

## Open Source Solution based Indian ETD repositories: A status report

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### Abstract

ETD repositories of India are based on institutional level and national level. Shodhganga a national level open access ETD repository set-up using open source software (OSS) called DSpace holds the largest number of full text theses. ETD repositories of some institutions are based either on open source software's or commercial software or in-house developed software. Some institutional efforts includes initiatives by Indian Institutes of Technology's (IITs), National Institute of Technology's (NIT's), Council of Scientific and Industrial Research (CSIR) labs, and by some universities and institutions. The Directory of Open Access Repository (OpenDOAR) displays 39 results upon search execution by content type - Theses, whereas Registry of Open Access Repository (ROAR) displays 11 results upon search execution by e-Theses repository type as on 29<sup>th</sup> March 2018. However the results displayed are not exhaustive as the registration is voluntary and not mandatory in OpenDOAR and ROAR. The current study undertaken reports the status of open access full text Open Source Solution based ETD repositories exclusive of Institutional Repository in which Theses are part of the collections. The methodology used for this study includes visiting of websites of ETD repositories listed on OpenDOAR and ROAR to ascertain the working status of such repositories and the results are reported. The finding shows that at National level only Shodhganga is in active state and at Institutional level only 3 exclusive open access ETD repositories are active.

**Keywords:** ETD repositories, Open Source Software, Shodhganga, OpenDOAR, ROAR.

### 1. Introduction

Open Source Solution based Open Access (OA) repositories offers free access to ETDs (Electronic Theses and Dissertation) over the Internet. ETD repositories play an important role of disseminating research; it got many benefits associated with it. ETD repositories help the researcher in knowing about the research work already done, so as to avoid duplication. Open Source Software's (OSS) like DSpace and Eprints are most widely used for archiving ETDs in India. DSpace facilitates simple and advanced search, it also allows browsing by communities and collection, title, author, subject and date. Shodhganga – a National reservoir of Indian Theses is using DSpace software and it offers simple search, advanced search, subject search and Google search options. It also provides search and browse by Universities and Departments, Upload date, Researcher/Guide, Title and Keywords. DSpace being an OSS allows customization and modification, with an ever growing community of developers, committed to continuously expanding and improving the software with each release. Eprints another OSS with a strong community of developers, librarians and users is popular repository software used for

archiving ETDs in India. Eprints provides facility for simple and advanced search. The content can be browse by year, subject, division and author. More options like Researcher/Guide, Title etc can be added to facilitate browsing by means of modification in source code. Some Institutional level repositories use Eprints software for archiving ETD repositories. Eprints software based institutional ETD efforts in India includes those by 13 Institutions and Universities as per the data retrieved from OpenDOAR (<http://www.opendoar.org>) when the search is executed by Institutional repository type, other categories Aggregating, Disciplinary and Governmental shows zero results as on 3<sup>rd</sup> June 2018. Whereas DSpace software based institutional ETD efforts includes those by 19 institutions and universities when the search is executed by repository type Institutional, Aggregating type shows 3 results, Disciplinary shows 2 results, Governmental repository type shows zero result, all together constitute 24 results on OpenDOAR as on 6<sup>th</sup> June 2018. The data retrieved from OpenDOAR contains some duplicate entries, some non functional websites and some unentered entries of ETD repositories. Whereas on ROAR (<http://roar.eprints.org/>) 1 National level ETD repository and 10 Institutional level repositories are displayed, out of that 2 are non functional. Institutional efforts also involve Universities, as an entity.

## **2. Review of Literature**

Hirwade (2011) in her paper mentioned that there are 47 digital repository initiatives from India have been reported in OpenDOAR and 59 initiatives have been reported in ROAR. An ETD initiative at National levels includes 6 repositories hosted by various institutions/organizations, where as ETD initiatives at Institutional level includes initiatives by 17 institutions/organizations.

Sengupta (2012) in her paper mentioned about the data collection from ROAR and OpenDOAR directories, the researcher found 25 E-Theses repositories in India. The oldest E-Theses repositories registered in ROAR is ETD@IISc in 2005. Her paper has attempted to overview the current status of E-Theses repositories in the world with special reference to India.

Gupta and Gupta (2014) in their paper mentioned that there are 31 theses repositories in India as reported by OpenDOAR. Their paper evaluates and analyses about the number of ETDs deposited in some prominent Indian ETD repositories and reports about their accessibility status.

Gayan (2014) in her paper mentioned that there are 59 ETD repositories registered in India in OpenDOAR and 8 ETD repositories have been registered in ROAR. She identified 2 ETD initiatives at National level i.e. Shodhganga and Vidyanidhi, whereas at Institutional level she identified 8 initiatives.

Shrivastava and Gupta (2016) have explored cooperative ETD efforts in USA, UK, China and India and they have done a comparative analysis. They mentioned about Shodhganga – a national level ETD repository which has completed 7 years and the growth achieved by the repository year by year. It mentioned about 30% universities contribution in the last five years.

They stated that ETD movement can be fostered if implemented at state level with national supported infrastructure.

Panda (2016) discussed about Shodhganga ETD status, he has analysed the ETDs submitted year wise in Shodhganga from 2010 to 2015 (up to June). The data used for this purpose includes 217 universities who have signed MoU (Memoranda of Understanding) with INFLIBNET (Information and Library Network) which established Shodhganga, he finds that 40,175 theses have been deposited in the repository by the member universities.

### **3. ETD initiatives in India**

ETD initiatives started in the late nineteenth century and gradually increased in popularity in higher educational institutes. The ETD initiatives in India can be broadly grouped into two categories: ETD initiatives at National Level and ETD initiatives at Institutional Level (Hirwade, 2011). ETD initiatives at National level include maintaining of a single repository where all participating universities submit Theses electronically to a central server maintained for archiving Theses. Whereas ETD initiatives at Institutional level includes efforts made by individual institutions in hosting their Institutional ETD repository. Vidyanidhi was the first national level ETD initiatives of India which was initiated in the year 2000, but it failed due to absence of provision of mandatory submission. The project was initiated by University of Mysore, and the initiative was largest in South Asia. The project although enlisted on OpenDOAR is not accessible today. The literature reviewed shows that 5,482 Theses were available at last time when it was active; the available Theses were archived by means of retro-conversion, which involves manual scanning of Print form Theses (Gupta and Gupta, 2014). Motivated to pursue ETDs in India, another project called Shodhganga was initiated (Cayabyab, 2015).

The literature reviewed shows that at Institutional level the first ETD initiative is taken by IIT Bombay in 1999, followed by Indian Institute of Science (IISc) and Indian Institute of Astrophysics (IIA) in 2004, IIT Delhi, IIT Kanpur and National Chemical Laboratory (NCL), Pune in 2005, Indian Institute of Oceanography in 2006 (Ghosh, n.d.), Mahatma Gandhi University in 2008, CSIR Explorations – Open Access Repository of Indian Theses and National Institute of Technology, Rourkela in 2009, Saurashtra University and University of Agricultural Sciences, Dharwad in 2012 (Gayan, 2014) and by others so on. Institutional ETD repositories are hosted using DSpace and Eprints software, except Mahatma Gandhi University (MGU) and Aligarh Muslim University (AMU) which have used Nitya and CALIBER software respectively. The MGU online Theses Digital Library has used the software Nitya Digital Archive which was customized as per the need of Mahatma Gandhi University by Beehive DC Group and is a commercial software and is capable of search and retrieval using Malayalam and Tamil Script. (Pillai, George and Suku, 2015) (Sheeja and Cherukodan, 2011). Whereas a telephonic survey reveals that CALIBRE software is an OSS which is in an inactive state at present. The ETD initiatives are summarized below.

#### **4. ETD initiatives at National Level – Shodhganga**

Shodhganga (<http://shodhganga.inflibnet.ac.in/>) is the second initiative of establishing national level ETD repository in India, which has been successful due to several reasons. The project currently accepts PhD Theses of Indian Universities and it may start accepting MPhil Dissertations at a later stage (Gupta and Gupta, 2014). India is the third largest higher education system in the world with 47 Central Universities, 384 State Universities, 123 Deemed to be Universities, and 296 Private Universities besides other Institutions of National importance offering Technical, Management and other sort of education. INFLIBNET set up Shodhganga a central digital repository of Indian electronic Theses in 2010 to facilitate open access to Theses to the entire academic community. The responsibility of hosting, maintaining and making the digital repository of Indian Theses is assigned to Shodhganga.

Shodhganga provides seamless access to ETDs. Shodhganga was formed as part of the efforts that was needed. In 2005 Planning Commission of India set up a National Knowledge Commission (NKN) that focuses on knowledge production and dissemination in the current knowledge economy. NKN recommended online storage of ETDs offering open access. Based on this recommendations UGC (University Grant Commission) passed a resolution in the year 2009 which stipulated (minimum standards and procedures for the award of MPhil and PhD degrees) mandatory submission of PhD Theses in electronic form within 30 days of the award of PhD degree. The participating Universities need to sign Memoranda of Understanding (MoU) to submit PhD Theses in Shodhganga repository (Panda, 2016).

At present 385 Universities have signed MoU with INFLIBNET and 1,93,953 full text Theses are available on Shodhganga as on 14<sup>th</sup> June 2018. Top 10 contributing Universities are University of Calcutta (11296), Savitribai Phule Pune University (9333), V.B.S Purvanchal University (7955), Aligarh Muslim University (7230), Panjab University (6942), Anna University (6748), Dr.Babasaheb Ambedkar Marathwada University (5027), University of Madras (4924), Jawaharlal Nehru University (4716) and Gauhati University (4492). The figures in the brackets indicate the number of PhD Theses deposited by the Universities.

Besides this 14 CFTI (Centrally Funded Technical Institutes) have signed MoU with INFLIBNET, which includes Indian Institute of Information Technology, Design and Manufacturing (IITD&M), Kanchepuram, School of Planning and Architecture (SPA), Bhopal, Indian Institute of Management (IIM), Indore, Indian Institute of Science, Education and Research (IISER), Kolkata, Indian Institute of Technology (IIT BHU), Varanasi, National Institute of Technology (NIT), Warangal, National Institute of Technology (NIT), Delhi, National Institute of Technology (NIT), Kurukshetra, Visvesvaraya National Institute of Technology (VNIT), Nagpur, Indian Institute of Management (IIM), Rohtak, National Institute of Technology (NIT), Meghalaya, Indian Institute of Information Technology, Design and Manufacturing (IITDM), Jabalpur, Indian Institute of Management (IIM), Udaipur and Motilal

Nehru National Institute of Technology (MNNIT), Allahabad (<http://shodhganga.inflibnet.ac.in/>).

## **5. ETD initiatives at Institutional Level**

There has been several Institutional efforts for establishing Institutional ETD repositories in India. Some of the successful and ongoing initiatives include that of Indian Institute of Technology's (IITs), National Institute of Technology's (NITs), Council of Scientific and Industrial Research (CSIR) labs, Saurashtra University, Indian Institute of Science (IISc), Aligarh Muslim University (AMU), Mahatma Gandhi University (MGU), Krishikosh, Goa University, Cochin University of Science and Technology (CUSAT), Central Marine Fisheries Research Institute (CMFRI), National Institute of Oceanography (NIO), Indian Institute of Geomagnetism (IIGM), National Metallurgical Laboratory (NML), Madras Diabetes Research Foundation (MDRF), Indian Institute of Astrophysics (IIA), University of Kashmir (UoK) etc as on 10<sup>th</sup> June 2018. Out of the 17 Institutional ETD initiatives listed above only 4 exclusive ETD repositories exist which includes National Institute of Technology (NIT), Rourkela, Mahatma Gandhi University (MGU), Saurashtra University and Indian Institute of Science (IISc) etc. Excluding 4 ETD repositories mentioned above all other remaining 13 repositories host Theses as part of the collection, along with Theses, other types of materials like Articles, Conference papers, Patents, Books and other types of materials are archived. These repositories are more sort of an Institutional Repositories (IR) in nature, in which Research Papers, Theses, Conference Proceedings of a particular Institutions are made available as observed. Indian Institute of Technology's (IITs) involves group of 23 IITs, ETD initiatives involves initiative by IIT, Hyderabad and IIT, Delhi listed on OpenDOAR.

Out of the 4 ETD repositories listed above i.e. National Institute of Technology (NIT), Rourkela, Mahatma Gandhi University (MGU), Saurashtra University and Indian Institute of Science (IISc), National Institute of Technology, (NIT), Rourkela is using EPrints software, Mahatma Gandhi University (MGU) is using Nitya – a commercial software, Saurashtra University is using EPrints software and Indian Institute of Science (IISc) is using DSpace software for hosting ETD repository. National Institute of Technology, (NIT), Rourkela, Mahatma Gandhi University (MGU) and Saurashtra University is offering open access to full text Theses, where as for accessing Indian Institute of Science (IISc) ETD repository, User name and Password is required and is accessible to only those having it. The ETD repository of National Institute of Technology (NIT), Rourkela covers subjects like Chemistry, Chemical Engineering, Engineering and Technology, Civil Engineering, Computer and Information Science, Electrical Engineering, Electronics and Communication Engineering, Mechanical Engineering, Management and several allied subjects. Mahatma Gandhi University (MGU) and Saurashtra University's ETD repository is Multidisciplinary in nature and it covers all the subjects of Arts, Commerce and Science streams. An analysis of the Saurashtra University's ETD repository shows that up to year 2013 only they have hosted ETDs in their repository later on they have signed MoU with INFLIBNET

on 13<sup>th</sup> October 2015 and they started depositing Theses to Shodhganga, 2013 onwards. Table 1 shows the current status of ETD initiatives at Institutional Level as on 13<sup>th</sup> June 2018.

<b>Sr . No.</b>	<b>Name of the Institute</b>	<b>Website</b>	<b>Software used</b>	<b>Repository</b>	<b>Theses uploaded</b>
1	IIT, Hyderabad	<a href="http://raiiith.iith.ac.in/view/type/thesis.html">http://raiiith.iith.ac.in/view/type/thesis.html</a>	EPrints	OpenDOAR	922
2	IIT, Delhi	<a href="http://eprint.iitd.ac.in/dspace/handle/2074/378">http://eprint.iitd.ac.in/dspace/handle/2074/378</a>	DSpace	OpenDOAR & ROAR	4662
3	NIT, Rourkela	<a href="http://ethesis.nitrkl.ac.in/">http://ethesis.nitrkl.ac.in/</a>	EPrints	OpenDOAR & ROAR	439
4	CSIR	<a href="http://eprints.csirexplorations.com/">http://eprints.csirexplorations.com/</a>	EPrints	ROAR	987
5	Saurashtra University	<a href="http://etheses.saurashtrauniversity.edu/">http://etheses.saurashtrauniversity.edu/</a>	EPrints	OpenDOAR & ROAR	1064
6	Aligarh Muslim University	<a href="http://ir.amu.ac.in/view/type/">http://ir.amu.ac.in/view/type/</a>	EPrints	OpenDOAR	10115
7	Indian Institute of Science (IISc)	<a href="http://etd.ncsi.iisc.ernet.in/">http://etd.ncsi.iisc.ernet.in/</a>	DSpace	OpenDOAR & ROAR	3637
8	Mahatma Gandhi University	<a href="http://mgutheses.org/">http://mgutheses.org/</a>	Nitya	OpenDOAR & ROAR	2551
9	Krishikosh	<a href="http://krishikosh.egranth.ac.in/">http://krishikosh.egranth.ac.in/</a>	DSpace	OpenDOAR	74081
10	Goa University	<a href="http://irgu.unigoa.ac.in/">http://irgu.unigoa.ac.in/</a>	DSpace	OpenDOAR	742
11	Cochin University of Science and Technology	<a href="https://dyuthi.cusat.ac.in/xmlui/community-list">https://dyuthi.cusat.ac.in/xmlui/community-list</a>	DSpace	OpenDOAR	2535
12	Central Marine Fisheries Research Institute	<a href="http://eprints.cmfri.org.in/view/doctype/thesis.html">http://eprints.cmfri.org.in/view/doctype/thesis.html</a>	Eprints	OpenDOAR	301
13	National Institute of Oceanography	<a href="http://drs.nio.org/drs/">http://drs.nio.org/drs/</a>	DSpace	OpenDOAR	58
14	Indian	<a href="http://library.iigm.res.in:8080/jspui/">http://library.iigm.res.in:8080/jspui/</a>	DSpace	OpenDOAR	22

	Institute of Geomagnetism				
15	Natioanal Metallurgical Laboratory	<a href="http://eprints.nmlindia.org/view/type/">http://eprints.nmlindia.org/view/type/</a>	Eprints	OpenDOAR	67
16	Madras Diabetes Research Foundation	<a href="http://mdrf-eprints.in/view/type/">http://mdrf-eprints.in/view/type/</a>	Eprints	OpenDOAR	2
17	Indian Institute of Astrophysics	<a href="http://prints.iiap.res.in/community-list">http://prints.iiap.res.in/community-list</a>	DSpace	OpenDOAR	134
18	University of Kashmir	<a href="http://dspace.uok.edu.in:8080/jspui/community-list">http://dspace.uok.edu.in:8080/jspui/community-list</a>	DSpace	OpenDOAR	684

**Table 1: ETD initiatives at Institutional Level**

## 6. Methodology and Scope

The current study undertaken studied the database of OpenDOAR and ROAR to report the working status of exclusive ETD repositories listed on it. The scope of the study is limited to Open Source Solution based Open Access (OA) full text exclusive ETD repositories. OpenDOAR provides a quality-assured listing of Open Access repositories around the world. It harvest and assign metadata to allow categorization and analysis to assist wider use and exploitation of repositories. OpenDOAR is maintained by SHERPA services, based at Centre for Research Communication at the University of Nottingham. It is primary a service to enhance and support the academic and research activities of global community (<http://www.opendoar.org>). Whereas ROAR is hosted at University of Southampton and is funded by JISC, United Kingdom (UK). ROAR is part of EPrints.org (<http://roar.eprints.org/>).

## 7. ETD initiatives of India – A Status Report

At a National level only Shodhganga qualifies for current study, whereas at Institutional level only 2 Institutes qualifies for the study which includes Saurashtra University and National Institute of Technology (NIT), Rourkela which provides open access to full text Theses. Shodhganga is using DSpace software, whereas Saurashtra University and National Institute of Technology (NIT), Rourkela is using EPrints software for hosting ETD repository.

### 7.1 Shodhganga (<http://shodhganga.inflibnet.ac.in/>) – Status Report

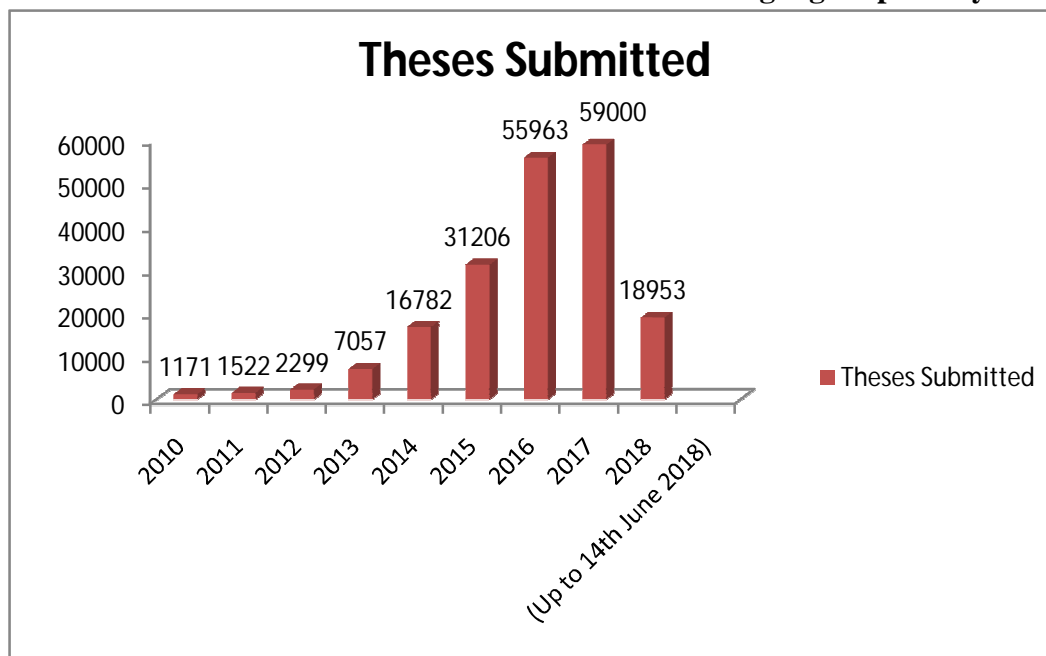
Shodhganga is the first unified efforts to host all the PhD Theses submitted and accepted in the Indian universities for open access by academic world (Gupta and Gupta, 2014). UGC has set Guidelines and conditions for joining INFLIBNET's Shodhganga ETD repository; UGC also provides funds for digitization of Theses, which has encouraged Indian universities to join



INFLIBNET. The research scholar needs to submit the Theses by each segment wise i.e. title page, certificate, acknowledgement, contents, chapters etc in Adobe PDF format most preferred but other formats like HTML, XML, Tex and LaTeX are also allowed, the researcher can submit copy of certificate in either PNG or JPEG format. The DSpace software used by Shodhganga uses internationally recognized protocols and interoperability standards. DSpace supports “Open Archives Initiative Protocol for Metadata Harvesting” (OAI-PMH 2.0) and uses a qualified version of Dublin Core schema for its metadata standards (<http://shodhganga.inflibnet.ac.in/>). Currently 1,93,953 full text Theses are uploaded, 325 universities are contributing and 385 universities have signed MoU with INFLIBNET as on 14<sup>th</sup> June 2018. Table 2 shows year wise submission of Theses in Shodhganga repository.

Sr. No.	Year	Theses Submitted
1	2010	1171
2	2011	1522
3	2012	2299
4	2013	7057
5	2014	16782
6	2015	31206
7	2016	55963
8	2017	59000
9	2018 (Up to 14 <sup>th</sup> June 2018)	18953

**Table 2: Year wise submission of Theses in Shodhganga repository**



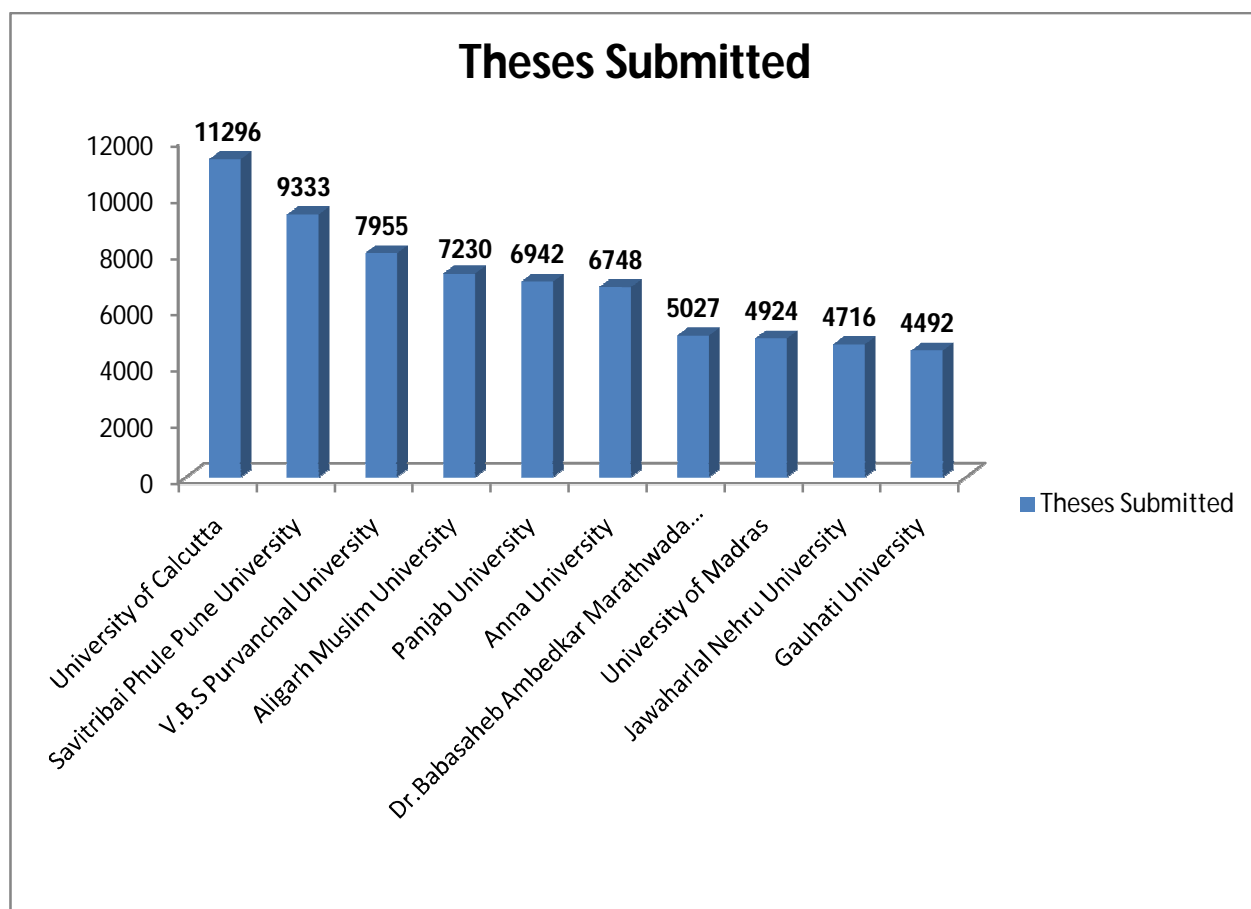
**Figure 1: Year wise submission of Theses in Shodhganga repository**



Table 3 shows top 10 universities contributing in Shodhganga repository as on 14<sup>th</sup> June 2018, which totals 68,663 and accounts for 35.40% of total submission.

Sr. No.	University	Theses Submitted
1	University of Calcutta	11296
2	Savitribai Phule Pune University	9333
3	V.B.S Purvanchal University	7955
4	Aligarh Muslim University	7230
5	Panjab University	6942
6	Anna University	6748
7	Dr.Babasaheb Ambedkar Marathwada University	5027
8	University of Madras	4924
9	Jawaharlal Nehru University	4716
10	Gauhati University	4492
	<b>Total</b>	<b>68,663</b>

**Table 3: Top 10 Universities contributing in Shodhganga repository**



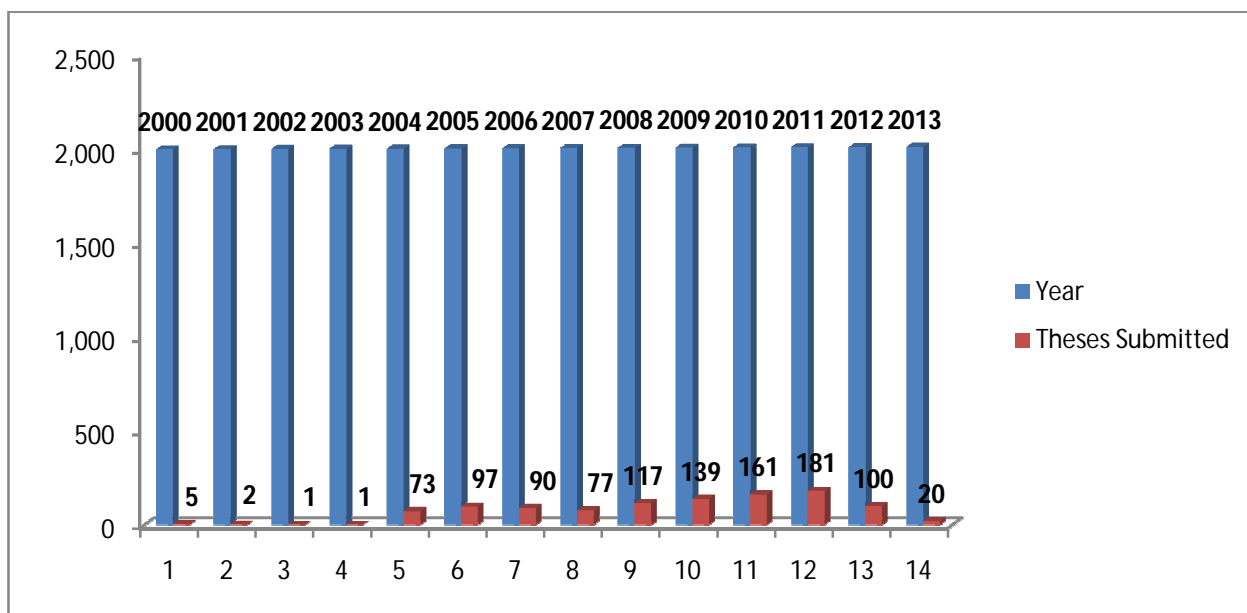
**Figure 2: Top 10 Universities contributing in Shodhganga repository**

## 7.2 Saurashtra University (<http://etheses.saurashtrauniversity.edu/>) – Status Report

Saurashtra University Research Archive (SURA) is a project of the Central Library of Saurashtra University. It is an online store of freely, publicly, permanently available full text research material produced by staff and researcher at the Saurashtra University and the colleges or institutes affiliated to the University. The Eprints software used is OAI-PMH 2.0 compliant and it supports Dublin Core metadata schema. The repository act as a focus for the University's research output and helps to manage the research process in future (<http://etheses.saurashtrauniversity.edu/>). An analysis of Saurashtra University Etheses repository reveals that up to year 2013, Theses were deposited and archived. Saurashtra University signed MoU with INFLIBNET on 13<sup>th</sup> October 2015 and subsequently all the PhD Theses which were archived on Saurashtra University's Etheses repository were uploaded on INFLIBNET. Saurashtra University's Etheses repository contains PhD theses in a single PDF file, whereas Shodhganga contains PhD Theses in segment wise files. Table 4 shows PhD Theses deposited in Saurashtra University Etheses repository from year 2000 to 2013. Although the university no longer is accepting PhD Theses for hosting but the repository website is still active and accessible. The repository contains PhD theses of Gujarati (389), English (581) and Hindi (94) languages, the figures in the brackets contains the number of theses by languages.

<b>Sr. No.</b>	<b>Year</b>	<b>Theses Submitted</b>
1	2000	5
2	2001	2
3	2002	1
4	2003	1
5	2004	73
6	2005	97
7	2006	90
8	2007	77
9	2008	117
10	2009	139
11	2010	161
12	2011	181
13	2012	100
14	2013	20
	<b>Total</b>	<b>1064</b>

**Table 4: Year wise contribution of PhD Theses from 2000 to 2013**



**Figure 3: Year wise contribution of PhD Theses from 2000 to 2013**

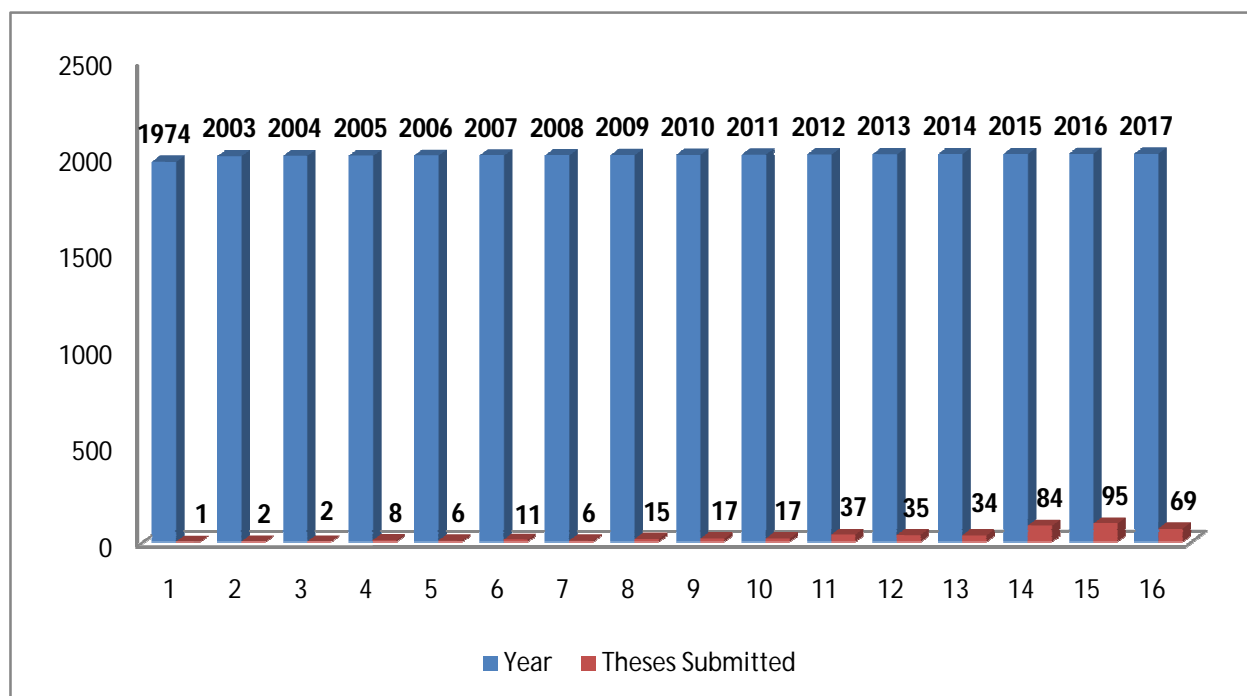
### 7.3 National Institute of Technology, Rourkela (<http://ethesis.nitrkl.ac.in/>) – Status Report

The official repository of electronic theses named ethesis@nitr is the exclusive ETD repository of National Institute of Technology (NIT), Rourkela. This repository is an attempt to make all locally produced theses more visible to global users. It is mandatory for students of all courses offered by NIT, Rourkela from all discipline to upload the final version of the theses submitted as partial fulfillment of the degree (<http://ethesis.nitrkl.ac.in/>). This repository is an open access repository and all Theses are uploaded in a single PDF file. This repository provides uninterrupted access to the website as it is observed from 10<sup>th</sup> to 16<sup>th</sup> June 2018. Table 5 shows the number of Theses deposited by year.

Sr. No.	Year	Theses Submitted
1	1974	1
2	2003	2
3	2004	2
4	2005	8
5	2006	6
6	2007	11
7	2008	6
8	2009	15
9	2010	17
10	2011	17
11	2012	37
12	2013	35
13	2014	34

14	2015	84
15	2016	95
16	2017	69
	<b>Total</b>	<b>439</b>

**Table 5: Theses deposited by year**



**Figure 4: PhD Theses deposited on 1974 and 2003 to 2017**

## 8. Discussion

ETD initiative at National Level named Shodhganga has been successful due to the funding and support provided by INFLIBNET. More and more number of Universities and CFTIs are signing MoU with INFLIBNET to participate in Shodhganga repository. The research scholars and Faculty members have benefitted immensely by Shodhganga. Whereas other Institutional initiatives which were active are non functional today, due to various issues like lack of support, funding problem, lack of skilled manpower, lack of infrastructure, lack of institution policy etc (Hirwade, 2011). The data analysis shows that only 18 Institutional ETD efforts are in active state at present out of 39 initiatives listed on OpenDOAR. The data analysis also shows contribution of PhD Theses are increasing in numbers year by year on Shodhganga. The policies related to Metadata reuse, Full data item policy, content policy, Submission policy and preservation policy are undefined by many Institutional ETD repository including Shodhganga as well, except IIT, Hyderabad, NIT, Rourkela, Saurashtra University, Madras Diabetes Research Foundation (MDRF), National Metallurgical Laboratory (NML) and Central Marine Fisheries Research Institute (CMFRI) which have defined some of the policies listed above as

observed on OpenDOAR. The participation of more and more numbers of Universities and CFTIs is itself a proof of success of Shodhganga. The PhD Theses are archived in Shodhganga in a structured manner unlike other repositories in which ambiguity is there. INFLIBNET also assist the participating Universities in Shodhganga by providing access to internationally renowned anti-plagiarism software service to detect plagiarism in theses and dissertations which is a serious issue. Although the UGC regulation 2016 (minimum standards and procedures for the award of MPhil and PhD degrees) mandates mandatory submission of PhD Theses in electronic form, the researcher can impose restriction/embargo on open access as a special case, if so desired by the university/research scholar (<http://shodhganga.inflibnet.ac.in/>). In UGC guideline the copyright issue and IPR (Intellectual Property Right) policy issue is left on the universities, i.e. who will hold the copyrights and IPR of the ETD – the university or researcher (Gupta and Gupta, 2014).

## **9. Conclusion and recommendations**

The development of a country depends on the kind of serious research work carried out by a country. Shodhganga has been a successful initiative by INFLIBNET, it provides seamless access to ETDs. During the period of current study from 4<sup>th</sup> June to 18<sup>th</sup> June 2018 the websites of Shodhganga, NIT, Rourkela and Saurashtra University were never under maintenance and their server was never down. This indicates the serious efforts made by the Institutions mentioned above. Shodhganga if maintained as a single unique ETD repository of India will foster research. The ETD initiative Shodhganga is the largest initiative by any developing country and there is a need for spreading awareness among researchers to increase its use. The Government of India should start funding support to maintain ETD repositories. The Shodhganga repository will soon cross the mark of 2 lacs open access PhD Theses in coming months, this itself is a remarkable accomplishment within a short span of 8 years from 2010 to 2018. The ETD initiatives by other institutions who have not registered on OpenDOAR and ROAR must be reported so as to benefit maximum researcher. Open Access to ETDs should be encouraged; nowadays born digital Theses can be easily created and maintained. The Shodhganga repository should display metrics relating to views, citations and downloads so as to guide researchers about more relevant PhD Theses of their interest.

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