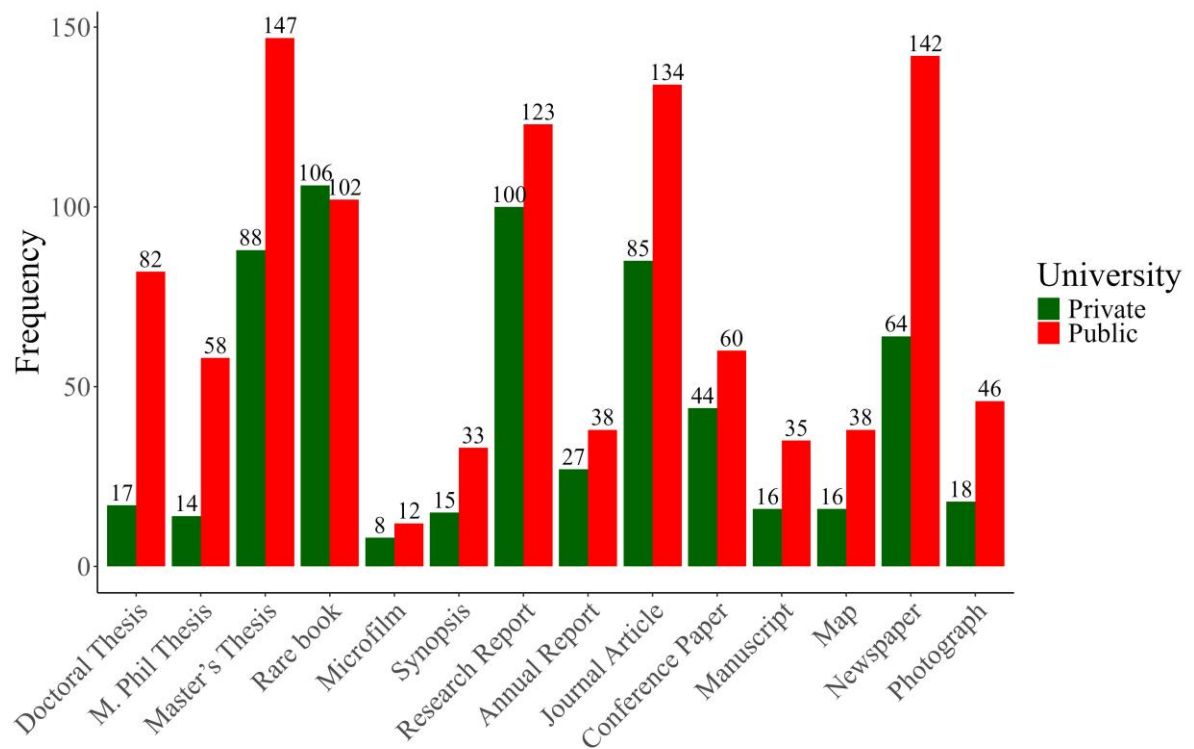


Figure 5.23: Types of Collection Searched by Users of Selected University Libraries

5.11.7 Method of Access to Digital Collection

Table 5.62 and Figure 5.24 present the methods used by users to access digital collections in university libraries, segmented by university category (public or private). For accessing digital collections via CD-ROM, a total of 18 users were reported, with 44.4% (8 users) from public universities and 55.6% (10 users) from private universities. This method accounts for 3.2% of the total user base, with 2.3% from public and 4.7% from private universities. Online access is the predominant method, with 367 users in total. Of these, 62.4% (229 users) are from public universities and 37.6% (138 users) from private universities. This method makes up 64.8% of the total, with 65.2% of public university users and 64.2% of private university users utilizing it. Accessing digital collections via email involves 126 users, with 69.0% (87 users) from public universities and 31.0% (39 users) from private universities. This method represents 22.3% of the total user base, with 24.8% from public and 18.1% from private universities. Through social media, 55 users access digital collections, with 49.1% (27 users) from public universities and 50.9% (28 users) from private universities. This method accounts for 9.7% of the total, with 7.7% from public and 13.0% from private universities. Overall, the data reveals that online access is the most common method for both public and private university users, followed by email, social media, and CD-ROM, indicating a preference for digital and internet-based access methods among university library users.

Table 5.62: Users Method of Access to Digital Collection in University Libraries

Access Method		University Category		Total
		Public	Private	
Via CD-ROM	Count	8	10	18
	% within Access Method	44.4%	55.6%	
	% within University Category	2.3%	4.7%	
	% of Total	1.4%	1.8%	3.2%
Online Access	Count	229	138	367
	% within Access Method	62.4%	37.6%	

	% within University Category	65.2%	64.2%	
	% of Total	40.5%	24.4%	64.8%
Via E-mail	Count	87	39	126
	% within Access Method	69.0%	31.0%	
	% within University Category	24.8%	18.1%	
	% of Total	15.4%	6.9%	22.3%
Through Social Media	Count	27	28	55
	% within Access Method	49.1%	50.9%	
	% within University Category	7.7%	13.0%	
	% of Total	4.8%	4.9%	9.7%
Total	Count	351	215	566
	% of Total	62.0%	38.0%	100.0%

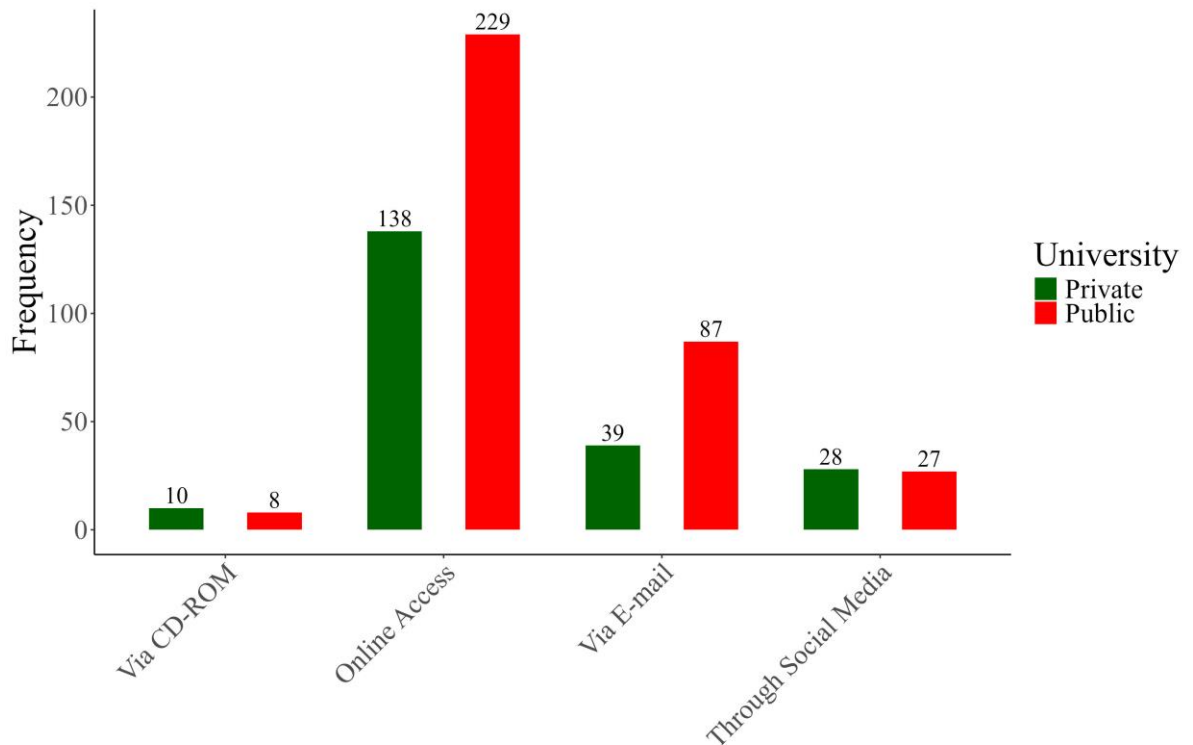


Figure 5.24: Users Method of Access to Digital Collection in University Libraries

5.11.8 Users Need Able to Get Required Digital Collection by Users in University Libraries

Table 5.63 presents the ability of users to get the required digital collections in university libraries, categorized by public and private university affiliations. A majority of users, 349 in total, reported that they were able to get the required digital collections. Of these, 57.3% (200 users) are from public universities and 42.7% (149 users) are from private universities. Within their respective categories, 76.9% of public university users and 86.1% of private university users were successful in obtaining the needed digital collections. This group constitutes 46.2% of the total public university users and 34.4% of the total private university users, making up 80.6% of the overall sample. On the other hand, 84 users reported being unable to get the required digital collections. Among these, 72.3% (60 users) are from public universities and 28.3% (24 users) are from private universities. This represents 23.1% of public university users and 13.5% of private university users within their respective categories. In terms of the total sample, these figures represent 13.9% of public university users and 6.1% of private university users, making up 19.4% of the overall respondents.

In summary, a significant portion of users, 80.6%, reported being able to access the digital collections they needed, with a higher success rate observed among private university users (86.1%) compared to public university users (76.9%).

Table 5.63: Able to Get Digital Collection in University Libraries

		University Category		Total
		Public	Private	
Yes	Count	200	149	349
	% within able to get digital collection	57.3%	42.7%	100.0%
	% within University Category	76.9%	86.1%	80.6%
	% of Total	46.2%	34.4%	80.6%
No	Count	60	24	84
	% within able to get digital collection	72.3%	28.3%	100.0%
	% within University category	23.1%	13.5%	19.4%

	% of Total	13.9%	6.1%	19.4%
Total	Count	260	173	433
	% within able to get digital collection	60.0%	40.0%	100.0%
	% within University Category	100.0%	100.0%	100.0%
	% of Total	60.0%	40.0%	100.0%

5.11.9 Organization of Digital Collection

Table 5.64 presents the responses regarding the organization of digital content in university libraries. Out of 433 respondents, 337 (77.8%) reported that they found the digital contents well organized in their libraries. This indicates a strong majority of users are satisfied with the organization of digital resources. On the other hand, 96 respondents (22.2%) did not find the digital contents well organized. This represents a significant minority who believe there is room for improvement in how digital collections are structured. Overall, the data indicates that while a large majority of users are satisfied with the organization of digital content in their libraries, there is a notable portion of users who see potential for better organization.

Table 5.64: Did you find the Digital Contents Well Organized in Your Library?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	337	77.8	77.8	77.8
No	96	22.2	22.2	100.0
Total	433	100.0	100.0	

5.11.10 Help from Library Staff

Table 5.65 and Figure 5.25 present data on whether respondents took help from library staff in university libraries. Out of 433 respondents, 313 (72.3%) reported that they took help from library staff. This indicates that a substantial majority of users seek assistance from library staff when accessing digital resources or navigating the library. On the other hand, 120 respondents (27.7%) did not take help from library staff. This represents over a quarter of the respondents, suggesting a significant portion of users either do not need assistance or

prefer to find resources independently. In summary, the data indicates that while a significant majority of users seek help from library staff, a notable minority do not, pointing towards varying levels of independence or familiarity with library resources among users.

Table 5.65: Help from the Library Staff

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	313	72.3	72.3	72.3
No	120	27.7	27.7	100.0
Total	433	100.0	100.0	

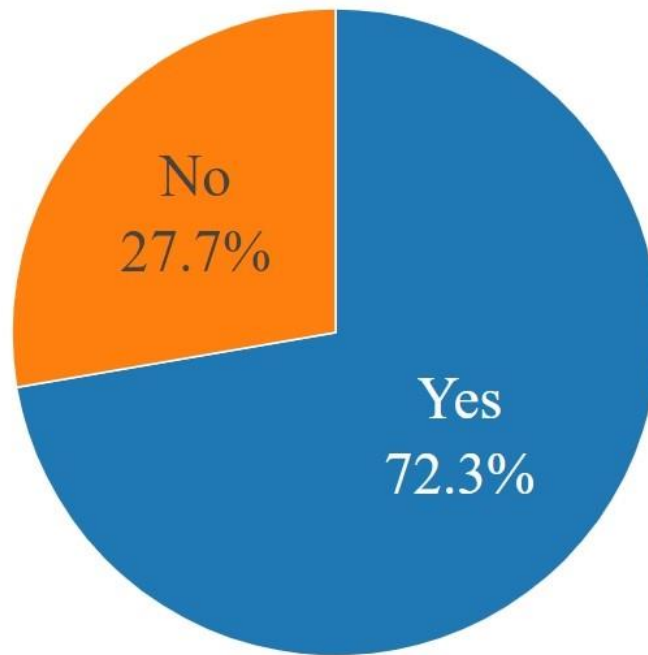


Figure 5.25: Help from the Library Staff

5.11.11 Collect of Print Copy of Digital Collection

Table 5.66 presents data on whether respondents are able to collect print copies of digital collections from the library. Out of 433 respondents, 287 (66.3%) reported that they are able to collect print copies from the library. This majority suggests that most users have the

option to obtain physical copies of digital materials, which can be essential for those who prefer or require print versions for their studies or research. In contrast, 146 respondents (33.7%) indicated that they are not able to collect print copies from the library. This represents a significant minority, implying that a notable portion of users either do not have access to printing services or the option to obtain physical copies of digital resources is not available to them. Briefly, the data indicates that while the majority of users can collect print copies of digital collections from the library, a substantial minority cannot, highlighting a potential area for service improvement in providing print access to digital resources.

Table 5.66: Can you Able to Collect Print Copy from the Library?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	287	66.3	66.3	66.3
No	146	33.7	33.7	100.0
Total	433	100.0	100.0	

5.11.12 Barriers or Challenges in Using Digital Collection

Table 5.67 and Figure 5.26 present a detailed overview of the barriers or challenges encountered by users when accessing digital collections in university libraries, categorized by the type of university they belong to, either public or private. Among the challenges highlighted, copyright issues are reported by 176 respondents from public universities and 52 from private universities, constituting 34.7% of the total challenges, with 7.9% originating from private institutions. Technical problems emerge as another significant obstacle, with 154 respondents from public universities and 111 from private universities facing such issues, comprising 40.3% of the total challenges. Additionally, instances where staffs were unable to provide assistance were reported by 58 respondents from public universities and 34 from private universities, contributing to 14.0% of the total challenges. Administrative problems were also noted, with 57 instances from public universities and 16 from private universities, accounting for 11.1% of the total challenges. In summary, the data underscores the need for improvements in copyright management, technical support, staff training, and administrative processes to enhance user experience with digital collections across university libraries.

Table 5.67: Barriers or Challenges Faced by the Users in University Libraries

		University Category		Total
		Public	Private	
Copyright Issue	Count	176	52	228
	% within Barriers or Challenges	77.2%	22.8%	
	% within University category	39.6%	24.4%	
	% of Total	26.7%	7.9%	34.7%
Technical Problem	Count	154	111	265
	% within Barriers or Challenges	58.1%	41.9%	
	% within University category	34.6%	52.1%	
	% of Total	23.4%	16.9%	40.3%
Staff Unable to Help	Count	58	34	92
	% within Barriers or Challenges	63.0%	37.0%	
	% within University category	13.0%	16.0%	
	% of Total	8.8%	5.2%	14.0%
Administrative Problem	Count	57	16	73
	% within Barriers or Challenges	78.1%	21.9%	
	% within University category	12.8%	7.5%	
	% of Total	8.7%	2.4%	11.1%

Total	Count	445	213	658
	% of Total	67.6%	32.4%	100.0%

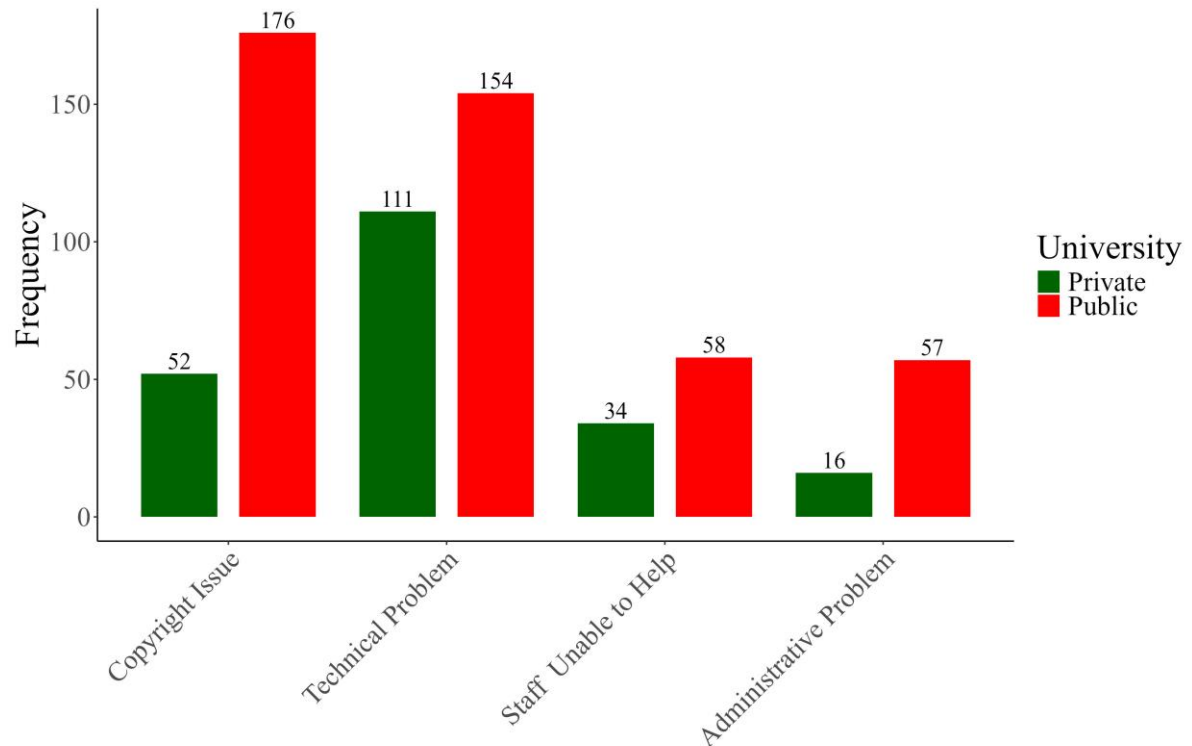


Figure 5.26: Barriers or Challenges Faced by the Users in University Libraries

5.11.13 Suggested Content to Preserve Digitally

Table 5.68 and Figure 5.27 provide insights into the content suggested by users to be preserved digitally in university libraries. Among the suggestions, doctoral theses were recommended by 253 respondents, constituting 8.9% of the total responses, with 59.5% of these indicating a preference for this content. MPhil theses were also suggested, with 189 responses, representing 6.7% of the total, and 44.5% expressing a desire for their preservation. Master's theses garnered significant interest, with 288 respondents suggesting their preservation, accounting for 10.1% of the total responses, and 67.8% expressing a preference for this content. Rare books were also highlighted, with 274 responses, making up 9.6% of the total, and 64.5% indicating a preference for their preservation. Other suggested content included research reports, journal articles, and newspapers, with varying degrees of interest expressed by respondents. Overall, the data underscores the importance

of preserving a diverse range of content digitally within university libraries to meet the needs and preferences of users effectively.

Table 5.68: Suggested Contents by Users to Preserve Digitally in Library

	Responses		Percent of Cases
	N	Percent	
Doctoral Thesis	253	8.9%	59.5%
MPhil Thesis	189	6.7%	44.5%
Master's Thesis	288	10.1%	67.8%
Rare book	274	9.6%	64.5%
Microfilm	79	2.8%	18.6%
Synopsis	139	4.9%	32.7%
Research Report	314	11.0%	73.9%
Annual Report	182	6.4%	42.8%
Journal Article	313	11.0%	73.6%
Conference Paper	226	8.0%	53.2%
Manuscript	116	4.1%	27.3%
Map	94	3.3%	22.1%
Newspaper	234	8.2%	55.1%
Photograph	141	5.0%	33.2%
Total	2842	100.0%	668.7%

N= Number

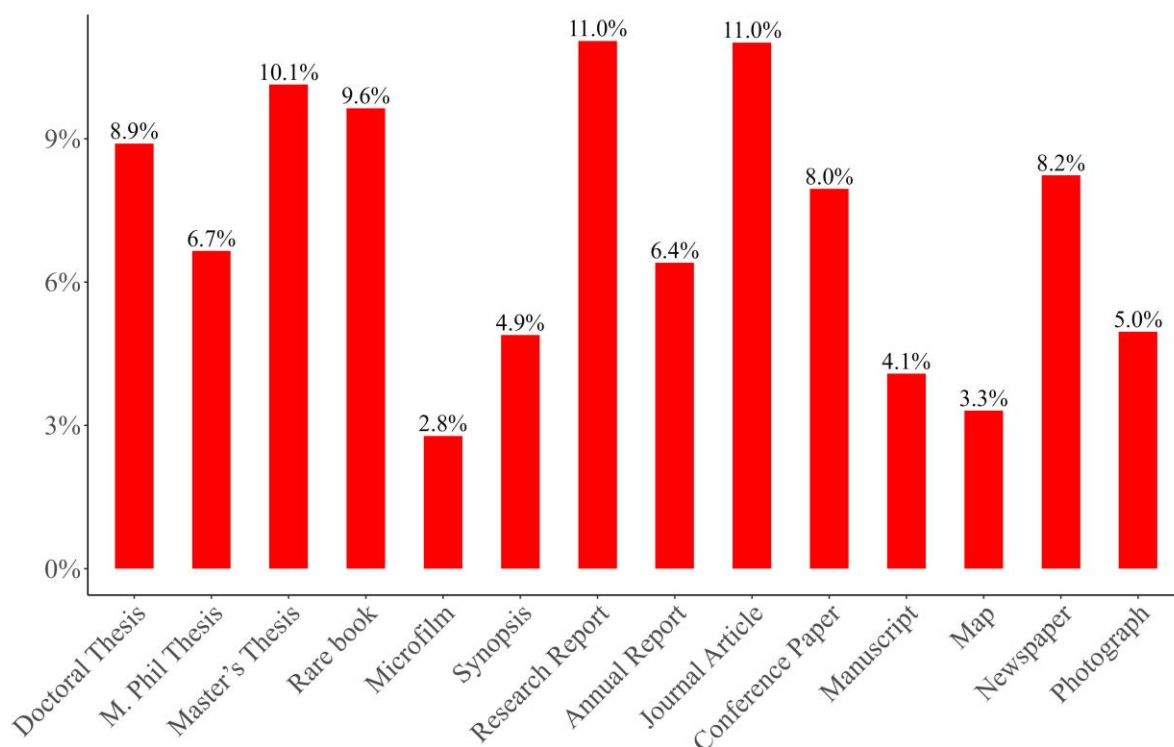


Figure 5.27: Suggested Contents by Users to Preserve Digitally in Library

5.11.14 Quality of the Digital Preservation

5.11.14.1 Is the library's Digital Content Quality full?

Table 5.69 indicates users' perceptions regarding the quality of digital content within the library. Out of 433 respondents, 329 (76.0%) affirmed that the digital content quality is satisfactory, while 104 (24.0%) expressed dissatisfaction. This suggests that a significant majority perceive the digital content quality to be satisfactory, although there is still room for improvement to meet the expectations of all users.

Table 5.69: Is the Digital Content Quality Full?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	329	76.0	76.0	76.0
No	104	24.0	24.0	100.0
Total	433	100.0	100.0	

5.11.14.2 Resolution of the Digital Content

Table 5.70 presents users' comments on the resolution of digital content, indicating whether they perceive it as good or not. Out of 433 respondents, 342 (79.0%) affirmed that the resolution of digital content is satisfactory, while 91 (21.0%) expressed dissatisfaction. This suggests that a majority of users find the resolution of digital content to be adequate, although there is a portion of users who feel there is room for improvement in this aspect.

Table 5.70: Comment of Users on Resolution of Digital Content. Is it good or not?

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	342	79.0	79.0	79.0
No	91	21.0	21.0	100.0
Total	433	100.0	100.0	

5.11.14.3 Quality Level of the Digital Collection

Table 5.71 and Figure 5.28 illustrate users' perceptions of the quality level of digital content available in the library. Among the 433 respondents, the majority rated the quality positively, with 82 (18.9%) describing it as "Very good" and 218 (50.3%) as "Good." Additionally, 122 (28.2%) users rated it as "Moderately" good. Only a small proportion of respondents expressed negative opinions, with 8 (1.8%) considering it "Bad" and 3 (0.7%) rating it as "Very bad." Overall, these findings indicate that a significant majority of users perceive the quality of digital content positively, with only a small fraction expressing dissatisfaction.

Table 5.71: Quality Level of Digital Content

	Frequency	Percent	Valid Percent	Cumulative Percent
Very good	82	18.9	18.9	18.9
Good	218	50.3	50.3	69.3
Moderately	122	28.2	28.2	97.5
Bad	8	1.8	1.8	99.3
Very bad	3	.7	.7	100.0
Total	433	100.0	100.0	

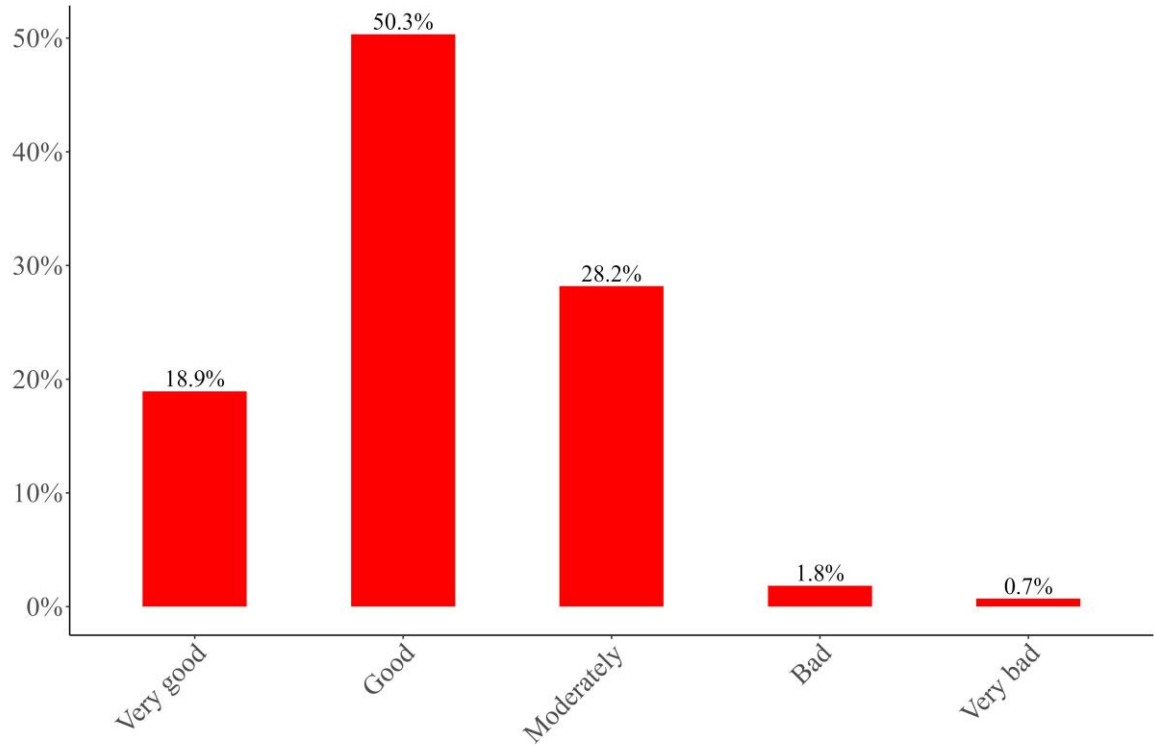


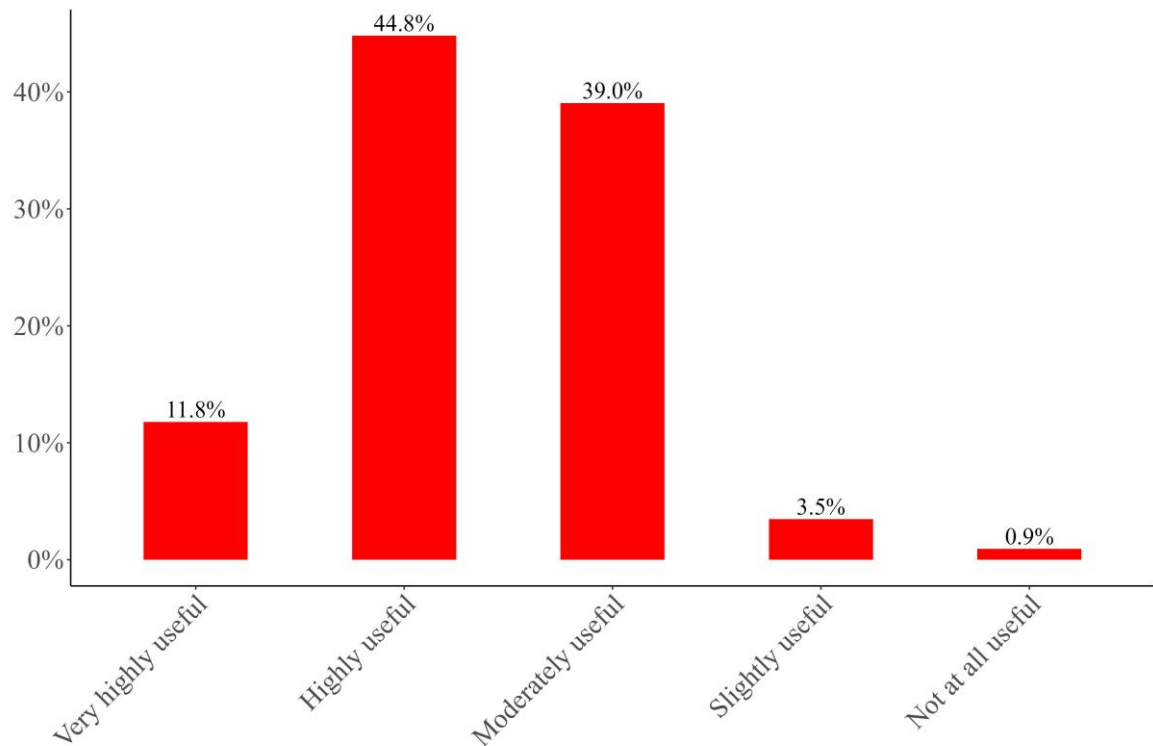
Figure 5.28: Quality Level of Digital Content

5.11.15 Usefulness of the Digital Collection

Table 5.72 and Figure 5.29 present users' perceptions of the usefulness of digital content available in the library. Out of 433 respondents, 51 (11.8%) considered the digital collection "Very highly useful," while 194 (44.8%) rated it as "Highly useful." Additionally, 169 (39.0%) respondents found the collection "Moderately useful." A smaller proportion of users, 15 (3.5%), described it as "Slightly useful," and only 4 (0.9%) respondents reported that it was "Not at all useful." These results indicate that a majority of users find the digital collection to be highly or moderately useful, with only a small fraction perceiving it as slightly or not at all useful.

Table 5.72: Level of Usefulness of the Digital Content

	Frequency	Percent	Valid Percent	Cumulative Percent
Very highly useful	51	11.8	11.8	11.8
Highly useful	194	44.8	44.8	56.6
Moderately useful	169	39.0	39.0	95.6
Slightly useful	15	3.5	3.5	99.1
Not at all useful	4	0.9	0.9	100.0
Total	433	100.0	100.0	

**Figure 5.29: Level of Usefulness of the Digital Content**

5.11.16 Satisfaction Level of Users regarding the Digital Preservation

Table 5.73 and Figure 5.30 indicate the satisfaction level of users regarding the digital preservation. Out of 433 respondents, 13 (30%) considered the digital preservation “Highly dissatisfied,” while 18 (4.2%) expressed it as “Very dissatisfied.” 13 (3.0%) users rated it as

“Dissatisfied,” and 70 (16.2%) considered it “Less satisfied.” Additionally, 245 (56.6%) users rated it as “Satisfied.” 60 (13.9%) users expressed that they were “Very satisfied,” and 14 (3.2%) users reported that they were “Highly satisfied.” This result indicates that a majority of users find the digital preservation to be satisfactory.

Table 5.73: Satisfaction Level of Users Regarding Digital Preservation

	Frequency	Percent	Valid Percent	Cumulative Percent
Highly dissatisfied	13	3.0	3.0	3.0
Very dissatisfied	18	4.2	4.2	7.2
Dissatisfied	13	3.0	3.0	10.2
Less satisfied	70	16.2	16.2	26.3
Satisfied	245	56.6	56.6	82.9
Very satisfied	60	13.9	13.9	96.8
Highly satisfied	14	3.2	3.2	100.0
Total	433	100.0	100.0	

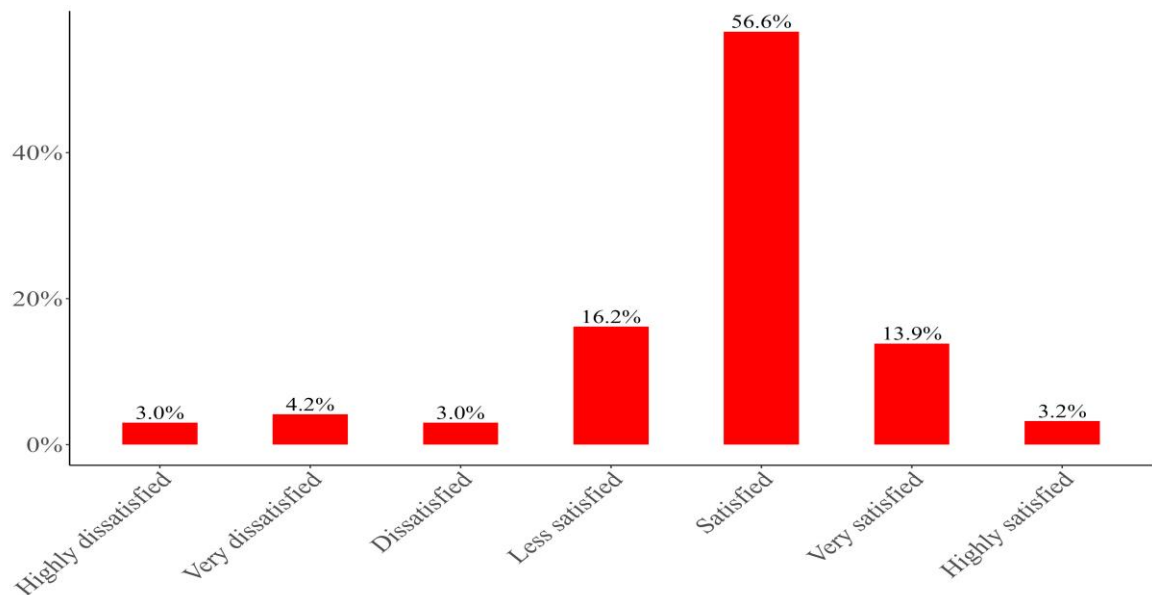


Figure 5.30: Satisfaction Level of Users Regarding Digital Preservation

5.12 Summary of the Findings

The analysis reveals that university libraries, both public and private, predominantly provide access to digital collections through online platforms, with a significant portion of users relying on email and social media for access. The organizational structure of these digital collections is generally well-received, with a majority of users finding them well-organized. However, there are notable challenges related to technical problems and copyright issues, which impede seamless access and use of digital content.

Users highlight several barriers to effective digital preservation, including technical problems, copyright issues, staff inadequacy, and administrative hurdles. These challenges suggest a need for improved infrastructure, better-trained staff, and robust administrative support to facilitate smoother digital preservation activities. Users have provided extensive suggestions for enhancing digital preservation activities: infrastructure and tools, skilled manpower, budget and resources, international standards, and remote access.

The study also identifies significant barriers to institutional repository development, including a lack of IT-skilled professionals, insufficient funds, and inadequate equipment. Additionally, copyright issues, quality control, and metadata management pose further challenges to effective digital preservation. Despite these obstacles, users' generally express positive perceptions of the quality and accessibility of digital collections, although some dissatisfaction remains, indicating areas for improvement.

5.13 Conclusion

The current state of digital preservation in university libraries is largely positive, with well-organized collections and generally high-quality content. However, addressing technical and administrative challenges, improving infrastructure, and ensuring continuous training for library staff are critical to further enhance digital preservation activities. By implementing users' suggestions, university libraries can significantly improve the accessibility, quality, and usefulness of their digital collections, better serving the academic community.

This chapter has provided a comprehensive analysis of digital preservation practices in selected university libraries in Bangladesh, highlighting key trends, challenges, and user perceptions. The findings reveal that thesis and dissertation materials are the most prioritized

for digital preservation, while government publications, maps, and images receive the least attention. Although a majority of institutions have adopted digital preservation policies, gaps remain in terms of resource allocation, infrastructure, and expertise. Public universities face greater challenges related to funding, staffing, and technical support compared to private institutions, which show a higher adoption rate of metadata creation and digital preservation policies.

Overall, this chapter underscores the need for strategic policy interventions, increased investment in digital infrastructure, and enhanced training opportunities for library professionals. Addressing these issues will help ensure sustainable digital preservation practices and improve user satisfaction with digital resources. The insights from this study serve as a foundation for future research and practical initiatives aimed at strengthening digital preservation efforts in university libraries.

CHAPTER SIX

Discussion and Interpretation of Findings

6.1 Introduction

The discussion chapter establishes a connection between the data analysis from the previous chapter and the wider implications of the study's findings. It interprets the results, connects them to the research objectives and questions, and places them within existing literature. This chapter explores the key findings concerning the objectives of the study, compares them with the literature reviewed, and highlights the significance of the results. Additionally, the discussion will address the research questions, identify the study's contributions to the field, and suggest possible directions for future research.

The demographic distribution of 15 library administrators across public and private universities in Bangladesh reveals distinct patterns. In public universities, deputy librarians are the majority, comprising 60% of the administrators, while librarians and assistant librarians each represent 20%. No assistant library officers were reported in public institutions. Conversely, in private universities, librarians dominate, making up 80% of the administrators, with only one assistant librarian (20%) and no deputy librarians or assistant library officers present (Table 5.1 & Figure 5.1).

The study surveyed 433 respondents as users, primarily consisting of teachers (77.1%), followed by students (17.1%) and researchers (5.8%). The respondents were affiliated with both public (40.0%) and private (60.0%) universities, with institutions like AUST, CU, and EWU having the highest representation. The sample was diverse in professional status, with significant representation from professors, postgraduates, and undergraduate students. Males comprised a larger portion of the respondents (62.4%) compared to females (37.6%). The age distribution was predominantly in the 20-29 year range (71.6%), reflecting a younger demographic overall (Table 5.52 & Figure 5.20). The survey of 433 respondents reveals varying patterns of library use among public and private university users. Daily library visits are most common, with 44.6% of users, including 130 from public and 63 from private

universities. Twice-a-week visits account for 24.0% of users, equally split between public and private institutions. Weekly visits make up 13.2%, while a small percentage (1.2%) visit fortnightly, all from public universities. Monthly visits are rare, at 0.9%, with slightly more from public universities. Additionally, 16.2% of users visit the library occasionally, with public university users being more frequent in this category (Table 5.53 & Table 5.54) and (Figure 5.21 & Figure 5.22).

The study utilized several statistical tests to analyze the data. A data distribution test was conducted to assess the overall distribution of the dataset, ensuring its suitability for further analysis. To determine whether the data followed a normal distribution, a data distribution normality test was performed, which is essential for choosing the appropriate statistical methods. Since not all data met the normality assumption, non-parametric tests were employed to offer flexibility in analyzing non-normally distributed data (Table 5.56 & Table 5.57). Among these, the Mann-Whitney test was specifically used to compare differences between two independent groups, such as public and private universities, to identify any significant disparities (Table 5.58 & Table 5.59). These tests collectively provided a comprehensive approach to analyzing the study's data.

6.2 Overview of Digital Preservation Practices in Selected University Libraries

The general information of selected universities in Bangladesh includes details such as their establishment year, category (public or private), and the size of their student and teacher populations (Table 5.2). The data reflects the scale of each university, showcasing their capacity for educational provision and academic support. This overview provides a basis for comparative analysis, helping to understand the organizational dynamics and academic infrastructure of these institutions within the higher education landscape.

The study highlights that all surveyed university libraries in Bangladesh have an active library committee. Library operation hours vary, with opening times between 8:00 AM and 9:00 AM and closing times ranging from 6:00 PM to 10:00 PM. There is significant variation in seating capacity, from 250 to 1200 seats, with larger universities like DU and RU offering more extensive study spaces, while smaller institutions such as BSMRAU and

BAU provide fewer seats (Table 5.3). This disparity reflects the varying levels of infrastructure and resources available to support student learning across different universities.

6.2.1 Variation in Available Materials

The data on library resources in selected universities in Bangladesh shows considerable variation in the availability of materials. Printed books range from 27,845 at AUST to 650,000 at DU. The availability of e-books also varies widely, with some universities like JU reporting none, while IUB offers 250,000. For printed journals, BAU leads with 2,123, while other universities like JU and SUST report 2,500 and 3,000, respectively. The availability of online journals and databases ranges from 3 at AUST to 120,000 at SUST (Table 5.4).

6.2.2 Adoption of Library Resources

The comparative analysis of library resources across public and private universities in Bangladesh shows that both categories of universities are equally equipped with printed books, e-books, printed journals, and online journals/databases, with all reporting the presence of these resources. This indicates a 100% representation of these resources across both public and private institutions. Additionally, the data on library manpower reveals substantial differences among universities, with DU having the largest library staff at 212 personnel, while smaller universities like AUST and BSMRAU have significantly fewer staff, with 7 and 15 personnel, respectively (Table 5.5 & Figure 5.2). This disparity highlights the variation in resource allocation and staffing across different universities.

6.2.3 Digital Preservation Program

The analysis of digital preservation programs across selected universities in Bangladesh reveals that 93.3% of the universities surveyed have implemented digital preservation programs, while 6.7% do not have such programs. Among public universities, 90% have active digital preservation initiatives, whereas all private universities surveyed, 100%, have established these programs (Table 5.7 & Figure 5.4). The commencement years of these

programs vary significantly, with some universities like AUST and BSMRAU starting their programs after 2020, while others like BAU and EWU initiated theirs between 2011 and 2015. Notably, some universities like CU did not report a specific commencement year for their digital preservation programs (Table 5.8).

6.2.4 Selection of Materials for Ensuring Digital Preservation

The analysis of materials selected for digital preservation across universities in Bangladesh shows that thesis and dissertation materials are the highest priority, with 93.33% of universities, including 90% of public and 100% of private institutions, focusing on their preservation. Institutional records and annual reports also receive significant attention, particularly from private universities, resulting in overall outcomes of 53.33% and 46.66%, respectively. There is a notable difference in the preservation of journals and monographs, with private universities showing more interest than public ones. Although less prioritized, old newspapers, rare collections, and manuscripts still receive attention, reflecting diverse preservation priorities. Categories like government publications, maps, and liberation war collections are the least prioritized, with only 13.33% of universities focusing on them. Overall, private universities lead in digital preservation efforts, with 54.0% of materials selected for preservation compared to 28.0% in public universities, resulting in an overall average of 36.66% (Table 5.9 & Figure 5.5).

6.2.5 Management of Digital Preservation Process

The data reveals that in the majority of university libraries surveyed (50.0%), the digital preservation (DP) process is primarily managed by the library authority, with 7 out of 12 cases (58.3%) coming from public universities and 5 (41.7%) from private universities. This accounts for 85.7% of the total instances. Additionally, in 14.3% of the cases, both the library authority and outsourcing are involved in the digital preservation process, exclusively within public universities (22.2% of public cases). Notably, no private universities reported outsourcing their digital preservation efforts. Overall, out of 14 universities, 64.3% of public universities rely solely on the library authority for digital

preservation, while 35.7% of private universities mention a combination of the library authority and outsourcing, covering 100% of the cases surveyed (Table 5.10 & Figure 5.6).

6.2.6 Responsible Authority for Digitization

The data shows that 50.0% of the universities surveyed have library staff responsible for preparing documents for digitization. Within this group, 58.3% are public universities, while 41.7% are private. This accounts for 85.7% of the total cases. Additionally, 14.3% of universities involve both library staff and an outsourcing agency in the document preparation process, with all such cases occurring in public universities (22.2% of public university cases). No private universities reported using both library staff and outsourcing agencies for this task. Overall, 64.3% of the universities rely solely on library staff for document preparation, while 35.7% use a combination of library staff and outsourcing agencies (Table 5.11).

6.2.7 Source for Digitization

The data reveals that among public universities, 40.0% use original sources for digitization, while 20.0% use born-digital sources and an equal proportion (40.0%) employ both types of sources. In contrast, private universities show a different pattern: 20.0% use original sources and none use born-digital sources, but a significant 80.0% use both original and born-digital sources for digitization. Overall, across all surveyed universities, 33.3% rely on original sources, 13.3% use born-digital sources, and 53.3% incorporate both original and born-digital sources in their digitization processes (Table 5.12 & Figure 5.7).

6.2.8 Participation in Research Project

The data indicates that 40.0% of the respondents have participated in research projects focused on digital preservation, while 53.3% have not been involved in such projects. Overall, 42.9% of respondents report engagement in research related to digital preservation. This shows a notable proportion of the academic community actively contributing to research in this area, reflecting ongoing interest and involvement in digital preservation efforts (Table 5.13).

The study's first objective was to investigate the existing condition of digital preservation practices in selected university libraries in Bangladesh. The findings reveal a varied landscape of digital preservation practices across the selected institutions. While some universities have well-established digital preservation systems with institutional repositories and archives, others are still in the nascent stages of developing such systems. The diversity in practices reflects differences in institutional priorities, resource availability, and technical expertise. When compared to existing literature, the findings align with global trends where digital preservation is recognized as crucial but is often hindered by financial constraints, lack of skilled personnel, and inadequate infrastructure. The similar result was found in the study in Pakistan and Africa. Progressive implementation of general digital preservation practices like virus checking, fire/water/theft-proof locations, and restricting unauthorized access is observed in university libraries of Pakistan (Ahmad & Rafiq, 2023). Most institutional repositories in Africa use DSpace software for digital content management and provide long-term digital preservation but lack funding and technical staff with required skills (Anyanwu et al., 2019). Most institutional repositories in Nigeria use DSpace software for digital content management and provide long-term digital preservation but lack long-term funding and technical staff with required skills (Kari & Baro, 2016).

However, the present study also highlights a gap in uniformity and standardization across institutions, which is critical for ensuring long-term access to digital resources.

6.3 Processes and Techniques Used for Digital Preservation

The second objective sought to identify the processes and techniques employed in digital preservation within the selected university libraries. The study found that while most libraries rely on basic digital preservation techniques such as backup and storage, only a few have implemented more advanced practices like format migration, emulation, or the use of trusted digital repositories. This finding suggests that while the importance of digital preservation is acknowledged, the depth of implementation varies widely. The literature supports the need for more advanced techniques to address the challenges of obsolescence and data degradation (Ahmad & Rafiq, 2023; Bhat, 2018; Ravenwood et al., 2013). The

reliance on basic techniques may indicate a lack of resources or expertise, which was also, reflected in the survey responses.

6.3.1 Digital Preservation Initiative

The digital preservation projects reported by university library administrators showcase a diverse range of initiatives aimed at safeguarding valuable digital resources. In Bangladesh, BRAC University's Institutional Repository Project focuses on archiving and providing access to scholarly output and other digital materials. The COLTEL Project at RU addresses digital preservation challenges specific to the university's context, likely involving digital content related to teaching and research. At DU, the Digitization of Old Newspapers, Manuscripts, and Rare Collections Project is dedicated to preserving historical newspapers, manuscripts, and rare collections, facilitating scholarly research into Bangladesh's cultural and historical heritage. The Manuscript Digitization Project (MDP) at CU aims to digitize and preserve valuable manuscript collections, making them more accessible while preventing physical degradation. Finally, the SUST IR Project focuses on establishing an institutional repository to archive and provide access to the scholarly work of its faculty, researchers, and students. Collectively, these projects highlight the commitment of Bangladeshi universities to preserve and enhance access to significant digital resources, thereby supporting the preservation of cultural heritage and academic knowledge.

University libraries are actively engaging in diverse digital preservation projects to safeguard valuable digital resources. These initiatives vary widely in scope and approach, reflecting the unique challenges and opportunities faced by different institutions. Only 11% of university libraries were actively conserving their digital materials, according to the researchers' analysis of the university and university website, while 89% of university libraries were either unaware of the system or were hesitant to use it (Islam et al., 2021). Many African university libraries utilize DSpace software for managing digital content, with a focus on long-term digital preservation and policy development, despite challenges like funding and technical expertise (Anyaku et al., 2019).

6.3.2 Digital Preservation Policy

The data on digital preservation policies across university libraries reveals notable differences between public and private institutions. Among the public universities surveyed, 60% have a digital preservation policy, while 40% do not. In contrast, private universities show a higher percentage, with 80% having a digital preservation policy and only 20% lacking one. Overall, across all universities surveyed, 66.7% have implemented a digital preservation policy, indicating a general trend towards formalizing digital preservation practices (Table 5.14 & Figure 5.8). This disparity highlights a greater prevalence of digital preservation policies in private universities compared to their public counterparts.

The survey data on digital preservation policies reveals that among the public universities surveyed, 40% adhere to their own digital preservation policy, while 80% of private universities follow their own guidelines (Table 5.15). Notably, no universities, whether public or private, report adhering to the NMM, IFLA, or UNESCO guidelines for digital preservation. Overall, 53.33% of all universities surveyed follow their own policies for digital preservation, with no institutions aligning with the NMM, IFLA, or UNESCO standards. The survey data on the future intentions of university libraries regarding digital preservation policies shows that 33.3% of libraries plan to develop their own digital preservation policies, while another 33.3% intend to follow existing standards (Table 5.16). In terms of valid percentages, 50% of libraries are considering developing their own policies, and 50% plan to adopt established standards. This indicates an equal distribution of intentions between creating internal policies and adhering to external guidelines, with the cumulative percentage reaching 100% across both categories (Table 5.17). The study revealed that scanning is the most widely used preservation strategy among university libraries, employed by 80.0% of both public and private institutions. Metadata creation is also prevalent, utilized by 40.0% of public and 80.0% of private universities. Other strategies, such as migration and replication, are less common, with only a few institutions adopting them. Notably, one public university has no preservation strategy, while one private university uses replication as a strategy (Table 5.18).

The data on digital preservation policies across university libraries indicates a notable difference between public and private institutions, with a higher prevalence of such policies in private universities. This trend reflects a broader movement towards formalizing digital preservation practices. In addition to providing useful guidelines for government policy makers, the research gives university administrators of all stripes useful guidance on how to improve their current circumstances. From the perspectives of OA and IR, the researchers will find new avenues for investigation (Islam, 2019).

Public universities, particularly in regions like Tanzania and Kenya, often lack comprehensive digital preservation policies. Studies highlight inadequate preparation and insufficient policy frameworks to support long-term digital preservation in these institutions (Mubofu et al., 2022; Ndegwa et al., 2022). In Pakistan, barriers such as lack of institutional policies, financial resources, and administrative support further hinder digital preservation efforts (Ahmad et al., 2023). Although specific data on private universities is not detailed in the provided abstracts, the general trend suggests that private institutions are more likely to have established digital preservation policies. This is inferred from the overall higher prevalence of such policies in private universities compared to public ones.

Common challenges across public universities include lack of funding, technical expertise, and awareness of digital preservation's importance. These issues are prevalent in regions like Jordan and Pakistan, where there is a moderate understanding of digital preservation's benefits but significant barriers to implementation (Awamleh & Hamad, 2022). Globally, there is a preference for in-house digital preservation activities over outsourcing, with a strong emphasis on developing internal capabilities and policies. However, many institutions worldwide still exhibit a passive attitude towards developing comprehensive digital preservation policies (Ahmad & Rafiq, 2022).

6.3.3 Preservation Standard

Among public universities, MARC is the most frequently used preservation standard, adopted by 60.0% of institutions, with Dublin Core following at 50.0%. Mannix Library's special collections are managed using various metadata and technical standards, including

MARC, Dublin Core, and Mirador, and interact with services like Omeka and CONTENTdm (Sandaver, 2020). The Dublin Core metadata schema is the most effective for cataloging thesis and research projects in DSpace repositories, with excellent ratings in technical, use, and functional aspects (Molina et al., 2018). Other standards, like METS and ISBD, are used by 20.0% of public universities, and 30.0% have no preservation strategy. In private universities, Dublin Core is the predominant standard, used by all surveyed institutions, while MARC is employed by 40.0%. METS and ISBD are each used by 20.0% of private universities, and none of the private universities reported lacking a preservation strategy. Overall, Dublin Core is the most widely used standard, employed by 66.66% of all surveyed libraries, followed by MARC at 53.33%, with METS and ISBD each used by 20.0%. The study reveals that scanning is the most commonly used preservation technique, with 80.0% of public universities and 100% of private universities employing it. Migration is also prevalent, used by 30.0% of public universities and 40.0% of private universities. Reformatting is utilized by 20.0% of private universities, while microfilming is only used by 10.0% of public universities and is not reported by any private institutions. Emulation is not utilized by any of the surveyed universities. Overall, scanning is the most widely adopted technique among all libraries, used by 86.66%, followed by migration at 33.33%. Reformatting and microfilming are less common, employed by 20.0% and 6.66% of libraries, respectively (Table 5.19 & Figure 5.9).

6.3.4 Data Migration Technique

The study found that among public universities, 70.0% use the migration technique to scan non-book materials, while 10.0% scan books, with none scanning both types of materials. In private universities, 60.0% scan both books and non-book materials, with none scanning exclusively either type. Overall, 46.6% of all libraries scan non-book materials, 20.0% scan both types, and only 6.66% scan books exclusively. Regarding file formats used for migration, 30.0% of public universities use software configurations exclusively, 40.0% employ both hardware and software, and 10.0% use only hardware. In private universities, 40.0% use software configurations alone, 60.0% use both hardware and software, and none use hardware configurations alone. Overall, 33.33% of libraries use software configurations

exclusively, 46.6% use both types, and 6.66% use hardware configurations alone (Table 5.20 & Figure 5.10); (Table 5.21 & Table 5.22).

The study found that among public universities, 50.0% use the migration technique to convert files from Microsoft Word to PDF, with 10.0% converting from PDF to PDF and another 10.0% from TIFF to PDF. No public universities reported converting from Microsoft Word to TIFF. In private universities, 60.0% convert from Microsoft Word to PDF, 20.0% from TIFF to PDF, and 20.0% from Microsoft Word to TIFF. Overall, the most prevalent file conversion is from Microsoft Word to PDF, accounting for 53.33% of conversions, while conversions from PDF to PDF and TIFF to PDF represent 26.66% and 20.0%, respectively (Table 5.23 & Figure 5.11). The study found that flatbed scanners are the most commonly used type of scanner among university libraries, with 60.0% of public universities and 80.0% of private universities employing this type. Book Eye scanners are used by 20.0% of public universities, but none of the private universities reported using them. Overall, flatbed scanners account for 66.66% of all scanner types reported, while Book Eye scanners make up 13.33%. Notably, no universities reported using drum or handheld scanners (Table 5.24). The most prevalent method for preparing resources for scanning among universities is to separate different material types, with 60.0% of both public and private universities employing this approach. In contrast, 40.0% of universities prefer to keep materials together in the workflow (Table 5.25). This indicates that the majority of institutions prioritize separating materials before scanning, while a smaller portion maintains a unified workflow. Among universities, the most common scanner resolution setting is 600 dpi, used by 33.33% of institutions. Public universities most frequently use a resolution of 300 dpi, with 40.0% employing this setting, while private universities predominantly use 600 dpi (60.0%). Resolutions of 1200 dpi are utilized by 20.0% of public universities and 40.0% of private universities. Additionally, 20.0% of private universities use a high resolution of 4800x9600, which is not reported among public universities (Table 5.26).

6.3.5 File Format

Among both public and private universities, the most commonly used file format for reproduced text files is .PDF, with 80.0% utilization in each category. .JPG is also frequently used, with 40.0% adoption in both public and private universities. Other formats such as .RTF and .TIFF are less common; .RTF is used by 10.0% of public universities and 20.0% of private universities, while .TIFF is employed by 20.0% of public universities and 40.0% of private universities. Overall, .PDF files dominate, representing 80.0% of all reported practices, followed by .JPG files at 40.0%. JPG is the most commonly used file format for reproduced image files in both public and private universities, with 80.0% utilization in each category. PNG is also widely used, with 10.0% adoption in public universities and 60.0% in private universities. BMP and TIFF formats are used to a lesser extent, with 10.0% and 20.0% utilization in public universities and 20.0% and 40.0% in private universities, respectively. Overall, JPG files are the most prevalent, representing 80.0% of all reported practices, followed by PNG files at 26.66%. With 80% of public and 40% of private universities using .PDF and 40% using .JPG file formats, the question demonstrates how common these file formats are in both types of educational institutions (Table 5.27 & Table 5.28). This is part of a larger pattern in academia where specific file formats are favored due to their compatibility and accessibility. The PDF format is popular in academic contexts because it is perfect for sharing and storing academic papers and resources because it maintains document layout across many platforms and devices (Orduña-Malea et al., 2014; Silva & Dobránszki, 2015). The .JPG format, while primarily used for images, is also common in academic settings for embedding figures and diagrams within documents. Its widespread adoption is likely due to its compatibility and ease of use on various digital platforms. The use of certain file formats, like .PDF, can influence the web visibility of academic institutions. Studies have shown that English and Spanish language documents in PDF format correlate with higher web visibility for universities. The open access nature of many academic files, including PDFs, raises concerns about data theft and misuse. This is particularly relevant for supplementary files that may not be as securely managed as primary publications. The preference for .PDF and .JPG formats in universities is driven by their functionality and compatibility, which support both academic

dissemination and web visibility. However, the open-access nature of these files also necessitates careful management to prevent data misuse.

6.3.6 Institutional Repository (IR) for Digital Preservation

The majority of universities have established institutional repositories (IRs) for digital preservation. Among public universities, 90.0% have an IR, whereas all private universities (100.0%) have implemented one. Overall, 93.3% of the surveyed universities have an IR for digital preservation, leaving 6.7% without one (Table 5.29 & Figure 5.12). Most universities use DSpace for their institutional repositories (IRs), with adoption dates ranging from 2001, as seen in institutions like BSMRAU, to 2024 for JU. DSpace's widespread use highlights a unified approach to managing and preserving digital assets among universities in Bangladesh. However, some universities, such as CU, lack information on their IR software and establishment year (Table 5.30). Overall, the dominance of DSpace reflects a strong commitment to developing effective digital preservation systems for scholarly and research outputs. DSpace is commonly used software for managing digital content in IRs across various regions, indicating a preference for this platform in digital preservation efforts (Kari & Baro, 2016; Anyaoku et al., 2019). Master's theses are the most prevalent type of material stored in institutional repositories (IRs), appearing in 93.33% of all universities, with 90% in public and 100% in private institutions. PhD theses and MPhil theses are also commonly represented, though to a lesser extent, with 73.33% and 66.66% prevalence in public universities and 40% and 20% in private universities, respectively. Conference papers are less frequently included, showing a presence of 26.66% in private universities and 10% in public ones. Overall, public universities have a total material presence of 48.75% in IRs, while private universities account for 72.50%. The presence of institutional repository (IR) policies varies between university types. Among public universities, 50% have established IR policies, while the other 50% do not. In contrast, 80% of private universities have implemented IR policies, with only 20% lacking them. Overall, 60% of the surveyed universities have IR policies, reflecting a notable adoption of structured guidelines for managing institutional repositories in these academic institutions (Table 5.31 & Figure 5.13).

Basically, academic libraries have operational directions for digital preservation, but existing standards and practices are often unsuitable. Recommendations include developing comprehensive digital preservation policies and disaster plans (Adjei et al., 2019). IRs are poorly prepared for long-term digital preservation due to inadequate policies and plans. There is a need for clear policy formulation and stakeholder involvement (Ndegwa et al., 2022; Moseti, 2016). Most IRs use DSpace software and engage in information migration but lack digital preservation policies and long-term funding. Many IRs use DSpace and engage in information migration. While some have developed digital preservation policies, there is a lack of long-term funding and skilled technical staff (Kari & Baro, 2016). Because of its user-friendly and efficient module, DSpace, an open-source institutional repository software, is used in these university libraries for digital preservation (Islam et al., 2020). Institutions are moving towards full implementation of digital preservation strategies, emphasizing the need for embedding these strategies in IRs (Luthuli, 2023). While institutional repositories are widely recognized as essential for digital preservation, many universities face challenges such as inadequate policies, lack of funding, and insufficient technical expertise. There is a strong need for comprehensive digital preservation strategies and policies to ensure the long-term sustainability of digital content in IRs.

6.3.7 Distribution of Institutional Repository (IR) Collection

The distribution of institutional repository (IR) collections varies between public and private universities. In public universities, 20% of IRs hold fewer than 500 items, another 20% have between 1501 and 2000 items, and 40% possess more than 2000 items. In contrast, private universities show a higher proportion, with 40% having fewer than 500 items and 60% having collections exceeding 2000 items. Overall, 46.66% of universities IRs maintain collections surpassing 2000 items, reflecting a significant volume of digital assets preserved within these repositories (Table 5.33). The data reveals that most university libraries provide institutional repository (IR) training for their staff, with 80% of public universities and 100% of private universities offering such training. Overall, 86.67% of university libraries conduct IR training sessions, demonstrating a strong commitment to improving staff expertise in managing institutional repositories. The data shows that 50% of public

universities and 60% of private universities provide institutional repository (IR) training for research scholars. Overall, 53.33% of university libraries offer such training, reflecting a widespread effort to equip scholars with the skills needed to effectively use institutional repositories (Table 5.34).

6.4 Satisfaction and Familiarity with Digital Resources

The third objective focused on examining user satisfaction with the use of digitally preserved resources. The findings indicate that user satisfaction is generally high when digital resources are accessible and reliable. However, several users expressed concerns about the consistency of access, the quality of digitization, and the ease of use of digital interfaces (Table 5.72 & Figure 5.29). These concerns are consistent with findings in other studies, which emphasize that user satisfaction in digital libraries is closely linked to the usability of digital resources and the effectiveness of the digital preservation strategies employed (Soltani-Nejad et al., 2020; Xu & Du, 2018; Miller, 2013; Jeng, 2005). The study's results underscore the need for ongoing assessment and improvement of digital interfaces and user support services.

Key Factors Influencing User Satisfaction

- **Accessibility and Reliability:** High user satisfaction is linked to the ease of access and reliability of digital resources. When users can easily and consistently access digital libraries or e-government services, their satisfaction increases significantly (Ameen et al., 2024; Noor, 2022).
- **Quality of Digital Resources:** The quality of digital resources, including system and service quality, plays a crucial role in user satisfaction. High-quality resources enhance perceived usefulness and ease of use, which are critical for user satisfaction and loyalty (Soltani-Nejad et al., 2020; Xu & Du, 2018).
- **Ease of Use:** The perceived ease of use of digital platforms is a significant determinant of user satisfaction. When digital interfaces are intuitive and user-friendly, satisfaction levels are higher, leading to increased engagement and loyalty (Calvo-Porrall et al., 2017; Xu & Du, 2018).

- **Consistency of Access:** Users express concerns when there is inconsistency in accessing digital resources. Ensuring stable and reliable access is essential for maintaining high satisfaction levels (Karadimce & Davcev, 2018).
- **Digitization Quality:** The quality of digitization affects user satisfaction. Poor digitization can lead to dissatisfaction, highlighting the need for high standards in digital resource development (Masrek & Gaskin, 2016).

6.4.1 Adequacy of Institutional Repository (IR) Collection

The library staff's ratings regarding the adequacy of existing institutional repository (IR) collections reveal varied perceptions. Specifically, 26.7% rated the collections as "Adequate," while 20.0% found them "Slightly adequate" and another 20.0% considered them "Almost adequate." Conversely, 13.3% rated the collections as "Poor," and an equal percentage deemed them "Inadequate" (Table 5.36). Overall, these responses highlight concerns among library staff about the sufficiency of the IR collections. The satisfaction levels of library administrators toward the institutional repository (IR) show a range of sentiments. Specifically, 20.0% are "Very satisfied," and 40.0% are "Satisfied," while 6.7% are "Neither satisfied nor dissatisfied." Conversely, 20.0% are "Dissatisfied," and 6.7% are "Very dissatisfied." This distribution indicates that while many administrators are content with the IR, there is also a notable level of dissatisfaction (Table 5.37). Library administrators' satisfaction with institutional repositories (IRs) varies, with both contentment and dissatisfaction present. This sentiment is influenced by several factors, including challenges in adoption, management, and perceived benefits.

Satisfaction and Challenges

- **Positive Sentiments:** Many library managers express positive views about the value of IRs, particularly in terms of content recruitment and visibility of research outputs (Cullen & Chawner, 2010; Demetres et al., 2020). IRs are seen as beneficial for increasing citation counts and exposure, which can enhance the institution's academic presence (Demetres et al., 2020; Bashir et al., 2021).

- **Dissatisfaction Factors:** Common challenges include limited resources, such as insufficient budget and staff, which hinder the development and deployment of IR services (Joo et al., 2019; Mater, 2024). Additionally, issues like copyright management, lack of technical support, and the complexity of data management are significant barriers (Kyprianos & Lygnou, 2022).

Adoption and Engagement

- **Faculty Engagement:** There is a noted reluctance among faculty to engage with IRs, often due to the perceived burden of submission processes and concerns about open access (Bell et al., 2005; Quinn & Quinn, 2023). Efforts to increase submissions include improving the perceived benefits and reducing the costs associated with the submission process.
- **Role of Librarians:** Librarians play a crucial role in promoting and managing IRs, often collaborating with IT staff and academics to enhance repository functionality and user engagement (Horwood et al., 2004). However, attracting faculty participation remains a challenge due to differing priorities and work practices (Bell et al., 2005).

6.4.2 Familiarity with Digital Resources

The data reveals that 87.1% of respondents are familiar with digital collections, with a higher familiarity rate among private university users (94.8%) compared to those from public universities (81.9%). Public university users make up 60% of the total sample, contributing to 49.2% of those familiar with digital collections, while private university users, representing 40% of the sample, account for 43.5% of those familiar. Notably, 83.9% of users unfamiliar with digital collections are from public universities, underscoring a greater familiarity with digital resources among private university users (Table 5.60). The study reveals that users from both public and private universities actively search a wide range of digital collections, with certain types being more popular in public universities. Master's theses are the most searched, followed by rare books and research reports, with public university users showing higher search activity across most categories. However, rare books and microfilm searches are more balanced between the two university types. Notably,

doctoral theses, MPhil theses, and photographs see significantly higher search activity among public university users, while private university users contribute a smaller but still significant portion across various digital collections. The data reveals that online access is the most common method for both public and private university users, followed by email, social media, and CD-ROM, indicating a preference for digital and internet-based access methods among university library users (Table 5.61 & Figure 5.23); (Table 5.62 & Figure 5.24).

6.4.3 Opinion on Organization of Digital Contents

The data reveals that 77.8% of respondents find the digital contents in their university libraries well-organized, indicating a strong majority are satisfied with the current structure. However, 22.2% of users feel that the organization could be improved, highlighting a significant minority who see room for enhancement in how digital collections are arranged (Table 5.63). The data shows that 72.3% of respondents seek help from library staff, indicating a strong preference for assistance in accessing digital resources. Conversely, 27.7% of users either do not require help or prefer to navigate the library independently (Table 5.64). This reflects a significant majority relying on staff support, while a notable minority operates independently.

The data reveals that 66.3% of respondents can collect print copies of digital collections from their library, suggesting that most users have access to physical versions of digital materials. However, 33.7% of respondents cannot obtain print copies, indicating a significant portion lacks this option. This highlights a potential area for improvement in providing print access to digital resources.

6.4.4 Quality Level of Digital Content

The data reveals that 76.0% of respondents find the quality of digital content in the library satisfactory, while 24.0% are dissatisfied (Table 5.68 & Figure 5.27). This indicates a general positive perception of digital content quality, with some room for improvement to address the concerns of all users. The data shows that 79.0% of respondents are satisfied with the resolution of digital content, while 21.0% are not (Table 5.69). This indicates that

most users consider the resolution satisfactory, though some believe it could be improved. The majority of respondents rate the digital content quality positively, with 18.9% describing it as "Very good" and 50.3% as "Good." Additionally, 28.2% rated it as "Moderately good." Only a small percentage found it "Bad" (1.8%) or "Very bad" (0.7%) (Table 5.70). Overall, most users have a favorable view of the digital content quality. Most users find the digital collection useful, with 11.8% rating it as "Very highly useful" and 44.8% as "Highly useful." Additionally, 39.0% consider it "Moderately useful." A small percentage views it as "Slightly useful" (3.5%) or "Not at all useful" (0.9%) (Table 5.71 & Figure 5.28). Overall, the digital collection is generally perceived as highly or moderately useful by the majority of respondents.

6.5 Challenges and Barriers to Digital Preservation

The fourth objective was to identify the challenges and barriers to successful digital preservation in the selected university libraries. The findings reveal several common challenges, including insufficient funding, lack of trained personnel, technological obsolescence, and limited institutional support. These challenges are consistent with the barriers identified in the literature, where financial constraints and the rapid pace of technological change are frequently cited as major obstacles to effective digital preservation (Corrado, 2022; Houghton, 2016; Evens & Hautekeete, 2011).

Digital preservation in university libraries faces several challenges that hinder its successful implementation. These challenges are consistent across various regions and institutions, highlighting common barriers that need to be addressed for effective digital preservation. Many libraries struggle with inadequate financial resources, which affect their ability to purchase necessary technology and maintain digital preservation systems (Ahmad et al., 2023; Anyaoku et al., 2019; Masenya & Ngulube, 2020). There is a significant shortage of skilled professionals with the necessary technical expertise to manage and preserve digital resources effectively. This includes a lack of training in digital preservation practices and technologies (Awamleh & Hamad, 2022; Masenya & Ngulube, 2020). Rapid changes in technology lead to obsolescence, making it difficult for libraries to maintain access to digital content over time. This includes challenges with outdated hardware and software, as well as

the need for constant updates and migrations (Cen, 2023). Many libraries face a lack of institutional commitment and support, which is crucial for developing and implementing effective digital preservation policies and practices (Fisher, 2017). Issues such as poor power supply, insufficient technological infrastructure, and inadequate storage solutions further complicate digital preservation efforts (Masenya & Ngulube, 2020). The absence of established digital preservation standards and policies makes it challenging for libraries to implement consistent and effective preservation strategies.

The challenges of digital preservation in university libraries are multifaceted, involving financial, technical, and institutional barriers. Addressing these challenges requires a coordinated effort to secure funding, train personnel, update technologies, and develop comprehensive policies and standards. By overcoming these barriers, libraries can ensure the long-term preservation and accessibility of digital resources.

Moreover, the study highlights specific challenges unique to the Bangladeshi context, such as limited access to high-quality digital preservation software and infrastructure. These localized challenges call for tailored solutions that consider the specific needs and constraints of institutions in developing countries.

6.5.1 Challenges of Developing Institutional Repository (IR)

The challenges faced by library staff in developing institutional repositories (IR) reveal several common issues. "Lack of IT-skilled professionals" is a major concern, reported by 50.0% of public university staff and 80.0% of private university staff. Other significant obstacles include "Lack of instruments" and "Insufficient funds," each affecting 50.0% of public universities and 60.0% and 40.0% of private universities, respectively. Additionally, "Insufficient publications" is a notable issue for 20.0% of public universities and 60.0% of private universities. Lesser challenges include "Negligence of researchers" and "Negligence from university authorities," highlighting broader issues related to resources and expertise (Table 5.38 & Figure 5.14).

6.5.2 Involvement of Library Staff in Digital Preservation (DP)

The involvement of library staff in digital preservation (DP) is notably high, with 80.0% of staff at public universities and 100% at private universities engaged in DP on a full-time basis. Additionally, 10.0% of public university staff participates in DP on a part-time basis (Table 5.39 & Figure 5.15). Overall, the data reflects a strong commitment to digital preservation activities, with most library staff dedicating their efforts full-time to these tasks. The data on staff sufficiency for digital preservation (DP) shows that 80.0% of public university respondents feel their staff levels are adequate, while 20.0% view them as insufficient (Table 5.40). In contrast, all private university respondents (100%) reported having sufficient staff for DP. Overall, 46.66% of respondents across both public and private universities believe their staffing levels for DP are sufficient, indicating a general adequacy but also highlighting a significant number who perceive a shortfall in staffing. The data on staff sufficiency for digital preservation (DP) indicates that 80.0% of respondents from public universities believe their staff levels are adequate, while 70.0% of private university respondents report the same. Interestingly, all respondents from private universities (100%) confirmed having sufficient staff for DP. However, overall, 46.66% of respondents across both public and private universities expressed concerns about insufficient staffing levels for DP. This suggests that, despite a majority feeling adequately staffed, a significant portion still perceives a shortfall in personnel dedicated to DP efforts (Table 5.41).

6.5.3 Training Facilities

The data shows that 70.0% of public universities have training facilities for digital preservation (DP) staff, whereas all private universities (100%) provide such facilities. Conversely, 30.0% of public universities lack these training resources, while no private universities report a deficiency (Table 5.42 & Figure 5.16). This highlights a higher prevalence of DP training facilities in private universities compared to their public counterparts. The data reveals that 80.0% of library staff in public universities has received training in digital preservation (DP), whereas all staff in private universities (100%) has undergone such training. Conversely, 20.0% of staff in public universities has not received training, while no staffs in private universities lack training (Table 5.43). This indicates that

private universities have a higher rate of DP training provision for their staff compared to public universities. The study reveals that library staffs in both public and private university have attended a variety of training programs. In public universities, staff members received certificates in DSpace and digital librarianship, with one attending a session organized by BALID. In private universities, staff participated in a workshop on digital library software, regular in-house sessions, and received training in metadata preparation, DSpace, Greenstone, and ILS_Koha, among other areas. Overall, private universities reported a slightly higher number of diverse training opportunities compared to public institutions (Table 5.44).

6.5.4 Copyright Practice

The data on the digitization of copyrighted materials in university libraries shows that 40% of public universities and 60% of private universities engage in this practice. Despite this, the majority of both public and private institutions have not digitized copyrighted materials, with 60% of public universities and 40% of private universities reporting no such digitization activities (Table 5.45 & Figure 5.17). The data on the digitization of copyrighted materials reveals that among public universities, 20% digitize materials with owner agreements, and 10% do so under legal provisions for libraries. In private universities, 20% digitize materials with owner agreements, but none follow legal provisions. Additionally, 10% of public universities digitize copyrighted materials without formalities, while this practice is not reported in private universities (Table 5.46). The data shows that in both public and private universities, 20% of institutions obtain copyright licenses from suppliers or vendors, while 80% do not. This indicates a similar approach to acquiring copyright licenses across both types of universities. The data reveals that among public universities, 30% reported owning the copyright for their digitization efforts, whereas 70% do not. In contrast, all private universities (100%) indicated that they do not own the copyright (Table 5.47 & Table 5.48).

6.5.5 Fund Allocation for Digital Preservation

The data shows that 40% of public universities reported owning the funds allocated for digital preservation efforts, while 60% do not. In contrast, all private universities (100%) reported owning these funds (Table 5.49 & Figure 5.18). The data indicates that 20% of public universities and 40% of private universities received funds for digital preservation from other projects. Among those who received funds, 30% of public universities found them adequate, whereas 80% of private universities considered the funds adequate. In contrast, 70% of public universities and 20% of private universities felt the funds were inadequate (Table 5.50).

6.5.6 Challenges Faced by Library for Digital Preservation

The data reveals that copyright issues are a significant challenge in digital preservation efforts, affecting 60% of public universities and 80% of private universities. Funding is a major concern for 80% of public institutions, compared to just 20% of private institutions. Additional challenges include hardware or equipment constraints, insufficient staff, lack of skilled personnel, insufficient staff, staff time management, lack of staff training facilities, metadata, Optical Character Recognition (OCR), preparing materials, quality control, selecting materials, software, congested workspace, and lack of air conditioning facilities. Overall, public universities reported facing slightly more challenges (40.66%) than private institutions (30%), with an average challenge rate of 37.32% across both types of universities (Table 5.51 & Figure 5.19).

6.5.7 Challenges and Barriers Faced by Users

The data highlights several challenges users face when accessing digital collections in university libraries. Copyright issues affect 26.7% of users, with a higher incidence in public universities. Technical problems are the most significant barrier, impacting 40.3% of users across both types of universities. Additionally, 14.0% of users experience difficulties due to staff not being able to assist, and 11.1% face administrative problems (Table 5.67 & Figure 5.26). These findings suggest a need for improvements in copyright management, technical

support, staff training, and administrative processes to better support users in accessing digital collections.

The data highlights user suggestions for digital preservation in university libraries. Among the recommendations, doctoral theses were suggested by 253 users (8.9% of total responses), with 59.5% favoring their preservation. MPhil theses received 189 suggestions (6.7%), with 44.5% expressing interest. Master's theses were the most favored, with 288 suggestions (10.1%) and 67.8% support. Rare books were recommended by 274 users (9.6%), with 64.5% backing their preservation. Other content such as research reports, journal articles, and newspapers also garnered interest (Table 5.68 & Figure 5.27). This indicates a strong preference for preserving a variety of academic materials to meet user needs effectively.

6.6 Justification of the Hypotheses:

H1: There is a difference in the types of materials selected for digital preservation between public and private university libraries.

Justification:

The data clearly shows contrasting priorities in selecting digital documents for digital preservation between public and private university libraries. Public universities have emphasized the preservation of intellectual content such as theses and dissertations (90% public vs. 100% private), concerning their intension on research steadiness and institutional scholarship. On the other hand, private universities indicate a strong tendency to preserve institutional documents (100% private vs. 30% public) and annual reports (100% private vs. 20% public), reflecting the need for documentation transparency and internal performance monitoring. This difference not only replicates the different missions and operational focus of these institutions, but also proposes appropriate digital preservation approaches based on user potential and administrative requirements. Perceptual differences between document types support the hypothesis.

H2: Public and private university libraries significantly differ in their adoption of digital preservation policies.

Justification:

The adoption of digital preservation techniques is a hazardous indicator of an organization's interest in thoroughly storing and controlling digital materials. The findings of the study reveal that 80% of private university libraries have applied formal digital preservation policies, compared to only 60% of public university libraries. This variance recommends a stronger institutional promise among private university libraries toward organized digital preservation attempts. This gap may be due to a more centralized decision-making process for the reform of library services, greater administrative flexibility, or modest contraction in the private sector. Public university libraries, although rich in academic legacy, may face bureaucratic delays or funding constraints that slow policy development. These noticeable variations indicate a significant difference in digital preservation practices between the two sectors.

H3: The frequency of challenges faced by libraries in building institutional repositories differs between public and private university libraries.

Justification:

The establishment of institutional repositories (IRs) needs both technical experts and financial investment, and the nature of challenges can differ based on institutional features. The study reveals that private university libraries often report a lack of IT-skilled persons, demonstrating a gap in technical human resources. Conversely, public university libraries more often face problems related to inadequate funding and a lack of important apparatus, directing to financial and infrastructural restrictions.

These changes are reliable with the structural and operational disparities between the two university types - private university may have more independence but fight with employing or retaining IT staff, while public university may help from skilled professionals but lack satisfactory financial provision. The data evidently highlight these dissimilar decorations,

supporting the hypothesis that the challenges to building IRs are not only predominant but vary meaningfully in frequency and type between public and private university libraries.

H4: There is no difference in user satisfaction levels regarding digital preservation between public and private university libraries.

Justification:

User satisfaction assists as a vigorous indicator of the usefulness of digital protection efforts in university libraries. Though public and private university libraries in Bangladesh fluctuate in terms of policy outlines, funding, and technical set up, the data show that users from both types of university libraries report similarly high levels of satisfaction with preservation facilities. This advises that crucial user needs, such as access to digitized theses, e-resources, and repositories are being sufficiently met in both sectors. The similar satisfaction outcomes suggest that institutional type does not essentially mark user involvement when digital preservation attempts are considered with user access and serviceability. Thus, the indication supports the hypothesis that no difference exists in user satisfaction levels between public and private university libraries.

H5: Libraries using recognized digital preservation standards show higher levels of digital collection quality compared to those that do not use such standards.

Justification:

Digital preservation standards such as MARC, Dublin Core, METS, and ISBD deliver a structured and reliable method to cataloging, metadata creation, and digital materials protection. These standards confirm that digital properties are exactly labeled, easily ascertainable, and interoperable across systems, vital issues for preserving durable access and serviceability. In this research, university libraries that stated using standards like MARC and Dublin Core (e.g., 60% of public and 100% of private university libraries using Dublin Core) were also those with higher user-reported satisfaction and better-quality scores for digital resources. Conversely, university libraries not resulting in any standard or using inconsistent performance often face issues such as poor metadata quality, retrieval

difficulties, and lack of system compatibility. For example, without such standards, the organization and quality control apparatus of university libraries was moderately low. The structured nature of standards-based systems helps to control the similarity between digital resources, allowing more functional content to be included and accessed.

The data support the hypothesis by showing that university libraries observing globally recognized safeguarding standards tend to have better-managed, more complete sources, which users perceive as higher in excellence. Thus, this defends testing the hypothesis statistically to ensure whether a constructive association exists between the application of standards and digital resource excellence.

6.7 Recommendations for Overcoming Digital Preservation Challenges

In line with the fifth objective, the study provides several recommendations to overcome the challenges identified. These include increasing institutional investment in digital preservation, providing ongoing training for library staff, adopting standardized digital preservation frameworks, and fostering collaborations between institutions to share resources and expertise.

The recommendations are informed by both the findings of this study and best practices in digital preservation as discussed in the literature (Quinn et al., 2018; Burda & Teuteberg, 2013; Strodl, 2006). By addressing the identified challenges, the selected university libraries can enhance their digital preservation practices and ensure long-term access to valuable digital resources.

The study highlights several recommendations to address challenges in digital preservation, emphasizing the importance of institutional investment, staff training, standardized frameworks, and collaboration.

1. **Institutional Investment:** Increasing institutional investment is crucial for developing robust digital preservation programs. Many libraries and archives face resource limitations, making it difficult to implement comprehensive digital preservation strategies independently (Trujillo et al., 2017; Zarnitz et al., 2019).

2. **Staff Training:** Ongoing training for library staff is essential to equip them with the necessary skills for digital preservation. This includes understanding new digital technologies and preservation techniques, which are vital for maintaining long-term access to digital resources (Awamleh & Hamad, 2022).
3. **Standardized Frameworks:** Adopting standardized digital preservation frameworks, such as the Open Archival Information System (OAIS), can help institutions establish consistent policies and procedures, ensuring the sustainability of digital preservation efforts (Mannheimer & Cote, 2017).
4. **Collaboration and Partnerships:** Fostering collaborations between institutions can help share resources and expertise, making digital preservation more feasible and effective. Collaborative models, such as consortia approaches and community-based efforts, have been shown to maximize resources and knowledge sharing (McLean, 2019; Stranger et al., 2023; Liew, 2019).

Users have highlighted several key areas for enhancing digital preservation in university libraries. They recommend improving infrastructure and access by ensuring 24-hour internet availability, remote access to digital archives, and a user-friendly digital library website. Skilled manpower and training are also crucial; users suggest hiring professional staff and offering regular training programs to keep skills updated. Additionally, increasing the budget for modern preservation tools and resources is emphasized, along with adopting international standards and best practices to align with leading institutions.

Furthermore, users advocate for better facilities and tools, including more library seating, reliable power supplies, and advanced digital preservation equipment. They also call for proactive policy and administrative actions to support digitization projects and enhance digital preservation efforts. Lastly, improving user experience by ensuring digital content is well-organized, regularly updated, and accessible through easy download and a search option is essential. Addressing these suggestions could significantly enhance the effectiveness and accessibility of digital preservation activities in university libraries.

6.8 Conclusion

The discussion chapter has explored the key findings of the study in relation to the research objectives and questions. The study reveals a complex landscape of digital preservation practices in Bangladeshi university libraries, characterized by both progress and ongoing challenges. The findings highlight the need for increased institutional support, investment in advanced preservation techniques, and ongoing user-centered improvements.

By addressing these areas, university libraries in Bangladesh can enhance their digital preservation practices, ensuring that valuable digital resources are accessible and preserved for future generations. The study also contributes to the broader field of digital preservation by providing insights that can inform practice and policy in similar contexts. The conclusions drawn from this discussion provide a foundation for future research and action, particularly in addressing the challenges identified and building on the strengths of current digital preservation practices.

CHAPTER SEVEN

Challenges, Recommendations and Conclusion

7.1 Introduction

This chapter discusses the various challenges and barriers to digital preservation in university libraries, as well as recommendations to overcome these issues. It draws upon insights from both library administrators and users, offering practical solutions to enhance digital preservation efforts. The chapter concludes with a reflection on the overall findings and their implications for university libraries in Bangladesh. It highlights the pressing need for well-developed digital preservation policies, adequate funding, and the adoption of international best practices to sustain the accessibility and longevity of digital content. Through an in-depth analysis, this chapter not only identifies these obstacles but also presents tailored recommendations, emphasizing the role of both administrative commitment and user involvement in building resilient digital preservation systems. Ultimately, the chapter aims to provide actionable insights that can guide university libraries in enhancing their digital preservation efforts, ensuring that they meet both current and future informational needs.

7.2 Challenges in Digital Preservation Practices

Graham (1998) divided the challenges and problems associated with digital preservation into three major categories: (i) the longevity of physical storage media; (ii) issues related to technology, including dependence on hardware and software, obsolescence of technology, and the variety of formats; and (iii) issues related to intellectual preservation, including information authenticity and integrity. University libraries in Bangladesh, like other institutions around the world, are facing challenges in preserving their digital resources. Based on literature and observation approaches, the challenges of digital preservation are as follows:

- i. **Absence of established standards and policies:** It is very important to have proper standards and policies for digital preservation. Digital preservation work is being hampered due to the lack of established standard and policy in university libraries in Bangladesh.
- ii. **Inadequate funding:** Due to inadequate funding, relevant infrastructure for digital preservation cannot be purchased, which is a major challenges for digital preservation in university libraries in Bangladesh.
- iii. **Copyright and Intellectual Property Rights (IPR) issues:** The existing intellectual property right and copyright law is a major challenge to digital preservation in university libraries in Bangladesh. To avoid causing issues for libraries looking to maintain their digital holdings, copyright rules and licensing schemes should be appropriately managed. The staff responsible for digital preservation in the library thus needs to identify where the current copyright protection impedes digital preservation and how technological techniques can influence copyright law.
- iv. **Lack of skilled manpower:** Trained and technically skilled manpower is required for digital preservation and proper management of resources. University libraries in Bangladesh lack trained manpower. This is a major challenge for digital preservation.
- v. **Staff training and development:** A skilled and effective workforce can be a library's greatest asset. Carefully planned staff training and continuous professional development activities can play a key role in the successful transition of libraries from the traditional model to the digital or hybrid model. University libraries should take a strategic approach to training and development by carefully considering new and developing roles and responsibilities in addition to the skills required. Skill development activities should be an integral part of digital preservation planning.
- vi. **Lack of staff expertise:** The lack of expertise in digital preservation is a significant barrier to the development of digital preservation programs. The digital preservation process requires trained and technically skilled personnel to manage the resources appropriately.

- vii. Technology problems:** The effective use of technology is essential to the success of digital preservation. However, software and hardware technologies are changing quickly, which makes the current technology outdated and fragile. If the required hardware and software are not upgraded, the system might not produce the desired results for the concerned organization.
- viii. Lack of collaboration efforts:** Bangladesh does not have any laws governing the preservation and upkeep of resources of national significance. A further obstacle to success is that digital preservation is typically underfunded and properly understood.
- ix. Machine dependency:** Digital content is machine-dependent and requires specialized hardware and software to store and retrieve information. Storage equipment needs to be updated and modified in accordance with the ongoing evolution of computers (hardware and software) and storage technologies. Otherwise, it might represent the biggest technological risk to digital content's continuous availability.
- x. Metadata:** Metadata is probably the most important aspect of digital preservation. Elements with weak metadata may be undiscovered, their authenticity is unverifiable, and their context is unclear. So, they may not be as usable as otherwise. Inadequate or missing structured metadata will also affect the rendering. Materials that are saved but lack quality metadata are like resources that have been wasted in order to 'save' them.
- xi. Lack of hardware or equipment:** University libraries in Bangladesh are facing digital disruption due to a lack of hardware and other related equipment due to limited access to essential hardware and equipment needed for digital preservation. This includes digital scanners, high-resolution cameras, and storage devices that are crucial for the effective preservation of digital content. The absence of these resources not only hinders the digitization process but also affects the quality and accessibility of preserved materials, placing libraries at a disadvantage in the digital age.
- xii. Insufficient staff:** Personnel are the lifeblood of a library. Insufficient and trained staff in university libraries in Bangladesh is a major challenge for digital preservation. A well-trained and adequately staffed library team is vital for managing digital preservation activities. In many university libraries in Bangladesh, there is a

significant shortage of personnel, compounded by limited training in digital preservation techniques. This lack of qualified staff is a major barrier to developing and maintaining effective digital preservation programs. With insufficient personnel, existing staff often struggle to manage both traditional library responsibilities and new digital initiatives, affecting the quality and sustainability of preservation efforts.

- xiii. Poor technology infrastructure:** Due to the lack of weak technical infrastructure, digital preservation in university libraries in Bangladesh is becoming a problem. Digital preservation heavily relies on a robust technology infrastructure, but many university libraries in Bangladesh operate with outdated or insufficient technical resources. These limitations create challenges in handling, storing, and securing digital content. Poor technological infrastructure results in slow access times, limited storage capacity, and inadequate data protection, all of which hinder the efficient management and preservation of digital materials
- xiv. Inadequate power supply:** Uninterrupted power supply is required in the library to operate the digital preservation activities. Uninterrupted power supply should be ensured through generators, inverters and solar systems to supply electricity to the university libraries. Consistent power supply is essential for the operation of digital preservation equipment and technology. However, many libraries in Bangladesh experience frequent power outages, which disrupt digital preservation activities. To address this issue, reliable backup solutions such as generators, inverters, and solar systems are needed. Without these alternatives, libraries face challenges in sustaining uninterrupted operations, impacting their ability to preserve digital resources over time.
- xv. Technological obsolescence:** Obsolescence can be defined as the process of becoming out of date or obsolete. Long-term digital preservation has been considered to be significantly hampered by technological obsolescence. The rapid pace of technological change means that hardware, software, and file formats quickly become outdated, rendering previously preserved digital materials at risk. Technological obsolescence is a critical challenge for long-term digital preservation, as it requires

libraries to continuously update or migrate digital content to newer formats. Without proactive measures to manage obsolescence, valuable digital assets could become inaccessible, putting historical, cultural, and scholarly materials at risk of permanent loss.

- xvi. Poor ICT infrastructure:** Weak ICT infrastructure is a major challenge for university libraries in Bangladesh in terms of digital preservation. A robust ICT (Information and Communication Technology) infrastructure is foundational to successful digital preservation, but many Bangladeshi university libraries lack adequate ICT support. Weak ICT infrastructure limits libraries' abilities to implement modern digital preservation practices, resulting in reduced efficiency, compromised data integrity, and limited user access. Strengthening ICT capabilities is essential to create a more resilient and accessible digital preservation framework in these institutions.
- xvii. Congested workspace:** One major issue with the library is its lack of workspace. One of the biggest obstacles to digital preservation is considered to be workspace constraints. Insufficient workspace is a pressing issue in many university libraries. Digital preservation requires designated areas for scanning, cataloging, and equipment storage, which can be difficult to establish in congested library environments. The lack of physical space restricts workflow and makes it challenging for staff to work efficiently on digital preservation tasks. As libraries expand their collections and preservation activities, addressing spatial limitations is critical to ensuring that both physical and digital resources are well-maintained.
- xviii. Lack of air-conditioning facilities:** Air conditioning facilities are very scarce in university libraries in Bangladesh. Lack of air conditioning facilities is a major challenge to digital preservation in libraries in Bangladesh. Maintaining a controlled environment is essential for preserving both physical and digital materials, as fluctuating temperatures and humidity levels can damage hardware and degrade the quality of stored materials. Unfortunately, many university libraries in Bangladesh lack air conditioning, which is essential for creating a stable environment for digital equipment and storage. The absence of these facilities impacts the longevity and

reliability of digital preservation efforts, posing risks to both equipment and preserved content.

These challenges underscore the need for strategic investments, infrastructure upgrades, and policy support to build a sustainable digital preservation environment in Bangladeshi university libraries. Addressing these issues is essential to protecting valuable academic and cultural resources and to ensuring that they remain accessible for future generations.

Digital preservation in university libraries faces some specific challenges, which hinder the effective management and accessibility of digital resources. These challenges include:

- i. Development of Institutional Repositories (IRs):** Setting up and maintaining institutional repositories require technical expertise and financial resources. Many universities face challenges in developing robust IR systems that can securely store and provide access to digital content.
- ii. Involvement of library staff in digital preservation:** Lack of skilled staff remains a critical barrier to successful digital preservation. Without adequate training, library personnel may struggle to handle digital resources effectively.
- iii. Training facilities:** Many institutions do not provide regular, advanced training for their library staff, leading to gaps in digital preservation knowledge and skills. This deficiency limits the libraries' ability to implement modern digital preservation techniques.
- iv. Copyright practices:** Managing copyright issues is a significant challenge, particularly in relation to digital collections. Many libraries lack the resources to navigate the complex legal landscape surrounding the preservation and sharing of copyrighted materials.
- v. Fund allocation for digital preservation:** Insufficient funding poses a major obstacle to digital preservation activities. Limited budgets prevent libraries from investing in the latest technologies and tools necessary for preserving digital resources effectively. Without proper financial support, essential updates to digital preservation systems are often delayed, increasing the risk of data loss or degradation. To ensure

sustainable digital preservation, a consistent budget allocation is needed to cover both current operational needs and future technological advancements.

- vi. **Challenges in digital preservation:** Technical issues, such as outdated systems, poor internet connectivity, and a lack of modern equipment, continue to be significant barriers to digital preservation efforts. These challenges impede libraries' ability to maintain and upgrade their digital infrastructure, which is crucial for long-term preservation. Additionally, the lack of dedicated IT support and digital preservation expertise makes it difficult to address these technical challenges effectively and efficiently.
- vii. **Connectivity and access issues:** Users often face difficulties accessing digital resources due to inconsistent connectivity, limited access to devices, and inadequate user support. These challenges further restrict the utilization of digital collections, limiting users' ability to retrieve information when and where they need it. Improved connectivity and access measures, along with user support systems, are essential to ensuring that digital resources are readily available to all library users.

7.3 Recommendations for Overcoming Digital Preservation Challenges

The suggestions provided by library professionals and users were gathered through open-ended questions, allowing respondents to freely express their views and recommendations regarding digital preservation activities. This approach encouraged a more detailed and personalized input, capturing a wide range of perspectives and insights.

7.3.1 Suggestions Made by Library Administrators

Library professionals highlighted critical areas such as the need for ethical practices in librarianship, digital training, enriched collections, and increased funding for digital preservation efforts. Their responses reflect the practical challenges they face and offer solutions grounded in their professional experience. The suggestions made by library administrators provide valuable insights into improving digital preservation efforts and overall library services. Here's an illustration and elaboration of each suggestion:

- i. **Awareness of librarianship ethics and implementation:** This recommendation emphasizes the importance of ethical considerations in librarianship practices, such as respecting intellectual property rights, protecting user privacy, and ensuring equitable access to information. Implementation involves integrating ethical principles into library policies, procedures, and staff training programs.
- ii. **Digital-based training for academic librarianship:** With the increasing digitalization of library resources and services, this suggestion highlights the need for training programs focused on digital librarianship skills. Topics may include digital asset management, metadata creation, digital preservation techniques, and using emerging technologies in library services.
- iii. **Enrich library collections through collecting the latest books and e-books:** Libraries play a vital role in promoting reading habits and supporting research and learning activities. By continuously updating their collections with the latest books and e-books, libraries can meet the diverse informational needs of users and enhance their educational experiences.
- iv. **More training of library staff and research scholars; increase budget and fund:** Investing in continuous professional development for library staff and research scholars is crucial for maintaining high-quality library services and staying abreast of advancements in the field. Increasing the budget and funding allocations for training initiatives can ensure access to resources and opportunities for skill enhancement.
- v. **Recruit proper library professionals, arrange motivational and technical sessions:** Hiring qualified library professionals with specialized skills and expertise is essential for effective library management and service delivery. Motivational and technical sessions can boost staff morale, enhance job satisfaction, and improve performance. Providing a conducive working environment further supports staff productivity and well-being.
- vi. **Support for projects like HEQEP:** HEQEP (Higher Education Quality Enhancement Project) or similar initiatives can provide critical support for library development, infrastructure upgrades, and capacity-building efforts. Collaborating with external

funding agencies and participating in grant programs can help libraries secure resources for implementing innovative projects and enhancing their services.

- vii. Full automation of the library:** Automation streamlines library operations, improves efficiency, and enhances user experiences. Implementing integrated library management systems, self-checkout kiosks, and digital cataloging solutions can automate routine tasks, reduce administrative burdens, and facilitate seamless access to library resources.
- viii. Collaboration between library personnel and faculty members:** Building strong partnerships between library staff and faculty members fosters a culture of collaboration and information sharing. By working together, librarians and faculty can develop tailored instructional materials, integrate information literacy into the curriculum, and support research endeavors effectively.

Overall, these suggestions underscore the importance of continuous improvement, resource allocation, staff development, and collaboration in advancing library services and digital preservation efforts.

7.3.2 Suggestions from Users

Library users emphasized infrastructure improvements, including better internet access and remote connectivity, as well as the need for skilled staff and up-to-date digital tools. Their suggestions were user-centered, focusing on accessibility, user experience, and content quality. By combining the insights from both groups, a comprehensive understanding of the current state of digital preservation in university libraries was achieved, highlighting key areas for improvement. Selected university library users provided several suggestions for improving digital preservation activities. Key recommendations include:

1. Infrastructure and Access:

- ❖ Ensure 24-hour internet access and improve connectivity, including availability in all student halls.
- ❖ Provide remote access to digital archives for students and professionals.

- ❖ Maintain a smooth and user-friendly digital library website for easy access.

2. Skilled Manpower and Training:

- ❖ Recruit skilled and professional staff to manage digital preservation.
- ❖ Provide regular training for library officers and staff to enhance their skills.
- ❖ Organize skill development programs to improve digital preservation practices.

3. Budget and Resources:

- ❖ Allocate sufficient budget for digital preservation activities, including purchasing modern preservation tools and high-resolution scanners.
- ❖ Increase funding for the acquisition of new books, journals, and international research papers.
- ❖ Ensure continuous updating of digital preservation tools to keep up with technological advancements.

4. International Standards and Best Practices:

- ❖ Adopt international standards for digital preservation and learn from leading institutions like Jawaharlal Nehru University, New Delhi.
- ❖ Create a common source of collection for researchers to facilitate access to a wide range of materials.

5. Enhanced Facilities and Tools:

- ❖ Improve facilities for all students by increasing seats, bookshelves, and overall library space.
- ❖ Ensure uninterrupted electricity supply and air conditioning to maintain a conducive environment for digital preservation.
- ❖ Implement modern digital preservation tools and software, including high-quality scanner machines and advanced digital tools.

6. Policy and Administrative Actions:

- ❖ University authorities should take proactive steps to enhance digital preservation facilities, including initiating digitization projects.
- ❖ Develop comprehensive administrative policies to support digital preservation efforts.
- ❖ Increase resources and access to digital content from renowned universities to benefit users.

7. User Experience and Content Quality:

- ❖ Ensure the digital content is regularly updated and organized according to international standards.
- ❖ Provide easy download and printing options, along with keyword searching and multiple filter capabilities.
- ❖ Address copyright issues and ensure that intellectual output from students and faculty is preserved and accessible.

By addressing these areas, university libraries can significantly improve their digital preservation activities, making resources more accessible and useful for students, researchers, and faculty members.

7.3.3 Recommendations Based on Survey Results and Observational Analysis

The current study found that if issues with digital preservation are not resolved soon, irreversible digital information will be destroyed. Therefore, the study looked into the variables influencing the long-term sustainability of digital preservation in university libraries in Bangladesh. In order to develop and strengthen digital preservation programs in university libraries, the study also offers further suggestions for addressing issues and challenges related to digital preservation that were found in survey results and observational analysis. Therefore, the recommendations proposed in this chapter will guide information professionals in university libraries on how to engage more targeted efforts in implementing effective digital preservation in their institutions so that they can enhance their practices for competitive advantage in the changing information environment. Therefore, the suggestions

in this chapter answer all of the study's research questions. Based on the findings of the study, the researcher made the following recommendations:

- i. **Infrastructure and access:** Complete digitization and digital preservation work in university libraries are being negatively affected due to insufficient infrastructure and materials. Therefore, quality infrastructure, including high-quality scanners, digital cameras, computers, internet facilities, and digital technology, is essential for every university library. Besides, ensure 24-hour internet access and improve connectivity, including every hall of the university. Provide remote access to digital archives for students and professionals. Maintain a smooth and user-friendly digital library website for easy access.
- ii. **Skilled manpower and training:** A skilled and effective workforce can be a library's greatest asset. Carefully planned staff training and continuous professional development activities can play a key role in the successful transition of libraries from the traditional model to the digital or hybrid model. The university library should recruit skilled and trained IT manpower and professional staff to manage digital preservation activities. Besides, library authorities should provide regular training for library officers and staff to enhance their skills. The library also should organize skill development programs to improve digital preservation practices. Skill development activities should be an integral part of digital preservation planning.
- iii. **Allocate sufficient budget and resources:** The findings of the study revealed that some university libraries do not allocate sufficient funds in their annual budget for digital preservation activities. The management of libraries should ensure sufficient budget for digitization and digital preservation activities, including purchasing modern preservation tools and high-resolution scanners. Every year, increase funding for the acquisition of new books, journals, and international research papers. The university libraries should ensure continuous updating of digital preservation tools to keep up with technological advancements. It is better to have a separate budget head in the annual library budget for digital preservation activities.

- iv. **Legal issues:** Since preservation may be in violation of current copyright regulations, digital preservation operations also have implications for the law. Libraries that want to maintain their digital resources over the long or even short term should manage copyright laws and licensing agreements appropriately to avoid any issues. Policymakers and responsible personnel in the field of digital preservation must therefore determine how technical strategies can affect copyright and where existing copyright laws obstruct digital preservation.
- v. **Provide software for digital preservation:** Software for the use of digital preservation work is still a challenge for most selective university libraries. Some university libraries have their own software, and some libraries do not use any software. In addition, compatibility of software and hardware can be a challenge for libraries. Therefore, Morrissey (2010) also suggested in his research that Free and Open Source Software (FOSS) would bring many benefits to digital preservation. Therefore, digital archiving software and open source software are recommended for the respective university libraries.
- vi. **Developing policy for digital preservation:** University libraries should make a policy to pay more attention to the latest trends in the world of effective digital preservation and preservation of information resources in libraries. University libraries should establish a comprehensive policy that reflects the latest trends and best practices in digital preservation. This policy should prioritize the continuous enhancement of digital preservation techniques and ensure resources are available to support its implementation effectively.
- vii. **Training for staff involved in digital preservation activities:** The library management should organize continuous training (in-house and on the job), which will enhance the ICT skills of the staff and also make them understand the recent ways to preserve library resources digitally so as to stand the test of time. The selected university libraries have been advised to ensure continuous and time-bound training for the staff engaged in digitization and digital preservation.

- viii. International standards and best practices:** University libraries should adopt international standards for digital preservation and learn from leading international institutions like Jawaharlal Nehru University, New Delhi, India. Besides, create a common source of collection for researchers to facilitate access to a wide range of materials. Adopting international standards for digital preservation is crucial for maintaining high-quality and consistent preservation practices. Libraries should consider learning from leading institutions like Jawaharlal Nehru University in New Delhi, India, to incorporate proven strategies and build a shared collection that can expand research accessibility.
- ix. Enhanced facilities and tools:** The university authority should improve facilities for all students by increasing seats, bookshelves, and library resources. The library needs to allocate more space for the storage of the library resources so that they can be prevented from the distortion caused by the lack of proper storage. Ensure uninterrupted electricity supply and air conditioning to maintain a conducive environment for digital preservation. Library authority should implement modern digital preservation tools and software, including high-quality scanner machines and advanced digital tools.
- x. Administrative actions:** University authorities should take proactive steps to enhance digital preservation facilities, including initiating digitization projects. The library should develop comprehensive administrative policies to support digital preservation efforts. The library management should increase resources and access to digital content from renowned universities to benefit users.
- xi. User experience and content quality:** The library authority should ensure the digital content is regularly updated and organized according to international standards. Libraries should provide easy download and printing options, along with keyword searching and multiple filter capabilities. Ensuring digital content is up-to-date and organized according to international standards will improve usability and accessibility for library users. Additionally, providing user-friendly features such as easy download

and printing options, keyword searches, and multiple filtering capabilities will greatly enhance the research experience.

- xii. Digital preservation as routine activities:** University libraries are required to adopt digitization and digital preservation as regular activities like other regular library activities. Digitization and digital preservation should become routine library activities, seamlessly integrated with other standard services. This approach will make digital preservation a regular practice, ensuring that libraries remain responsive to the evolving needs of digital information management.
- xiii. Digital preservation strategies:** The selected university libraries will have to focus on various strategies for availability and long-term accessibility of digital resources by implementing digital preservation. The libraries basically have to implement all the digital preservation strategies including migration, scanning, emulation, replication, metadata techniques, etc. University libraries should implement a variety of strategies for the availability and long-term accessibility of digital resources. Effective strategies include migration, scanning, emulation, replication, and metadata techniques, which together will help libraries protect digital assets and ensure their usability over time.
- xiv. Share digitization work with other organizations:** The author's observation found that most libraries do not share the task of digitization. As a result, there is a challenge to reduce the duplication of efforts between the respective libraries and therefore work on it by forming a coordination network at the national level and for future exchanges. Libraries should be recommended to share experiences and digital efforts and resources.
- xv. Train librarians for developing technical skills in the field of digital preservation:** Human Resource Development (HRD) is the key to the success of digital preservation. Thus, the participation of archivists, preservation staff, librarians, and collection managers in maintaining digital repositories is essential for developing a sense of ownership and establishing a new culture of digital preservation. Thus, it is

recommended that selected university libraries have to provide training for librarians regarding digitization and digital preservation.

- xvi. Create content management for digitized materials:** Based on the research findings and observations of the researchers, it is recommended that university libraries should organize and classify their digital information resources so that they can be stored, published, and reused in multiple ways. Libraries should develop a robust content management system for organizing and classifying digitized resources. This system will enable the efficient storage, retrieval, and reuse of digital materials, enhancing both accessibility and the preservation of valuable academic content.
- xvii. Preserve digitized material for long-term availability:** As Dovratz and Astrid (2009) have recommended, “Network of Expertise in Long-Term Storage of Digital Resources” (NESTOR) offers a framework for developing trustworthy long-term repositories and guidance for the evaluation of sustainable conservation measures. The results of the current study revealed that most university libraries store digital material on departmental servers and local computers. So, university libraries should create a network for long-term preservation, and there should be a framework for developing long-term repositories.
- xviii. Provide legal deposit of e-content:** Copyright or legal issues do not allow some libraries to make digital material accessible through the internet, and this is a barrier for users to access digital material in libraries. Therefore, libraries are required to have a valid deposit of e-content for the use of digital materials. To overcome copyright and legal barriers that limit access to digital materials, libraries should establish a valid legal deposit of e-content. This will ensure that digital resources are accessible for educational and research purposes while complying with copyright regulations.

7.4 Challenges and Recommendations (University Category)

Understanding the challenges faced by university libraries in executing digital preservation practices is important for constructing effective and supportable solutions. However, these

challenges are not similar across all university libraries. In Bangladesh, public and private universities contrast meaningfully in terms of organizational structure, funding apparatuses, staffing capability, and technical willingness. As such, examining their challenges and requirements distinctly offers deeper understandings into the nature and strength of obstacles met in digital preservation efforts. This section presents a categorized analysis of the major challenges identified from the study and suggests specific, actionable recommendations for both public and private university libraries to improve their digital preservation creativities efficiently and sustainably.

7.4.1 Public University Libraries

Challenges:

1. **Insufficient Funding:** Public universities face tenacious financial limitations, with 80% of surveyed institutions identifying a lack of adequate funding as a key barrier to digital preservation. Limited budget provisions make it difficult to purchase essential digitization equipment, implement digital repository platforms, or keep existing infrastructure. Most public university libraries rely on irregular project-based funding (e.g., HEQEP), lacking sustained monetary support.
2. **Scarcity of Contemporary Equipment and Infrastructure:** Many public university libraries lack elementary tools such as high-resolution scanners, OCR (Optical Character Recognition) software, devoted servers, and stable backup systems. These technological shortages hamper large-scale digitization of print materials and operative metadata creation.
3. **Limited Technical Expertise and Training:** Though public universities have more staff in number, many librarians and technical personnel have restricted or no formal training in digital protection standards (e.g., METS, Dublin Core, MARC). Moreover, 60% of public institutions highlighted the absence of proper staff training facilities as a barrier.

4. **Overfilled Workspaces and Unfavorable Working Conditions:** Libraries in public universities frequently work in space-constrained surroundings, with insufficient air-conditioning systems. These physical restrictions distress the safeguarding of breakable print materials and degrade staff productivity during digitization tasks.
5. **Lack of Comprehensive Digital Preservation Policies:** 40% of public universities showed operating without any formal digital preservation policy. This findings in fragmented efforts, unpredictable metadata performs, and a lack of synchronized repository growth approaches.
6. **Low Faculty Assignment and Contribution:** Public universities occasionally face challenges in inspiring teachers to donate to institutional repositories. Some scholars are uninformed of the necessity of archiving intellectual outputs, while others persist cautious due to copyright or scholarly resource concerns.

Recommendations:

- **Amplified Budget Provision and Governmental Support:** The Ministry of Education and University Grants Commission (UGC) should establish recurring budget lines specifically for digital library development, equipment procurement, and repository maintenance. A special grant mechanism for underfunded institutions may accelerate digital preservation progress.
- **National Capacity Building Efforts:** National workshops, certificate programs, and hands-on training sessions should be introduced to enhance librarians' skills in digital preservation tools and standards. Collaboration with LIS departments can help in training the next generation of library professionals.
- **Infrastructure Development Projects:** Investment in scanners, storage systems, metadata creation tools, and air-conditioned digital preservation labs is essential. Such support should prioritize public institutions with large collections of rare or archival materials.

- **Policy Progress and Standardization:** All public universities should be required to adopt a formal digital preservation policy aligned with international standards. UGC may issue a model framework for institutions to adopt or modify based on local needs.
- **Faculty Assignment Campaigns:** Awareness movements and encouragement apparatuses should be launched to encourage scholar to preserve theses, reports, datasets, and publications to the institutional repository. Library-faculty association models may help to endure contributions.

7.4.2 Private University Libraries

Challenges:

1. **Lack of Skilled IT Professionals:** About 80% of private university libraries recognized the lack of skilled IT staff as a noteworthy obstacle. Unlike public universities, many private institutions work with smaller library teams where staffs are expected to succeed multiple roles without specialized knowledge in repository software, metadata, or digital curation.
2. **Time Management and Manpower Issues:** With constrained professionals, library staff often struggle to balance routine library procedures with digitization and repository management tasks. This multitasking situation leads to slow repository development and frequent backlogs.
3. **Limited Infrastructure Integration:** Although private universities often have better funding, many lack advanced integration of preservation tools. Several institutions still rely on basic or outdated systems and have not fully adopted international metadata standards, limiting resource discoverability.
4. **Low Institutional Engagement:** In some cases, faculty and administrative leadership show low commitment toward long-term digital preservation. This results in underutilized repositories, limited policy implementation, and fragmented digital resource management.

5. **Software Necessity without Strategic Planning:** Some private universities adopt digital preservation software (e.g., DSpace, Greenstone) without a proper roadmap or sustainability plan. This may lead to technical issues, outdated repositories, or duplication of effort.

Recommendations:

- **Capacity Building of IT Professionals:** Private universities should prioritize recruitment of library technologists or provide dedicated IT support to library teams. Short-term training programs should also be arranged for current staff in collaboration with software communities (e.g., DSpace user groups).
- **Role Concentration and Staff Development:** Institutions should allocate additional manpower or create specialized roles within the library for digital resource management, metadata design, and repository administration. This will allow smoother workflow and better time utilization.
- **Deliberate Planning and Software Up gradation:** Private universities need to develop comprehensive digital preservation strategies that outline content selection, metadata schema, access policy, and long-term storage solutions. Open-source platforms should be properly customized and maintained.
- **Institutional Mandates and Faculty Policies:** Library guidelines should mandate academic staff to deposit their work in the institutional repository. Regular orientation and recognition programs can enhance faculty involvement and content acquisition.
- **Networking and External Teamwork:** Private university libraries should form consortiums or partnerships for shared repository hosting, metadata standardization, and resource optimization. Such collaborations can reduce costs and increase perceptibility.

This comparative analysis of digital preservation challenges and recommendations by university category discloses different institutional authenticities. Public universities struggle more with infrastructural inadequacies and policy gaps, while private universities face human resource shortages and weaker strategic planning. Pointing out these category-specific challenges through tailored recommendations is crucial for building a robust and sustainable digital preservation system in Bangladeshi university libraries. By recognizing these alterations and acting on them, stakeholders can improve digital access, confirm long-term knowledge preservation, and expand user satisfaction across higher education institutions.

7.5 Contribution to the Field and Implications for Practice

This study contributes to the field by providing a detailed analysis of digital preservation practices in the context of Bangladeshi university libraries. The findings offer valuable insights into the current state of digital preservation, the challenges faced by institutions, and user satisfaction with digital resources. The study's commendations have practical implications for improving digital preservation strategies and can assist as a guide for other institutions facing alike challenges.

This study marks a significant influence to the field of digital preservation by offering an in-depth analysis of its implementation in university libraries in Bangladesh. It highlights the priorities and practices of both public and private universities, revealing that theses, dissertations, institutional records, and annual reports receive the most attention, while materials like maps, government publications, and images are often overlooked. By identifying these preservation patterns, the study offers a comprehensive understanding of the types of materials that institutions value for digital preservation. Furthermore, it discovers the adoption of preservation policies, strategies, and standards, showcasing how universities to integrate the digital preservation to ensure long-term accessibility and longevity of intellectual resources.

Beyond documenting present practices, the study illustrates key challenges faced by university libraries in their digital preservation efforts. Problems and challenges such as a lack of IT-skilled professionals, insufficient funding, hardware constraints, and copyright

concerns emerge as prime hurdles. Additionally, differences between public and private universities in terms of policy integration, resource allocation, and technical infrastructure further complicate the implementation of effective digital preservation strategies. By addressing these challenges, the study not only provides a clearer picture of the current limitations but also highlights opportunities for improving digital preservation in academic institutions. The insights gained from these challenges can inform policymakers, library administrators, and university management on the necessary interventions to strengthen digital preservation efforts.

The practical implications of this study extend beyond Bangladeshi universities, as the findings and recommendations can serve as a roadmap for other institutions facing similar challenges in digital preservation. By enhancing the importance of standardized preservation practices, strategic funding allocation, and capacity-building initiatives for library professionals, this research underscores the need for a more structured and sustainable approach to digital preservation. Moreover, the study sheds light on user perceptions of digital resources, revealing that while many patrons are satisfied with present digital collections, there is still room for enhancement in terms of accessibility, quality, and comprehensiveness. As a result, this research not only contributes to academic discourse on digital preservation but also offers practical guidelines that can assist libraries and policymakers to enrich more effective, user-centric digital preservation frameworks.

7.6 Possibility for Further Research

As digital preservation continues to evolve with technological advances and the growing demand for uninterrupted access to information, there remain a number of unexplored areas and opportunities for further research. This study on digital preservation practices in selected university libraries in Bangladesh has laid the foundation for understanding the current context, identifying challenges, and proposing strategies. The findings of this study highlight significant gaps in digital preservation practices in university libraries in Bangladesh, which presents opportunities for further research. Based on the results of this study, the following suggestions have been made for further research:

1. **Comparative analysis across institutions:** Future research can compare digital preservation practices based on university categories, including private and public universities, to provide a more inclusive understanding of the state of digital preservation.
2. **Integration of advanced technologies:** Investigating the potential of advanced technologies such as artificial intelligence (AI), block chain, and cloud computing in improving the efficiency and reliability of digital preservation systems could yield innovative solutions for libraries.
3. **Research on policy development:** Researchers can focus on developing comprehensive digital preservation policies tailored to the Bangladeshi context, examining their impact on sustainability and implementation in university libraries.
4. **User-centered research:** Future studies could explore user perspectives on digital preservation, including usability, accessibility, and satisfaction with digital resources, to ensure that preservation efforts align with user needs.
5. **Long-term impact assessment:** To assess the long-term efficacy of digital preservation techniques and their contributions to the highest standards of academic and scientific excellence, conduct longitudinal research studies.
6. **Collaborative preservation efforts:** Examine the feasibility and benefits of inter-university collaborations for digital preservation, focusing on resource sharing, cost management, and collective policy-making.
7. **Training and capacity building:** Research can explore the effectiveness of training programs for library staff in digital preservation techniques and their impact on enhancing institutional practices.
8. **Ethical and legal challenges:** Investigate the legal and ethical dimensions of digital preservation, such as copyright compliance, data privacy, and intellectual property rights, which remain critical in ensuring sustainable practices.
9. **Key factors of digital preservation:** Exploring the key factors influencing digital preservation in higher academic institutions: an exploratory factor analysis approach.

10. Assessing the impact of digital preservation: Assessing the impact of key variables on user satisfaction in digital preservation practices: A variable analysis approach. The five independent variables can be technological infrastructure, staff competency, access to resources, policy implementation, and financial support; and the dependent variable will be user Satisfaction. The research will investigate how these factors individually and collectively influence user satisfaction in the context of digital preservation in higher academic institutions. Using statistical techniques such as regression analysis, the study will provide insights into the most significant predictors of user satisfaction and offer practical recommendations for improving library services.

Further studies in these areas will not only expand the existing knowledge base but also contribute to the development of robust and user-friendly digital preservation practices in university libraries, which will demonstrate the culture of information accessibility and preservation in Bangladesh.

7.7 Conclusion

The challenges and barriers to digital preservation in university libraries are multifaceted, encompassing issues related to infrastructure, funding, technical expertise, and user access. Addressing these challenges requires a concerted effort from both library administrators and users. By increasing budget allocations, investing in training, adopting international standards, and improving infrastructure, university libraries can significantly enhance their digital preservation efforts. Also, encouraging library staff and faculty to work together, automating services, and making sure that ethical behavior is followed will help meet the changing needs of students, researchers, and faculty, leading to a better and more user-centered library experience. The insights gathered from this research provide a roadmap for the future direction of digital preservation in university libraries in Bangladesh.

The importance of digital preservation services in libraries is immense in building Smart Bangladesh. Digitization offers many advantages for university libraries. University libraries are becoming more interested in digital preservation as a result of users' increasing requirements for information. Tremendous growths of information technology (IT) have

made it possible to digitally archive university library resources in order to ensure long-term access to them. For this reason, the majority of university libraries in Bangladesh have taken initiatives to digitize their collection resources. A standard digitization procedure was lacking in all of the university libraries in Bangladesh in the recent past due to the absence of clear guidelines, which is currently causing user discomfort and lower-than-expected output quality. In this situation, it is very essential to have a national policy for guiding university libraries regarding digitization and digital preservation.

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APPENDIX-A

Questionnaire Set-1

Confidential

Sample No.:

**Research Questionnaire for
(Librarians/Library Administrators)
A Study of Digital Preservation Practices in Selected University Libraries in
Bangladesh**

Dear Sir/Madam,

I am pursuing PhD at Department of Information Science and Library Management, University of Dhaka (DU) on the topic ***A Study of Digital Preservation Practices in Selected University Libraries in Bangladesh.***

[Digital Preservation is defined for this study as the set of processes, activities and management of library resources over time to ensure its long term accessibility. For this study, Preservation Practices means digital preservation activities of library resources are running in the selected university libraries and present condition of these activities.]

Dear Respondent,

I am a Doctoral Fellow of the University of Dhaka pursuing my PhD on the topic “A study of Digital Preservation Practices in Selected University Libraries in Bangladesh” under the guidance of Dr. Md. Nasiruddin Munshi, Professor in the Department of Information Science and Library Management at the University of Dhaka.

In order to get a comprehensive understanding of the present scenario of the digital preservation practices in selected university libraries of Bangladesh, I am here by submitting a set of questionnaire to you. This survey is completely confidential and will be used only for the academic research. I would appreciate it if you could please take a few moment of your valuable time to complete the questionnaire.

Supervisor:

Sincerely Yours,

Dr. Md. Nasiruddin Munshi
Professor
Dept. of Information Science and Library
Management, University of Dhaka
Email: ramanasir@yahoo.com

Mohammad Shakaought Hossain Bhuiyan
PhD Research Fellow
University of Dhaka
Cell: 01716760120
Email: shakaought_bhuiyan@yahoo.com

Section-1: General Information of the University

- 1.1 Name of the University.....
- 1.2 Year of the Establishment.....
- 1.3 Category of the University:
- (a) Public ☐
- (b) Private ☐
- 1.4 The Number of Students at the University.....
- 1.5 The Number of Teachers at the University.....

Section-2: General Information of the Library

- 2.1 Name of the Library.....
- 2.2 Establishment Year of the Library.....
- 2.3 Does the Library have a Library Committee?
- (a) Yes ☐
- (b) No ☐
- 2.4 Please Mention the Library Opening and Closing Hours:
- Opening Hour:AM/PM
- Closing Hour:AM/PM
- 2.5 Total Seating Capacity of the Library.....
- 2.6 Total Collection in your Library:
- Printed Books.....Copy
- E-Books.....Copy
- Printed Journals.....Copy
- Online Journals.....Copy
- 2.7 Total Manpower (library staff) in the Library.....

Section-3: Existing Condition of Digital Preservation Practices

3.1 Does your Library have Digital Preservation Program?

- (a) Yes ☐
- (b) No ☐
- (c) Do not know ☐

3.2 When did Digital Preservation Begin by your Library?

- (a) Before 2000 ☐
- (b) 2001-2005 ☐
- (c) 2006-2010 ☐
- (d) 2011-2015 ☐
- (e) 2016-2020 ☐
- (f) After 2020 ☐

3.3 Which Materials has Selected for the Digital Preservation in your Library?

- (a) Theses and dissertations ☐
- (b) Rare collection ☐
- (c) Government publications ☐
- (d) Manuscripts ☐
- (e) Journals and monographs ☐
- (f) Maps ☐
- (g) Collection of liberation affairs ☐
- (h) Old newspapers ☐
- (i) Annual report ☐
- (j) Institutional records ☐
- (k) Images ☐
- (l) Any other, please specify

3.4 Who carries out the Digitization Process in your Library?

- (a) The library authority ☐
- (b) Outsourcing agency ☐
- (c) Both ☐
- (d) Any other, please specify

3.5 Who Prepare the Documents for Digitization in your Library?

- (a) Library staff ☐
- (b) Staff of outsourcing agency ☐
- (c) Both ☐
- (d) Any other, please specify.....

3.6 From which Type of Source, the Digitization Process is Carried Out?

- (a) Original ☐
 (b) Born digital ☐
 (c) Both ☐
 (d) Any other, please specify

3.7 Is There any Research Project Dealing with Digital Preservation in your Library?

- (a) Yes ☐
 (b) No ☐

3.8 The Name of the Research Project

Section-4: Digital Preservation Policy

4.1 Does your Library have Digital Preservation Policy?

- (a) Yes ☐
 (b) No ☐

4.2 Does your Library Follow any Digital Preservation Policy?

- (a) Yes ☐
 (b) No ☐

4.3 If yes, which Rules, Guidelines and Standards are Used for Digitization?

- (a) NMM ☐
 (b) IGNAC ☐
 (c) IFLA ☐
 (d) UNESCO guidelines ☐
 (e) Own policy ☐
 (f) Others ☐

4.4 If no, do you have a Plan to Develop or Follow such a Policy?

- (a) Have a plan to develop ☐
 (b) Have a plan to follow ☐

4.5 Does your Library have any of the Following Digital Preservation Strategies?

- (a) Migration ☐
 (b) Replication ☐
 (c) Scanning ☐
 (d) Metadata creation ☐
 (e) No preservation strategy ☐

4.6 Does your Library have any of the Following Digital Preservation Standards?

- | | | |
|-----|--------------------------|--------------------------|
| (a) | MARC | ☐ |
| (b) | Dublin Core | ☐ |
| (c) | METS | ☐ |
| (d) | ISBD | ☐ |
| (e) | No preservation standard | ☐ |

Section-5: Digital Preservation Techniques and Strategies

5.1 Which Preservation Techniques do use in your Library?

- | | | |
|-----|--------------------------------|--------------------------|
| (a) | Migration | ☐ |
| (b) | Emulation | ☐ |
| (c) | Scanning | ☐ |
| (d) | Reformatting | ☐ |
| (e) | Microfilming | ☐ |
| (f) | Any other, please specify..... | |

5.2 If Migration Techniques are Used, Which Type of Material is Scanned?

- | | | |
|-----|-----------|--------------------------|
| (a) | Book | ☐ |
| (b) | Non- book | ☐ |
| (c) | Both | ☐ |

5.3 Which Type of File Format do you Use for Migration Techniques in your Library?

- | | | |
|-----|------------------------|--------------------------|
| (a) | Hardware configuration | ☐ |
| (b) | Software configuration | ☐ |
| (c) | Both | ☐ |

5.4 For the Migration Technique, File Converts into....?

- | | | |
|-----|--------------------------------|--------------------------|
| (a) | PDF to PDF | ☐ |
| (b) | Microsoft Word to PDF | ☐ |
| (c) | Tiff to PDF | ☐ |
| (d) | Microsoft Word to Tiff | ☐ |
| (e) | Any other, please specify..... | |

5.5 Which Type of Canner is used for Scanning in your Library?

- | | | |
|-----|---------------------------------|--------------------------|
| (a) | Flatbed Scanner | ☐ |
| (b) | Drum Scanner | ☐ |
| (c) | Hand held Scanner | ☐ |
| (d) | Book Eye | ☐ |
| (e) | Any other, please specify | |

5.6 How do Prepare Resources for Scanning?

- (a) Separate different material types ☐
- (b) Keep them together in workflow ☐
- (c) Others ☐

5.7 What is DPI of Resolution Scanner is used for Digitization of Image?

- (a) 200 ☐
- (b) 300 ☐
- (c) 600 ☐
- (d) 1200 ☐
- (e) Any other, please specify.....

5.8 What is the File Format of Reproduced Text File?

- (a) .PDF ☐
- (b) .RTF ☐
- (c) .TIFF ☐
- (d) .JPG ☐
- (e) Any other, please specify.....

5.9 What is the File Format of Reproduced Image File?

- (a) JPG ☐
- (b) PNG ☐
- (c) BMP ☐
- (d) TIFF ☐

Section-6: Institutional Repository for Digital Preservation

6.1 Does your Library Maintain Institutional Repository (IR) for Digital Preservation?

- (a) Yes ☐
- (b) No ☐

6.2 Please Mention the Establishment Year of IR in your Library.

6.3 Please Mention the URL of Institutional Repository (IR) in your Library.....

6.4 Which Software is used for Institutional Repository?

- (a) Greenstone ☐
- (b) DSpace ☐
- (c) Fedora ☐
- (d) Eprints ☐
- (e) SLiMS ☐
- (f) Invenio ☐
- (g) Customize ☐

6.5 What Types of Materials are Kept in the Institutional Repository (IR) in your Library?

- | | | |
|-----|------------------|--------------------------|
| (a) | PhD thesis | ☐ |
| (b) | M. Phil thesis | ☐ |
| (c) | Journals | ☐ |
| (d) | Research article | ☐ |
| (e) | Research report | ☐ |
| (f) | Master's thesis | ☐ |
| (g) | Annual reports | ☐ |
| (h) | Conference paper | ☐ |
| (i) | Others | ☐ |

6.6 How much Collections are Available in your Repository?

- | | | |
|-----|------------|--------------------------|
| (a) | Below 500 | ☐ |
| (b) | 500-700 | ☐ |
| (c) | 701-1000 | ☐ |
| (d) | 1001-1500 | ☐ |
| (e) | 1501-2000 | ☐ |
| (f) | above 2000 | ☐ |

6.7 Does your Library have any Policy on Institutional Repository?

- | | | |
|-----|------------|--------------------------|
| (a) | Yes | ☐ |
| (b) | No | ☐ |
| (c) | Don't know | ☐ |

6.8 Does your Library Organize any Type of Training on IR for the Library Staff?

- | | | |
|-----|------------|--------------------------|
| (a) | Yes | ☐ |
| (b) | No | ☐ |
| (c) | Don't know | ☐ |

6.9 Does your Library Organize any Training on IR for the Research Scholars?

- | | | |
|-----|-----|--------------------------|
| (a) | Yes | ☐ |
| (b) | No | ☐ |

6.10 How do you Rate Present Collection in your Library?

- | | | |
|-----|-------------------|--------------------------|
| (a) | Adequate | ☐ |
| (b) | Slightly adequate | ☐ |
| (c) | Almost adequate | ☐ |
| (d) | Poor | ☐ |
| (e) | Inadequate | ☐ |

6.11 Overall Satisfaction Level in Existing IR of your Library are----

- | | | |
|-----|----------------|--------------------------|
| (a) | Very satisfied | ☐ |
| (b) | Satisfied | ☐ |
| (c) | Neither | ☐ |
| (d) | Dissatisfied | ☐ |
| (e) | Very satisfied | ☐ |

6.12 Which Problem has you Faced Building Institutional Repository (IR) in your Library?

- | | | |
|-----|--------------------------------------|--------------------------|
| (a) | Lack of IT skilled professionals | ☐ |
| (b) | Lacking of instruments | ☐ |
| (c) | Insufficient fund | ☐ |
| (d) | Insufficient publications | ☐ |
| (e) | Negligence of researchers | ☐ |
| (f) | Negligence from university authority | ☐ |

Section-7: Manpower for Digital Preservation

7.1 Which type of Staff is involved with Digital Preservation?

- | | | |
|-----|-----------|--------------------------|
| (a) | Full time | ☐ |
| (b) | Part time | ☐ |

7.2 According to your Estimate, the Staff is.....

- | | | |
|-----|--------------------------------|--------------------------|
| (a) | Sufficient | ☐ |
| (b) | More than sufficient | ☐ |
| (c) | Insufficient | ☐ |
| (d) | Any other, please specify..... | |

7.3 Have the Library Skilled Staff for Digital Preservation?

- | | | |
|-----|-----|--------------------------|
| (a) | Yes | ☐ |
| (b) | No | ☐ |

7.4 Is there any Training Facility for the Staff for Digital Preservation?

- | | | |
|-----|-----|--------------------------|
| (a) | Yes | ☐ |
| (b) | No | ☐ |

7.5 Does your Staff Receive any type of Training for Digital Preservation?

- | | | |
|-----|-----|--------------------------|
| (a) | Yes | ☐ |
| (b) | No | ☐ |

7.6 If yes, Please Describe the Training the Staff Receives.....

.....

.....

.....

Section-8: Copyright Issue for Digital Preservation

8.1 Is Copyright Materials are digitized in your Library?

(a) Yes ☐

(b) No ☐

8.2 If yes, under what Arrangement is the Digitization of Copyright Material Carried Out?

(a) With owner agreement ☐

(b) Under legal provisions for libraries ☐

(c) Without formalities ☐

(d) By paying the owner ☐

(e) Any other, please specify.....

8.3 Are you getting a copyright license from the supplier/vendor?

(a) Yes ☐

(b) No ☐

8.4 Does your library own the copyright in the digitized for the document?

(a) Yes ☐

(b) No ☐

Section-9: Funding for Digital Preservation

9.1 Have you own fund for digital preservation?

(a) Yes ☐

(b) No ☐

9.2 Do you fund for digital preservation from any other project?

(a) Yes ☐

(b) No ☐

9.3 Do you think that the funds raised for digital preservation are adequate?

(a) Yes ☐

(b) No ☐

Section-10: Challenges for Digital Preservation

- 10.1 What challenges are being faced by your library for digital preservation?
- | | | |
|-----|-------------------------------------|--------------------------|
| (a) | Copyright | ☐ |
| (b) | Funding | ☐ |
| (c) | Hardware/equipment | ☐ |
| (d) | Metadata | ☐ |
| (e) | Optical Character Recognition (OCR) | ☐ |
| (f) | Preparing materials | ☐ |
| (g) | Quality control | ☐ |
| (h) | Selecting materials | ☐ |
| (i) | Software | ☐ |
| (j) | Insufficient staff | ☐ |
| (k) | Lack of skilled person | ☐ |
| (l) | Staff time management | ☐ |
| (m) | Lack of staff training facility | ☐ |
| (n) | Congested work space | ☐ |
| (o) | Lack of air condition facility | ☐ |
| (p) | Any other, please specify..... | |

Section-11: Suggestion and comments

10. State below your suggesting to improve the service quality of university libraries in Bangladesh (If necessary please use separate sheet)
-
-
-

Section-12: Respondent's Information

- 11.1 Designation.....
- 11.2 Email.....
- 11.3 Age.....

THANK YOU FOR YOUR NICE CO-OPERATION

APPENDIX-B

Questionnaire Set-2

Confidential

Sample No.:

**Research Questionnaire for
(Library Users)**

A Study of Digital Preservation Practices in Selected University Libraries in Bangladesh

Dear Sir/Madam,

I am pursuing PhD at Department of Information Science and Library Management, University of Dhaka (DU) on the topic ***A Study of Digital Preservation Practices in Selected University Libraries in Bangladesh.***

[Digital Preservation is defined for this study as the set of processes, activities and management of library resources over time to ensure its long term accessibility. For this study, Preservation Practices means digital preservation activities of library resources are running in the selected university libraries and present condition of these activities.]

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In order to get a comprehensive understanding of the present scenario of the digital preservation practices in selected university libraries of Bangladesh, I am here by submitting a set of questionnaire to you. This survey is completely confidential and will be used only for the academic research. I would appreciate it if you could please take a few moment of your valuable time to complete the questionnaire.

Supervisor:

Sincerely Yours,

Dr. Md. Nasiruddin Munshi
Professor
Dept. of Information Science and Library
Management, University of Dhaka
Email: ramanasir@yahoo.com

Mohammad Shakaought Hossain Bhuiyan
PhD Research Fellow
University of Dhaka
Cell: 01716760120
Email: shakaought_bhuiyan@yahoo.com

Section-1: Demographic Information of Users

1.1. Name of the university.....

1.2. Category of the university

Public	☐
Private	☐

1.1 Gender

Male	☐
Female	☐

1.4 Type of users

Teacher	☐
Student	☐
Researcher	☐

1.5 Status of users

Professor	☐
Associate Professor	☐
Assistant Professor	☐
Sr. Lecturer	☐
Lecturer	☐
PhD Researcher	☐
M.Phil Researcher	☐
Post-Graduate Student	☐
Under- Graduate Student	☐

1.6 Age group

Under 20 years	☐
20-29 years	☐
30-39 years	☐
40-49 years	☐
50-59 years	☐
60 and above	☐

1.7 How frequently do you use the library?

Daily	☐
Twice a week	☐
Weekly	☐
Fortnightly	☐
Monthly	☐
Occasionally	☐

Section-2: Digital Preservation and its Use

2.1. Are you familiar with the digital collection of the library?

Yes	☐
No	☐

2.2 What type of digital collection do you search in the library? (*Select all that apply*)

Doctoral theses	☐
M.Phil theses	☐
Master's theses	☐
Rare book	☐
Microfilm	☐
Synopsis	☐
Research report	☐
Annual report	☐
Journal article	☐
Conference paper	☐
Manuscripts	☐
Maps	☐
Newspaper	☐
Photographs	☐

Any other, please specify.....

2.3 How do you access the required digital collection? (*Select all that apply*)

via CD-ROM	☐
Online access	☐
Via E-mail	☐
Through social media	☐

Any other, please specify.....

Section-3: Users Needs about Digital Collection

3.1 Are you able to get easily your required digital collection in the library?

Yes	☐
No	☐

3.2 Did you find the digital collection of the library well organized?

Yes	☐
No	☐

3.3 Do you take the help of library staff to find digital collection in the library?

Yes	☐
No	☐

3.4 Can you able to collect your print copy for digital collection from the library?

Yes	☐
No	☐

3.5 What barriers or challenges do you feel in using digital collection in the library?

Copyright issue	☐
Technical problem	☐
Staff unable to help	☐
Administration	☐
Others, please specify.....	

3.6 What are the content you would suggest your library to preserve digitally? *(Select all that apply)*

Doctoral theses	☐
M.Phil Thesis	☐
Master's thesis	☐
Rare book	☐
Microfilm	☐
Synopsis	☐
Research report	☐
Annual report	☐
Journal article	☐
Conference paper	☐
Manuscripts	☐
Maps	☐
Newspaper	☐
Photographs	☐
Others, please specify.....	

Section-4: Quality of the Digital Preservation Content

4.1 Is your library's digital content quality?

Yes ☐
No ☐

4.2 Rate the quality level of the digital collection in your library?

Very Good ☐
Good ☐
Moderately ☐
Bad ☐
Very Bad ☐

4.3 Is the resolution of library's digital content good?

Yes ☐
No ☐

4.4 Rate the level of usefulness of the digital collection in your library?

Very Highly useful ☐
Highly useful ☐
Moderately useful ☐
Slightly useful ☐
Not at all useful ☐

Section-5: Satisfaction level of users regarding digital preservation

5. Rate your level of satisfaction regarding the digital preservation practices of your library?

Highly Dissatisfied ☐
Very Dissatisfied ☐
Dissatisfied ☐
Less Satisfied ☐
Satisfied ☐
Very Satisfied ☐
Highly Satisfied ☐

Section-6: Suggestions

6. Do you have any suggestions to increase the digital preservation facilities in your library? Please mention bellow.....
-
-
-

THANK YOU FOR YOUR NICE CO-OPERATION

APPENDIX-C**List of Published Articles during the Study**

1. **Mohammad Shakaought Hossain Bhuiyan**, Md. Monirul Islam and Dr. M Nasiruddin Munshi. “Digitization of newspaper for space shaping and ensuring user facility in dhaka university library, Bangladesh.” International Journal of Information and Knowledge Studies, December, 2023, Vol. 3, No. 1, Pages: 49-62. <https://doi.org/10.544857/ijiks.v3i1.71>
2. **Mohammad Shakaought Hossain Bhuiyan**, Syeed Ahmed Rasel & Md. Noman Hossain. “Uses of Information and Communication Technology (ICT) in School Libraries of Bangladesh: A Case Study in Kishoreganj District.” Bangladesh Teacher Education Journal (BTEJ), December, 2023, Vol. 3, Pages: 31-41. ISSN: 2789-2719. <https://www.tcdhaka.edu.bd>
3. **Mohammad Shakaought Hossain Bhuiyan**, Md. Monirul Islam and Dr. M Nasiruddin Munshi. “Digital Preservation Practice in University Libraries of Bangladesh.” Global Library Summit. 5-7 February, 2025. South Asian University, New Delhi, India. Email: gls25@sau.int

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Digitization of newspaper for space shaping and ensuring user facility in Dhaka University Library, Bangladesh

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Abstract

Purpose: The digitization and automation functions of newspaper will have an enormous influence on library and information institutions. The purpose of the study is to explore the digitization process of printed newspaper preserved in Dhaka University library.

Methodology: The observational method based on reassessment of the related literature was used in the study. Authors' experiences as well as their managerial and observational involvement in digitization process of printed newspapers is reflected in the study.

Findings: Digital scanners were employed to digitize the newspaper collection, making online accessible scanned editions of printed issues from 1900 to 2022. DocuDex software is used to convert papers, and a sizable, sophisticated scanner is being used to scan newspapers into digital form in Dhaka University Library. Every month, on average, 100-200 scholars use digitized newspapers. A scanner with a camera is used to scan the papers. The scanner operates at a speed of 700 pages per hour (Manually). Apart from scanning newspapers, currently, M.Phil theses, PhD theses, books, and articles are being scanned with this machine.

Research implications: The premeditated approach used in this study can serve the library practitioners to develop a successful transition from traditional systems to a technology based one.

Originality/value: The study is one of the first attempts to trace the implications of newspaper automation in any university libraries of Bangladesh.

Keywords: Digitization, print media, archive newspaper, space shaping, University Library, Bangladesh.

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Uses of Information and Communication Technology (ICT) in School Libraries of Bangladesh: A Case Study in Kishoreganj District.

Mohammad Shakaought Hossain Bhuiyan¹

Syed Ahmed Rasel²

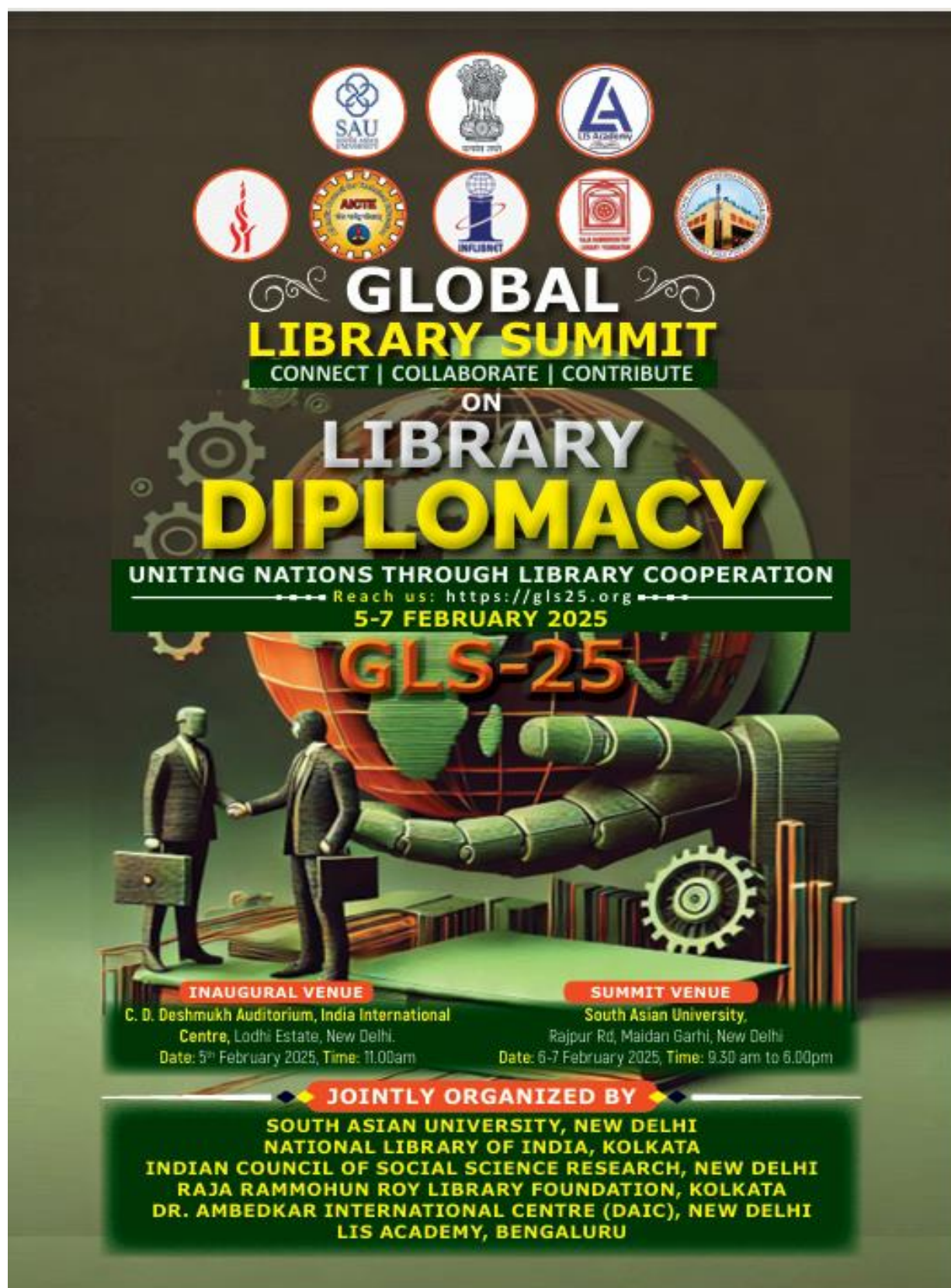
Md. Noman Hossain³

Abstract

This comprehensive study focused on the use and integration of Information and Communication Technology (ICT) in school libraries in Kishoreganj district of Bangladesh. Recognizing the pivotal role of ICT in reshaping information management, enhancing library services, and fostering innovative teaching and learning strategies, this research provides a detailed analysis based on a survey conducted on 269 schools. The findings shed light on the current state of hardware and software facilities, the Internet connectivity, web browsers, search engines, and specialized ICT staff in school libraries. The study underscores the existing challenges, such as limited Internet access, lack of specialized ICT personnel, and the need for modernization to meet the evolving demands of the digital age. Recommendations are provided to improve ICT infrastructure, allocate sufficient funds, and prioritize ICT-based services to enhance user satisfaction and service quality in school libraries.

Keywords: ICT, school library, Kishoreganj District, software, hardware

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SUMMIT VENUE
South Asian University,
Rajpur Rd, Maidan Garhi, New Delhi
Date: 6-7 February 2025, Time: 9.30 am to 6.00pm

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CONTRIBUTORY PAPERS	
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LIBRARY DIPLOMACY	
DATE: 06/02/2025	TIME: 14.00 - 15.20
TRACK CODE: CA1	VENUE: MAIL HALL
1.	Library Diplomacy Through Cultural Events & Exchange Programmes - <i>Reshma Rana Verma</i>
2.	Library Diplomacy Programmes of the Indian Ministry of External Affairs: A Study - <i>Anup Kumar Das, Manorama Tripathi</i>
3.	Health Library Diplomacy in the Era of Globalization – <i>Sangeeta Narang,</i>
4.	Libraries as Bridges: Fostering Global Understanding, Collaboration, and Diplomacy - <i>Vuppala Lingaiah and A. Suryanarayana</i>
5.	'To Be or Not to Be' is the Heart of Library Diplomacy - <i>Amandeep Kaur Dhillon</i>
6.	Digital Preservation Practice in University Libraries of Bangladesh - <i>Mohammad Shakaought Hossain Bhuiyan, M Nasiruddin Munshi; Md. Monirul Islam</i>
7.	Sources of Indian Traditional Knowledge Systems – <i>Uttkarsh</i>

Digital Preservation Practice in University Libraries of Bangladesh

Mohammad Shakaought Hossain Bhuiyan¹, Dr. M. Nasiruddin Munshi², Md. Monirul Islam³

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Abstract

Purpose: The main objective of the research is to investigate the existing condition of digital preservation practices in the selected university libraries in Bangladesh.

Methodology: The study employed a quantitative approach using purposive sampling and non-probability sampling methods. Data were collected through structured questionnaires, with 433 valid responses received out of 700, yielding a response rate of 61.85%. Data analysis was performed using SPSS, incorporating descriptive statistics to summarize trends and non-parametric tests like the Mann-Whitney U test for group comparisons. Normality tests revealed that the data did not follow a normal distribution, necessitating the use of non-parametric methods. The Mann-Whitney U test indicated no statistically significant difference in library use frequency between male and female respondents.

Findings: The findings highlight that universities in Bangladesh prioritize digital preservation of theses, dissertations, institutional records, and annual reports, with limited attention to maps, government publications, and images. While 66.7% of universities have digital preservation policies, private universities show higher adoption (80%) than public ones (60%). Scanning is the most common preservation strategy (80%), and Dublin Core is the preferred standard, especially in private institutions. Challenges in building institutional

repositories include a lack of skilled IT professionals, insufficient funding, and copyright issues, with public universities facing slightly more obstacles. Users highly value digital collections, with most rating the quality positively and 73.7% expressing satisfaction with digital preservation efforts. Addressing resource and technical challenges can further enhance preservation outcomes and user satisfaction.

Practical implication: The research underscores its importance in the Bangladeshi context. By addressing the identified challenges, university libraries can enhance their capacity to preserve digital content, ensuring long-term accessibility and contributing to the nation's academic growth and socio-economic development.

Conclusion: This research serves as a roadmap for policymakers, library administrators, and practitioners to strengthen digital preservation initiatives in Bangladesh.

Keywords: Digitization, Digital Preservation, Preservation Policy, Preservation Strategy, University Library, Bangladesh.

Mohammad Shakaought Hossain Bhuiyan

A Study of Digital Preservation Practices in Selected University Libraries in Bangladesh

 University of Dhaka

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