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**Impact Analysis of  ETD Repository through the
Lens of Scopus Citing Documents**

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Introduction:

Research impact refers to a demonstrable contribution of a specific research output to the academy, education, economy, society, culture, politics, policy, health, environment, professional services and other areas of life (Science Foundation Ireland 2013: 38–53).

The academic impact can be determined by means of analysing citations received from the ETDs.

Literature Review:

- ✚ The most widely used method to measure the ‘success’ of the IR is to count the gross number of items in the live repository and to measure retrieval by counting hits and downloads,
- ✚ Many advocated ‘time-increment measures’ rather than one-time-only counts,
- ✚ Other proposed the use of the Registry Service ROAR (Registry of Open Access Repositories) to examine the performance of repositories according to the daily activity of any of its repositories with counts of days with 1-9 deposits (weak); 10-99 (healthy) and 100 (batch imports)
- ✚ Some pointed out for the analysis of dataset of IR use and performance from the Repository Analytics and Metrics Portal (RAMP) (Arlitsch & Wheeler, 2020; OBrien et al., 2017),
(RAMP is distinct from other IR metrics services because it harvests data from Google Search Console (Google, 2020) for each participating IR’s pages and hosted content files returned from searches on Google properties (e.g., web search, image search, Google Scholar)
- ✚ The citation counts obtained through Google Scholar (GS) and the altmetrics data obtained from Dspace & altmetric.com,
- ✚ Mendeley reader counts, a known source of scholarly-like impact data,
- ✚ The citation counts obtained through Scopus and Web of Science.

Objectives of the Study:



The main aim was to analyse the impact of Shodhganga ETD repository by means of reference analysis of citing documents retrieved from Scopus.

- ✚ To assess the impact of the national ETD repository of India, Shodhganga, and its theses,
- ✚ To know the top theses from Shodhganga that are referred to or cited,
- ✚ To identify the top Universities from Shodhganga whose theses are referred to or cited,
- ✚ Comparing total thesis views and citations to theses, etc.,
- ✚ For overall analysis of guides/supervisors of whom more theses are cited, from which years' awarded theses are cited maximum, keywords, etc.

Methodology used for the Study:

- ✦ The required data, the list of citing documents were retrieved from **Elsevier's Scopus** database. Linked Theses metadata details were extracted from **Shodhganga**. The data was collected on **6th June 2023**.
- ✦ Study is limited to the citing documents published globally till **2022**.
- ✦ **References search feature** of Scopus was used to search using search terms/links such as **shodhganga**, **shodhganga.inflibnet.ac.in**, **baadalsg.inflibnet.ac.in**, **sg.inflibnet.ac.in**, **retrievedfromshodhganga.inflibnet.ac.in**.
- ✦ A total of **1764 citing documents** were retrieved first, with **2042 references** with the aforementioned terms/links.
- ✦ Out of the total of 2042 references, **271 references** were not considered for the study. **(25 + 127 + 119 = 271)**
(1467 unique handles linked to Theses in Shodhganga with duplication of 304 handles from those references, making it a total of **1771 handles** of Theses that are cited.
- ✦ Further, from the **1771 handles**, the Theses details of **06 handles were not found and 1 thesis was withdrawn** hence details were not in Shodhganga.
- ✦ Thus, the analysis and results are based on the details of only **1764 handles/theses**.



Results and Findings:

- ✦ Citations to Shodhganga theses are very less in Scopus publications.
 - ✦ Only 1492 (1467+25) unique handles/works of the total 4,10,691 theses works maintained in the Shodhganga repository till 2022, have been cited by publications indexed in Scopus as of the data collection date of 6th June 2023.
 - ✦ This represents only a fraction of the total theses with a total of 1796 (1771+25) citations and an average of 0.0044 citations per thesis.
 - ✦ Approximately, only 0.36% of all Theses works hosted in the Shodhganga repository had been cited, with some being cited up to 09 times in Scopus publications.
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- ✦ To compare, (Angelo et al., 2016) reported in their poster that just 1068 unique items which constituted about only 2% of all items in New Zealand Institutional Repositories at NZresearch.org.nz had been cited 1902 times in articles indexed by Scopus.
 - ✦ As a result of these 2 studies, it can be concluded that although at a very modest rate, theses from ETDs are getting cited and becoming part of mainstream scholarly communication.

Findings and Discussions:

✚ Table 1 shows the top 15 cited Theses details with the number of times they have been cited in Scopus publications.

✚ But, when compared the listed theses with Shodhganga's top 10 viewed theses list taken from the last three FYs: 2022-23, 2021-22 & 2020-21 INFLIBNET Annual Reports, no relation was found between both.

✚ No thesis from the top 10 viewed theses appears in the list of top 15 cited theses.

unique handle	publisher.university	publisher.institution/department/fac.	thesis title	contributor.guide	creator.researcher	year.completed	nos. time cited
https://hdl.handle.net/10603/1221	Pondicherry Univ.	Pondicherry Engineering College	Optimal, power dispatch and pricing for deregulated power industry	Palanivelu, T G	Gnanadass, R	2005	9
https://hdl.handle.net/10603/3534	Punjabi Univ.	Dept. of Economics	Unorganised manufacturing sector in India during postliberalisation period	Anupama	Gupta, Neeru	2010	9
https://hdl.handle.net/10603/5247	Pondicherry Univ.	Pondicherry Engineering College	Investigations on power system operation and management in restructured market	Manivannan, K; Gnanadass, R	Rajathy, R	2011	9
https://hdl.handle.net/10603/24460	Anna Univ.	Faculty of Information and Communication Engineering	Efficient analysis of satellite image denoising and resolution enhancement for improving classification accuracy	Ramar, K	Sree Sharmila, T	2012	8
https://hdl.handle.net/10603/43041	Univ. of Lucknow	Dept. of Botany	Application of multi proxy tree ring parameters in the reconstruction of climate vis a vis glacial fluctuation from the eastern Himalaya	Bhattacharyya, Amalava	Shekhar, Mayank	2013	7
https://hdl.handle.net/10603/154792	Univ. of Calcutta	Dept. of Technology	Computer studies of silicon carbide gallium nitride and indium phosphide based IMPATT devices operating in MM wave and terahertz region and corresponding studies on the photo sensitivity of the devices	Roy, Sitesh Kumar	Mukherjee, Moumita	2009	6
https://hdl.handle.net/10603/31769	Univ. of Delhi	Dept. of Library & Information Science	Use of library classification schemes in the ICT environment in selected libraries in national capital region a study	Singh, K P	Gulati, Dipti	2013	6
https://hdl.handle.net/10603/37614	Anna Univ.	Faculty of Science and Humanities	Development of titanium nanotube Arrays for orthopaedic applications	Rajenen, N	Indira, K	2014	6
https://hdl.handle.net/10603/4267	Punjabi Univ.	Dept. of Commerce	Pilgrimage tourism in North Indian evaluation	Arora, R S	Tomer, Padmini	2011	6
https://hdl.handle.net/10603/6102	Kannur Univ.	Dept. of Information Technology	Analysis and design of tamperproof and contrastenhanced secret sharing based on visual cryptography schemes	Babu Anto, P	Thomas, Monoth	2011	6
https://hdl.handle.net/10603/705	Saurashtra Univ.	Dept. of Business Management	An analysis of financial performance of state road transport corporation in Gujarat	Chauhan, Pratap Sinh L	Trivedi, Shilpa M	2010	6
https://hdl.handle.net/10603/1271	Pondicherry Univ.	Pondicherry Engineering College	Performance evaluation of swarm intelligence-based power system Optimization strategies	Palanivelu, T G	Raj, P Ajay D Vimal	2008	5
https://hdl.handle.net/10603/23970	Tata Institute of Social Sciences	School of Social Work	Study of institutions of social work education and role of social work educators in developing indigenous knowledge	Lata, Narayan	Tirmare, Prabha	2013	5
https://hdl.handle.net/10603/4566	Jawaharlal Nehru Technological Univ.	Dept. of Electrical and Electronics Engineering	Design and development of cluster algorithms for power system problems	Ramana, N V	Amarnath, R V	2012	5
https://hdl.handle.net/10603/96820	Assam Univ.	Dept. of Ecology and Environmental Science	Studies on Litter Production Decomposition and Nutrient Recycling in Tea Agro Ecosystem of Cachar District Southern Assam	Dutta, B.K ; Ray, D.C	Singha, Deepti Mala	2015	5

Findings and Discussions:

- To identify which university awarded theses has received the most citations, the name of the university that awarded the studied theses was taken from Shodhganga ETD repository.
- 1764 theses were awarded by 194 different universities.
- Table 2 lists the name of **the top 20 universities with more than 20 citations each based on the total number of citations received.**

publisher. university	nos. time cited	publisher. university	nos. time cited
Anna University	150	Manonmaniam Sundaranar University	35
Mahatma Gandhi University	64	Jawaharlal Nehru University	35
Pondicherry University	51	Karnatak University	31
Cochin University of Science and Technology	48	Manipal University	30
University of Calcutta	46	Shivaji University	26
Aligarh Muslim University	45	Gujarat University	26
Punjabi University	44	Maharaja Sayajirao University of Baroda	25
Gauhati University	41	Maharshi Dayanand University	21
Savitribai Phule Pune University	40	University of Calicut	21
University of Mysore	40	Jawaharlal Nehru Technological University	21

Findings and Discussions:

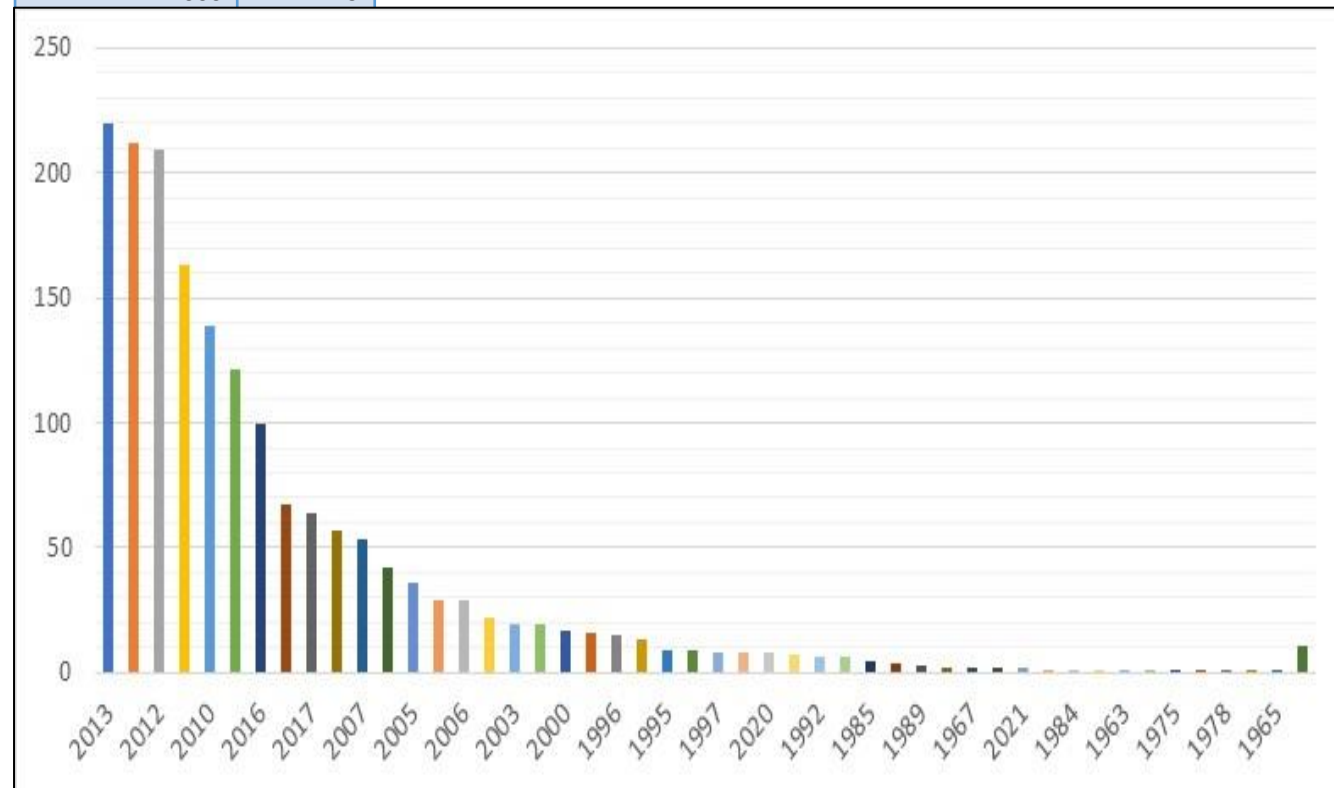
- To identify the guides/supervisors' names whose supervised theses were cited most, the names of each guide were taken from the theses.
- The names of the guides or supervisors could not be identified in 1 of the 1764 Shodhganga theses that were investigated.
- With a total occurrence of 1953 times, 1764 theses were guided by 1562 different guides/ supervisors based on their names filtered with the department and university name.
- Table 3 lists the top 17 names of guides/supervisors with more than 5 citations each based on the total number of citations their guided theses have received.

contributor. guide	publisher. university	publisher.institution /dept/faculty/college	nos. time cited
Palanivelu, T G	Pondicherry University	Pondicherry Engineering College	14
Gnanadass, R	Pondicherry University	Pondicherry Engineering College	9
Manivannan, K	Pondicherry University	Pondicherry Engineering College	9
Anupama	Punjabi University	Department of Economics	9
Ramar, K	Anna University	Faculty of Information and Communication Engineering	8
Rajenen, N	Anna University	Faculty of Science and Humanities	7
Bhattacharyya, Amalava	University of Lucknow	Department of Botany	7
Babu Anto, P	Kannur University	Department of Information Technology	6
Arora, R S	Punjabi University	Department of Commerce	6
Chauhan, Pratap Sinh L	Saurashtra University	Department of Business Management	6
Roy, Sitesh Kumar	University of Calcutta	Department of Technology	6
Singh, K P	University of Delhi	Department of Library & Information Science	6
Ramachana, V	Anna University	Faculty of Electrical and Electronics Engineering	5
Dutta, B.K	Assam University	Department of Ecology and Environmental Science	5
Ray, D.C	Assam University	Department of Ecology and Environmental Science	5
Ramana, N V	Jawaharlal Nehru Technological University	Department of Electrical and Electronics Engineering	5
Lata, Narayan	Tata Institute of Social Sciences	School of Social Work	5

Findings and Discussions:

- To determine which year's completed theses have received the most citations, the year of completion of cited theses was taken from Shodhganga ETD repository.
- But in 11 of the 1764 Shodhganga theses examined, the year of completion was not found.
- 1753 theses were completed in 47 different years.
- Table 4 and Graph 1 present **the top 15 years with more than 25 citations each based on the total number of citations received.**
- Theses completed in 22 different years have been cited more than 10 times each.

year. completed	nos. time cited
2013	220
2011	212
2012	209
2014	163
2010	139
2015	121
2016	100
2009	67
2017	64
2008	57
2007	53
2018	42
2005	36
2004	29
2006	29

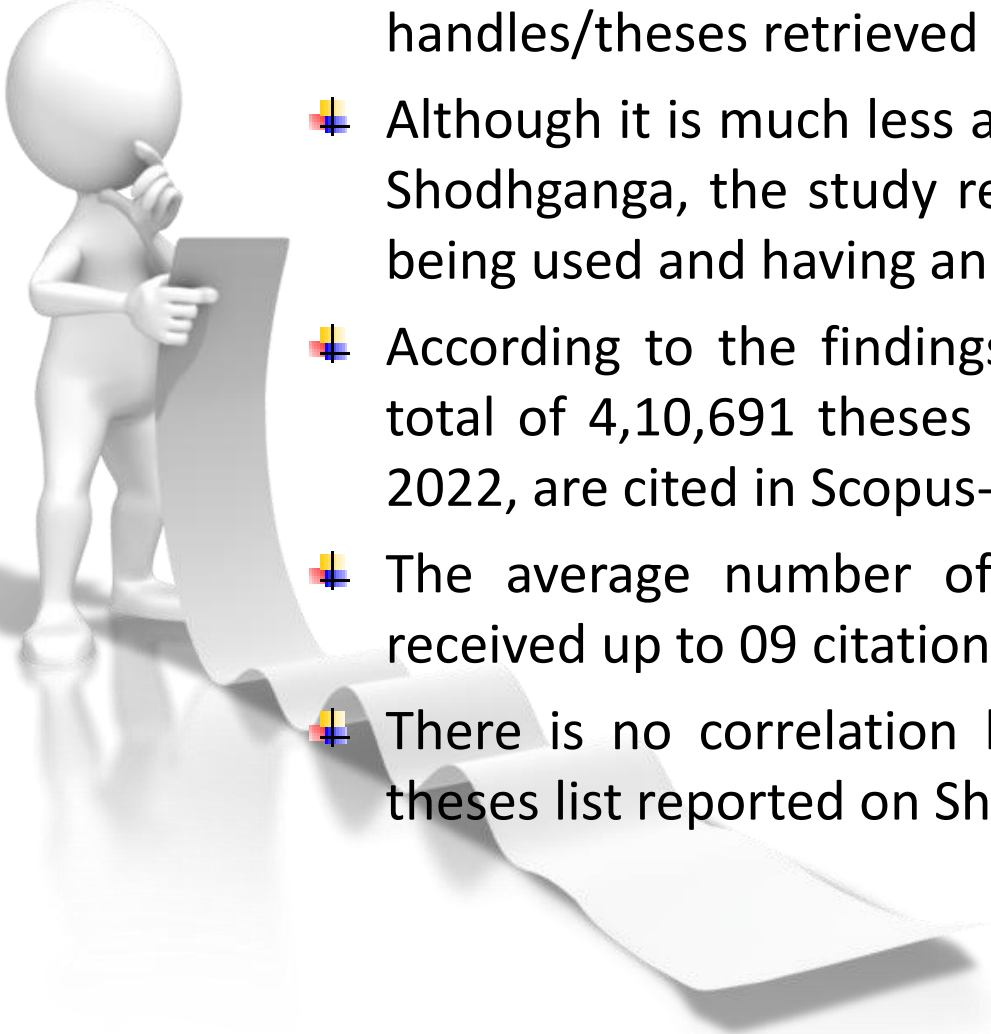


Findings and Discussions:

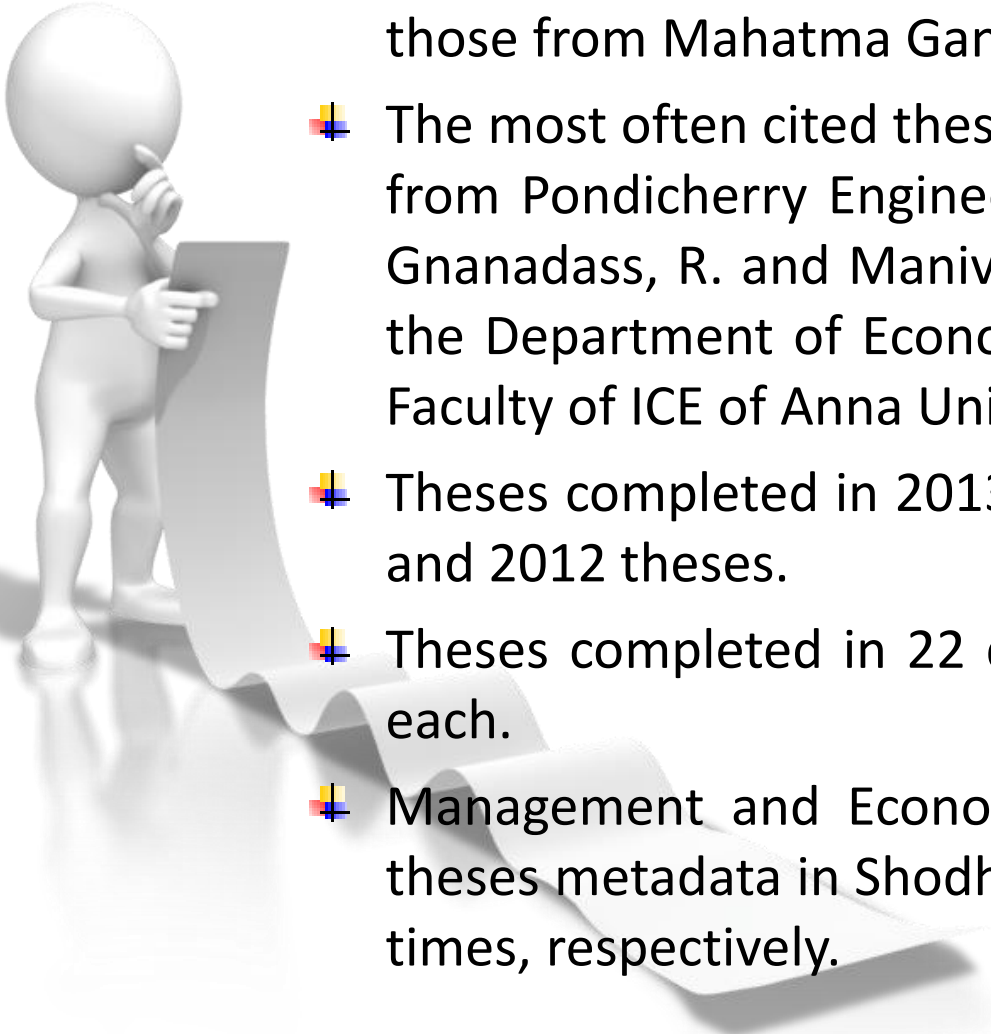
- To investigate which keywords have been used most frequently in the studied theses, the keywords indicated in the theses metadata in the Shodhganga ETD repository were retrieved.
- Of the 1764 theses, 228 did not have any keywords mentioned in their metadata.
- With a total occurrence of 5942 times, 3678 unique keywords were mentioned in 1536 theses' metadata in Shodhganga.
- The top keywords mentioned in the theses metadata in the Shodhganga ETD repository are listed in Table 5.**

keywords	nos. time occurred	keywords	nos. time occurred	keywords	nos. time occurred
Management	56	Kerala	16	Life Sciences	12
Economics	43	Library and Information Science	16	Education	12
Chemistry	35	Engineering	16	Electronics Engineering	12
commerce	33	Geography	15	Psychology	11
Social Sciences	31	Development	14	Study	11
India	27	Growth	13	Industry	11
Computer Science	27	History	13	Sociology	11
Physics	25	Tourism	13	pharmacy	11
Electrical engineering	23	Computer	13	English	11
Engineering and Technology	21	Botany	13	literature	10
Civil Engineering	21	Mechanical engineering	12	Marketing	10
Information and communication engineering	18	Economics and Business	12	Others	5294

CONCLUSIONS:

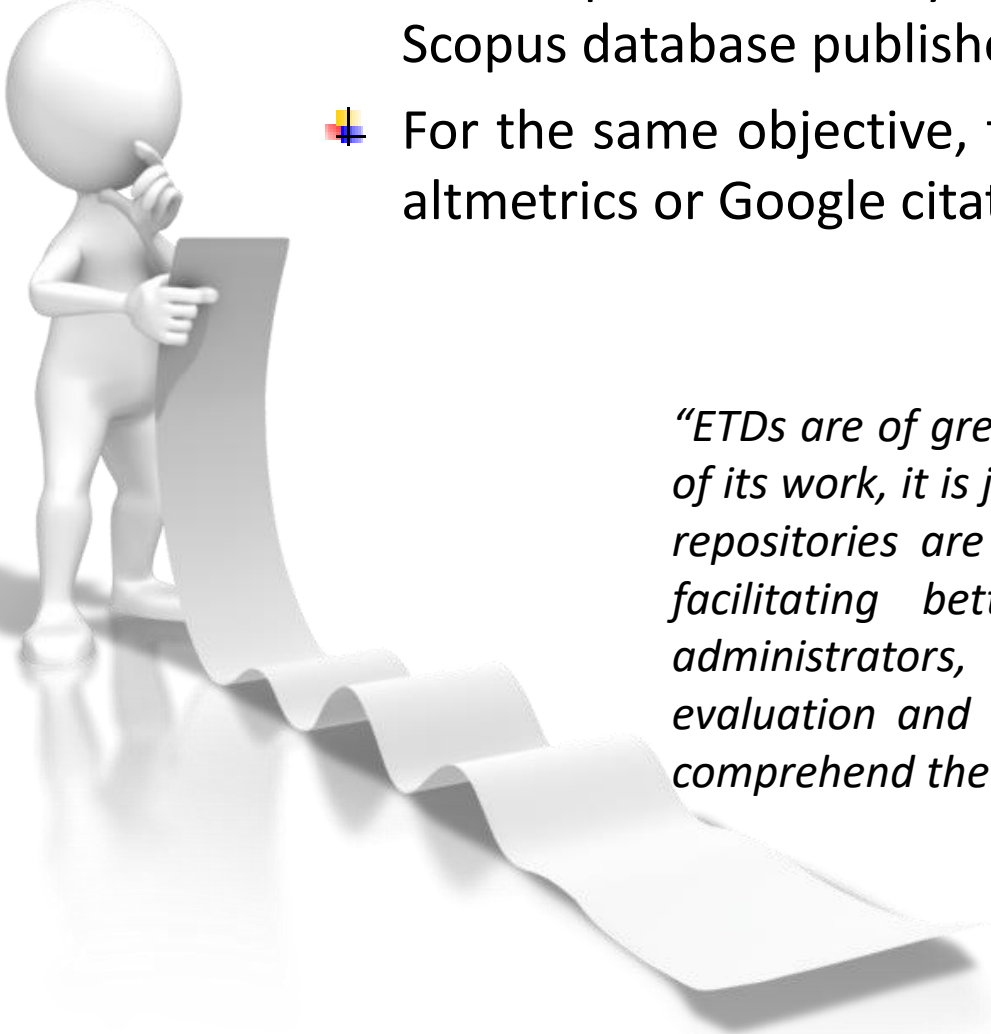
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- ✚ The analysis and findings of this study are based on the details of only 1764 handles/theses retrieved from the reference list of Scopus citing documents.
 - ✚ Although it is much less as of date in comparison to the total theses hosted in Shodhganga, the study reveals that Shodhganga and its theses collection are being used and having an impact on scholarly publications.
 - ✚ According to the findings, only 1492 unique thesis works (0.36%), out of a total of 4,10,691 theses works maintained in the Shodhganga repository till 2022, are cited in Scopus-indexed publications.
 - ✚ The average number of citations per thesis is 0.0044, while some have received up to 09 citations in Scopus publications.
 - ✚ There is no correlation between the top cited theses and the top viewed theses list reported on Shodhganga.

CONCLUSIONS:

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- ✚ Anna University theses have received the most citations overall, followed by those from Mahatma Gandhi University and Pondicherry University.
 - ✚ The most often cited theses were those guided/supervised by Palanivelu, T. G., from Pondicherry Engineering College of Pondicherry University, followed by Gnanadass, R. and Manivannan, K., also from that institution, Anupama from the Department of Economics of Punjabi University, and Ramar, K., from the Faculty of ICE of Anna University.
 - ✚ Theses completed in 2013 have received the most citations, followed by 2011 and 2012 theses.
 - ✚ Theses completed in 22 different years have been cited more than 10 times each.
 - ✚ Management and Economics are the top two keywords mentioned in the theses metadata in Shodhganga ETD repository, with an occurrence of 53 & 46 times, respectively.

DISCUSSIONS:

- ✚ The scope of the study is limited to only the citing documents indexed in the Scopus database published till 2022.
- ✚ For the same objective, further large-scale research can be carried out using altmetrics or Google citations analysis, etc.



“ETDs are of great beneficence. Building an ETD repository is not the end of its work, it is just the beginning. Populating contents and enriching ETD repositories are much necessary with value additions to it along with facilitating better access to it through technology. Additionally, administrators, librarians, and repository managers must make evaluation and assessment of ETDs a primary goal if they are to fully comprehend the value of ETDs as a service.”



Thank You!

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