

Digitization and Digital Preservation of Cultural Heritage in India with Special Reference to IGNCA, New Delhi

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Abstract - Indira Gandhi National Centre for the Arts is an autonomous centre under Ministry of Culture, Govt. of India established in 1987 with a vision to preserve the rich arts and cultural heritage of the country. The centre has a variety of heritage resources available in different formats. Preservation of these resources in traditional as well as digital form is a major challenge. The purpose of this paper is to explore the collection of IGNCA and methods adopted for preservation especially digital preservation of cultural heritage resources by the centre. Case study is used as research method to examine the collection, digitization and preservation of heritage resources in IGNCA. A well structured questionnaire, interview and observation methods were used as research tools to get the exact data for the study. Findings of the study reveal that IGNCA has a huge number of cultural heritage resources which includes photographs, photo-negatives, photographic slides, digital images, motion picture films, LP records, audio spools, audio and video tapes, microfilms, microfiches, manuscripts, digital images, digital audio and video files. The centre has digitized a major part of its collection for preservation and access. A digital library named as KALASAMPADA is also developed containing heritage resources accessible through internet. This study is only one of its kind as it explores the digitization and digital preservation practices of a pioneering institute working in the area of arts and cultural heritage in India.

Keywords: Digitisation, Digital Preservation, Cultural Heritage, India, IGNCA

I. INTRODUCTION

Culture is daily living style of people. It is represented by values, customs, ethics, beliefs, arts, games, songs, music, dance etc. Culture is the way we live, behave, believe, talk, dress, entertain, eat etc. Taylor (1871) has defined culture as "knowledge, belief, art, morals, law, custom and other capabilities and habits acquired by man as a member of society". Heritage is the record of the living style of people of past and present generations. Cultural heritage is the materials found in museums, archives and libraries having evidence of living manners of past generations. Preservation of cultural heritage is a part of historical process and it holds great value. Information and communication technology has opened new doors to each and every field of human life. Preservation of cultural heritage is also greatly affected by this technological revolution.

II. DIGITIZATION AND DIGITAL PRESERVATION

The institutions having cultural heritage have unique resources representing the beliefs of that particular region.

Previously cultural heritage preservation was done by traditional methods like microfilming, microfiche preparation, controlled environment of storage maintaining required temperature and humidity etc. After the advent of technology, digitisation is established as a unique method of preservation of traditional cultural materials. It is possible for nearly every material having cultural value found in cultural institutions, from map to manuscripts, and images to sound recordings.

According to UNESCO charter for the preservation of digital heritage (2003) digital heritage has been defined as "unique resources of human knowledge and expression. It embraces cultural, educational, scientific and administrative resources as well as technological, legal, medical and other kinds of information created digitally or converted into digital form, from existing analogue resources." Many countries has adopted digitisation for preservation of heritage material like National Digital Library of China was launched in 2009, to provide access to about 120 million Chinese cultural heritage in digital form. The heritage resources include ancient documents, newspapers, rare books, journals etc. In Japan, PORTA portal was launched in 2007, to provide access to cultural materials in digital form (Lee, 2010). National Library of New Zealand developed National Digital Heritage Archive for the purpose of collecting and preserving digital content of New Zealand's cultural heritage (Public Act, 2003).

III. CULTURAL HERITAGE PRESERVATION IN INDIA

India has very rich and extremely diverse cultural heritage. It is available in the country in various facets like architecture, buildings of historical value, monuments, artworks, manuscripts, rare-books, artefacts, paintings, recorded history documents, songs, dance etc. Ministry of Culture, under its various establishments, programmes and missions works for the preservation of this sundry heritage of the country. Archaeological Survey of India under Ministry of Culture is established to preserve the monuments of historical importance and ancient sites. There are various missions like Gandhi heritage sites mission, National mission on libraries, National mission on manuscripts etc. Some non-government organisations are also working voluntarily like Indian National Trust for Arts and Cultural Heritage (INTACH), Indian Trust for Rural

Heritage and Development (ITRHD), Native Planet etc. Many projects are going on under the various programs of the Ministry with the technical support of National Informatics Centre (NIC), C-DAC etc.

IGNCA was established in 1987 as an autonomous institution under Ministry of Culture and envisioned as a centre for research, academic pursuit and dissemination in the field of arts. The arts comprises of oral and written arts, literature, visual arts, sculpture, architecture, graphics, painting, festivals, cultural traditions, lifestyle, fairs and all other activities like music, folk dance etc. (IGNCA, 2015). It is located in Delhi with regional centres in Bangalore, Varanasi and Guwahati.

IV. REVIEW OF RELATED LITERATURE

Ekwelem *et al.* (2011) found that the cultural heritage resources available in selected institutions in Nigeria are morals, artefacts, artworks, photographic slides, images, folklore, songs etc. The preservation methods adopted are binding of loose sheets, photocopying and microfilming. Digitization is less popular due to insufficient infrastructure, lack of software and untrained manpower. However, Baro *et al.* (2013) stated that twelve university libraries in Nigeria have started digitization projects. Rare books, photographs, old newspapers, art-work, historical documents etc are being digitized, while the issues faced are insufficient budget, irregular electricity, absence of policy, IPR issues etc. Heidi (2014) discussed about digital cultural heritage collection in Kazakhstan and opined that the newly established Nazarbayev University can work for sustainable digital preservation solutions for cultural heritage collection. Manaf (2007) examined the digitization status by cultural institutes in Malaysia and found that many institutions have started digitization for preservation of cultural heritage of the country. Bradley (2014) explained Australia's cultural heritage available as audio recordings and its management by National Library of Australia. Urgola (2014) reported about preserving Egypt's historical collection which includes digital images, videos and audio records, artefacts and rare books. Loebecke and Thaller (2005) examined cultural heritage preservation of Europe in digital environment. Several initiatives like DigiCULT, Bibliotheque Nationale are evaluated and a reference architecture Digital Autonomous Cultural Objects is proposed. Rosenblum (2008) reported that in Czech republic the National Library is working on many projects to preserve cultural heritage. Some projects are Manuscriptorium, Kramerius, WebArchive etc. Matusiak *et al.* (2015) explained about University of Wisconsin-Milwaukee libraries digitization project of painted and calligraphic scrolls and fans. The authors examined the current approaches in multilingual indexing and retrieval and proposed bilingual metadata fields for digitized cultural heritage collection. Chmielewska and Wrobel (2013) explored digitization of historical documents and their metadata creation in University of Warsaw library, Poland. Dearborn *et al.* (2014) discussed digital preservation policies and a

metadata structure for Perdue University's digital repository. Galiotou (2014) explained about attempt to create a Greek digital historical corpus for preservation of heritage collection of old books and manuscripts.

Crane *et al.* (2003) articulated the issues faced in developing digital cultural heritage collection. Stephen (2014) evaluated the status of digital heritage preservation in East Africa and concluded that there are several issues like inadequate government support, weak regulatory framework and policy, limited infrastructure etc. Becker *et al.* (2014) identified gaps in preservation mechanism already available and suggested a new architecture for digital preservation planning. Bradley (2005) reported that libraries, museums and other cultural institutes are spending considerable amounts of money and time to digitization for preservation and access to heritage collections. Bote *et al.* (2013) examined the budgetary aspects of digital preservation and its accessibility over a long time. For calculating the cost of digital preservation an application is also proposed.

Lee (2010) focused on collaboration in cultural heritage digitization and recommended that cultural heritage preservation may be done having standardized policies if the countries of East Asia may collaborate with each other. In a similar study, Manaf (2008) stressed that if different type of cultural heritage institutions would collaborate in digitization project, it may help in establishment of National Digital Cultural Heritage Repository in Malaysia. Chen (2004) shared the experience of creating Global Memory Net and Chinese Memory Net projects of US National Science Foundation. It is recommended that a very comprehensive global network can be built, if collaborative effort with countries like India having rich heritage resources will be done.

Cultural institutions in any country have a great role to play in the overall development of a nation. India has its own culture in many facets and colours. Digitization has emerged as a modern concept of preservation and access of cultural heritage. Karekar and Mudhol (2014) argued that digitization is the only long term solution for preservation of cultural heritage material specially manuscripts. Das (2012) enumerated and evaluated major digital library projects of heritage resources in Indic Language. These are Traditional Knowledge Digital Library, Digital Library of India, Punjab Digital Library, Kalasampada Digital Library and National Mission for Manuscripts by IGNCA. Sahoo *et al.* (2013) discussed about the innovative Indian project in the field of digital preservation of manuscripts named as National Mission for manuscripts. Singh (2015) reported that Punjab Digital Library is a NGO working for digitization of manuscripts in Punjab started in 2003. Singh (2012) discussed the initiatives taken by Government for the preservation of manuscripts and other heritage resources and found that the major initiatives taken are National Mission for Manuscripts program by Ministry of Culture and the initiatives by IGNCA. IGNCA has created a digital library of heritage resources KALASAMPADA and

databank on Indian Art and Culture. Gaur and Chakraborty (2009) focused on preservation of Indian manuscripts by National Mission for Manuscripts by IGNCAs.

V. OBJECTIVES OF THE STUDY

The objectives determined in the present study are as follows.

- To enumerate the heritage collection available in different formats in Indira Gandhi National Centre for the Arts (IGNCA).
- To explore the preservation methods adopted by the centre.
- To examine the present status of digitization and the tools & techniques being used in digitization of various heritage resources.
- To find out the obstacles related to digitization and digital preservation of cultural heritage resources in the centre.

VI. SCOPE AND SIGNIFICANCE

Arts and cultural heritage institutions have a unique role to play in the overall development of the country. IGNCAs are established by Indian Government to preserve its arts and culture in whatever form it appears. IGNCAs have a rich collection of heritage resources in digital as well as traditional forms. The study seeks to explore the heritage collection and examines the preservation methods adopted by the Centre. The status of digitization and digital

preservation is identified. Further an attempt has been made to identify the barriers in digitisation and digital preservation. The digital library development initiatives by IGNCAs are investigated. The present study is aimed to provide a clear picture of the efforts taken by IGNCAs, dedicated for preservation of arts and cultural heritage of India.

VII. MATERIALS AND METHODS

Case study has been chosen as the research method to scrutinize the cultural heritage resources of IGNCAs. A questionnaire was developed after a thorough study of relevant literature. Pilot study has been conducted to check the feasibility and objectivity of questionnaire. Final questionnaire was filled by Director IGNCAs. Interview was also conducted to enrich the qualitative data from the questionnaires. The investigator has observed the existing heritage collection, digitization methods and status of digital library initiative. Annual reports, pamphlets, brochures, unprocessed internal data, website and other records of the centre were also collected.

VIII. DATA ANALYSIS AND INTERPRETATION

The data collected through questionnaire, observation and interview is analysed and interpreted as follows.

Total Collection of Heritage Resources

TABLE 1 TOTAL COLLECTION OF IGNCAs

S. No.	Type of Resource	Collection
1	Books	1,60,000
2	Periodicals (bound volume)	2360
3	Current periodicals (including e-journals)	250
4	Microfilms	20, 600 rolls
5	Microfiches	1,20,000
6	Manuscripts	2,50,000
7	Photographs	5,000
8	Photo negatives	1,700
9	Photographic slides	1,08,000
10	CD-ROM databases	4
11	Digital images	1, 30,800
12	Multimedia walkthrough	50
13	Motion picture films	64 Reels
14	LP records and Gramophone records	500
15	Audio spools	471
16	Audio tapes	4133
17	Video tapes	125
18	Mini DV	456
19	DVCAM	477
20	DVCPRO	45

The collection of arts and cultural centres comprises of print, non-print and digital resources reflecting the traditional values of that geographical region. As per the responses of IGNC Director, exact collection is presented in Table-1.

It is clear from the table that, there are 1,60,000 books, 2360 bound volumes of periodicals, 250 current periodicals and four CD-ROM databases. IGNC has some very precious rare books in its collection. There are 20,600 rolls of microfilms and 1,20,000 microfiches in IGNC. The manuscript collection in IGNC is 2,50,000.

It is found that IGNC has 5000 photographs, 1700 photo-negatives and 1,08,000 photographic slides. The number of digital images is 1, 30,800. Further IGNC has 50 multimedia walkthrough programs of historical places of India. There are 64 reels of motion picture films, 500 LP records and 471 audio spools in IGNC. IGNC has total 4133 audiotapes of 30, 60 and 90 minutes. When asked about the video recording, IGNC has 125 videotapes of 60 minute and 180 minute. There are 456 Mini DV of 66 minute in IGNC. Total number of DVCAM is 477 in IGNC. The DVCAMs available are of different durations as 32, 40, 64, 126 and 184 minutes. IGNC has also 19 DVCPRO of 126 min used for broadcast on various television channels.

Analysis reflects that the Centre bears a rich collection of resources having great cultural value for India.

Preservation of Resources

Preservation is long term archival of resources for future use. It has its own importance in the institutes working as national cultural heritage institutes. While asked about the methods adopted for preservation, the authorities of IGNC opined that the centre is preparing microfilms and microfiches. There is special arrangement for proper storage of information resources on required temperature and humidity. This arrangement is particularly done for the manuscript collection in IGNC.

However, digitization is identified as a practical and sustainable solution for long term preservation and access of information resources specially heritage resources. The Centre is actively involved in digitization of various heritage resources.

Digitized Collection

As the mission of IGNC is to preserve Indian arts and cultural heritage, therefore its purpose of digitization is more oriented towards preservation along with providing access. To know the total digitized collection in IGNC in respect to different type of resources, the data collected is tabulated in Table-2.

TABLE 2 DIGITIZED COLLECTION IN IGNC

S.No.	Resource Type	Total Collection	Digitized Collection
1	Books	1,60,000	25,500 (15.93%)
2	Periodicals (back issues)	2360	600 (25.42%)
3	Manuscripts	2,50,000	1,50,000 (60%)
4	Microfilms	20,600	12,000 rolls (58.25%)
5	Images	1,14,700	1,00,000 (87.18%)
6	Audio recordings	5,000 hours	1,800 hours (36%)
7	Video recordings	3,000 hours	1,200 hours (40%)

It can be inferred from Table-2, that in IGNC 25,500 books (15.93 percent) out of total collection of 1,60,000 have been digitized. Most of these books are from rare books collection. More than 600 (25.42) back issues of periodicals in IGNC have been digitized. Moreover, IGNC has digitized 1,50,000 (60 percent) out of the total 25,000 manuscripts collection. The exact number of digitized microfilms in IGNC is 12,000 rolls (58.25 percent). Total number of digitized images in IGNC are 1,00,000 (87.18 percent). About 1,800 hours (36 percent) of audio out of approximately 5,000 hours in IGNC is digitized. The digitized video collection in IGNC is about 1,200 hours out of total 3,000 hours (40 percent). Concerning the total collection, information is sketchy,

because the centre doesn't maintain rigorous statistics on the total collection in terms of total number of hours.

It is evident from the analysis that digitisation is most focused towards the image collection as photographs, photographic slides and photo-negatives are digitised and available in the form of digital images (87.18 percent). The next large digitized collection is manuscript collection i.e. about 1,50,00 manuscripts (60 percent of the total collection). About 12000 rolls of microfilms (58.25 percent) is also digitised, which is the next largest digitized collection.

Type of Resources Outsourced for Digitization

As far as the process of digitization is concerned, IGNCA has digitized their books and other textual resources by outsourcing. Moreover the slide and manuscript collection is also digitized entirely by outsourcing. IGNCA has outsourced digitization of its resources because it is easy, less time consuming and there is no requirement of recruiting permanent staff for this purpose.

On contrary to this, audio and video resources are digitized within the premises of the Centre. IGNCA has infrastructure and technical staff for digitization of audio and video resources including softwares. Photoshop is used for image editing, Nero Wave Editor-3 for audio editing and Adobe Photoshop-7 and Nero Image Viewer for video editing.

Barriers in Digital Preservation

The response sought by Director, IGNCA regarding barriers in digital preservation is presented in Table-3. The table shows that the centre has constraints of budget and infrastructure. Technological obsolescence is a major barrier in digital preservation. LP records, audio spools and many other old materials are facing technological obsolescence as mediated equipments for many of these materials are either not functioning properly or unavailable now. Conversion of these materials into new formats is very expensive. The digital version of such materials also requires large storage space.

The centres under study do not have technological vision for digital preservation. Most of the digitized material is put down in the form of CD/DVDs, hard-disks and computer files, having no long term vision for next step of digital preservation. Lack of trained IT manpower is another problem faced in digital preservation.

IGNCA is facing intellectual property rights issue in digitisation and digital preservation. As some collections in IGNCA are gifted and some are acquired from other libraries and museums, these couldn't be reproduced without permission. Therefore IGNCA has digitized only that resources which are owned by the centre, or prior permission is granted by the owner organisation.

Digital Library Development

Digital library plays very crucial role in efficient organization and access of digital resources through internet. IGNCA has done some pioneering efforts in digital library development. A multimedia digital library of cultural heritage resources "KALASAMPADA Digital Library-Resources for Indian Cultural Heritage" is created and accessible through <http://www.ignca.nic.in/dlrich.html>. It showcases the rich heritage of the country in various multimedia formats like text, image, graphics, audio, animation, video etc. in a non linear mode. The digital library covers digital images from different heritage collections, audio and video recordings arts performance,

multimedia walkthrough of historical sites, Multimedia documentation on Jataka and Buddha, arts of north-east India, the manuscripts catalogue etc. (IGNCA, 2015). Another major initiative in development of Kirtisampada - The National Database of Manuscripts under National Mission of Manuscripts Program. The databases contain information of various kinds of India's manuscript titles, themes, commentaries, scripts, language, conservation status etc. it can be searched at <http://www.namami.org/Database.htm> (Gaur, 2011).

IX. FINDINGS

In the light of analysis of data received, personal observations and interview the following findings were enumerated.

- (i) The manuscript collection in IGNCA is about 2,50,000. The total image collection is about 1,14,700 comprises of photographs, photo-negatives, photographic slides as well as digital images. There are motion picture films, LP records and audio spools, microfilms and microfiches. IGNCA has rich collection of heritage resources available in analogue as well as digital formats.
- (ii) For preservation of heritage resources, the centre has an appropriate arrangement for storage on controlled temperature and humidity. Microfilms and microfiches are prepared, as well as digitization is also being done. Digitization is adopted for long term preservation and access of various types of heritage resources.
- (iii) The centre has digitized about eighty-seven percent of its photographic collection which is the largest digitized collection. Another largest digitized collection is manuscripts which is sixty percent of the total collection. It is worth to mention that total digitized microfilm collection is fifty eight percent. About forty percent of audio and video collection is also digitized.
- (iv) As far as outsourcing of digitization process is concerned, IGNCA has digitized their books and other textual resources by outsourcing. The centre has digitized the slide collection by giving the entire work to outside vendor. Moreover audio and video resources are digitized in-house.
- (v) For editing of digitized images IGNCA use Adobe Photoshop. For audio editing Nero Wave Editor-3 is used. Adobe Photoshop-7 and Nero Image Viewer is used for video editing.
- (vi) Analysis in regard to the barriers associated with digital preservation in IGNCA reveals that the centre has constraints of budget, infrastructure and storage capacity. The centre under study has a less focus on technological vision for digital preservation, which is another major constraint. Technological obsolescence is also a hurdle in digital preservation as LP records, audio spools and many other old materials are facing this issue. IPR is also a barrier as Indian Copyright

Act 1957 and IT Act 2000 does not cover issues concerning digital preservation of cultural heritage.

- (vii) IGNCA has developed a multimedia digital library of cultural heritage resources “KALASAMPADA Digital Library-Resources for Indian Cultural Heritage” accessible through <http://www.ignca.nic.in/dlrich.html>. A database Kirtisampada - The National Database of Manuscripts under National Mission of Manuscripts Program is created containing information of various kinds of India’s manuscript titles, themes, commentaries, scripts, language, conservation status etc. accessible at <http://www.namami.org/Database.html>.

X. SUGGESTIONS

- (i) Cultural heritage is vulnerable for any country. Preservation of heritage resources is a must. There must be proper action plan defined before starting the project. Knight (2010) recommended that the key factors to be considered before developing a preservation program are definition of strategic drivers, defining the exact purpose of the digital preservation programme, choice of a suitable business model, deployment and implementation, staffing aspects and how to start.
- (ii) Digitization is identified as the most logical method of preservation of cultural heritage resources.
- (iii) Preservation and access are two sides of the same coin. For convenience they are considered separately, but they are so independent that access can be seen as an integral part of preservation. The centre should have well drafted policy for digital preservation and access.
- (iv) All the major heritage resources should be digitized. After digitization, the digital surrogate may be preserved for always and the original will also remain safe from multiple use or wear and tear. The digitized resources may be more easily available for access to the users with-in and outside the premises of the centre through internet.
- (v) Many of the digitized resources are stored as computer files, external hard-disks or CD/DVDs in TIFF and JPEG formats. There must be proper storage policy and space for digital information storage.
- (vi) The digital multimedia library of heritage resources is a good initiative taken by IGNCA in the field of digital library development. It can be upgraded to a comprehensive cross-searchable digital library of all kinds of heritage resources. Moreover there are number of metadata standards for heritage collection like CDWA (Consortium for the Computer Interchange of Museum Information), VRA Core (Visual Resource Association), METS (Metadata Encoding and Transmission Standard) etc. These can be used for better description of heritage resources in the digital library.
- (vii) A major hurdle in digital preservation is provisions of Intellectual Property Rights. In Indian copyright act 1957 and IT Act 2000, there is no provision of digitization of cultural heritage. There is need to revise these acts to deal clearly the IPR and other copyright issues for digitisation of cultural heritage resources.

XI. CONCLUSION

One of the domains where Information Technology is increasingly employed is functioning of cultural heritage institutions. Digital and Multimedia technologies open up new opportunities for the heritage institutions to preserve, as well as to show-case their collection beautifully. IGNCA have cultural heritage collection in many forms i.e. manuscripts in many languages, image collection in various forms, rare documents, slides, audio recordings, video clips etc. Digitization has been started and IGNCA has digitized a considerable proportion of heritage resources, available through its website, however development of an efficient digital multimedia library with proper retrieval facilities is still in experimental phase. Much has been initiated by IGNCA through various projects, but the centre is yet to draft proper policy guidelines for preservation, digitization and provisions for access to the heritage resources available to them. There is a need of thorough policy for preservation of cultural heritage in India and a collaborative approach is strongly recommended for this purpose.

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