CHAPTER VII

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION
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7.1 Introduction

According to Srivastava and Kanungo (2010) libraries maintain large volumes of documentary sources such as records, manuscripts, books, films and other materials. These materials with the passage of time deteriorate, decay, and need to be preserved in good condition, for use.

The foremost reason behind digitization is to enhance access and improve preservation of documents, mainly rare ones. Digitization is more popular in cultural heritage institutions, which open their collection to one and all for the noble cause of study and research. This also facilitates search of collections rapidly and comprehensively, irrespective of the venue and time (Bansode, 2008).

Digitization and digital preservation holds tremendous promise for both collections and researchers, through greater access, interaction and preservation of our heritage for future generations. Digital access allows researchers, students, and the public to have an on-line access to an entire collection, without handling the original materials. So, digitization and digital preservation in India and Iran are very vital to preserve cultural heritage collections, and also make them accessible to the public. Therefore, the investigator tried to study the digitization and digital preservation activities in select libraries in India and Iran, and find out the challenges faced by them. The review of literature revealed, that there had been little research done on digitization and digital preservation in India and Iran. Moreover, there is dearth of a comprehensive study in this field. In India and Iran no research had been done to study fifteen libraries together, and cover all activities attempted by the libraries in the field of digitization and digital preservation.

The present study has analysed the data related to libraries from India and Iran regarding digitization and digital preservation of heritage collection. The data related to library profile, library collection, and digitization activities of the libraries and digital preservation have been studied and the summary of the finding are provided in this chapter.
A survey of users of the respective libraries has also undertaken to know the category of the users of the respective libraries, use of libraries and digitization and its use. The important findings of study survey have been presented here.

### 7.2 Issues Studied

Digitization and digital preservation of heritage collection in fifteen libraries in India and Iran is the main objective of the present study. In particular, the study aims to find out the main reasons for digitization and digital preservation and to identify the type of collections which are being digitized. The study ascertains the availability of infrastructure and the budgeting areas for digitization and digital preservation in India and Iran.

The study also attempts to understand challenges for digitization and digital preservation in India and Iran. The study also examines the traditional and modern methods for preservation. It further attempts to study the storage procedures of digitized materials, identify the accessibility ways to digital materials and suggest a model for digitization and digital preservation in India and Iran for easy access for users and to promote better usage of these materials.

### 7.3 Methodology

The investigator carried out detailed literature search, using LISA, LISTA and Emerald databases. The methodology adopted for this research is collection of primary data from select libraries regarding digitization and digital preservation issues. The technique employed for this purpose was a survey through questionnaire. It followed informal interview with Heads of select libraries and some users; also observation was applied since the investigator collected data in person from all select libraries. The filled in questionnaires were organized, coded and analyzed. They were interpreted in the light of the objectives and hypotheses stated in the third chapter. In analyzing and interpreting the data, different statistical measures like Frequency, Percentage, Mean, Standard deviation, $\chi^2$ (Chi-Square) test, Independent-Samples T-Test has been used. While detailed study and interpretation of data was presented in chapter V and VI. Further, the summary of findings are listed in succeeding sections of chapter VII.
7.4 Summary of Findings

The summary of findings of the study is presented as under:

7.4.1 Principal Reasons for Digitization of Heritage Collection

With regard to the principal reasons for digitization of heritage collection, it was found that, 15 Indian and Iranian libraries digitized heritage collection to 'enhance access'. 14 libraries accounting 93.30 percent digitized heritage collection for 'preservation' purpose. 10 libraries representing 66.70 percent digitized for 'facilitating new forms of access and use'. 'Reduction in handling' the old materials like manuscripts, rare books etc was another reason for 10 libraries which account for 66.70 percent. Finally it is encouraging to note that, majority of the libraries have digitized heritage collection for the purpose of preservation and to enhance access to the materials of cultural heritage (see Table 7).

The Chi-Square value indicates that Indian and Iranian libraries do not differ significantly regarding 'facilitate forms of access and use' ($\chi^2 = 0.478, p= 0.490>0.05$), 'preservation' ($\chi^2 = 1.054, p= 0.305>0.05$), 'reduction in handling' ($\chi^2 = 2.455, p= 0.117>0.05$). It is worth to note that, they do not differ with regard to, enhanced access for digitization of heritage collections (see Table 7).

7.4.2 Criteria for Selection of Heritage Collection for Digitization

Of the eight libraries from India, 'condition' was the main criteria for selection of heritage collection for digitization. 'Demand' was the criteria for selection of heritage collection among 5 libraries representing 62.50 percent, and only 3 libraries have mentioned that 'content' was the criterion for selection of heritage collection, representing 37.50 percent. Of the seven libraries from Iran, 'demand' was the criteria for selection of heritage collection in all libraries, 6 libraries representing 85.70 percent considered 'condition' and only 2 libraries mentioned 'content' as the criterion for selection of heritage collection representing 28.60 percent. This indicates that, 'condition' was the criteria for selection of heritage collection for digitization in most of Indian libraries, while, 'demand' was the main criteria for selection of heritage collection in Iran libraries. However, it is important to note that, in few libraries, 'content' was the criteria for selection of heritage collection in Indian and Iranian libraries (see Table 8).
Chi-Square analysis of criteria for selection of heritage collections for digitization was formulated. The Chi-Square value depicts that Indian and Iranian libraries do not differ significantly regarding content ($\chi^2 = 1.209, p= 0.272>0.05$), condition ($\chi^2 = 1.054, p= 0.305>0.05$). Whereas, the Chi-Square shows that they differ significantly in demand ($\chi^2 = 8.399, p= 0.004<0.05$) (see Table. 8).

### 7.4.3 State of Digitization of the Heritage Collection

Regarding state of digitization of heritage collections in the libraries from India and Iran, it was found that, majority of Indian libraries numbering 7 representing 87.50 percent were digitizing their collection and only NMML had not started the digitization program which represent 12.50 percent; whereas, all Iranian libraries were digitizing their collection. With regard to the total digitized collection, both in India and Iran, it was found that, a total of 301,071 records have been digitized, Iranian libraries had large number of digitized collection numbering 198,800 representing 66.03 percent and Indian libraries numbering 102,271 representing 33.97 percent (see Table 9 and 10).

### 7.4.4 Type of Digitized Collection

With regard to the type of digitized collection, of the total eight libraries from India, majority of them numbering 7 representing 87.50 percent have digitized manuscripts, next to that 4 libraries representing 50 percent have digitized rare books. 2 libraries have digitized microfilms representing 25 percent. Only IGNCA has digitized microfilms and slides, representing 12.50 percent each. Further, no Indian library has digitized historical documents and stone inscriptions. Regarding seven samples of Iran, all libraries have digitized manuscripts. 5 libraries have digitized rare books and stone inscriptions, representing 71.43 percent each. 3 libraries have digitized historical documents representing 42.86 percent. 2 libraries have digitized microfilms and slides representing 28.57 percent each. Only 1 library has digitized microfiche representing 14.29 percent. It is encouraging to note that, manuscripts and rare books have been the most preferable collections for digitization among Indian and Iranian libraries (see Table 11).

Chi-Square analysis of the types of collection which is being digitized was conducted. The Chi-Square value indicates that, Indian and Iranian libraries do not
differ significantly regarding digitization of manuscripts ($\chi^2 = 0.766, p = 0.381 > 0.05$), rare books ($\chi^2 = 3.645, p = 0.056 > 0.05$), microfilms ($\chi^2 = 0.296, p = 0.586 > 0.05$), and microfiche ($\chi^2 = 0.037, p = 0.847 > 0.05$). However, the Chi-Square shows that, they differ significantly in digitization of slides ($\chi^2 = 6.095, p = 0.014 < 0.05$). So, the null hypothesis is supported for manuscripts, rare books, microfilms, microfiches but it is rejected for slides (**hypothesis 1**). It is worth to note that, no Indian library under the study had been digitizing the historical documents and stone inscription. So, hypothesis 1 is accepted as Indian and Iranian libraries do not differ significantly in digitization of most collections such as manuscripts, rare books, microfilms and microfiches (see Table 11).

### 7.4.5 Managing of Digitized Heritage Collection

As regards managing of digitized heritage collection, it was found that, 7 libraries used 'naming' and 'description of images' which account for 87.50 percent each. 5 libraries used 'organization of images' accounting 62.50 percent. 4 libraries used 'metadata' representing 50 percent. With regard to Iran libraries, 7 of them used 'naming of images'. 5 libraries used 'description of images' representing 71.43 percent. 4 libraries used 'organization of images' and 'metadata' accounting 57.14 percent. From this it can be concluded that, a large majority of the libraries used 'naming of images' and 'description of images' for organization of digitized collection. Therefore, pertinent to note that, use of metadata should be more considered for organization and presentation of data for access, because it helps the libraries to depict the collection from the point of users across the world (see Table 12).

The Chi-Square value shows that, Indian and Iranian libraries do not differ significantly regarding 'organization of images' ($\chi^2 = 0.300, p = 0.584 > 0.05$), 'naming of images' ($\chi^2 = 0.766, p = 0.381 > 0.05$), 'description of images' ($\chi^2 = 1.818, p = 0.178 > 0.05$), 'use of metadata' ($\chi^2 = 0.458, p = 0.499 > 0.05$) (see Table 12).

### 7.4.6 Sharing of Digitization Work with Other Organizations

In respect of sharing of digitization work with other organizations, it was found that, of the eight libraries in India, only 1 library representing 12.50 percent shared digitized collections and remaining 7 libraries representing 87.50 percent did not share digitized collection with other organizations, However, of the seven libraries
from Iran, 4 libraries representing 57.10 percent shared digitized collections with other organizations and 3 libraries representing 42.90 percent did not share digitized collections with other organizations. This clearly shows that, Indian libraries did not share digitized collection with other organization and this causes duplication of digitization work. Whereas, a majority of Iran libraries shared digitized work with other organization (see Table 13).

7.4.7 Budgeting for Digitization of Heritage Collection

Regarding budget for digitization of heritage collection, it was found that, all the libraries from India have invested on 'digital conversion', followed by 7 libraries representing 87.50 percent have invested on 'human resource'. 4 libraries representing 50 percent have invested on 'metadata capture' and 4 libraries representing 50 percent have invested on 'data management'. As far as Iranian libraries were concerned, all the libraries have invested on 'digital conversion' for digitization, 4 libraries have invested on 'metadata capture' and 4 libraries have invested on 'data management' amounting 57.14 percent each. 3 libraries have invested on 'human resource' and 3 libraries on 'managing storage and delivery system' representing 42.86 percent each. It is encouraging to note that, Indian libraries have invested on 'digital conversion' and 'human resource', while, majority of Iranian libraries have invested on, 'digital conversion' and 'metadata capture' for digitization (see Table 14).

The Chi-Square value indicates that, Indian and Iranian libraries do not differ significantly regarding 'metadata capture' ($\chi^2 = 0.458, p= 0.499>0.05$), 'data management' ($\chi^2 = 0.458, p= 0.499>0.05$). While, the Chi-Square shows that, they differ significantly with regard to 'human resource' ($\chi^2 = 15.458, p= 0.000<0.05$). So, the null hypothesis is supported for 'metadata capture', and 'data management' but it is rejected for 'human resource' (hypothesis 4). It is important to note that, no Indian library have invested on 'managing storage and delivery system' for digitization. It is worth mentioning that, Iranian and Indian libraries do not differ regarding digital conversion, since all of them have invested on it for digitization. With regard to the expenditure incurred on the digitization, it is 412 lakhs for Indian libraries and 252 lakhs for Iran libraries. This indicates the vast differences in expenditure on digitization between Indian and Iranian libraries. So, the null hypothesis is rejected for
the expenditure on digitization in Indian and Iranian libraries (hypothesis 4) (see Table 14 and 16).

7.4.8 Infrastructure for Digitization of Heritage Collection

Considering the tools and equipment used for digitization in India and Iran, it was found that, tools and equipment for Indian libraries adapted were: computer systems 60, servers 14 and scanners 10. As far as Iran libraries were concerned, it was found that they adapted: computer systems numbering 60, scanners 27 and servers 23. Therefore, a large majority of Indian and Iranian libraries adapted good numbers of computer system for digitization. However, it is important to note that, Indian and Iranian libraries used very few scanners and servers. This clearly indicates that, there is a lack of sufficient facilities for digitization (see Table 17).

Regarding adequacy of infrastructure for digitization both in India and Iran, it was found that, among Indian libraries, only 2 libraries accounting for 25 percent stated that the infrastructure was sufficient for digitization, while, 5 Iranian libraries representing 46.70 percent, expressed that infrastructure was sufficient for digitization. This clearly shows that, Indian and Iranian libraries need to improve the infrastructure used for digitization (see Table 18).

Chi-Square analysis of the adequacy of infrastructure for digitization indicates that, Indian and Iranian libraries differ significantly in adequacy of infrastructure for digitization ($\chi^2 = 22.042$, $p = 0.000<0.05$) (see Table 18).

7.4.9 Traditional Methods Used for Preservation

With reference to the traditional methods used for preservation of heritage collection in India and Iran, it was found that, 6 Indian libraries used 'AC with low temperature' and 'chemical treatment for old manuscripts/books' representing 75 percent each, 5 libraries used 'fumigation with Thymol' and 'anti-termite treatment' representing 62.50 percent each, and only 2 libraries used 'binding with tissue and hand paper' representing 25 percent. With regards to Iranian libraries, all libraries used 'anti-termite treatment', 6 libraries used 'chemical treatment for old manuscripts/books' representing 85.70 percent, 5 libraries used 'fumigation with Thymol' and 'insect spray for manuscripts' representing 71.40 percent each, only 2 libraries used 'binding with tissue and hand paper' accounting for 28.60 percent. From
this it can be concluded that, a majority of Indian libraries used 'AC with low
temperature' and 'chemical treatment for preservation', whereas a majority of Iran
libraries used 'anti-termite' and 'chemical treatment' for preservation of heritage
collection (see Table 19).

The Chi-Square value shows that, Indian and Iranian libraries do not differ
significantly regarding use of 'fumigation with Thymol' ($\chi^2 = 0.478$, $p= 0.490>0.05$),
'chemical treatment to old manuscripts/books' ($\chi^2 = 0.752$, $p= 0.386>0.05$) and
'binding with tissue and hand paper' ($\chi^2 = 0.296$, $p= 0.586>0.05$). While, the Chi-
Square indicates that, they differ significantly in 'anti-termite treatment' ($\chi^2 = 8.399$, 
$p= 0.004<0.05$) and in 'AC with low temperature' ($\chi^2 = 8.678$, $p= 0.003<0.05$). Hence,
the null hypothesis is supported for 'fumigation with Thymol', 'chemical treatment to
old manuscripts/books', and 'binding with tissue and hand paper', but it is rejected for
'anti termite treatment' and 'AC with low temperature' (hypothesis 5). It is worth
mentioning that, no Indian libraries under the study used 'insect spray for manuscripts'
for preservation (see Table 19).

7.4.10 Methods Used for Preservation of Heritage Collection

Regarding the methods used for preservation of heritage collection in India and
Iran it was found that, 5 Indian libraries representing 62.50 percent used 'microfilms'
for preservation, next to that, 4 libraries used 'microfiches' representing 50 percent. As
far as libraries from Iran were concerned, a great majority of libraries numbering 6
representing 85.70 percent used 'microfilms', 3 libraries representing 42.90 percent
used 'magnetic discs'. 1 library used 'microfiches' and 'magnetic tapes' representing
14.30 percent each. This clearly shows that, microfilming is the most preferable
method among Indian and Iranian libraries for preservation of heritage collections
(see Table 20).

The Chi-Square value indicates that, Indian and Iranian libraries do not differ
significantly regarding use of 'microfilms' ($\chi^2 = 3.550$, $p= 0.060>0.05$). Whereas, the
Chi-Square shows that, they differ significantly in 'microfiches' ($\chi^2 = 20.250$, $p= 
0.000<0.05$). So, the null hypothesis is supported for 'microfilms' but it is rejected for
'microfiches' (hypothesis 6). It is worthwhile to note that, no Indian libraries under
the study used 'magnetic tapes' and 'magnetic discs', for preservation (see Table 20).
7.4.11 Software Used for Digital Preservation

While referring to the software used for digital preservation both in India and Iran, it was found that, 3 Indian libraries used 'commercial software' representing 37.50 percent, 2 libraries representing 25 percent used 'in house software', 1 library used 'open source software' and 'mixed software' representing 12.50 percent each. Only 1 library had not decided on the use of software representing 12.50 percent. With regard to Iranian libraries, 3 libraries used 'in house software' for digital preservation representing 42.90 percent, 1 library used 'open source software', 1 library used 'commercial software' and the other used 'mixed software' representing 14.30 percent each. Only 1 library had not yet decided on using software representing 14.30 percent.

It is clear that Indian and Iranian libraries need to provide software for digital preservation (see Table 21).

The Chi-Square value indicates that Indian and Iranian libraries do not differ significantly regarding use of 'open source software' \( (\chi^2 = 0.37, p = 0.847 > 0.05) \), 'in house software' \( (\chi^2 = 4.765, p = 0.029 > 0.05) \), 'mixed software' \( (\chi^2 = 0.37, p = 0.847 > 0.05) \). However, the Chi-Square indicates that they differ significantly in use of 'commercial software' \( (\chi^2 = 11.077, p = 0.001 < 0.05) \) (see Table 21).

7.4.12 Policies and Procedures in Place for Storage and Preservation

Regarding policies and procedures for storage and preservation both in India and Iran, it was found that, 4 Indian libraries representing 50 percent had policies and procedures for storage. However, 5 Iran libraries representing 71.40 percent had policies and procedures. It is pertinent to note that, it is pertinent to note that, libraries have their own policies and procedures for storage and preservation. However, libraries do not have any national policies (see Table 22).

The Chi-Square value shows that Indian and Iranian libraries do not differ significantly regarding policies and procedures for storage and preservation \( (\chi^2 = 3.645, p = 0.056 > 0.05) \) (see Table 22).

7.4.13 Digital Preservation Strategies

Regarding digital preservation strategies, both in India and Iran, it was found that, 4 Indian libraries used 'replication', 'scanning' and 'metadata creation' representing 50
percent each as digital preservation strategies. Only 1 library used 'migration' representing 12.50 percent. Regarding Iran libraries, 6 libraries representing 85.70 percent used 'scanning'. 4 libraries used 'replication' and 'metadata creation' representing 57.14 percent each. It can be concluded that, most of the Indian and Iranian libraries used 'replication', 'scanning' and 'metadata creation' strategies. But there were lack of migration policy in libraries. Therefore, it is recommended that libraries pay attention towards strategies for making accessible and also long term availability, of digital preservation (see Table 23).

The Chi-Square value indicates that, Indian and Iranian libraries do not differ significantly regarding use of 'replication' ($\chi^2 = 0.458$, $p = 0.499 > 0.05$), and 'metadata creation' ($\chi^2 = 0.458$, $p = 0.499 > 0.05$). Whereas, the Chi-Square shows that, they differ significantly in 'scanning' ($\chi^2 = 9.529$, $p = 0.002 < 0.05$). So, the null hypothesis is supported for 'replication', 'metadata creation', but it is rejected for scanning (hypothesis 2). It is worth to note that, no Iranian libraries under the study used migration as strategy, and also it should be noted that, 2 Indian libraries did not have any digital preservation strategies (see Table 23).

### 7.4.14 Digital Preservation Metadata Standards

Regarding metadata standards used for digital preservation, it was found that, 5 Indian libraries representing 62.50 percent did not follow any metadata standards. 3 libraries representing 37.50 percent followed Dublin Core; 2 libraries representing 25 percent followed MARC.  No Indian libraries followed OAIS, METS, ISBD (G) and Z39.50. Regarding Iranian libraries, 4 libraries followed Dublin Core and MARC representing 57.14 percent each. 3 libraries representing 42.86 percent did not follow any metadata standards. 2 libraries followed OAIS, METS and Z39.50, representing 28.57 percent. No Iran libraries followed ISBD (G). This indicates that, a majority of Indian libraries did not follow metadata standards for digital preservation, whereas a majority of Iranian libraries followed Dublin Core and MARC, so Indian libraries also should adopt metadata standards for making digital materials accessible through the web (see Table 24).

The Chi-Square value shows that, Indian and Iranian libraries do not differ significantly regarding Dublin Core ($\chi^2 = 0.800$, $p = 0.051 > 0.05$). However, the Chi-
Square shows that, they differ significantly in MARC ($\chi^2 = 12.488, p = 0.000<0.05$). So, the null hypothesis is supported for Dublin Core but it is rejected for MARC (hypothesis 3). It is pertinent to note that, no Indian libraries under the study followed OAIS, METS, ISBD (G) and Z39.50. Also no Iranian libraries followed ISBD(G). Therefore, hypothesis 3 is rejected, as there is vast difference with regards to use of metadata standards among Indian and Iranian libraries (see Table 24).

7.4.15 Main Barriers for Digital Preservation

Regarding the major barriers for digital preservation, it was found that, for 7 Indian libraries representing 85.70 percent the problem was 'manpower'. 'IT support' was the problem among 6 libraries representing 75 percent. 'Data storage' was the problem among 5 libraries representing 62.50 percent. 'Copyright', 'expertise and experience' were the problems among 4 libraries representing 50 percent each. 3 libraries representing 37.50 percent had regular 'funding' problems, only 2 libraries representing 25 percent had 'administration' problem. It is worth to mention that, 'inadequate funding' was main problem among 5 Iranian libraries representing 71.40 percent. 'Expertise and experience' was the problem for 2 libraries representing 28.60 percent and 1 library representing 14.30 percent had 'administration' problem. From this it is clear that, manpower and IT support were problems for majority of Indian libraries. While, inadequate funding was the main problem for majority of Iranian libraries (see Table 25).

The Chi-Square value indicates that, Indian and Iranian libraries do not differ significantly regarding 'administrative' problems ($\chi^2 = 3.103, p = 0.078>0.05$). While, the Chi-Square shows that, they differ significantly in 'inadequate funding' ($\chi^2 = 9.991, p = 0.002<0.05$), 'expertise and experience' ($\chi^2 = 5.582, p = 0.018<0.05$). So, the null hypothesis is supported for 'administrative' problem but it is rejected for 'inadequate funding' and 'expertise and experience' (hypothesis 9). It may be noted that, no Iranian libraries, under the study had 'manpower', 'IT support', 'data storage' and 'copyright' problems, in their respective libraries. Therefore, hypothesis 9 is rejected, as there are vast differences with regards to barriers between Indian and Iranian libraries (see Table 25).
7.4.16 Training Required for Librarians for Developing Technical Skills

Regarding the training required for librarians for developing technical skills, it was found that, a great majority of Indian libraries needed 'technical skills' and 'assistance for digitization' in order to develop their skill in the field of digital preservation. 5 libraries needed 'copyright advice' which account for 62.50 percent. 5 libraries required 'ensuring material availability for long term' which account for 62.50 percent, and 3 libraries required 'allowing other institutions to view the material' which account for 37.50 percent. As far as Iran libraries are concerned, 5 libraries required 'technical skills' and 'assistance for digitization' which accounting for 71.40 percent each. 3 libraries needed 'ensuring material availability for long term' and 'allowing other institutions to view the material' representing 42.90 percent each. 2 libraries representing 28.60 percent required 'advice on copyright issues'. From this it can be concluded that, a large majority of Indian and Iranian libraries required 'technical skills' and 'assistance for digitization' to work in order to develop their skills in the field of digital preservation (see Table 26).

The Chi-Square value shows that Indian and Iranian libraries do not differ significantly regarding need for 'ensuring material availability for long term' ($\chi^2 = 3.774, p= 0.052>0.05$) and 'allowing other institutions to view the material' ($\chi^2 = 0.309, p= 0.579>0.05$). However, the Chi-Square indicates that they differ significantly in need for 'technical skills' ($\chi^2 = 4.918, p= 0.027<0.05$), 'assistance in digitization' ($\chi^2 = 4.918, p= 0.027<0.05$) and 'copyright advice' ($\chi^2 = 12.565, p= 0.000<0.05$) (see Table 26).

7.4.17 Use of Internal or External Advisors to Provide Guidance on Digital Preservation Planning

As regards adopting the internal or external advisors, both in India and Iran, it was found that, 6 Indian libraries representing 85.70 percent adapted internal or external advisors for guidance on digital preservation. Similarity, 6 Iranian libraries representing 85.70 percent adapted internal or external advisors for guidance on digital preservation. This shows that, a large majority of Indian and Iranian libraries invited internal/external advisors to provide guidance on digital preservation (see Table 27).
The Chi-Square value indicates that Indian and Iranian libraries do not differ significantly regarding providing internal or external advisors ($\chi^2 = 0.752$, $p = 0.386 > 0.05$) (see Table 27).

### 7.4.18 Storage of Digitized Materials

With reference to the storage of digitized materials both in India and Iran, it was found that, 4 Indian libraries stored digitized material on local computers and CD-ROMs/DVDs representing 50 percent each, 3 libraries stored on departmental servers representing 37.50 percent, only 1 library stored on external HDD representing 12.50 percent. As far as Iran libraries are concerned, 5 libraries representing 71.40 percent stored digitized materials on departmental servers, 4 libraries representing 57.10 percent stored on central institution servers. It should also be noted that 1 library stored on local computers and CD-ROMs/DVDs representing 14.30 percent respectively. From this it can be concluded that, majority of Indian libraries stored digitized material on local computers and CD-ROMs/DVDs, while, majority of Iran libraries stored digitized material on departmental servers and central institution servers (see Table 29).

The Chi-Square value indicates that, Indian and Iranian libraries differ significantly in storage on local computers ($\chi^2 = 20.250$, $p = 0.000 < 0.05$), departmental servers ($\chi^2 = 9.991$, $p = 0.002 < 0.05$), and CD-ROMs/DVDs ($\chi^2 = 20.250$, $p = 0.000 < 0.05$). The Chi-Square value also shows that, Indian and Iranian libraries do not differ significantly regarding policies and procedures for storage and preservation ($\chi^2 = 3.645$, $p = 0.056 > 0.05$). So with regard to Table 22 and 29, the null hypothesis supported for policies and procedures for storage and preservation but it is rejected regarding storage of digitized materials on local computers, departmental servers and CD-ROMs/DVDs (**hypothesis 7**). It is worth to note that, no Indian libraries stored digitized materials on central institution servers and it also should be mentioned that, no Iran libraries stored digitized materials on external HDD. Therefore, hypothesis 7 is rejected as there are vast differences with regard to storage of digitized material in India and Iran (see Table 29 and 22).
7.4.19 Creation of Digital Content

While considering the creation of digital content in Indian and Iranian libraries, it was found that, 3 Indian libraries created digital content and 3 libraries did not, representing 37.50 percent each and also it is worth noting that 2 libraries planned to create digital content representing 25 percent. Of the seven libraries from Iran libraries, 4 libraries representing 57.10 percent created digital content and 2 libraries did not create digital content representing 28.60 percent. Only 1 library has planed to create digital content representing 14.30 percent. This shows that, few Indian libraries created digital content. They need to be encouraged to create digital content further. Whereas most of Iran libraries have created digital content (see Table 30).

The Chi-Square value shows that Indian and Iranian libraries do not differ significantly regarding creating digital content ($\chi^2 = 3.800, p= 0.051>0.05$). However, the Chi-Square indicates that they differ significantly in planning for creation of digital content ($\chi^2 = 11.077, p= 0.001<0.05$) (see Table 30).

7.4.20 Formats Used for Digital Content Creation

As regards the formats used for digital content creation both in Indian and Iranian libraries, it was found that, 6 Indian libraries used 'JPEG' and 'TIFF' representing 75 percent each, 3 libraries used 'PDF' representing 37.50 percent, 2 libraries used 'MPEG' representing 25 percent 1 library used 'BMP' and 'GIF' representing 12.5 percent each. As far as Iran libraries are concerned, 6 libraries representing 85.70 percent used 'JPEG', 5 libraries representing 71.40 percent used 'TIFF', 3 libraries representing 42.90 percent used 'PDF' and only 1 library used 'MPEG' representing 14.30 percent. It can be deduced that, majority of Indian and Iranian libraries used 'JPEG' and 'TIFF' for digital content creation. It is worth to note that, 'JPEG' is for access and presentation of digital content and 'TIFF' is for archival proposes among libraries (see Table 31).

The Chi-Square value shows that Indian and Iranian libraries do not differ significantly regarding use of 'JPEG' ($\chi^2 = 0.752, p= 0.386>0.05$), 'TIFF' ($\chi^2 = 0.110, p= 0.741>0.05$), 'PDF' ($\chi^2 = 0.309, p= 0.579>0.05$), 'MPEG' ($\chi^2 = 3.103, p= 0.078>0.05$). It should also implement that, no Iranian libraries used BMP and GIF formats (see Table 31).
7.4.21 Accessibility of the Digital Materials Held by the Libraries

Regarding accessibility of the digital materials held by the libraries, both in India and Iran, it was found that, 5 Indian libraries representing 62.50 percent provided access through CD or DVD in search room, 2 libraries representing 25 percent provided access through Intranet. It should also be mentioned that 1 Indian library did not provide any access which account for 12.50 percent. As far as Iran libraries were concerned, 4 libraries representing 57.10 percent provided access through Internet, and 3 libraries representing 42.90 percent provided access through CD or DVD in search room. From this it can be inferred that, majority of Indian libraries provided access to digital information through CD or DVD in search room. While, majority of Iran libraries provided access through Internet. It is pertinent to note that, due to copyright problem Indian libraries have not been able to make accessible the digital information accessible via Internet. However, they should provide legal deposit of E-content to make digital information accessible via Internet (see Table 34).

The Chi-Square value indicates that Indian and Iranian libraries do not differ significantly regarding access through CD or DVD in search room ($\chi^2= 3.774$, $p= 0.052>0.05$). So, the null hypothesis is supported for access through CD or DVD in search room (hypothesis 8). It is also seen that no Indian library provided access through Internet and one Indian library does not provide any access to digital materials. It is also important to note that, no Iranian libraries provided access through Intranet. So, hypothesis 8 is rejected, as there are vast differences with regard to accessibility of digital materials held by the libraries in India and Iran (see Table 34).

With regard to availability of digital materials freely, it was found that, only 2 Indian libraries provided access freely, representing 25 percent, whereas, 4 Iran libraries provided access freely which account for 57.10 percent (see Table 35).

7.4.22 Awareness of Copyright Issues Regarding Use of Digital Collection

Regarding awareness of copyright issues for use of digital collection both in India and Iran, it was found that, 4 Indian libraries representing 50 percent were aware of copyright issues and 5 Iranian libraries representing 71.40 percent were aware of
copyright issues. This clearly shows that, to a considerable extent, Indian and Iranian libraries were aware of copyright issues (see Table 36).

The Chi-Square value shows that, Indian and Iranian libraries do not differ significantly, regarding awareness of copyright or legal issues ($\chi^2 = 3.645, p = 0.056 > 0.05$) (see Table 36).

### 7.4.23 Model for Development of Digital Preservation

Regarding model for development of digital preservation, it was found that, of the eight Indian libraries, a majority of Indian libraries preferred 'an in-house digital repository' with mean score 3.63; followed by preferred 'National Digital Repository for local government', with mean score 2.25; 'regional digital repository for a group of archival services' with mean score 1.50; 'partnership with local/regional libraries or museums' with mean score 1.38 and 'outsourcing to a private supplier' with mean score 0.88 preferred as models for development of digital preservation. As regards Iranian libraries, a majority of libraries preferred 'National Digital Repository for local government' with mean score 2.29, next to that 'partnership with local/regional libraries or museums' with mean score 1.86, 'outsourcing to a private supplier' with mean score 1.71, 'regional digital repository for a group of archival services' with mean score 1.43 and 'an in-house digital repository' with mean score 1.29 preferred as models for development of digital preservation. From this it can be concluded that, a majority of Indian libraries preferred 'an in-house digital repository', while a majority of Iranian libraries preferred 'National Digital Repository for local government'. It is significant to see that, for both Indian and Iranian libraries establishing National Digital Heritage Repository for development of digital preservation is strongly recommended (see Table 37).

The T-Test was conducted at the 0.05 level of significance. The results showed that Indian and Iranian libraries do not differ significantly regarding 'Regional digital repository for a group of archival services' ($t = 0.410, df = 13, p = 0.689 > 0.05$), 'National Digital Repository for local government' ($t = -0.036, df = 13, p = 0.972 > 0.05$), 'Partnership with local/regional libraries or museums' ($t = 0.515, df = 10.968, p = 0.617 > 0.05$) and 'Outsourcing to a private supplier' ($t = -0.876, df = 10.399, p = 0.401 > 0.05$) and they differ significantly in 'An in-house digital repository' ($t = 3.173, df = 6.788, p = 0.016 < 0.05$). Hence, the null hypothesis is supported for 'Regional
digital repository for a group of archive services', 'National Digital Repository for local government', 'Partnership with local/regional libraries or museums', and 'Outsourcing to a private supplier', but it is rejected for 'An in-house digital repository'. Therefore **hypothesis 10** is accepted as it does not differ in most of items such as 'Regional digital repository for a group of archive services', 'National Digital Repository for local government', 'Partnership with local/regional libraries or museums' and 'Outsourcing to a private supplier' (see Table 37).

7.4.24 Type of Traditional Documents Used

Referring to the type of traditional documents used by respondents, it was found that, of the 544 respondents from India, 393 respondents representing 72.24 percent used 'microfilms', 323 respondents representing 59.38 percent used 'rare books', 177 respondents representing 32.54 percent used 'manuscripts'. 50 respondents representing 9.19 percent used 'paintings'. 33 respondents representing 6.10 percent used 'others documents'. Of the total 505 respondents from Iranian libraries, 409 respondents accounting for 80.99 percent used 'rare books', 382 respondents representing 75.64 percent used 'manuscripts', 261 respondents representing 51.68 percent used 'microfilms', 35 respondents representing 6.90 percent used 'paintings' and 12 respondents representing 2.38 percent used 'other documents'. Therefore, it can be concluded that, the majority of Indian and Iranian libraries used microfilms, rare books and manuscripts to a greater extend (see Table 47).

7.4.25 Use of Digital Repository

On the use of digital repository, both in India and Iran, it was found that, 396 Indian respondents representing 72.49 percent used digital repository and 332 Iranian respondents representing 65.74 percent used digital repository. This clearly shows that, there is a great demand on digital repository by users of both India and Iran (see Table 49).

With regard to digital repository resources used by respondents both in India and Iran, it was found that, 265 Indian respondents representing 48.71 percent used digital repository of 'manuscripts', and, 190 respondents representing 34.93 percent used digital repository of 'rare books'. 50 respondents representing 9.19 used digital repository of 'microfilms'. With regards to Iranian respondents, 308 respondents
representing 60.99 percent used digital repository of 'manuscripts', 125 respondents representing 24.75 percent used digital repository of 'rare books' representing 24.75 percent, 108 respondents representing 21.39 percent used digital repository of 'microfilms' and 105 respondents representing 20.79 percent used digital repository of 'stone inscriptions'. This indicates that, majority of digital repository resources used by respondents in Indian and Iranian libraries were manuscripts since most of libraries have digitized manuscript collections (see Table 50).

7.4.26 Accessibility of Digital Information

Regarding accessibility of digital information by respondents both in India and Iran, it was found that, majority of Indian respondents numbering 339, representing 62.32 percent accessed digital information via CD-ROMs and DVDs, those who preferred information in traditional formats in respective libraries, numbering 124 representing 22.79 percent. 58 respondents representing 10.66 percent accessed digital information via Internet and 23 respondents representing 4.23 percent did not access digital information. It is worth noting that no Indian library was provided access to digital information via Internet due to copyright issues. Regarding Iranian respondents, large numbers of respondents numbering 230 representing 45.54 percent accessed digital information via Internet and 173 respondents representing 34.26 percent preferred information in traditional formats. Those who accessed digital information via CD-ROMs and DVDs numbering 102 represent 20.20 percent. It should be noted that no Iran library provided access through Intranet to the respondents. This clearly indicates that, a majority of respondents from Indian libraries accessed digital information via CD-ROMs and DVDs. While, a majority of respondents from Iranian libraries accessed digital information via Internet. So, Indian libraries also should provide access through Internet to the users (see Table 51).

7.4.27 Usefulness of Digitized Heritage Resources

With regard to usefulness of digitized heritage resources by respondents both in India and Iran, it was found that, of the total 544 respondents from Indian libraries, with mean score of 2.90, 314 respondents accounting 57.72 percent selected to 'highly useful', 188 respondents representing 34.56 percent opted for 'moderately useful', 36 respondents representing 6.62 percent accorded 'slightly useful' and only 6 respondents representing 1.10 percent selected 'not all useful'. Of the total 505
respondents from Iranian libraries with mean score 2.43, with 292 respondents representing 57.82 percent selected 'highly useful', 147 respondents representing 29.11 percent opted for 'moderately useful', 61 respondents representing 12.08 percent selected 'slightly useful' and 5 respondents accounting 0.99 percent selected 'not at all useful'. From this it can be concluded that, majority of respondents from Indian and Iranian libraries opined that the digitized information is 'highly useful'. Therefore, libraries have to digitize the heritage collections, to make them accessible to the users (see Table 53).

7.4.28 Future Program to Access Digital Information

With regard to future program to access digital information by respondents both in India and Iran, it was found that, majority of Indian respondents numbering 240 representing 44.12 percent preferred on-line open access, followed by 228 respondents representing 41.91 percent preferred on-line subscription based access. 47 respondents representing 8.64 percent preferred access via CD-ROMs and DVDs and those who preferred traditional sources numbering 29 account for 5.33 percent.

With regards to Iranian libraries, the respondents numbering 285 representing 56.44 percent preferred on-line open access; next to that, 118 respondents representing 23.37 percent preferred on-line subscription based access. 69 respondents representing 13.66 percent preferred access via CD-ROMs and DVDs and those who preferred traditional sources numbering 33 account for 6.54 percent. This clearly indicates that, considerable number of respondents from Indian and Iranian libraries preferred on-line open access, as well as on-line subscription based access (see Table 55).

7.5 Recommendations

Based on the findings of the analysis of the study reported in chapter V and VI; the investigator has made the following recommendations for improvement of digitization and digital preservation activities both in India and Iran.

7.5.1 Share Digitization Work with Other Organizations

The findings revealed that most of libraries do not share digitization work. It should also be noted that, to reduce duplication of effort and resources which was a challenge among respective libraries, a coordination network at national level is
recommended to the libraries, in order to share experiences and digitized efforts and resources promoting common approaches for future interoperability.

7.5.2 Allocate Sufficient Budge for Digitization of Heritage Collection

The findings revealed that some libraries do not allocate adequate funds in their annual budget, for the digitization and digital preservation of their holdings. This has really caused a low priority or lack of desired attention given, to the digitization activates by the management of such libraries. Hence, adequate funding for digitization initiatives is anticipated, for the proper nurturing, growth and long term sustenance.

7.5.3 Provide Sufficient Infrastructure for Digitization of Heritage Collection

Lack of suitable equipment and materials, contributes significantly to the present poor status of digital preservation of materials in Indian and Iranian libraries. Adequate infrastructure such as scanners, computers, Internet, and Intranet facility, digital technology, and availability of trained IT manpower are suggested for the libraries, under the study.

7.5.4 Provide Software for Digital Preservation

The findings revealed that, use of software is still challenge for most of the libraries, for digitization work. Some libraries possess in house software, and some still do not use any software. In addition, compatibility of software and hardware (update of software for compatibility with new hardware) can be a challenge for the libraries. Therefore, Morrissey (2010) has also suggested in his study that, Free and Open Source Software (FOSS), would bring many benefits to digital preservation. Hence, digital archiving software and open source software are recommended for the respective libraries.

7.5.5 Create Content Management for Digitized Materials

Based on findings of the study and also on observation, it is recommended that the libraries have to organize, and categorize their digital information resources, so that they can be stored, published and reused in multiple ways.
7.5.6 Evolve National Policy for Digital Preservation

Although the findings of the study revealed that some libraries used scanning, replication and metadata strategies, there was lack of a migration policy in libraries. Therefore, it is recommended that libraries have to pay attention towards strategies for making accessibility and also long term availability, of digital preservation and it should implement them. Most of the surveyed libraries have preservation policies based on individual library policy. Setting out guidelines for digitization and digital preservation, is desired. Such policies need to be implemented, and reviewed, from time-to-time to cater to new challenges and emerging technologies. For this purpose an overall national policy is recommended for digital preservation.

7.5.7 Adopt Metadata Standards for Digital Preservation

As Murthy (2005) says, the experience of digitization of information from conceptualization, choice of standards and guidelines, co-ordination between information technology experts and library professionals to operate the final system is necessary and equal importance be giving to securing consent for archiving and sharing resources globally, from concerned parties. The findings of the study revealed that, most of libraries do not have any metadata standard for digital preservation, and hence the incompatibility of metadata standards to describe cultural heritage objects, and other standards for the digitization and preservation of the cultural heritage sector are also required in libraries.

7.5.8 Train Librarians for Developing Technical Skills in the Field of Digital Preservation

Human resource development is the key to success for digital preservation, so participation of archivists, preservation staff, librarians, collection managers and curators, in maintaining the digital repository is essential to develop a sense of ownership, and for establishing the new culture of digital preservation. Thus, it is suggested that libraries have to provide training for librarians regarding digitization and digital preservation.

7.5.9 Opt National and International Collaborative Digitization Programs

According to Allen (2000) Collaborative Digitization Program (CDP) has broadened its scope and serves a number of roles as a collaborative organization,
supporting digitization infrastructure for cultural heritage organizations of all kinds. Therefore, while referring to the present study, it is recommended that the libraries have to opt for national and international collaborative digitization programs for making digital preservation more successful.

7.5.10 Preserve Digitized Material for Long Term Availability

As Dobratz and Astrid (2009) have recommended “Network of Expertise in Long-Term Storage of Digital Resources” (NESTOR), offers a framework for developing trustworthy long-term repositories and guidance, for the evaluation of sustainable conservation measures.

The findings of the present study revealed that most libraries store digital material on departmental servers and local computers. Thus, it is recommended that, libraries create a network for long term preservation, and have a framework for developing long-term repositories.

7.5.11 Provide Legal Deposit of E-Content

Copyright or legal issues do not allow some of the libraries to make digital materials accessible through Internet, and is also a barrier for the users, for accessing digital material in libraries. Hence it is necessary that libraries have a legal deposit of e-content, for making use of digital materials.

7.5.12 Provide Access to Digital Materials On-line

The findings of the study showed that, there was on-line access in a few libraries. On the other hand, most of the respondents as users preferred online open access. It is recommended that access to digital material in the field of heritage resources should be made on-line and free of charge. However, there is some cost involved in it, and this cost needs to be made good by the government or the stakeholders.

7.5.13 Create Online Multilingual Database

As Guar (2009) suggested in his study, digitized heritage collection should take care of multi-linguality. Access in more than one language should be provided.

The observation of this study was that libraries were faced with multilingual problems while digitizing, since India is a multilingual country and in Iran too there
were some heritage collections in different languages. Therefore, it is suggested that an online multilingual cultural thesaurus for libraries, be developed which provides access in more than one language. Such a system would help the libraries, as well as the users of libraries.

7.5.14 Establish National Digital Repository of Heritage Collection

The findings of the study revealed that most of users of the respective libraries preferred online access to the digital repository and most libraries would also like to consider the national digital heritage repository.

Abd Manaf (2008) in her study, recommended for the establishment of national digital cultural heritage repository, to the cultural institution in Malaysia, with a view to disseminate, and make information accessible to the public. The establishment of the national digital heritage repository can improve accessibility, resource discovery, preservation and promotion of the nation’s heritage information. Hence it is strongly recommended that libraries have to move towards creating the digital repository of materials of cultural heritage.

7.5.15 Train the Library Users on the Use of Digital Information

A finding of the study showed that there were still users who were not willing to use digital information, basically due to lack of confidence. Therefore, it is felt that libraries should periodically conduct orientation programs and workshops to educate users on access to digital information.

7.5.16 Digitize Heritage Resources Based on the Demand

The findings of the study showed that, there was demand for using digitized manuscripts and rare books, by the respondents. Hence, it is opined that libraries should digitize more of their resources based on the materials that are in demand.

7.6 Further Scope of Research

Manuscripts are found to be used extensively when compared to the rest of the sources in select libraries of India and Iran. This presupposes the need of conducting a detailed survey of the use pattern of manuscripts. This facilities creation of the national repository of the manuscripts dealing with the subject of cultural heritage and
providing online access to the users. An in depth study may be undertaken on the use pattern of manuscripts available in the holding of the libraries.

7.7 Conclusion

Over the centuries, scholars and researchers have ventured to access rare materials of cultural heritage that are in the form of manuscripts, written records, copper plate etchings and inscriptions. Quite a number of these information seekers belong to the disciplines of philosophy, religion, history, folklore, anthropology, architecture, metaphysics and linguistics. Academicians and researchers from these subject fields have been relying upon the rare materials of cultural heritage preserved in the heritage libraries. Of late, Information Technology has paved the way for archiving much of these rare ancient information resources in digital form.

The digitization of rare materials is viewed as an essentiality because these old manuscripts, written works and rare books turn brittle and crumble into pieces while being browsed. Further, they degenerate over time, and mutilate on account of constant handling.

Digital preservation has evolved in the last three decades, and attempts have been made to improve the quality of scanning and capturing images, the basic process of digitization on the whole. The application of ICT has been a boon, as original rare manuscripts remain intact, and the accessible to the users, either on-line or on the library network. The libraries or institutions can at any time consider the possibility of extending the information on-line. Individual institutions can also develop their financial resources, by providing access to valuable materials of cultural heritage, on a subscription basis.

This is an era of information and communication teaching and hence heritage libraries are expected to “care and share” their valuable heritage of rich cultural heritage. These heritage libraries have to join together on a cooperative basis and plan and function in a network environment. Resource sharing programmes have to be augmented for mutual and reciprocal benefits, mainly to enhance access and to use information resources to the maximum extent.

Individual libraries can archive manuscripts that are in demand, on CDs or publish them in printed form with research summaries and make them available to the
scholars. In this way, individual libraries can market information and improve their financial position so as to be able to concentrate on the preservation aspects of rare manuscripts and old books.

India and Iran are countries with a huge wealth of ancient knowledge, created in different historical periods, going back to thousands of years. Most of them belong to different areas of intellectual activities such as religion, history, culture and tradition, arts and literature, are in several languages and scripts, and are preserved in form of manuscripts, written on different materials and also in rare books. Their heritage collections are spread all over the country, and in some cases also abroad. Today most of them face survival threats. Both the countries have probably lost a large number of manuscripts already. Among the existing collections, only a portion has been surveyed. So, digitization and digital preservation of these heritage collections will be helpful in safeguarding accessibility for the present and future generations.

Many scholars, national and international organizations, and libraries have emphasized the need for digitization and digital preservation of heritage documents, like UNESCO, National Library of Australia, National Mission for Manuscripts and the Library of Congress National Digital Information and Preservation Program (NDIIPP). It is worth to note that National Digital Preservation Programme (NDPP) is a good beginning to have a National Digital Preservation Policy for India and Iran as well.

Digitization will help to preserve these heritage resources, as well as retrieval of information contained within documents in digitized form. Therefore what is most important is to augment programmes for sharing of resources of respective libraries, in the networked environment. The heritage holdings of Indian and Iranian libraries have to be freely accessed and shared for mutual and reciprocal benefits. For the purpose of the digitized collection of libraries together, there is need for developing the database of the holdings and facilitating on-line access. This venture in fact has to be encouraged and supported by all concerned, as this programme has to be developed and nurtured on a co-operative basis, after settling the issue of copyright.

Creation of a national digital repository will be of immense help to facilitate access to the nation’s heritage resources globally, preserve and develop the nation's digital resources, and encourage sharing and exchange of information among libraries.
The programme has to avoid duplication of efforts in digitization, develop metadata standards, and ensure sustainability of the nation’s resources.

Above all, the establishment of the National Digital Repository would definitely contribute towards enhancing the accessibility, resource identification, and preservation and promotion of the nation’s heritage resources for future generations in India and Iran.