National Workshop on "Digital Preservation in India" held on November 7, 2008 at Federation of Indian Chambers of Commerce and Industry (FICCI), Tansen Marg New Delhi

RECORD OF PROCEEDINGS

The workshop started with the opening address by **Mr. Rajan Kohli, Deputy Secretary General, FICCI**. In his opening address Mr. Kohli emphasized the importance of digital preservation and especially the long term digital preservation in various industries like finance, petroleum etc.. He mentioned that the initiative taken by the Department of Information Technology, Government of India to develop a National Digital Preservation Programme (NDPP) is timely and very relevant for India at the stage when so much digitisation programmes are going in the country. He highlighted the importance of digital preservation for e-governance, archives, libraries, films, audio and video etc. and emphasized that a sound policy on digital preservation is needed.

Thereafter, **Dr. A.K.Chakravarti, Adviser, Department of Information Technology, Government of India**, gave his special address. Dr. A.K.Chakravarti welcomed the participants on behalf of the Department of Information Technology, Government of India, to participate in the National Workshop on "Digital Preservation". He informed the participants that Department of Information Technology has embarked upon a coordinated initiative to develop National Digital Preservation Programme/strategy/Policy/ Action Plan with the participation of whole lot of stake holders, researchers and others. For this purpose, a broad based Working Group in DIT has been set-up under the Chairmanship of Special Secretary. Working Group in turn has set-up five Sub-Committees with specific tasks, viz, (i) Develop Standards for digital Preservation including study of ISO reference model for Open Archival Information System (OAIS) and Digital Repository Audit & Certification, (ii) R&D Agenda for Digital Preservation, (iii) Analysis of International Best Practices in Digital Preservation (including organizing International Workshop), (iv) Identify common issues for Digital Preservation across the technologies, strategies, Open Standards and Interpretability aspects including the legal issues and (v) Preservation Metadata. Work of the Sub-Committees is progressing steadily. The current Workshop is one milestone of the Ongoing Initiative which is prelude to an International Seminar planned in the near future where we plan to learn from the experience of those who are in the forefront of this subject.

Thereafter he explained about why long-term sustainable Digital Preservation? How is it different from digital library or archiving? If all citizen services like birth certificate, income tax return etc., go digital, as is the

current trends in e-governance applications, and they are born digital, what happens if we need an authenticated certificate, say, after 25 or 50 years? How to ensure technology proofing or future proofing in such a fast moving digital technology scenario which has become so fundamental and so pervasive, where technology change every year? If the data is tempered with, what is the legal remedy? Could generations, say after a century enjoy old classics? What is the cost and business model? What to preserve and what not to preserve…. for what time frame. How to ensure long-term sustainable preservation of society's knowledge assets and culture heritage, digital or otherwise? Print materials can survive for centuries without direct intervention. In contrast, digital materials may need active management and preservation in order to survive even a decade.

He emphasized that we are not alone to ask these questions and seek answers. The entire world is doing in multiple disciplines, library, museum & heritage, music industry, motion picture industry – Hollywood, Bollywood, Medical, Earth Science, Archives and Records Administration etc. Some solutions are emerging and a lot more are getting debated/in-depth and studies are being carried-out; pilot projects/test-beds are being set-up to try-out proposed solutions. In some disciplines, the needs are immediate and pressing and while in others, it is becoming important.

Thereafter he touched upon the needs of the industry for long-lived data such as Healthcare, Pharmaceutical Industry, Aerospace, Petroleum, Scientific and Cultural etc.

He pointed out that the biggest change which has happened in e-society is globalisation of information/knowledge/market and therefore the need to understand and adopt international best practices and international standards wherever evolved. And, therefore learn from the experience of other countries, learn from the experience of other domains, learn from case studies – some successful and some not so successful and adopt them after suitably modifying to own needs.

Thereafter he gave a snap-shot of recent ongoing activities on Digital preservation globally particularly to bring-out the ongoing importance of the subject. Full impact of IT revolution leading to Information/e-Society can't be realized if long-term sustainable digital preservation strategy, where it matters, is not in place. He explained about the National Digital Information Infrastructure and Preservation Programme (NDIIPP) Initiative and National Archive and Records Administration's Electronic Records Archive (ERA) of USA, CASPAR of European Union - Cultural, Artistic and Scientific Knowledge for Preservation, Access and Retrieval and Digital Preservation Europe (DPE).

He concluded his address by welcoming all the participants to the national workshop on "Digital Preservation in India" and wished this workshop a grand success.

After the special address discussions on various sessions started which are summarised as below:

Session I: Needs and Challenges for Digital Preservation:

Chairperson of this session **Dr. Shalini R. Urs, Executive Director and Professor International School of Information management, University of Mysore** drew attention of the participants to increasing volumes of digital information. She indicated that as per a study conducted in 2006, 160 exabyte of information was available and that the same is increasing at the rate of 6 times every year. She made following important points in her opening remarks:

- Take digital preservation from niche area to mainstream area
- Preservation is ensuring access for 1000 years and not 10 or 100 years
- We are used to best practice of crisis management or disaster management for analog materials but not for digital materials
- In digital the preservation has to start before the information is created
- In digital preservation we are talking about its usability over the years. It is not bit stream preservation alone.
- Difference in analog and digital is not human eye readable
- 40% of the websites sustain over one year
- We are 10 years late
- Challenge in digital preservation is not technological but also related to the organisational structure
- There is a need of a National Policy in India for digital preservation of data and an effective implementation process of the policy

Thereafter two case studies were presented as follows:

Case Study I: *Problems faced in implementing Digital Preservation by Mr. N.S.Mani, Microphotographist, National Archive of India (NAI)*

He presented that for preserving the cultural heritage of the country NAI has taken up the mammoth task of creating a back up of the originals by microfilming the entire collection of documents and keeping them away from the originals in its Regional office at Bhopal wherein the temperature and humidity is controlled 24 x 7, 365 days. This practice is being followed internationally as the life expectancy of film medium is more than 500 years as compared to the other media.

In order to keep pace with the changing environment in the field of Information Technology, NAI has taken up the conversion of the analog microfilm images into digital and has integrated the same with the meta data of the record holdings ever since 1998.

The present Archival Information Management Software (AIMS) developed by NAI in 1998 and recently upgraded by National Informatics Center (NIC) has a

total of 23,000 lakh data entry of reference media of records and the same is available in the intranet of NAI for retrieval by scholars and users of Archives.

Further he made following salient points during the presentation:

- Libsys software in Linux platform is being used for retrieval of information from approximately 1.5 lakh books / periodicals / journals in NAI. The system provides Online Public Access Catalogue (OPAC)
- In July 2000 NAI had initiated a pilot project for digitization of rare manuscripts with the help of Sony Digital Camera
- Rare manuscripts viz. Bhagwadgita, Ramayana, Mahabharata etc. have been digitized and stored in CD medium
- There are following challenges for digital preservation
    - No standard formats are available for the image formats
    - Integration of images with reference media data (digital images of analog microfilm with data base)
    - Periodical checking of images in CDs and DVDs (whether the hardware, drives would be available in future?)
    - Lack of Migration Policy (will it be 5 years or 7 years?)
    - Compatibility of Software and Hardware (update of software for compatibility with new hardware)
    - New technological advancements
    - Non-standardized technical activities
    - Shortage of manpower
    - Management policy
    - Preservation policy

Finally he made following suggestions:

- An office procedure manual for Electronic Records both born digital and converted to digital mode in line with the stipulations incorporated in line with the stipulations incorporated in ‘Manual of Office Procedure” should be drawn up within a specific time frame.
- Till a final decision is taken regarding the retention schedule/ appraisal/ transfer/ access of electronic records (both born digital and converted to digital) Department of Information Technology should initiate in collaboration with National Archives of India, a DIGITAL RECORDS PRESERVATION PROGRAMME” by creating a corpus of experts to visit various Ministries/Departments and take ‘back up’ of electronic records in appropriate medium which would subsequently be migrated to latest technology in keeping pace with the changing technology. (This would also take care of Disaster Management of Electronic Records towards preserving the cultural heritage for posterity).
- National Archives is the nodal agency for upkeep of paper and other formats of records as per the mandate of Public Record Rules. Therefore, Department of Information Technology should take initiative to develop National Archives as a hub center for preserving the digital information which could be retrieved for the benefit of scholars and users of Archives.

- Conducting regular awareness programmes for the benefit of personnel in the Ministries and Departments and thus apprising them of the latest developments in the field of information technology.

Case Study II: *Digital Preservation of Records in Archaeological Survey of India: Problems and Challenges by Mr. S. B. Ota, Director, National Mission on Monuments and Antiquities, Archaeological Survey of India*

Mr. S. B. Ota explained that Archaeological Survey of India (ASI) was set up in 1861 and carries out archaeological investigations through explorations and excavations for proper understanding of the past. ASI carries out documentation of archaeological resources and protects and preserves national archaeological heritage.

The archaeological heritage resource is finite and non-renewable that is fast disappearing. Therefore there is need to create authentic records of these resources that can be preserved for the posterity ensuring that the people can discover, use and learn about them from these records. There is also need for these resources to be documented through various means such as visual records (photography, drawings, estampages etc.) and text records for the posterity facilitating historical understanding of the past.
Thereafter he explained the activities, problems and requirements of ASI as under:

- ASI has photo negatives, photographs, maps and drawings, printed records, handwritten text records, paintings, manuscripts, estampages, videos and 3-D scanning data
- As regards photo negatives and photographs they have negatives (glass negatives, celluloid negatives), photographs, digital photographs, video films, video tapes and digital videos
- In respect of maps, drawings and text records, they have maps and drawings in pencil and ink, printed maps and drawings, digital drawings, handwritten texts, printed texts and 3-D scanning data
- For scanning of film negatives work was carried out in American Institute of Indian Studies. Nearly 10,000 film negatives of varied sizes (3” x 4”, 4” x 5” and 2.25” x 2.25”), scanning in 1000 dpi with 2 x Optical Density, editing was done wherever required, stored in TIFF (uncompressed) format and created database in Excel
- Nearly 5,000 books with more than 20 lakh pages have been digitised, scanned in 300 dpi, scanned in color mode, stored in TIFF format, for easy access the same is converted to JPEG and the back up is on online server
- Glass negatives of varied sizes (6” x 8”, 10” x 12” and 12” x 15”) of more than 100 years old have been digitized, nearly 10,000 negatives have been produced, scanned in 300 dpi, stored in TIFF format and a customized software ‘IMAGE PHOTO SERACH’ was developed for retrieval purposes
- He indicated following problems in digital preservation of negatives:
    - Negatives and slides
    - Negatives of different materials (glass / celluloid)

    - Different age
    - Different sizes
    - Variations in intensity and type of damages
    - Varied resolution
    - Exposed in different cameras
    - Black and white and color negatives / slides
- He high lighted following problems in digital preservation of Photographs, Maps, Drawings and Paintings:
    - Different medium (types of photo papers, tracing paper/cloth, leather, drawing sheets
    - Different painting medium like handmade paper, cloth, canvas, wood, metal etc.),
    - Different age
    - Different sizes
    - Records of unspecified sizes
    - Variations in colors and nature of colors (pencil, / ink / water color / oil paint etc.)
    - Digital drawings (Auto CAD drawings)

Fe further high lighted following problems in digital preservation of text records and estampages:

    - Different age
    - Different sizes
    - Variations in intensity of damages
    - Variations in colors
    - Handwritten / types / printed
    - Problems in estampages
- Thereafter, he explained the following requirements for digital preservation in ASI:
    - Provision for appropriate output retaining the original features of the archival records
    - Provision for well defined scale for blow ups in case of photographs, drawings, maps etc.
    - Provision for micro features of the records beyond life size for specific research purposes
    - Provision for easy access when the archival records are shared with public domain
    - Noise reduction in digitization
- Finally he threw open following expectations from the professionals on digital preservation:
    - Defining prescribed resolution
    - Defining formats for storage of varieties of records
    - Mode of preservation of records
    - Develop strategy / policy guidelines for digital preservation
    - Identification of risk factors
    - Derive successive models for the maintenance and recovery factors for the digital archival records
    - Provision of appropriate safety measures to prevent hacking of the archival records

- Compatibility with state of art and future advancements in digital technology
- Integrity of document structure and navigation
- Authenticity of color

In this session after the two case studies there was panel discussion which is summarised as below:

Mr. Vijay Garg, Research Staff Member, IBM India Research Lab gave an over view of BBC Doomsday Book Project. He explained that a survey completed in 1086 under order of William the Conqueror and the same is still preserved today (1986) since it is used (de facto) standard. In 2002, after 16 years, the BBC Domesday Project was almost obsolete. BBC used laser disk on BBC micro master computer using BPCL language which is obsolete now. He also stated that digital preservation is both bit preservation and logical preservation.

He then made comparison between digital and physical medium. Physical is lasting since centuries but digital is in terms of decades or so. He also explained the industry needs of digital preservation as follows:

- X-Rays – 75 years
- Finance – 6-10 years
- Life Insurance – 6 – 10 years
- Petroleum – 50 years
- Pharmacy – 50 to 100 years
- Aerospace – 50 years
- Government – Life of individual to for ever
- Scientific and Culture – for ever
- Music and Entertainment – 100 years or more

Thereafter he touched upon the Open Archival Information System (OAIS) and explained the preservation approaches like museum, migration, emulation, encapsulation etc. and presented certain features of the European Unions CASPAR (Cultural, Artistic and Scientific knowledge for Preservation, Access and Retrieval) project including IBM's involvement in the same. He explained IBM's experience from CASPAR as learn about learn term digital preservation, gain access to a user community data, evaluate technology for preservation and apply concepts to IBM technology.

Major General S. K. Pathak, Deputy Surveyor General, Survey of India indicated that they are preserving only various types of maps in digital mode. However, they have other types of data as well such as tidal data, magnetic data etc. for which they want to explore the Public-Private-Partnership (PPP) mode. They are storing data on removable and hard disks. They have two storage locations one at Hyderabad and second at Dehradun.

He informed that as per National Policy on Maps of 2005 maps data is available to any body under license.

Ms. V. V. Lakshmi, Scientist F, SAARC Documentation and Information Resources (NISCAIR) made the following points:

- Digitisation is imperative
- Initially funds are available for the first phase but not to sustain the projects in future. Therefore, the mind set has to change.
- It is important to identify what needs to be digitised and preserved
- IT support is needed for understanding preservation strategies like migration, emulation etc.
- Education and training of the personnel is required
- Projects are generally personality based
- Collaboration is required
- More knowledge is required before implementing the projects. Suggested pilot study on risks and management needs to be undertaken
- Public-Private-Partnership (PPP) model should be adopted for digital preservation projects to become sustainable
- In Government the lowest bid selection process is a hurdle

After the above panel discussions and the question – answer session following main issues emerged:

- Internationally there is collaborative approach but in India we don't have the same. Therefore there is need to establish collaborations with stakeholders, institutions and industry
- There is a need for a National Policy on Digital Preservation and Implementation Standards
- In order to make the digital preservation projects sustainable the business case of Reserve Bank of India (RBI) could be studied

Session II: Processes & Technologies for Digital Preservation

Chair of the session **Dr. Gautam Bose, Deputy Director General – National Informatics Center (NIC), Department of Information Technology, Government of India** briefed the participants on various speakers during the session and the topics. He spoke about the importance of processes and technologies for digital preservation and emphasized that the same need to be standardised as the same varies from object to object and material to material.

Thereafter two case studies were presented which are summarized as below:

Case Study I: *Digitisation of Sound Archives by Ms. Indira Mathur, Director, Transcription and Programme Exchange Service, All India Radio*

Ms Indira Mathur made presentation on the preservation programme of All India Radio (AIR). She explained digitisation process and infrastructure like CD, DVD, barcode and authentication, DRM, watermarking etc. The salient points emerging from the presentation are as under:

- They are preserving content as per local culture. At present they handle 22 languages and 250 dialects
- All programmes are preserved for future use
- AIR archive is a treasure house of precious recordings of more than 53,000 tapes both music and spokenword
- First Parliamentary session audio recording is preserved only in AIR
- Mahatma Gandhi's first and last prayers are in AIR sound archive
- Two formats of audio tapes are used, one for Music and second for Spoken words
- In AIR digitisation started in 2001 and recordings are preserved in two formats and three copies – Wave CDs (15742 CDs), Audio CDs (13700 CDs) and Wave CDs (Backup Copy / Disaster Copy)
- Six storage mediums are used namely, Gramophone Records, Analog Magnetic Tapes, Analog Cassette Tapes, Transcription Service Records, Digital Audio Tapes (DAT) and CDs
- With 11th Plan funding for sound archive initially central archive in Delhi will be linked with four regional Digital Sound Archives (after upgrading with facility of digitisation) Mumbai, Kolkata, Chennai. Besides these, 28 more Regional Archives have also been identified.
-

Case Study II: *Digital Library of India by Dr. V. N. Shukla, Director, Specialized Applications, Center for Development of Advanced Computing (C-DAC)*

Dr. V. N. Shukla made presentation on the Digital Library of India project which is part of the Carnegie Mellon University (CMU) Million Book Project. He stated that 14 countries are participating in this project and one million books are to be digitised from each nation. He explained that 20-25% books are without copyright. They are aiming to build biggest possible library, preservation and human quantum of data for research. They have so far digitised 7.5 lakhs of books in India.

He discussed the comparison between physical and digital library. He indicated that it does not mean a physical library exists and we are digitising it. It is about portal site. He indicated that 106 books were taken where 146 small mistakes and 9 major mistakes were detected. Therefore digital library is also to correct the errors. He mentioned that less than 20% books are in public domain, 15% in print and 65% are unclear about the copyright status. He further explained the digitisation process issues with editing and spell checking etc.

He highlighted following problems in information access:

- Search is only based on Metadata (Author name, Title, Publishing date, Subject and Library)
- Currently the search engine is not handling the spelling errors, spelling variants (i.e. colour and color)

- The books/manuscripts are stored in TIFF format, to access these more bandwidth is required
- Metadata creation for regional languages
- Metadata creation for bundled manuscripts (10 or more some times grouped together)
- What is the granularity of documents for indexing?
- OCR: pretty good, but not perfect
    - Internationalization
    - Old texts, manuscripts, marginal scribbles
- Page number detection
- Page ordering
- Metadata and book equivalence
- Segmentation and disaggregation
- Book summarization
- Other types of content and how to integrate

After the above two case studies there was panel discussion which is summarised as below:

Dr. P. Anandan, Managing Director, Microsoft Research India talked about Digital Heritage Project monumental and Sri Andal Temple Pilot Project. He gave demo of application and explained tools for common people use indicating that no high skill set are required.

He indicated that digital technology can capture images which can be processed to have bright images. These images can be zoomed and seen with greater clarity which otherwise is not possible sometimes. He cited the example of temples which are very high and have many sculptures at a very height.

Ms. Kamilini Dutt, Director (Archives) Doordarshan of India explained Doordarshan's plans for digitisation and preservation. Some of the salient points that emerged are as under:

- They are using digital technology.
- Online archiving and standardisation of metadata is in place.
- Programmes are being digitised
- At present they are issuing DVDs
- Have plans to do Video on Demand and Web Casting
- 1,50,000 hours of programme is in archive
- The change of technology can be handled through File formats

Mr. J. Srikanth, Head Storage Business, Kores India Ltd explained that paper is the ultimate medium. Therefore the technology should match the paper medium. Archives are not accessed frequently. Archiving in context of end user technology selection is based on this factor. There can not be uniform solution for all types of archives (storage for 10 years, 20 years, 50 years, 100 years …….. or for ever). There are higher technology costs and higher maintenance costs.

Dr. Sen Gupta, Director, Photo Division, Ministry of Information and Broadcasting made the following points:

- They have more than 10 lakhs of images and pictures in their archive
- In 2004 these have been converted into digital format
- Preservation and retrieval have to be looked into
- Two systems of preservation are followed:
    - CD for day to day use
    - Moving to storage on servers
- Life of the CD/DVD is a concern
- Server is good but there is fear of hacking etc.
- Black and white images is no problem as life is known but for color images no idea about life. Continuous examination is required for colored images
- Suggested to create a forum to discuss such issues in future

During the Question and Answer session it emerged that requirements of tangible and intangible archiving are different. Likewise knowledge and design archiving are different.

Session III: Viability and Sustainability of Digital Preservation in India

Chairperson Ms. Kalpana Dasgupta, Former Director, Central Secretariat Library, Ministry of Culture made her opening remarks indicating that we do work first and then set policies. Librarian assumes the services of users and work accordingly. User needs might affect the policy of Digital Preservation. She talked about divide in society – social and digital and that will digital help to bridge the gap? She emphasized the need for human resource development and training to personnel. She remarked that lack of human resources affects the digitization programmes.

Thereafter two case studies were presented which are summarized below:

Case Study I: *Imperatives for survival of digital preservation in Indian museums by Dr. Dinesh Katre, Group Head, Human Centred Design and Computing, Center for Development of Advanced Computing (C-DAC)*

Dr. Katre presented JATAN – a Virtual Museum Builder. Gave overview of Jatan and other tools. He explained that digital preservation is following most of the international standards. Migration from proprietary database and web application server to open-source database and web server is essential.

In case of JATAN: Virtual Museum Builder such migrations are feasible. In the year 2005, Prince of Wales Museum and Raja Kelkar Museum were advised to not to make upfront investment in Storage Area Network (SAN). They were asked to proceed with digital documentation by storing the data on local hard-disk, as the data size was not much initially. In 2008, 1 terabyte hard-disk has

become cheaply available, which is adequate to handle the current size of data available with them.

This approach has saved these museums from upfront expenditure on SAN and left the option open to go for state-of-art storage solution at an appropriate time.

During the presentation following lessons and points emerged:

- User centred approach has been adopted
- Dublin Core and NARA standards have been used
- Stakeholders must participate in digital preservation projects. Don't totally outsource
- Use open source programs for developing the software for collection management
- Follow the international standard for metadata description
- Avoid integrating the content as part of database
- Use multimedia formats for all round documentation and preservation
- Don't make upfront investments in storage devices unless the data size demands it
- Sustainability and value added services must be addressed in the overall solution
- Birth – Close specifications, no funding huge upfront investment, no user involvement, short sighted approach, unrealistic timeframe for delivery
- Parenting – Training, introduction to best practices, team building, stakeholder participation
- Nurturing – System and process enhancement, frequent guidance and technical support, institutionalization of the digital preservation, continued learning to staff, rooting the digital preservation culture
- Sustenance – Value creation, economic and technical sustenance; migration, technological upgradation

He finally drew the conclusion that value creation/value added applications and services for use, economic sustenance and technical sustenance are the three imperatives for the survival of digital preservation in Indian museums.

Case Study II: *Documentation of Cultural Heritage in India by Mr. Pratapanand Jha, Director, Cultural Informatics Lab, Indira Gandhi National Centre for the Arts*

Mr. Jha gave an overview of Indira Gandhi National Center for Arts. He explained that user expectations for data from organised source – structured data – manuscripts, printed books and visual and audiovisual (Archival) holdings, and data from other sources – unstructured data – oral traditions, rituals, festivals and individual / group (community) knowledge. They want all this under the same umbrella, anytime and anywhere.

Touching upon technology factors, he stated that communication speed is increasing (bytes to mbps), computing capabilities are increasing (MHz to GHz), decreasing communication, computing and storage costs, increasing spectrum of consumer electronics generating digital data (majority of data today is born digital) and multimedia technology allows users to interact and explore the subject in multiple layers, in a non-linear and integrated mode by combining audio, text, graphics, animation and video on a computer.

He explained that Indira Gandhi National Centre for the Arts (IGNCA) as a nodal agency started in 1988 with HP 3000 super computers (Minisis DBMS) using PICTO, CATCAT, MNUS, KK TERM and Musical Records. But the efforts could not be utilized as majority of the data could not be migrated on the new platforms.

He explained about Gita-Govinda Exhibition – interactive multimedia exhibition and other ongoing activities of IGNCA viz. digitisation of manuscripts, digitisation of visuals, digitisation of audio / video, digitisation of rare books, digital documentation of archaeological and heritage sites and visual and audio-visual documentation of the life styles / rituals / festivals of the communities.

In his presentation on 'Learning' he made the following points:

- Data accessibility to users – highest priority
- Standards for metadata (for data exchange)
- Standards for digitization (for quality)
- Standards for storage (media) and policy for data migration (online / offline / distributed storage)
- Platform independent applications

After the above two case studies there was a panel discussion which is summarized as below:

Professor Subhashis Banerjee, Department of Computer Science and Engineering, IIT Delhi expressed willingness to work in the area of digital preservation. He stated that digital preservation is not the work of one group. We need collaborations. Such programmes should be backbone for future in the country.

Mr. Ashish Banerjee, Chief Software Technologist, Sun Microsystems India Pvt. Ltd. Cited example of framework of National Digital Information Infrastructure and Preservation Programme (NDIIPP) of USA. He discussed about born digital data, refreshing technologies, migration, replication and emulation, open standards and open source software etc.

After the panel discussion following recommendations emerged:

- A national policy is required on digital preservation so that Departments/ Ministries consider the need of preservation

- National Fund for Digital Preservation is needed where Department of Information Technology, Education, Culture, Tourism, Science and Technology, Information and Broadcasting, Health etc. should join hands
- Policy and strategy for digitisation and preservation is required
- Standards for digitisation and preservation are required
- Preserve what users want
- Reaching out the users is required
- Human Resource Development is the key to success for digital preservation

Session IV: Governance, Legal and Regulatory Framework

Chairman, Dr. Gautam Bose, Deputy Director General, National Informatics Center (NIC), Department of Information Technology, Government of India, made his introductory remarks and emphasized the importance of governance, legal and regulatory framework for digital preservation.

Thereafter, a presentation and a case study were taken up which are summarized as below:

Presentation on Digital Preservation of Forensic Data-Emerging Issues and Challenges by Dr. M. S. Rao, Director – cum – Chief Forensic Scientist, Directorate of Forensic Science, Ministry of Home Affairs, Government of India:

Dr. Rao explained the Forensic Digital Data Bank Management. He stated that Forensic Digital Data Bank Management is a complex task/process. The data bank contains information on intimate and non-intimate objects. He shared the UK experience, policy and best practices.

During his presentation following salient points emerged:

- Without legal sanction, one can have the data bank on intimate objects but the information from data bank can be used in legal matters only after getting legal sanction (privacy, human rights & ethical issues are involved)
- Some data banks are for temporary period (for identification)
- Some are to be preserved for long period (convicted persons)
- Retention of information in data banks is subject to conviction period / death of the individual
- Some data is for volunteers (for identification / insurance)
- Some forensic data banks on non-intimate objects need for long preservation (paint, glass, fiber, ink, toner, cartridge, bullet etc.)
- Data should be in the databank till conviction or till death of the criminal
- They have data for the criminals and not for the volunteers
- Data collection is a problem and updating is a big problem
- Forensic Data Banks are for three purposes

    - Forensic intelligence – for detection and prevention of crime – (face, voice, gait, fingerprint etc.)
    - For linking crime with criminal – or to prove innocence (DNA, fingerprint, biometrics, counterfeit currency, firearms, signature etc.)
    - For identification – (during disaster – biometric like DNA, dental, fingerprint, iris, ear, endangered animals/plants etc.)
- Some data banks need to be preserved for long duration, some need not
- For legal purposes – data bank management needs
    - Authenticity of data
    - Integrity and identity of the data
    - Chain of custody
- Preservation of digital data – Mirror image concept)disaster management
- Data input / data collection is a big problem (from convicts, suspects, volunteers, crime scene, post mortem centers). Upgradation of tool and updating of data by authorized persons only.

Case Study: *Legal Issues in e-Preservation and e-Access by Dr. A. L. Moorthy, Director, Defence Scientific Information and Documentation Center (DESIDOC)*

Dr. Moorthy made a detailed presentation. He stated that advances in technology have produced radical shifts in the ability to reproduce, distribute, control and publish information. With its commercialization and integration into everyday life, the information infrastructure has run headlong into intellectual property law.

Following main issues were presented by him:

- Stakeholders are many and varied. Content creators have different agendas to handle IP according to varying strategies and look for different kinds of return on their investment
- Fundamental legal concepts can be interpreted differently
- Laws and practices vary worldwide, yet networks have global reach
- The economics of information products and IP can be subtle
- Digital Rights Management (DRM) is a systematic approach to copyright protection for digital media. The purpose of DRM is to prevent illegal distribution of paid content over the Internet
- License is a legal method of voluntary transfer of ownership of an intellectual property over a definite period
- Licensed content comes with a set of terms and conditions that govern the permitted use of that content. License should clearly define the content. It should have content name, licensor's complete details, rights, terms and conditions etc.
- Standard clauses in a License Agreement are indemnity & liability limitations, governing laws & amendments, dispute resolution/ arbitration jurisdiction
- Points to be considered for licensing digital content are

    - Payment mode
    - Length of license
    - Permitted uses & authorized users
- Issues of concern for Licensing Digital Content are
    - Perpetual licensing
    - Annual/ Renewal
    - Permitted uses and authorized users
- Issues in E-access – E-Journals / Online Journals, E-Books and E-Standards
- Issues in E-Preservation
    - Formats and standards
    - Open access/open archives
    - Self archiving
    - Institutional archiving/repositories
- Points to Ponder
    - Monopoly of publishers
    - Content Creators v/s Rights Holders
    - Rights Holders v/s Consumers
    - IPRs v/s Societal Rights
    - Reasonability in pricing
    - Application of fair use for digital documents
- Legislations needed
    - At National Level
        - Public Access to Science Act
        - Consumer Protection Act for Digital Products
        - Audio Home Recording Act (Consumers Right to Copy)
- At WTO/WIPO Level
    - Remedy against monopolistic attitude of Developed Countries

After the above presentation and case study there was panel discussion which is summarized below:

Dr. Mukulita Vijayawargiya, Deputy Legislative Counsel, Legislative Department, Ministry of Law and Justice gave a detailed account of various Acts that are applicable to digital preservation. She indicated that classification of documents is required. Likewise retention time for documents is needed to be decided. Further authenticity of the documents is required to be established.

Following Acts were listed which are applicable to digital preservation:

- Public Records Act
- IT Act 2000
- Evidence Act
- Freedom of Information Act
- Destruction of Public Records Act
- Companies Act
- Depositories Act
- Govt. Securities Act

Mr. Praveen Dalal, Managing Partner, Perry4Law made following points:

- Right management policy is must
- Rights are to be acquired before preservation
- Right To Information (RTI) Act provides right to access to information
- Law should provide for preservation before it becomes obsolete
- Legal deposit of e-content is required to be implemented
- Patent issues
- Security issues – cyber security issues in law
- Amend IT Act 2000 to provide for digital preservation

At the end there were following closing remarks by Mr. Rajan Kohli, Deputy Secretary General, FICCI:

- Work is being done in various areas but in isolation. Linkages and synergy is required to work together.
- As technology is changing, so whole process should be such that it should not be hindered
- India is unique. We can not copy what others are doing. Customisation as per Indian needs is required.
- Robust legal and regulatory framework is required.
- Proper standards are required.
- NDPP output will help in standardisation, policy making etc.

CONCLUSIONS AND RECOMMENDATIONS:

Following conclusions and recommendations have emerged from the proceedings of the workshop:

1. Public-Private-Partnership (PPP) model should be adopted for digital preservation projects to become sustainable

2. Internationally there is collaborative approach but in India we don't have the same. Therefore there is need to establish collaborations with stakeholders, institutions and industry

3. There is a need for a National Policy on Digital Preservation and Implementation Standards

4. In order to make the digital preservation projects sustainable the business case of Reserve Bank of India (RBI) could be studied

5. National Fund for Digital Preservation is needed where Department of Information Technology, Education, Culture, Tourism, Science and Technology, Information and Broadcasting, Health etc. should join hands

6. Value added applications should be developed as part of digital preservation projects to ensure its long term sustainability and viability

7. Adequate funding for digital preservation initiatives should be anticipated for its proper nurturing, growth and long term sustainance

8. Participation of archivists, preservation staff, librarians, collection managers and curators in building the digital repository is essential to develop a sense of ownership and for establishing the new culture of digital preservation

9. Standards for digitisation and preservation are required

10. Preserve what users want

11. Reaching out the users is required

12. Human Resource Development is the key to success for digital preservation

13. Legal deposit of e-content is required to be implemented

14. Amend IT Act 2000 to provide for digital preservation