CHAPTER 6

FINDINGS, CONCLUSIONS & SUGGESTIONS

The present research on ‘E-thesis Repositories in the world: a critical analysis’ brought in front various unexplored and interesting concepts related to the planning, development, implementation, pre-requisites, collection development, software, metadata issues, language compatibility, budget factor, staff required, contributors, usage statistics, copyright and preservation issues of electronic theses and dissertations.

In this chapter the research objectives will be verified with the findings of the data collection, conclusions will be drawn and appropriate suggestions will be given. The web survey questionnaire was designed according to the research objectives and divided into eleven sections. The findings and conclusions are also discussed in section wise and in some cases the sections are combined.

The chapter concludes with suggestions on future research topics that can be conducted in the field of E-theses repositories.

6.1 FINDINGS, CONCLUSIONS & SUGGESTIONS

Section A: Background Information of E-Theses Repository

1) Objective 1: To identify time required for planning, pilot testing, final implementation of E-theses repository and to perform other pre-requisites prior to implementation of E-theses repository.

1.1) Findings & Conclusions:
Out of the 96 institutions, who participated in the present research, 81 institutions attempted the question and it was found that 84.4% institutions had done pilot testing before final implementation of the repository. The
period required for planning, pilot testing and final implementation varied from 0 to 48 months. Central Food Technology & Research Institute (India) and Dublin City University (Ireland) required zero months i.e. less than 30 days for planning, pilot testing of the repository before its final launch. Whereas two institutes from Netherlands i.e. Delft University of Technology and Wageningen University took maximum period of 48 months for final implementation of the repository. Majority of the institutions i.e. 24.21% required 12 months for the complete process. This proves that pilot testing is a very important stage for successful implementation of E-theses repository.

The E-theses repository of SISSA Digital Library (Italy) was found to be the oldest one to start submission and searching of digital content by its authorized users in January, 1988. The year-wise distribution of the launch of E-thesis repositories also shows that out of the 95 participating institutions, 70.52% were launched in from 2000 to 2010. The credit in the increase of number of E-thesis repositories goes to Open Access Initiatives like BOAI, ECHO, Berlin Declaration and several national and international open access policies and movements.

Majority of the participating institutions (86.4%) were fully operational. To study the importance of results of exploratory activities, Likert Scale method was used. It was found that knowledge of successful implementation of e-theses repository at some other institution and studying the available literature on ETDs was Very Important for the respondents. Analyzing the available literature on ETDs definitely provide in-depth knowledge about all the underlying concepts in ETD, problems encountered and probable solutions which help the repository administrator and his/her team to understand various concepts. Attending workshops, learning about availability of expertise and demonstrating e-thesis repositories ranked second in the order of importance.
1.2) **Suggestions:**

a) Any institution must go for pilot testing stage before final implementation in order to understand and rectify any problems related to uploading of data, software related problems and choice of most appropriate user friendly repository software.

b) National and International Policies need to be framed for promotion of digitization of grey literature like theses and dissertations.

2) **Objective 2: To find out the reasons of contributing to E-thesis repositories and identify factors that act as barrier in setting up E-theses Repository.**

2.1) **Findings & Conclusions:**

75.5% respondents hold an opinion that contributing ETDs to e-thesis repositories provide maximum access to research results. 74.5% contribute their research since it is a mandatory policy of the institute. The overall response received shows the willingness of acceptance of open access by the research community due to its various benefits of improving the citation count, magnifying institutes prestige and appropriate solution of preserving institutes academic output.

It was found that 71.9% respondents feel that concern about copyright issues is one of the major barriers in implementation of ETD program. Plagiarism issues and illiteracy about benefits of ETD are equally responsible for creating hindrance in ETD contribution. 40.4% respondents believe that absence of stringent rules acts as barrier in setting up E-theses repository. It can therefore be concluded that although research scholars are willing to disseminate their research work through repositories but presence of such barriers slows down the growth of E-theses repository development.
2.2) **Suggestions:**

a) All research institutes must motivate their employees and research scholars to submit their research work in the repository.

b) Along with making it a mandatory policy, some reward should be given to the contributor so that he/she will definitely submit the ETD in the repository.

c) Special lectures may be organized through which subject experts will explain the various benefits of open access to researcher and the institute. Repository administrators of fully operational and successful E-theses repositories may be invited in order to share their experiences and success stories in order to encourage the research scholars to contribute their research work through repositories and through open access.

d) In every country, organizations of national importance must frame standards and mandatory policies for institutions to submit the theses and dissertations in electronic format. Also, precise rules should be framed in order to prevent plagiarism and protect copyright. If such measures are taken, it will definitely help in increasing the number of ETDs deposited in the repositories as well as increase number of E-thesis repositories.

3) **Objective 3: To determine the subject coverage and country wise distribution of E-theses repository.**

3.1) **Findings & Conclusions:**

Out of the participating institutions in the present research, majority of the repositories (25%) were found to have E-theses deposited in the field of Engineering. 18.75% mentioned having E-theses repositories in Medical Sciences followed by Chemistry with 14.58%. Arts and Social Sciences had coverage of 11.45% among the participating E-theses repositories. Data received indicates that major amount of research is done in scientific areas and social science research needs a massive boost up to increase the research
output. The poor scenario of social science research is same in developed and developing countries.

Repositories whose web interface was not in English and which does not contain E-theses in English were not considered for the present research. The sample for data collection was finalised using ‘Krejcie & Morgan Table for Determining Sample Size’ and out of the total number of E-thesis repositories present in a country, only those were selected for the present research study which had a collection of >1000 ETDs. The web survey questionnaire was sent by e-mail to the repository administrators. USA gave an excellent response with 23 out of 27 responded the questionnaire. UK also gave positive response with 08 institutions replying to the web survey questionnaire out of 14.

Although many Indian E-thesis repositories were listed from repository directories, search engines, articles etc. only 27 Indian E-thesis repositories were found to be functional during sample selection stage and being the mother country the researcher mailed questionnaire to all. But the response received was not up to the mark with only 12 institutions responding to the questionnaire after sending three reminders through mail, personally calling up the repository administrators and sending e-mail to the personal mail addresses of the repository administrators. The results obtained shows that all over the world there is a growth of repositories containing ETDs in English language and all over the world the awareness of ETD benefits and growth of E-theses repositories have started. Developed countries show higher number of E-theses repositories compared to developing countries.

3.2) Suggestions:

a) There should be an increase in Social Science, Arts & Humanities research.

b) Like developed countries, the developing countries should also establish more number of E-thesis repositories. Open access movements should be carried out in more effective manner in order to motivate people to do the research and submit their research work in electronic format.
4) Objective 4: To study the objectives for setting up an E-theses repository and ways of creating awareness amongst institutional members about E-theses repository.

4.1) Findings & Conclusions:
74.5% respondents feel that setting up e-theses repository is the best way to increase exposure to the institutes ETD since it helps in providing maximum access to research results followed by 70.2% who feel that it is one of the best ways of promoting data sharing and knowledge. Preservation of digital resources was chosen by 66.7% respondents as a highly relevant objective of setting up repository. 51.6% feel that setting up E-theses repository is one of the ways of promoting new modes of publication. This shows that institutions have variety of reasons for setting up E-theses repository out of which the most common objective is to maximize exposure to institutes research output.

80.4% respondents provide Links from Library website/Institutional website in order to create awareness about E-theses repository to the institution members. 60.9% created awareness by organising open access seminars/symposia. Three institutions mentioned use of social media (Facebook, blogs, twitter, mailing lists, LinkedIn) for promoting the benefits of ETDs and E-theses repository. This shows that institutes advertise their E-theses repository through variety of means in order to increase the usage as well as make the user community aware of the benefits of open access.

4.2) Suggestions:
   a) A lot of research carried out across the world gets unnoticed since they are published and submitted only in print format which gets submitted only in the respective institute. In this way, very useful research outcome remains in the library shelves only. If the institute or any national organization E-theses repository then such researches will have global access which in a way will help the researcher to increase his/her citation index.
b) Social networking sites should be used as one of the most powerful way of creating awareness about E-theses repository.

Section B: Repository Materials

5) Objective 5: To identify type of documents (other than ETDs) included in E-theses repository and discover the number of E-theses and other documents (if any) in the repository.

5.1) Findings & Conclusions:

The data collected shows that 89.6% repositories contain documents other than ETDs. Only 10.4% respondents informed of containing only ETDs in their repositories. The researcher provided list of 22 types of documents in the web questionnaire from which the respondent was to select the type of document included in their repository. Since the question was open-ended the participants specified 16 more different types of documents which are available in their repository. ‘Journal Articles’ ranked first amongst the type of documents other than ETD to be included in the repository. 60% respondents informed of including peer-reviewed documents in their repository. This proves that although number of institutional repositories shows a positive growth but there is still a dearth of ETD only repositories. This category of grey literature is mostly included in the institutional repository as one of the scholarly document.

The collection details obtained from 84.4% respondents show a good number of ETDs and other documents in the E-theses repository. The findings show the presence of 4,70,368 ETDs (Doctoral Theses+ Master’s Theses + Bachelor’s Theses). ‘Newspaper Clippings’ topped the list with 8,39,671 clippings. This shows that institutes throughout the world believe in preserving and archiving documents through repositories and they include not only Journal articles, ETDs, Conference Proceedings etc. but also documents like Newspaper Clippings.
5.2) Suggestions:

a) Benefits of ETD submission should be promoted in order to encourage the institutes in setting up ETD only repository.

b) The number of ETDs should increase in the future years. Theses database like INFLIBNET’s Shodhganga (India) shows having MoU with various Indian Universities, Research Institutes, Colleges but the submission status of ETDs shows that various institutes are in MoU with INFLIBNET but have still not submitted a single ETD. University Grants Commission (UGC)\(^1\), India has made it mandatory for every University to submit soft copy of M.Phil/Ph.D theses for hosting the same in INFLIBNET. Such initiatives will definitely help in improving the collection of ETDs in the repositories.

6) Objective 6: To know which file formats are supported by the repository.

6.1) Findings & Conclusions:

100% respondents supported PDF. Images and Audio-Video were second most supported file formats. The results obtained determine that all institutions across the globe prefer Text format for presenting and disseminating their research work.

6.2) Suggestion:

a) Text format is the most easily accessible format globally. Research organisations must set-up a protocol mentioning that ETDs must be submitted in Text format and other file formats can be submitted as additional files, if required.
7) Objective 7: To find out the software used for setting up E-theses repository, factors influencing the choice of repository software and server connectivity issues of E-theses repositories.

7.1) **Findings & Conclusions:**
Choice of software is one the most important part in successful implementation of repository. Directory of Open Access Repositories lists more than 144 Institutional Repository software packages. DSpace (83.7%) was found to be the most preferable software followed by EPrints (79.2%).

Features such as open source, greater functionality, adequate support and regular updating are the most important ones that influence the selection of particular software.

Results obtained prove that institute's prefer selecting the best IR software for hassle free implementation of repository due to which pilot testing becomes very important. Software used during pilot testing if not found suitable, is changed before final implementation.

91.7% institutions have their repositories accessible on Internet in order to maximise the access of the ETDs and 84.3% host their repositories on Institution’s server rather than going for Cloud Computing server due to issues related to privacy, reliability and security.

7.2) **Suggestions:**

a) Institutions should analyse the successful implementation of fully operational E-thesis repositories, read the available literature regarding IR software packages, check out the support available and keep a track of the updates released before selection of software for the E-theses repository.
b) All institutions should have their repositories accessible on Internet for the benefit of the researchers as well as for the institute.

Section D: Ways of Providing Access to ETDs

8) Objective 8: To identify ways providing access to E-theses deposited in the repository and to find out the information regarding authorised contributors to the repository.

8.1) Findings & Conclusions:

81.7% respondents informed of providing full-text access to anyone referring the E-theses repository. 22.6% mentioned of providing full-text access only to members of the institution. None of the participating institution provides paid access to full-text of ETDs. This proves that the institutions holding the E-theses repositories believe in promotion of open access and the various benefits it provides to the researcher and the institution like increase in citation count, increase in prestige of the institution etc.

56.7% institutions provide access to ETDs right from the inception of the Institution (i.e. the first Thesis or Dissertation submitted to the institute). 35.1% mentioned of providing access to ETDs produced during last ten years only. Some institutions were found to provide varying access period to ETDs depending upon the category of Doctoral theses, Master’s theses and Bachelors theses. By providing access to the archival thesis and dissertations right from the establishment of the institution, the repository administrators help in increase the citation index of the institution and researchers affiliated to it.

Out of the 11 categories of contributors listed by the researcher, ‘Post Graduate Students’ were found to be the topmost contributor of ETD with 64.4% institutions opting for them. ‘Librarians’ (63.3%) and ‘Faculty’
(57.8%) rank second and third respectively. Only six institutions mentioned of submission of ETDs by ‘External Contributors’.

It can be concluded that due to the inclusion of Project component in Master’s level across all the disciplines throughout the world the quantity of research has increased and since majority of students opt for Post-Graduate courses, the number of Project reports submitted is on a rise.

8.2) Suggestions:

a) All the institutions should try to provide access to ETDs right from the establishment since it helps in improving the citation index of the author and institution.

b) Getting the old printed thesis and dissertation transformed into electronic format will also make them accessible for a longer period and will solve the issues related to preservation techniques to a greater extent.

9) Objective 9: To investigate the various monitoring techniques of use of ETDs and check the usage frequency of ETDs.

9.1) Findings & Conclusions:

57.3% institutions monitor the use of ETDs by taking into account the ‘Statistical count of number of views (Abstract + PDF/HTML)’. 46.1% respondents depend on ‘Statistical count of number of views (Country wise)’. Only 14.6% E-theses repositories have not employed any monitoring technique to measure the usage statistics of ETDs. The most advanced usage monitoring technique is found to be implemented by California Institute of Technology (USA) since they keep track of hourly, daily, weekly and monthly visits. They also maintain record of the duration for which the pages are visited, search engines used, web browsers, navigation tools, keywords used. This interprets that institutions depend on some or the other method of monitoring the use of ETD present in their repository since it helps them to understand the popularity of their repository and even makes them...
understand the ways (use of keywords) in which the ETDs submitted in their repository is searched.

79.1% respondents informed of frequent use of ETDs submitted in their repository. 20.9% informed of occasional use of ETDs. None of the institutions mentioned that their E-theses repository is rarely or never used. This shows that users understand the importance of the content of ETDs and the authenticity of the research carried out.

9.2) Suggestion:
   a) All E-theses repositories must employ at least basic method of monitoring usage of items deposited in the repository.

Section E: Budget Consideration & Human Resource

10) Objective 10: To explore issues related to budget considerations and human resource management of the E-theses repository.

10.1) Findings & Conclusions:
   From the data obtained it can be interpreted that very few institutions allot special grant to the institute for setting up E-theses repository. Majority of the institutions (67.9%) set-up the repository from the annual budget allotted to the library. In spite of being an important initiative, not many external agencies provide grant to institutes for implementing e-theses repository. Developed countries like UK, USA, and Europe have provided government funds for development of ETD Projects. However, the grants are not provided to all institutions and are very rarely seen in developing countries. This clearly proves the poor status of open access movement and lack of governmental initiatives to encourage open access to scholarly literature.
Only 33% institutions replied regarding the percentage of funds allocated under various heads of staff, hardware, software and consultancy. It was found that major share of the fund received is utilized for staff followed by software maintenance and updates. Dublin City University (Ireland) informed of spending 100% grant received for staff. 61.8% respondents informed of appointing special full-time staff for developing and maintaining e-theses repository. The response received for the question shows that, of all the components of an e-theses repository, staff holds the most important place since they are the main persons responsible for successful functioning of the E-theses repository.

Librarian was found to be the most preferable person to head the repository since he/she has professional training and special skills of managing, developing and archiving the digital materials.

10.2) **Suggestions:**

a) Development of the status of E-theses repository depends on the Government of respective state or country which should devise special schemes and provide grants to research institutes of national and international repute.

b) Universities should make budgetary provision in their annual budget to fund the institutes having research centres in order to help them in setting up their own repository.

c) Central pool of research work should be established at university/state/national level in order to promote submission of ETDs in controlled budget expenditure.
Section F: Metadata & Interoperability Standards

11) Objective 11: To find out the metadata and interoperability standards of the repository.

11.1) Findings & Conclusions:

49.5% respondents inform of getting the metadata created by ETD contributor (researcher) and it is verified by the repository administrator which is mostly Librarian of the institution. 37.4% institutions opted for metadata creation by Repository administrator. Only 13.2% said that metadata is created by item distributors and there is no role of repository administrator in that. 95.6% institutions were OAI-PMH compliant. The overall response received proves that creation of metadata is an integral part of submission of ETD in repository which is mostly performed by Librarian or library staff in general. Almost all the institutions follow standards required for providing global access to the contents of the repositories.

11.2) Suggestions:

a) Metadata being the most important part of submission of research work in repository must be prepared by Librarian or at least library staff members since metadata creation needs accuracy, completeness and should be accessible easily.

b) Considering the importance all the repositories must be OAI-PMH compliant.
Section G: Preservation Policy

12) Objective 12: To enquire about the long term preservation policy and withdrawal policies employed by the E-theses repository.

12.1) Findings & Conclusions:

60.4% respondents informed of having employed long term preservation policy for their E-theses repository. Bitstream copying (making an exact duplicate of a digital object) was the most commonly used preservation technique with 68.3% opting for it. Considering the importance of the scholarly content in ETDs, repositories make use of some or the other popular techniques for long term preservation. However, it was also found that 39.6% E-thesis repositories did not make use of any preservation technique.

83.3% institutions have withdrawal policy of ETDs and 75.3% said that the ETDs under withdrawal are removed from public view. Only 24.7% mention of permanently deleting such ETDs. 97.3% informed that only Repository administrator have the authority of withdrawing items from the repository. It can be interpreted that institutions have well-defined withdrawal policy and the act is performed mostly by the Repository administrator who has all the authorities of adding or removing items from the repository.

12.2) Suggestions:

a) Information contained in ETDs is of scholarly nature and can prove to be very important for long time access. Therefore, institutes must apply preservation technique to make the ETD accessible for long.

b) Withdrawal of items must be carried out under the supervision of the Repository Administrator and they should be removed only from public view. Proper reasons should be submitted by the researcher requesting for removal of items from the repository.
Section H: Copyright/IPR Issues of E-Theses

13) Objective 13: To explore issues related to Copyright protection/ IPR of E-theses.

13.1) Findings & Conclusions:

50% participating institutions inform that the E-theses repository staff is responsible for managing IPR. 41.7% mention about Contributors managing the IPR of E-theses. The researcher listed three commonly used features for copyright management. 75.3% mentioned of declaring that the work is the intellectual property of the author. 64.7% clearly mention the details of copyright ownership and 49.4% mention disclaimer regarding the content of the document.

75.9% institutes confirmed that the Researchers retain the copyright of the ETD post submission. Very few (21.8%) institutes retain the copyright after submission in repository.

However, when it came to identify the measures adopted by the institute for copyright protection of the submitted E-thesis, the results were shocking as 64.5% stated absence of measures for copyright protection. Handful of institutions opted for restricting access to full-text of ETD or copying, saving, printing options were not available for the full-text. Digital watermarking technique had a very poor response from the community of repository administrators. Various institutions mentioned different measures applied by them for copyright protection like Open access without restriction, full-text access was given to ETDs submitted during specific period.

Thus we can arrive at a conclusion that institutions are aware about the importance of copyright protection of ETDs and make use of some or the other feature for copyright management but hesitate in deploying a particular
copyright protection measure. Lack of initiative has been taken in national level to discuss copyright issues of documents in open access. Due to this problem researchers all over the world are worried about their work being plagiarised thereby resulting in decreasing submission of research work.

13.2) Suggestions:

a) Standards and mandatory rules should be framed by the institutes at local level or by organisations of national importance like UGC (in India) to protect copyright of authors thereby promoting submission of research work and stopping plagiarism.

b) Instead of providing access only to metadata and limiting full-text access only to authorised institutional members, the repositories must use modern techniques of copyright protection and if necessary may charge nominal fees for the full-text access of the ETD. Proper reasons should be mentioned by a person who seeks permission to access some restricted ETD.

c) If required the institutions may fix an embargo period after which full-text access should be provided to the ETD.

d) Strict action should be taken if plagiarism takes place. Stringent acts should be framed at national level to discourage plagiarism.

Section I: Language Compatibility & Currency of Information

14) Objective 14: To find out language compatibility and frequency of updating the E-theses repository.

14.1) Findings & Conclusions:

English being a universal language is the most preferred language for ETDs and 81.1% institutions have mentioned of having major percentage of English language ETDs in their repositories. Other language ETDs which
cover a good share are French and Portuguese. The researcher could discover various national and regional languages in which ETDs are submitted across the world.

73.5% institutes informed of updating the collection of ETDs in their repository frequently as and when it is submitted to the institute. 12% mentioned half-yearly and annual updating and only 2.4% stated that they have never updated the E-theses repository. This shows that majority of institutes are willing to provide global access to the ETDs as soon as they are submitted to the repository.

14.2) Suggestion:

a) Considering the importance of knowledge content in an ETD, special efforts must be taken to update the E-theses repository frequently in order to maintain the currency of information disseminated.

6.2 Prospective Areas of Research:

1) Explore reasons of slow growth of E-thesis repositories.
2) In-depth study of repository software package most suitable for ETD.
3) Criteria for evaluation of E-theses repository.
4) Role of Librarian in each stage of development of E-theses repository.
5) Copyright Protection techniques of ETDs.
6) Impact of ETDs on the research community.
7) Case study of any particular E-theses (only) repository to discover various concepts involved in the development and management of the repository.
8) Comparative study of E-thesis repositories in a particular country.
9) Preservation strategies of ETDs.

Conclusion:

The overall conclusion that can be derived from the present research work is that setting up only E-theses repositories is not a common practice in institutions across
the world. E-thesis is one of the types of various other types of documents included in the Institutional Repository. Various organizations and advocates of open access are working hard in spreading awareness about the importance and benefits of E-theses repositories and submission of their research work in electronic format. The progress has still a long way to go.

Government must take efforts to promote dissemination of scholarly communication through open access. They should also frame standards and stringent rules in order to prevent plagiarism.

In India, National Knowledge Commission (NKC) has plans to promote open access and digitize doctoral theses. NKC in its ‘Report of the Working Group on Open Access and Open Educational Resources-2007’^2 mentioned that research conducted in third world countries representing 80% of world’s population is largely invisible to the research community due to financial and governmental restraints’. INFLIBNET’s Shodhganga introduced ShodhGangotri which is a database of research in progress.^3

With the efforts being taken all over the world it can be said that in the coming years the benefits of open access will definitely spread its umbrella to majority of institutions and more and more E-theses Repositories will be successfully set up by organizations in various countries providing full-text access to Electronic theses and dissertations.
References:

