

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Library Philosophy and Practice (e-journal)

Libraries at University of Nebraska-Lincoln

Fall 6-17-2021

Digital Preservation of Library Resources: Strategic planning a Management perspective

Dr. Rakesh D. Parmar

Gujarat University Ahmedabad, rdparmar@gujaratuniversity.ac.in

Dr. Urmila Pravin Rawat

Gujarat University Ahmedabad, urmilapraavinravat@gmail.com

Follow this and additional works at: <https://digitalcommons.unl.edu/libphilprac>



Part of the [Library and Information Science Commons](#)

Parmar, Dr. Rakesh D. and Rawat, Dr. Urmila Pravin, "Digital Preservation of Library Resources: Strategic planning a Management perspective" (2021). *Library Philosophy and Practice (e-journal)*. 5905. <https://digitalcommons.unl.edu/libphilprac/5905>

**Digital Preservation of Library Resources: Strategic planning a
Management perspective**

Digital Preservation of Library Resources: Strategic planning

A Management perspective

Dr. Urmila Pravin Ravat

Librarian

Gujarat Commerce College, Ahmedabad

Dr. Rakesh D. Parmar

Head, Information Centre

Gujarat University , Ahmedabad

Dr. Urmila Pravin Ravat

Librarian

Gujarat Commerce College, Ahmedabad

Email- urmilapraavinravat@gmail.com / Contact: 9737677995

Dr. Urmila Pravin Ravat is M.A.,M.L.I.Sc., PHD., she is cleared UGC NET, GSET in Library and information science . She secured Gold medal in B.L.I.Sc. from Gujarat University Department of Library and Information Science. She has very rich professional experience in renowned institute like behavioral science centre at Xavier's college, Ahmedabad, National Institute of Fashion technology, Gandhinagar, Gujarat University, UNIFPA Gandhinagar, Revaba Sarvajaink Education College, Mehsana. R.C. College of Commerce, Ahmedabad. She also served as a visiting faculty in various well known universities like Gujarat University, BAOU, Raxa Shakti University, Gujarat Vidhyapith and Shri Somanth Sanskrit University Veraval. She has attended various national, international, state level conferences and workshop throughout her professional carrier. She has presented more than 50 papers and published more than 40 papers in various research journals, conference proceedings etc. She has secured three times best research paper award also. She published two books. Her area of interest is research, modern trends and librarianship, digitization and human relationship.

Dr. Rakesh Parmar

Hod Information Centre and Assi. Librarian

Gujarat University , Ahmedabad. Email: rdparmar@gujaratuniversity.ac.in

Dr. Rakesh Parmar was born on 4th February, at Ahmedabad. He pursued his BA, MA and PhD in Indian Culture History with University first Gold Medallist from Gujarat University Ahmedabad. He pursued his B.L.I.Sc. and M.L.I.Sc.,LLB, LLM(II) From Gujarat University Ahmedabad. He pursued his M.Phil. and Ph.D. in Library and Information Science from Gujarat Vidyapith Ahmedabad. . He pursued his GSET in Library and Information Science Librarian at the Gujarat University Ahmedabad from M.S. University, Baroda. He has also been and Head of Information Centre and Assistant Librarian Gujarat University.

Abstract

Our cultural heritage has been presented on many different materials, including stone, vellum, bamboo, silk, paper and etc. these all materials for information storage had been found in physical medias. That time the attention had been focused only on preserving physical media. Now a day a variety of information exists in digital forms, including emails, blogs, social networking websites, national elections websites, web photo albums, etc. US Library of Congress, had reported(1998) that 44% of the sites available on the internet. It means technology help us to access the cultural heritage from storage of digital memory. However technology creates some opportunity as well as raise challenges also. Libraries and information professionals are now being challenged by new technology; Like multimedia, internet, www, and other virtual computer technology. The environmental, legal, ethical and technological challenges create some major issues to retrieve and preserve the digital information. So the responsibility of librarian and information technology professionals has been wider. The paramount need is to create a well-organized digital preservation strategy for modern library. The researchers have tried to define digital preservation of library resources. The present paper flew the light on the challenges of digital preservation and recommends the suitable strategy implement for digital preservation. They also focus on proposed model for strategic planning for digital preservation.

Keywords:

Preservation, Digital Preservation, Challenges- Ethical, Political, Economical, Technical and Legal, Strategy for digital preservation , Proposed Model for Strategic Planning for Digital Preservation

Introduction:

The rapid growing technology has paved a revolutionary change in Library & information technology. Day by day information has taken place from physical media to digitized form. So, it is essential to know how to prevent it. Information created, stored and access digitally is at risk for loss in two important ways; obsolescence and physical damage. Obsolescence can affect hardware, software and even the arrangement of the data in a stored file. Physical damage can occur to multiple components required to access digital

information, namely hardware and media. Digital preservation seeks to achieve longevity of the digital object with all its original properties intact. The issue of long term preservation of digital data has become a critical issue with many diverse groups and organisations recognizing the need to preserve digital documents before they fall victim to digital obsolescence.

Scope of the paper

This paper seeks to address what is digital preservation. It focuses issues related to digital preservation like; environmental, ethical and legal. The issues covered in three steps. The first step is an overview of the background to preserving digital resources that has developed in response to the concerns of digital and research libraries. The second step will assess the challenges and the third will consider recommended mechanisms for libraries to develop strategies that support the long term retention of digitised data. The researchers have discussed on proposed model for strategic planning for digital preservation. The paper also highlights some policy matters on digital preservation. Researchers also tried to provide some historical background on digital preservation.

LITERATURE REVIEW

Digital preservation means, “the process of maintaining in a condition suitable for use, materials produced in digital format.(veer, 2009).

Digital preservation aims at taking steps to ensure the longevity of electronic documents. It applies to document that are either born digital and stored in online platform or CD/DVDs . it means digital preservation needs high range of strategic planning. There has been concern about preservation of primary research data and records in digital formats in the library community internationally as early as in the 1990s. In 1996 the Commission of Preservation and Access (CPA) and the Research Libraries Group (RLG) in the USA

published a joint report on *Preserving digital information* which identified problems, made recommendations and suggested areas for further research (Garrett et.al, 1996). In the UK, in November 1995, the Joint Information System Committee (JISC) of the Higher Education Funding Councils and the British Library addressed the question of the preservation of digital media by holding a national conference in Warwick, where a number of action points were identified (Fresco, 1996).

Since then extensive studies and collaborative efforts on preservation of digital data and records were undertaken by the library, archival and publishing communities in the UK. The first study (Bennett, 1997) developed a framework of data types and formats, in order to indicate the likely problems, requirements and responsibilities appropriate to each category, and to identify the most appropriate method of preservation.

The literature suggests that, within the Asia and Southeast Asian region, centralized data archives are yet to be established.

CASE STUDIES HAVE BEEN CARRIED OUT ON DIGITAL PRESERVATION IN VARIOUS PALCES OF UNITED KINGDOM:

DORSET HISTORY CENTRE

This case study discuss A local governments archive service, and its use of Preservica Cloud Edition - a cloud-based digital preservation service. It explains the organisational context of the archive, the nature of its digital preservation requirements and approaches, its one year pilot project using Preservica Cloud Edition, the archive's technical infrastructure, and the business case and funding for the pilot. It concludes with the key lessons they have learnt and future plans.

TATE GALLERY

This case study discusses the experience of developing a shared digital archive for the Tate's four physical locations (Liverpool, St. Ives, and two in London), powered by a commercial storage system from Arkivum. It explains the organisational context of the Gallery, the nature of their digital preservation requirements and approaches, and their rationale for selecting Arkivum's on-premise solution, OSCAR (On-Site Cloud ARchive) in preference to cloud-based offerings from Arkivum and others. It concludes with the key lessons learned, and discusses plans for future development.

BODLEIAN LIBRARY, UNIVERSITY OF OXFORD

This case study covers the Bodleian Library and the University of Oxford, and their provision of a "private cloud" local infrastructure for its digital collections including digitised books, images and multimedia, research data, and catalogues. It explains the organisational context, the nature of its digital preservation requirements and approaches, its storage services for research data, the technical infrastructure, and the business case and funding. It concludes with the key lessons they have learnt and future plans.

THE PARLIAMENTARY ARCHIVES

This case study covers the Parliamentary Archives and their experience of procuring via the G-Cloud framework and running public cloud storage as part of their digital preservation infrastructure. For extra resilience/an exit strategy they have selected two cloud service providers with different underlying storage infrastructures. The archive is not storing sensitive material in the cloud and is using local storage systems for that material. It has a locally installed preservation system (Preservica Enterprise Edition) which is integrated with cloud and local storage. As such it is an example of an archive using a hybrid set of storage

solutions part-public cloud and part-locally installed for digital preservation.

ARCHIVES & RECORDS COUNCIL WALES DIGITAL PRESERVATION CONSORTIUM

This case study discusses the experience of a cross-sectoral consortium of Welsh archives as they cooperated to pilot deployment of the open source Archivematica software with Microsoft's Windows Azure public cloud service. It explains the organisational context of the consortium, the varied nature of their digital preservation requirements and approaches, and their experience with selecting, deploying and testing Archivematica in the cloud. It concludes with the key lessons they learned, and discusses current proposals to secure grant funding in order to move this pilot into operation.

RESEARCH PROJECTS ON DIGITAL PRESERVATION

Voutssas (2012) argued that initially digital preservation projects in the past tended to focus on the endurance of CD's and DVD's, tapes and other storage devices, and its artificial aging and how to keep them safely. However in the later part of the 20th century, the literature suggested that large amount of writings were focusing on the issues of philosophical underpinnings and technical aspects of digital preservation.

Here researchers, have try to provide some past and present international projects list which was initiated in earlier on digital preservation, so the next generation would be benefited to be familiar with how the development has been made for digital preservation around the world. As mention below

Table 1. Past and Present International Projects on Digital Preservation

Research Projects	Year of Commencement
Victorian E-Records Strategy (VERS)	1990s

Exemplars in Digital Archives (CEDARS)	1990s
Creative Archiving at Michigan and Leeds: emulating the old on the new (CAMiLEON)	1990s
University of Pittsburg project	1990s
University of Indiana project	1990s
University of Yale project	1990s
Preserving access to digital information (PADI)	1998
The Dutch Digitale Bewaring (Digital Preservation testbed) project	2002
Network Excellence on Digital Libraries (DELOS)	2004-2007
The Long-Term Preservation Metadata for E- Records (LMER)	2005
Minnesota Historical Society	2005 - 2007
Effective Strategic Model for the Preservation and Disposal of Institutional Digital Assets (ESPIDA)	2005 - 2007
Clever Recordkeeping Metadata Project (CRKM)	2007
Life-Cycle Information for E-Literature (LIFE)	2007
Investigating Significant Properties of Electronic Content (InSPECT) Project	2007 - 2008
Digital Archiving in Flemish Institutions and	2007/2008

Administrations (DAVID)	
Managing the Digital University Desktop (MDUD)	2007/2008
Co-operative Development of a Long-term Digital Information Archives (KOPAL)	2007/2008
Cultural, Artistic and Scientific Knowledge for Preservation, Access and Retrieval (CASPAR)	2007/2008
Securing a Hybrid Environment for Research Preservation and Access Development Partner (SHERPA DP2)	2007/2008
Repository for Preservation of Authentic Digital Records (RODA)	2007/2008
Service-Oriented Architecture for Preservation and Ingest of Digital objects (SOAPI)	2007–2008
Digital Repository Infrastructure Vision for European Research (DRIVER)	2009
Preservation E-print Services (PRESERV)	2009
Exploring Collaborations to Harness Objects in a Digital Environment for Preservation (ECHO Depository)	2009
Data Preservation Alliance for the Social Science (Data-PASS)	2009
Preservation and Long-term Access through Networked Services (PLANETS)	2009
Metadata Encoding and Transmission	2009

Standard (METS)	
Image Spatial Data Analysis Group (ISDA/Ip2Learn)	2009
Digital Preservation Europe (DPE)	2009
International Research Project on Permanent Authentic Records in Electronic Systems (InterPARES 1, 2 & 3)	1996 - 2012
InterPARES 4- Trust and Digital Records in an Increasingly Networked Society	2013

Source : Irwan Kamaruddin (2014)

Definition of the terms:

Digital preservation

Digital preservation is the active safekeeping of digitally stored information. As a part of the formalized efforts of library and archival sciences, digital preservation includes the practices required to ensure that information is safe from medium failures as well as software and hardware obsolescence.

Preservation

Preservation includes all the managerial and financial considerations including storage and accommodation provisions, staffing levels, policies, techniques and methods involved in preserving library and archive materials and information contained in them.

Challenges

A challenge is something new and difficult which requires great effort and determination.

Strategies

Strategic means relating to the most important, general aspects of something such as a military operation or political policy, especially when these are decided in advance.

Why Worry About Digital Preservation?

Society's heritage has been presented on many different materials, including stone, vellum, bamboo, silk, paper and etc. Now a large quantity of information exists in digital forms, including emails, blogs, social networking websites, national elections websites, web photo albums, and sites which change their content over time. However, technologies create some opportunity as well as raise some challenges also. Therefore the responsibility of librarian and information professional has become wider in terms of techno savvy person. The paramount need is to create a well-organized digital preservation strategy for modern library.

What Is Digital Preservation?

Morrow defined preservation as “The action taken to prevent, stop or retard deterioration” it means Digital preservation...refers to all of the actions required to maintain access to digital materials beyond the limits of media failure or technological change. In other words Digital preservation refers to the series of managed activities necessary to ensure continued access to digital materials for as long as necessary.

What Digital PRESERVATION IS Not occur

- Reformatting from print to digital for access surrogates or product line expansion
- Back-up or byte storage on various media
- Mirror sites or networks designed for reliable delivery
- Carried out within delivery systems
- Active content management designed to ensure enduring usability, authenticity and accessibility over the very long-term

Core Requirements for Digital Preservation

Preservation of digital source is as important as collection development. So some key requirement needed for it. Following are the core requirement.

- Third-party with an organizational mission to carry out preservation
- A sustainable economic model able to support preservation activities over the targeted timeframe
- Technological infrastructure able to support selected preservation strategy and best practices
- Clear legal rights and relationships with content providers and (eventual) users
- Compliance with digital preservation standards and best practices
- OAIS: Open Archives Information Systems
- TRAC: Trustworthy Repositories Audit and Certification
- DRAMBORA: Digital Repository Audit Method Based on Risk Assessment

Aspects of Digital Preservation

According to Graham (1997), digital preservation problems are associated with three distinct aspects which are mention below.

- Medium preservation – the preservation of the physical media on which the bits and bytes of electronic information reside.
- Technology preservation – refreshing of technologies from old to new as they become available.
- Intellectual preservation – addressing the integrity and authenticity of the information as originally recorded.

Challenges of Digital Preservation

“The root of the digital preservation problem is technological, but any proposed solution also needs to take an account of organizational and economic issues. Almost all kinds of digital information need to be interpreted by machines before they can become intelligible to humans.”

Legal & Ethical Challenges

- (1) Digital preservation often occurs while materials are still under copyright – can we reproduce, reformat, or migrate these materials?
- (2) Many digital materials are obtained through license or subscription. These materials are outside custody of institutions with mandate to preserve – how can one preserve something that he/she doesn’t really own?
- (3) Can we preserve Web sites hosted by others?

Economic challenges

- (1) Large sums of money are invested in digitizing materials, and these digital assets need to be managed and preserved.
- (2) Digital preservation is costly.
- (3) Economic sustainability – Digital preservation is not an one-off, short-term operation. It’s a long-term obligation and continuous effort.

Organizational Challenges

Most of the challenges associated with digital preservation are organization – not technical, e.g.

- (1) Creators of digital information ≠ Owners of server space
- (2) Supporting infrastructure

- (3) Trusted and empowered organizations or repositories Certification process

Technical Challenges

- (1) Improve cost efficiency and affordability
- (2) Under standing how to préserve High-volume rapidly changing content
- (3) Anticipation of future contextes of use
- (4) Standards – and support for inter operability

Strategic planning

“Strategic planning is a management activity often used by businesses to better focus their energy, establish priorities, and strengthen operations to achieve targeted goals.”

Library have variety of resources which may needs to preserve or stored in digital format , so future generation can be utilize without any difficulty. As we know strategic planning is not a simple process. It is purely managerial activities. Here, researchers have tried to focus what strategies should be applied before and after digital preservation of library resources.

Table : 1 Proposed Model for Strategic Planning for Digital Preservation

Sr. No	Input of thoughts	Framing Activities	Out put
A	Top management Librarian and Authority	Technical structure	Final digitized product
B	Decision making on Tools to be used Financial assistance Technological	Build repo with humans and technology	Bibliographic data set
C	Allocation of resources Human Technology	Test trial version	Institutional repository

	Co-ordination Evaluation		
D	Develop alternate solution	Team work	High Satisfaction

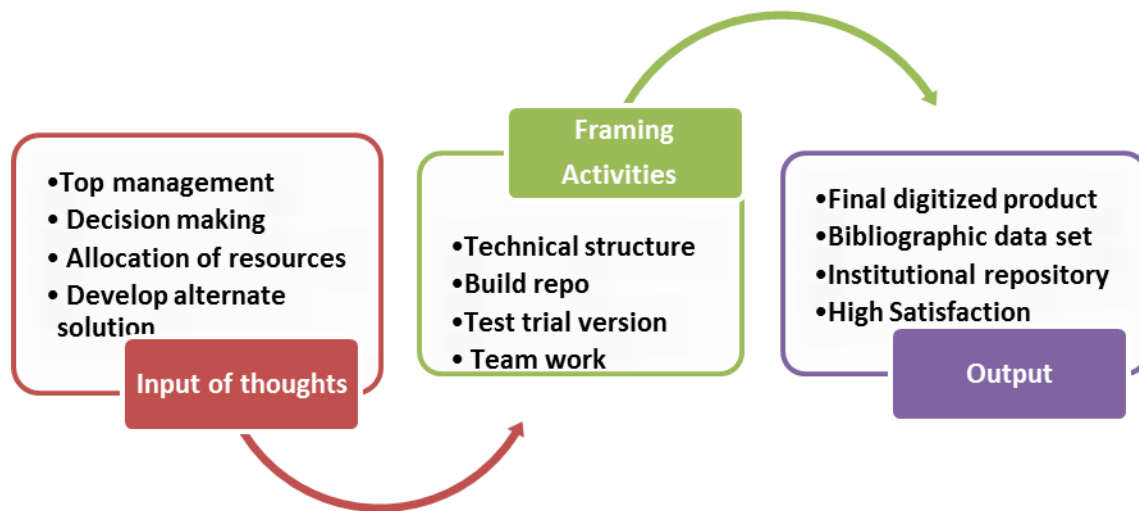
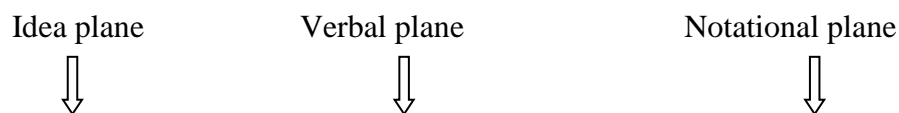


Figure 1. Proposed Model for Strategic Planning for Digital Preservation

Dr. S.R. Ranganathan’s philosophy for classification works on three basic principles. The Idea Level, The verbal level and the Notational level. According to Dr. Ranganathan’s philosophy human mind is the place of origin of ideas. The creators of ideas need self – communication within the mind in order to create more ideas. Language is the medium for communication of ideas. Written language made communication even more widespread than spoken language. This philosophy is rich in its content and leads towards more practical solution in today’s era in a scientific way. As a professional when we frame the work situations according to these principle its look like



Input of thoughts → Framing Activities → Output of product

Idea level planning: Input of thoughts

Let's discuss all in brief

Top Management (Librarian and Authority)

The vision, mission and goals of every institute or library have its own. The main function of library is to serve society information timely and take possible steps to conserve resources for future references. Here librarian's moral duty is to assure guarantee for preservation of documentary and non-documentary sources to easy access of future generation. As we know, Library is a social institution and dedicated to knowledge dissemination for providing better human civilization to society. Here, one question arise that, who is responsible for preservation of library resources? The answer is everybody is responsible for conserving and preserving the library resources who are directly or indirectly users of library resources or an employee of library or institutions. As an authority of the institution or library the director, HR person and an employees of this institution the all are responsible for enhancing library services. They should take responsibility and make possible arrangement for necessary equipment for library personal and person who are engaged with digital preservation work.

Decision Making:

Digital preservation involves series of activities and an organizational structure in all its dimensions. Librarian and authorities of institution should concentrate on decision making like.

- Tools to be used- for digital preservation which tools be useful should be categorised and arrange according to requirements.

- Financial assistance- assures and fixes the party or person who will be responsible for all the financial assistance whenever needed for the project. It is advisable to get advance payment at time of project approval.
- Technology –refers to which type of techniques, tools and software should be applied for digital preservation is considered must. When the project taken for digital preservation for “paper to digital” or “born digital” needs lots of efforts, tools techniques, equipment and hardware, software tools. It assumed that an employee’s having basic computer knowledge may be considered.

Allocation of resources

It is important to have clear ideas of digital preservation project among the staffs. Before starting any procedures the Authorized person should study the details information regarding the policies, operations in written documents. How they may be utilized to fulfill institutional goals and objectives. Let’s discuss

Human

The most preferable resources are humans; which will be utilized for preservation and digitalization of library resources. Selection of the person related to digitization work made by interview and observation. It is necessary to identify qualify and devoted person for this noble work. This activity creates awareness among the staff and made concentration on shared responsibilities of what to preserve and what extent the library will acquire and retain material would be digitization.

Technology

There is no definable strategy to used technology for digital preservation. It is defers

according to size of institutes , size of holding resources in library , the potential users and the amount of budget spent on the project on digital preservation. It's depending on logical decision taken by authorised person. The most convenient and preferable technological tools are describe as follows

Wide format scanner (8.5” * 14 or 8.5” *11.5)

Book scanner with V shaped cradle

Dark rooms with lighting

Servers with high storage capacity

Backup equipment's like; Tap Drives, hard drivers, DVD writers, Cloud and Virtual space

Computers, Hard ware and Software

Standards for Architecture: ISO/DIS 15489, AS 4390, DOD 5015.2 STD, OAIS

Standards for digital Content: PDF, XML, Dublin core, MARC, Z39.50

Standards for interoperability: ODMA, DMA,

Co-ordination

According to Merriam Webster “Co-ordination is the process of organizing people or groups so that they work together properly and well”

For library professionals and IT professional digital preservation is a big challenge to tackle with information technology and connect an employee as a human. Means proper co-ordination and command needs in written documents than they work smoothly. Here, library professionals and IT professionals experience as well as knowledge towards digital

preservation helps them to run the project step by step as smoothly.

Evaluation

As we discussed library is a mirror of knowledge society and serves for society. It is assumed that a small mistake can lead to wrong interpretation of documents or presentation which is digitized. Before completing whole library materials to be digitized, an evaluation process has been carried out after some content were digitized or born to digital. So the errors or small mistakes can be removed at the trial stage.

Develop alternate solution

When library or institute get approval for digitization of library holdings, it is necessary to work out future obstacles' also. Because

- When you are pioneering some activities it is going to be most costly, might be this cost effect the whole budget.
- Technology change is so rapid, might be outdated soon. Cost spent on technology may be worthless.
- Getting skilled employees for smooth running project for long term without any disturbance is a question mark for project directors.
- So, it is important ingredient for deciding how to develop alternate solutions. All these situations need an excellent project director to have expertise to handle critical situation.

Verbal level Planning: Framing Activities

Technical structure

The digitization project is run by the director who is in-charge of all operation related to digital preservation carried out by library or an institute. He/ she are the authority of co-ordinating, directing and guiding to employees. The project director reports to librarian, librarian reports to institutes head. As a project director he/ she have to fix vision, mission and fix the goals. According to this, project director have to plan and execute technical structure and co-ordinate their employees with their assign work. A working blue print has to prepared and gave demonstration in meetings also. This will creates awareness among the employee, colleague, librarian and the head of the institution. The main area of discussion considered follow items or content.

Find out sources to be digitized

Digital preservation concerns two types of documents namely “born digital documents” and “digital created documents”. As library have variety of collection in terms of printed and non-printed items like books, journals, newspaper, manuscript, documents and other grey literature. So, the pre-requisite is to identify the source (in terms of documents) which would go to be digitized. These activities ensure that the preserved digital materials are authentic and valuable. So, it is important to identify most preferable and valuable sources to be digitized. Like

- Costly books, most utilised books and articles
- Rare books which were going to out of print
- Most preferable items which were suggested by users, publishers, experts etc.

Observation and notified items

Digital preservation also concerns with preserving damaged and deteriorate items. So preservation of damaged and deteriorate physical media in to digital media, needs the basic requirements must have to checkout

- The condition of resources in terms of overall condition of require items
- Identified items which are especially poor in terms of (Torn items, rare items, stop publication)
- Identified the most risky and old collections
- What is the alternate and possible direction for preservation of materials?
- Duplication of items should be avoided

Combination of sources

Selection for digital preservation of items is multi-stage and contents range of activities. Every step needs different methods to proceed. It is necessary to select proper items which have longevity in terms of usage and storage. After selecting proper physical media or documents it is necessary to give identification to sources like

- Collection should be notifying with some identical codes or numbering patterns
- Make list accordingly
- Stored in different space or reserve separate cupboard for easily identify and labelled them
- Stop for transaction for this separate collection

Fix the source which would be adopt

Organizational structure is also important factor for acquiring funds or financial assistance.

Majority of libraries or institutions have its own powerful link with state government and national level bodies. As we know library is growing organism and not for profit making service factor. It is totally depends on government and public funds. Some autonomous institute have their own financial funding agencies. As related to preservation of library collection needs excessive library funds. Here the authority and project director plays vital role in creating most preferable source for financial assistance. Final decision depends on authority how they fix the sources without any interruption for financial needs.

Time management

“Time management” refers to the way that you organize and plan how long you spend on specific activities.”

How much time needs to digital preservation activities should be calculate for every stage and gave algorithm to staff for wok accordingly and make assure to follow the rules strictly. This will help out to get benefit in cost effective ways.

SWOT analysis

“SWOT (strengths, weaknesses, opportunities, and threats) analysis is a framework used to evaluate a company's competitive position and to develop strategic planning. SWOT analysis assesses internal and external factors, as well as current and future potential.”

When institute or library is working on this important project, it is essential to check out the possible strength, weakness, opportunity and traits also. This analysis will help to identify present situation and how the institute can take advantages of his strengths and moderate his weakness into opportunity to bring out new inventions, it would be helpful for smooth running for the said project. Ex. Books and documents damage is a weakness of any library. A clever project director can covert this weakness in opportunity and make possible

arrangement to traits financial and organizational barriers with strong funding agency. He creates digital platform and make best ROI (return on investment) through subscription base document delivery.

Notation level

After completing thinking process the project director should maintain all the files in written form, as specially workflow charts and coding language. This might be easier to follow and moderate all functions regarding digital preservation.

Execute Technical Process

Execute technical process in terms of operational level work assigned. The flow chart of assign work contents as follows

Codification of compiled items

Digital transformation needs lots of attention at time of scanning or image captured. A small mistake can overload the task of replication work. To survive with computers and information technology era, proper coding and interpretation of documents needed. Failing in this it is meaningless activities of “0” and “1” without interpretation. Means convert binary document from physical structure.

Digital preservation involves set of activities with access right for longevity of data. Proper identification and coding of electronic documents vice versa physical documents are primary activities of digitization of resources. Ex. A well define class numbers require same as physical and digital documents and they must be unique in nature. So everybody can identify easily.

Making decision for quality control

Digital contents needs quality in three phases, first at time designing workflow, second at time of digital image capture or scanning how it is selected and handled. Third one is access and downloads time with user's friendly in its nature. This may require quality control at every stage and gave guarantee for produce first product output as same level whenever and whatever time it will retrieve for usage. Means, maintain consistency in quality work despite the technological changes occur. It will be able migrate data in to other format also. Like word to PDF, mp3 to mp 4 and so on.

Special treatments of rare items

Form Stone Age to digital Age, library holdings gets variety of information sources like; manuscripts, clay books, paper books, original copies, Maps, charts, diagram, photographic materials, microfilms, films, documentary , recordings, CDs, DVDs, etc. all these materials needs to preserve from deteriorations of various hazards like Environmental, biological, chemical , natural and disasters , human related. All these hazards affect the original product and harm the quality of library holding.

Environmental factors- temperature, humidity, light and dust

Biological factors-fungi, Insects, other parasites

Chemical Factors- Chemical product used in production

Disasters and Natural Factors – Floods, Earth quack, Hurricane, Volcanic

Eruptions, Sand storm

All this printed and non-book materials needs special treatment like;

Treatment for environmental hazards: to maintain library resources properly, the environmental condition/ storage condition should scientific monitored. Proper lighting,

ventilation, Air and temperature should be maintained. Cleanliness of library resources, shelves should be maintained and check by periodically.

Treatment for Biological hazards: in order to biological hazards; strictly banned food and drinks inside the library. Prevent with insect used naphthalene bricks on the shelves, periodically spray dry neem powder and placed the camphor tablets inside the shelves for pest control.

Treatment for Chemical hazards: books/ documents kept indoors are better protected than books/documents kept outside. This will prevent records from dust, chemical reaction of papers used in paper making process and binding process. Torn and damaged resources should be maintained with lamination, re-binding, re-pairing and restoring with excellent quality equipment's.

Treatment for disasters and natural hazards: library should plan proper disasters management systems and this will checked and tracked on regular basis. The building maintenance, water and air facilities, drainage and flood resistance systems, fire alarm security should checked and maintained on periodic times. Certification, verification and updating of equipment's also are done by regular systems for preventive natural hazards. It advisable to get best quality scanning and digital output of library resources, the digital preservation process should be start after proper maintaining of physical library resources or documents.

Convert in to Meta data and Bibliographic work

Archiving and preserving of library resources/documents involves using standardized format of data captured and migration process. This will help out to recall deteriorate data. The fundamentals requirements is the validation of digital documents should be done with Meta data standards including EAD (encoding archives description for discovering guidelines and

EACs encoding archive materials). It advisable to get access of data put bibliographic work on local hard disks as well as institutional websites also.

Build repo with humans and technology

Working with technology needs suitable integration and collaboration with technology as well as humans. So the project director should make some guidelines for completing the task of digital preservation. This may include;

- Pin point key functions and task may drawn out for this project
- Provide manuals to project head, how the functional and organizational units would be worked with supporting staffs.
- Determine degrees of authority needed to manage each units
- Provide co-ordination among the functional and organizational units
- Negotiate with hard ware/ software agencies , which they are responsible for assigned work at every stages like; at the time of beginning, at time of completion and at time of execution of work, to get better result the policy should remain to maintain the continuity of work

Test trial version

To ensure access to digital materials, which are under process and repositories of particular institutions? It is advisable to test trial version first. After getting remarkable notification for successful operations of various levels it should be linked with institutional website.

Team work

Team work is essential elements for every institutions, industry or firm. As we know teamwork is the collaborative effort of a group to achieve a common goal or to complete a

task in the most effective and efficient way. In this regard when all employees work together, then and then the project director would be able to accomplish the digital preservation of library resources task.

Out put

Final digitized product

At the end of the digitization process, the final product achieved by institute is that documents are digitally produced. This may be in form of “digital born documents” or “digitally created documents”.

Bibliographic data set

After creating digital product, it is essential to have total bibliographic details on this digital product. So, beneficiary can easily retrieve the documents whenever they needed.

Institutional repository

The project director of the digital preservation can claim for the institutional repositories. Because the final product is planning, prepared, offered and maintain by the parental institute.

High Satisfaction

High Job- Satisfaction, Institutional satisfaction and work satisfaction itself can be derived through the successfully completion of digitization of library resources. It always reflects on smiles and working behaviours of employees and user’s feedback as well as institutions returns on Invests. ROI

Recommended Strategy for digital preservation

Medium preservation

- Media renewal or media refreshing like, Copying – transferring data from old storage
- Media to new storage media with the same format specification
- Authentication and accreditation
- Decrease in physical size & Increase in storage capacity

Technology preservation

- This approach intends to retain the needed original hardware and software
- May have an important role for the recovery of data from obsolete storage media and Platforms, but it is unlikely to become a viable long-term strategy
- Digital resources would be to preserve the original software and then to run this on
- Emulators that would mimic the behavior of the obsolete hardware and operating systems
- Digital data object together with the application software used to create or interpret it and a description of the required hardware environment that could be used as a specification for an emulator

Intellectual preservation

- Regarding existing législation (especially copyright & IPR)
- Awareness of the broader scope of the problem

Policy framework

Due to technological revolutions and seeking instant information more and more content are created, converted in digital format. To maintain Libraries and archival record those who are

actively related to digital assets realised for policy matters and intellectual property rights. Their Nobel prospects lead them to create policy framework for digital preservation.

Why policy on digital preservation:

As we discuss technological revolution made easy transformation of physical media in to digital media. Easy availability of information and plagiarism raised some issues towards Intellectual property rights and owners identity. Librarians, archivists and groups of society realize the policy framework on digital preservation. Based on previous studies some observation has been made as :

Lyman and Besser noted, "The long term preservation of information in digital form requires not only technical solutions and new organizational strategies, but also the building of a new culture that values and supports the survival of bits over time." Beagrie, Semple, Williams, and Wright reinforced the idea that "...any long-term access and future benefit may be heavily dependent on digital preservation strategies being in place and underpinned by relevant policy and procedures and that the digital preservation policy should be integrated into business drivers, activities and functions e.g. regulatory compliance, staff development, applied technology, academic excellence."

The Electronic Resource Preservation and Access Network's (ERPANET) Digital Policy Preservation Tool suggests that "A policy forms the pillar of a programme for digital preservation. It gives general direction for the whole of an organization, and as such it remains on a reasonably high level from an external point of view, a written policy is a sign that the organization takes the responsibility to preserve digital material."

Cloonan and Sanett noted, "The lack of preservation policies in place is a distinct gap in the research design of many of the projects and possibly reflects a lack of commitment among the stakeholders in institutions."

Conclusion

Preservation in the area of digital technology is a shared responsibility. Library and information technology professionals are playing vital role in developing strategies for this sustainable issues. The emerging need is to develop high storage medium & work collaboratively with professionals & community. It is also needed to create awareness on IPR & related issues. It is also require having a healthy coordination among the various parties who involved in digital preservation and increase staff expertise with issues of digital technology. In views of overall situation the satisfaction reflects on employee's behaviour and face of happy customers.

REFERENCES

- Balasubramaniun, P. Presearvation and conservation of library resources. Ess Ess Publications, New delhi, 2021.
- Fresco, M. Long term preservation of electronic materials. *Report of a JISC/British Library Workshop as part of the electronic libraries programme (eLib)*, organized by UKOLN, 27-28 November 1995, University of Warwick. British Library R&D Report 6328. London: British Library, 1996.
- Kadir, I.K.A Yunus A. Recent Projects of a Preservation Framework for Digital Preservation 2014. *International Journal of Academic Research in Business and Social Sciences* 2017, Vol. 7, No. 11 DOI: 10.6007/IJARBSS/v7-i11/3431 URL:<http://dx.doi.org/10.6007/IJARBSS/v7-i11/3431> (accessed on 12 may 2021).
- Lyman and Besser, Defining the Problem of Our Vanishing Memory, 12.ERPANET (Electronic Resource Preservation and Access Network), [*erpa guidance – Digital Preservation Policy Tool*](#) (ERPANET: September 2003), 3.
- Michèle V. Cloonan and Shelby Sanett, Preservation Strategies for Electronic Records: Where We Are Now—Obliquity and Squint? *The American Archivist* 65 (Spring/Summer 2002): 91. <https://er.educause.edu/articles/2014/7/digital-preservation-policy-framework-a-case-study> (accessed on 20 April 2021).
- Ramamurty, C.R. information security: A source book for librarians. Author press. Delhi. 2001, pp. 161,

Trusted Digital Repositories: Attributes and Responsibilities. An RLG-OCLC Report, May 2002.

The Preservation Management of Digital Material Handbook. Marcum, 1997, p.358.

Voutssas, J. Long-term digital information preservation: Challenges in Latin America. *Aslib Proceedings*, 2012, 64(1), 83 – 96.

<https://www.collinsdictionary.com/dictionary/english/challenge> (accessed on 20 April 2021).

<https://www.collinsdictionary.com/dictionary/english/strategic> (accessed on 20 April 2021).

<https://www.bbgbroker.com/strategic-planning-process-6-steps/> (accessed on 20 April 2021).

<https://en.wikipedia.org/wiki/Teamwork> (accessed on 20 April 2021).

<https://www.merriam-webster.com/dictionary/coordination> (accessed on 20 April 2021).

<https://www.investopedia.com/terms/s/swot.asp> (accessed on 20 April 2021).

https://www.mindtools.com/pages/article/newHTE_00.htm (accessed on 20 April 2021).

www.wikipedia.org (accessed on 20 April 2021).

<https://www.dpconline.org/handbook/digital-preservation/why-digital-preservation-matters>

(accessed on 20 April 2021).

<https://whatis.techtarget.com/definition/digital-preservation> (accessed on 20 April 2021).