

Issues in Preservation of Digital Cultural Heritage

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Abstract

The cultural heritage is the remembrance of its living civilization. Culture is expressed in various diverse types, i.e. tangible and intangible. Cultural heritage has to be valued with utmost care as it is presented by ancestors. Libraries, archives, museums and information centers are using several Information Communication Technology (ICT) tools for collecting, organizing, managing and providing access to cultural heritage information. There are many unique and priceless assets of tangible and intangible cultural heritage (CH) presently positioned at high risk. Over the years one of the agenda over and over again overlooked by libraries, archives and museums is how to document Traditional knowledge (TK). Libraries, archives and museums are non-profit making institutions serving the public at large. Digital CH preservation is best way, providing easy access to CH information to all. Today so many different types of technologies are available for preservation CH. Cultural heritage preservation which has diverse financial implications: individual impacts and benefits, economic impact and benefits and social impact and benefits. A range of problems to be addressed such as funds, lack of trained manpower, quick obsolescence of technology, dependency, and copyright hinder the functioning of cultural heritage institutes.

Keywords: Archival & Museum Professionals, Cultural Heritage, Digital Preservation, Digital Preservation Techniques, Traditional Knowledge

1. Introduction

The present era has faced a revolution in term of functioning and administration of libraries, archives, museums and other information centers by using Information Communication Technology (ICT). A large number of well established libraries, archives, museums and other information centers in developed countries have digitized CH and providing easy access to their resources and easily reaching to their potential users across the globe. Digital preservation is widely used for safeguarding and administering original CH objects. Cultural heritage

(CH) illustrates the exemplary way of life that integrates the past, present and future of a community (Singh, Sahoo, & Mohanty, 2012). There are many assets of valuable tangible and intangible CH presently positioned at high risk. The government, non-governmental organizations (NGOs), international organizations and cultural institutes and local communities are playing positive role in preserving traditional knowledge, particularly in digital format for future generations (WIPO, 2016). IT tools like computers, scanners, cameras and internet have comprehended preservation simple and compose uncomplicated admittance and distribution (WIPO, 2016). All technologies are prone to become obsolete quickly such as media storage, software and hardware, computer viruses, changes



in file formats, hacking, etc. shielding to our digital cultural heritage resources by way of proper planning, management, vigilance and imparting training and education (Anderson, 2005).

2. Cultural Heritage

In The Hague Convention, cultural heritage was measured as assets and come out as an entity of protection for the nation (UNESCO, 1954). According to World Heritage Convention, cultural heritage still relates to immovable assets, such as monuments, sites and cultural countryside (UNESCO, 1972). “The Convention for the Safeguarding of Intangible Cultural Heritage” separated the intangible cultural heritage from the tangible cultural heritage (UNESCO, 2003).

Today CH area has been developed into an explicit, specialist and interdisciplinary research subject. CH is repeatedly described as artifacts, places, custom, celebration and ritual practices that compose with history (Bradshaw, 2011). Nowadays, cultural heritage studies are becoming more focus mainly because of public interest. CH provides a link to past and present, thus it is a prime key of any community for its identify (Bradshaw, 2011). Cultural heritage has to be valued as it is a key attribute of the landscape, forming a vital component for sustainable planning. Different types of approaches to be employed to preserve cultural CH without harming communities. Tourists from foreign or national want more to discover and experience a diverse variety of cultural heritage, such as monuments, old buildings, arts, festivals, etc. CH is broadly divided into tangible and intangible forms.

2.1 Tangible

Tangible Cultural Heritage (TCH) refers to physical entities, artifacts that can be physically experience and store. TCH can be further divided into two types.

i) Immovable tangible cultural heritage consists of monuments, sculptures, buildings, cave, inscriptions and city centers, archaeological, ethnological, historical and underwater sites, cultural landscapes, geographic spot, natural wealth, wildlife, domestic birds and animals, activity and aesthetic values.

ii) Movable tangible cultural heritage consists of artifacts such as sculptures, paintings, collections and objects; media such as audio, video, music, books, plays and consumer and manufacturing goods. TCH presents a solid basis for historical studies, authenticate memories and it is vital for validating to the past and providing proof in the history. Preserving TCH reveals our identity different from other communities (UNESCO, 2017).

2.2 Intangible

Intangible Cultural Heritage (ICH) is very delicate and vital in sustaining cultural diversity in the fast changing modern era. ICH consists of art expressions, drama, acting, literature, language, martial arts, livelihood cultures, food habits, traditional practices, folktale, folksong, folklore, folkdance, oral records, etc. ICH aids in intercultural discourse, promote shared respect among different communities. The most important element of ICH is the transmission of tacit skills that is being precedent down from generation to generation. This transmission is very important to sustain the traditional wealth of a minority group so that it strengthens and keeps CH alive, now several ICH are exposed to danger of vanishing, endangered by globalization, homogenization, lack of understanding form government and people, lack of support for preservation, etc. To protect ICH, youngsters should learn from elders, perform those rituals frequently

and transmit knowledge and skills to the next generation. When ICH is not preserved and transmitted to the next generation it will vanish with the passage of time and will be lost forever. Safeguarding ICH is vital, its process should include identifying, classifying and documenting the traditional cultural heritage; identifying and celebrating festivals; promoting and supporting the sharing of ICH skills and knowledge and researching ICH for community progress (UNESCO, 2009).

3. Traditional Knowledge

Traditional knowledge (TK) is a knowledge, expertise, talents, innovation, skills, expression, practices, unique signs and symbols that are established, continued and passed on from generation to generation within a particular community. Traditional knowledge forms a part of cultural identity and can be employed in wide-ranging diversity such as agriculture, ecological, traditional medicinal knowledge, technical, scientific knowledge (WIPO, 2016). The features of TK comprise: formation of knowledge and passing down of knowledge from generation to generation; continuous developments as novel information is assimilated to the existing knowledge; formation and development of knowledge is a collective struggle.

Anthropologist Johnson (Johnson, 1992) describes TK as a knowledge constructed by a cluster of individuals living in close contact with flora and fauna. It comprises a scheme of taxonomy, a set of pragmatic explanations about the local environments and a structure of self-management that oversees the resource usage. TK is an aspect of the community with a chronological connection of less advance society (Berkes, 1993). TK is a cultural principle and customary practices passing from

generation to generation for the sole reason of endurance while living with contemporary era (Hiebert & Rees, 1998).

3.1 Sources of Traditional Knowledge

Traditional knowledge can be understood as information which has been congregated by a group of people or community over a period of years (Parashar, 2014). The inclination amongst Library and Information Science professionals has been to, underline documented knowledge (Explicit) at the cost of undocumented (Tacit) TK. As stated by the World Health Organization (WHO), approximately 80% of the world's populace in developing countries depends on TK to meet their medical necessities (Ngulube, 2002).

Abundant sources of Traditional knowledge are buried in our society, communities, villages and countryside. The prime sources of traditional knowledge are community elders, community leaders, teachers, farmers, ancient documented records, published materials, folksong, folktale, folklore, poetry, oral records, etc. It is vital to know that traditional knowledge is locally fitting and exclusively tailored as per the condition of the local community, which ultimately control in exploitation of traditional knowledge that is required for endurance, and aid in the diversified manufacture without over usage of an individual resource (Parashar, 2014).

3.2 Need for Preserving Traditional Knowledge

The following points provide proper justification for the need to preserve the traditional knowledge (Parashar, 2014).

- ❖ Develop the living standard of TK holders and TK communities: Traditional knowledge is a

priceless asset to native communities who rely on traditional knowledge for their living, also to manage and utilized local resources in sustainable approach.

- ❖ Promote national financial system: Many commercial industries are exploring TK for developing new goods having wide marketability. Therefore, protecting TK is vital to enhance the economy of developing nations by wise utilization of their natural wealth and export traditional natural products. For example India is producing so many TK based products and contributing to the national economy.
- ❖ Safeguard the environment: Traditional sustainable agricultural cultivation practices create balance between the environments.
- ❖ Avoid biopiracy: Unlawful extraction of natural resources or related traditional knowledge or patenting certain TK. For example India protected and stopped all the patents filed by USA based on our TK, if not the situation would have been very bad.

4. Role of The Lis, Archival & Museum Professionals In Preserving Traditional Cultural Heritage

The consequences of globalization masquerade confronts for the protection and preservation of cultural heritage resources and universal identities (Chibuzor & Ngozi, 2009). Advancement in urbanization has resulted into separation and detachment from culture. Younger generation's affinity towards their cultural identity is almost neglected. However, documenting and safeguarding with the help of ICTs will make it achievable to view others cultural heritage electronically and vice versa,

thereby opening the door for global outreach for education and research (Chibuzor & Ngozi, 2009). Libraries, archives and museums can take the responsibility as a moderator and bridge the communication space between the generations and also contributes to society's knowledge on a better stage with diverse communities and a different array of visitors. Libraries, archives and museums need to implement a novel model to fit into place themselves with the public in a regular course of the revolution through gathering and safeguarding of tangible and intangible heritage resources.

For many years, all information centers aimed to preserve and conserve records about its cultural account so that it can be useful to the younger generations. Libraries, Archives and Museums can be involved in documenting and safeguarding of cultural heritage resources in the following ways (Chibuzor & Ngozi, 2009):

- ❖ Provision of cultural heritage resources for all sections of the community.
- ❖ Providing sufficient space for cultural works.
- ❖ Supporting cultural heritage activities, e.g. organizing book fair, exhibitions and storytelling.
- ❖ Organizing seminars, conferences and workshops, and presentation of talks to propagate information on cultural events.
- ❖ Ensuring that Libraries, Archives and Museums collected works and transform into services to aid citizens.

5. Digital Preservation Of Cultural Heritage

Digital preservation is a substitute and auxiliary to physical CH objects (Vilbrandt, et al., 2004). UNESCO (2003) defined digital heritage as a distinct wealth

of human being's knowledge, understanding and expression. Digital preservation is best defined as safeguarding and administering digital objects for long term usage (Bakhshi, 2016). 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. Digital preservation swathe variety of issues, ranging from short to long-term access on the use of digital objects. It influences all individual citizens in the information society (Chanod, Dobрева, Rauber, Ross, & Casarosa, 2010). Considering its application, digital preservation has developed into an interdisciplinary research area, joining subject experts from library science, cultural studies, archival science, museology, anthropology, law, IT professionals, etc. This research will effectively raise our understanding of preservation issues and examine on a different perspective.

5.1 Advantages of Digital Preservation

Cultural heritage preservation could be given special treatment based on the collection types. Digital preservation increases wider access by breaking all existing physical boundaries. The preserved collections can be accessed locally and remotely via internet by students, teachers, researchers and common public. It provides administrative stability, i.e. recognition, preservation and safeguarding by ensuring administrative continuity (CDAC, 2013). CH contents are converted into different digitally formats that need to behold and protected. CH digital preservation promotes reuse and it aids in lawful obligations of document preservation and protect from lawsuits. CH digital preservation forms heritage for upcoming generations (CDAC, 2013). Digital

preservation of CH generates revenue for the society through the use of images, audio and video contents in the form of publications.

5.2 Applications of Digital Preservation

During the current electronic era, we have undergone a revolution in identifying, classifying and preservation of cultural heritage using ICTs. Many archives, museums and libraries use computers to preserve cultural heritage (Swain & Mahapatra, 2011). In this regard Vilbrandt, et al., (2004) listed the following points such as converting identified objects into digitize text and images from active records; rebuilding misplaced cultural work of art like photographs, paintings, arts, drafts, written evidence, archaeological result; cultural heritage digital depiction of all figures of existing objects such as sculptures, monuments, buildings, natural environments, etc. founded on dimensions and 3D examination; designing and developing cultural heritage online or virtual exhibition for wider accessibility to the larger audience that can be viewed through the internet.

5.3 Approaches to Cultural Heritage Preservation

According to Vilbrandt, et al., (2004) the following different approaches to CH preservation can be carried out using ICT. The shape of the object, internal and external structure and other factors can be a reason for preserving CH under different approaches.

- ❖ **Quantification and drafting:** A number of existing entities are traditionally recorded by the measurement and 2D outline representation and these are not computer replica objects.

- ❖ **Quantification and modelling:** This approach utilizes all obtainable recorded documents and measurements to create a 3D dimension model to present internal and design logic of the object. This approach is best suitable to execute if the object is lost, damaged or destroyed so that the model can be restored.
- ❖ **Exterior scanning:** This approach is supported by lasers, resonance and structured radiance. In this technique, unprocessed data provides the paramount way of actual representation.
- ❖ **Exterior scanning and interconnect:** Generally a multilayer network is produced rooted on the raw data. This approach best used when the dimension tools does not present point coordinates in a straight line.
- ❖ **Volumetric scan and modelling:** Volumetric scanning equipments sample the physical features of items to be archived in condensed mathematical models. This approach employs techniques such as Magnetic Resonance Imaging (MRI), Computed Tomography (CT) or Computed Axial Tomography (CAT) scanning, ultrasound and very responsive and deep infiltration and high resolution named Tray spectroscopy.

6. Technologies for Preservation of Cultural Heritage

Techniques for preserving CH can be done using different preservation techniques such as technology preservation, emulation, replication, migration and encapsulation (Swain & Mahapatra, 2011; Lee, Slattery, Lu, Tang, & McCrary, 2002). These are general methods/techniques used for preservation of all types of digital materials which

could be used for CH contents also. There are 6 technologies/methods of digital preservation that are being suggested by various experts as given below

- ❖ **Refreshing:** Refer to transfer of data from two kinds of the identical storage standards to avoid variation of the data.
- ❖ **Emulation:** It focuses on recreating the environment considering the originality of the digital object created.
- ❖ **Replication:** Replication is a digital preservation technique of copying documents without loss of bits of information and store manifold copy of files for preservation (SAA, 2004).
- ❖ **Migration:** The migration technique refers to the cyclic transfer of digital resources from one software and hardware configuration to a new configuration or migration from one computer generation to a newest generation. Migration technique is successful against media, software malfunction, and hardware malfunction and obsolesces.
- ❖ **Encapsulation:** This technique consists of creating the authentic application that was deployed to access the digital entity on the future generation computer platform. Encapsulation can be accomplished by means of physical or logical formation named containers to present a link between all information mechanism like digital entity and various supporting information with metadata (Rieger, 2000).
- ❖ **The Digital Tablet:** This technique would have a self-controlled command source; display the accumulated information on a screen as symbols of a printed language proper for the information

(Kranich, 1998). The digital tablet technique is a new equipment preservation method and its practical execution is yet to be proved.

7. Economic Impacts of Cultural Heritage Preservation

Baumol (1986) suggested numerous ways on the return on the investment of arts. Every investment will definitely have different forms of financial returns, in other words returns on investment. The degree of ROI will differ based on numerous causes, such as the amount of investment made and kind of project (Bowitz & Ibenholt, 2009). Cultural heritage preservation can impact on the economy of the community directly and indirectly. Economic impact of CH can be evaluated by means of traditional and renowned economic impact models (Dümcke, 2015).

- ❖ Economic investigation of the Gross Value Added by the cultural heritage segment.
- ❖ Local Monetary Impact Analyses by means of a modified multiplier.
- ❖ Strength of visitors to cultural heritage spot and their gross tourist expenditure.
- ❖ Direct, indirect and induced result that is computed in terms of expenses and job creation.
- ❖ Impact on tourist services and spending on goods and services relate to particular cultural heritage institutions/spots.

7.1 Individual Impacts and Benefits

Cultural heritage preservation has an impact on individuals based on use and non-use (Frey B. S., 1997; Frey & Meier, 2003).

❖ 80%

❖ Use value

a) Direct: Shaped by persons by means of cultural heritage sites (customers). Example: A visit to Taj Mahal.

b) Indirect: Resulting from persons who are not making use of CH sites directly. Individual physical presence is not required in such scenario. Example: Reading a book about Taj Mahal.

c) Future use: Persons who are planning to visit the CH sites in the near future.

❖ Non-use value

a) Non-use ethics refer to profit to an individual who has not visited a CH site, however, still consider the importance of its protection. Frey (1997) identified a number of non-use values that an individual may attach to cultural heritage may include option, bequest, exchange, prestige, education and altruistic payback.

7.2 Economic Impact and Benefits

Economic evaluations of CH impacts and benefits have been the conventional technique used to sustain the requirements for financially supporting cultural heritage institutions. The improved cultural heritage, economic impact and benefits comprise of (Kaminski, McLoughlin, & Sodagar, 2006):

- ❖ Total number of guests and tourists visiting cultural heritage sites,
- ❖ Additional guest accommodation and rooms engaged,

- ❖ An increase in selling traditional finished product sales,
- ❖ Increase usage of hotels and restaurants,
- ❖ More optimization on community transport and
- ❖ Creating employment opportunities.

7.3 Social Impact and Benefits

Cultural impact and benefits have been debated, as whether to consider an impact made by CH and can be quantified in term of economic. The profits of cultural heritage sites are significant, however, not all the benefits received from culture heritage can be quantified or measured. Some examples of CH social impact and benefits are: client who visits CH preservation sites can discover regarding the history and heritage of another group of people; cultural heritage preservation sites are commonly sighted as a foundation of uniqueness to the person entity at local, national and international level; trade has been acknowledged to establish location in the environment of cultural heritage locations to add benefits from the customers of the heritage; cultural heritage locations facilitate to safeguard professional skills set examples: stone mason; CH sites can enhance the value of life by giving cultural scene for inhabitants; CH sites are extensively utilized as venues for movie and television industry as well as for pictorial backdrop; CH sites is a services segment thus offer employment opportunities to many people (Kaminski, McLoughlin, & Sodagar, 2006).

8. Problems in Digital Preservation of Cultural Heritage

Research in ICT has promoted in the development of novel technologies. Nevertheless, such

developments create significant software and hardware problems and data vivacity (Thibodeau, 2005). The main areas in digital CH preservation are file formats, technology, storage media, infrastructure, financial, organization and administration (Vilbrandt, et al., 2004). File format presents a critical responsibility in preserving digital objects.

- ❖ **Lack of Funds:** Finances continue to be crucial challenges for libraries, archives and museums. Funds are required to run traditional services for libraries, archives and museums and other novel service demands of the clients. To execute efficiently libraries, archives and museums require adequate funding.
- ❖ **Lack of practical experience/Trained manpower:** Few people are conscious about cultural heritage preservation and assumed as a viable occupation, as such others do not support children to study the courses related to this area (Chibuzor & Ngozi, 2009).
- ❖ **Technology Obsolesce:** Every year new technologies are invented and developed. Software and hardware are prone to be obsolete after 3-5 years, for the reason being incompatibility problems with newer systems and software. The software and hardware incompatibility gap growing wider and wider each year, thus data created and stored in the older file formats can no longer be used or accessed.
- ❖ **Technology Dependency:** Migrating the data cannot be executed unless legal admittance to file format and source code of the software. Emulation is an option to overcome the

preservation problems, but the emulation is costly moreover, it is made unlawful by the Digital Millennium Copyright Act (Vilbrandt, et al., 2004).

- ❖ **Copyright:** There are considerable legal issues in preserving cultural heritage. Copyright and associated rights are main obstructions in cultural heritage preservation. Activities engaged in preserving CH are preparing multiple copies and distributing multiple users' institutions (Coates, et al., 2008).

9. Conclusion

Cultural heritage depicts as a reflector to our ways of living and habits. One area where ICT is progressively engaged is operation of cultural heritage institutions. ICT and multimedia equipments open novel prospects for cultural heritage institutions to safeguard and display a collection magnificently. Cultural Heritage is an inclusive perception that comprises of various ethics like cultural, civilized, natural, architectural, historical, archaeological, and biological values. It is significant to comprehend culture of a society, what distinguishes one community from others. International agencies, governments, NGOs and every citizen should value and safeguard one's own cultural heritage. In the present globalization scenario, cultural heritage dying day by day if it is not safeguarded properly. Therefore, preserving cultural heritage is an obligation to all nations and the world at large. Involvement of educational institutes in promoting and safeguarding CH assets by way of introducing cultural related courses like Cultural Heritage Studies (CHS), Heritage Conservation, and Cultural Heritage Management (CHM) to produce required trained manpower. A well

action plan has to be prepared considering the scope, purpose, policy, preservation techniques, implementation and maintenance of digital CH. Adequate funds should be provided to run the CH institutions to safeguard CH assets. While designing CH information system designing simple user interface and providing easy access to contents are the critical issues to be looked into. Bringing out of regional/national preservation guidelines, storage facilities, access mechanism to the CH assets so that contents can be used optimally for education, research and general public in the country. It is hoped that Indian government will soon realize these facts and protect our cultural heritage for the benefits of future generations.

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