SELF-ARCHIVING PRACTICES BY LIBRARY & INFORMATION SCIENCE PROFESSIONALS IN INDIA

Ashiya Ahmadi

Mohammad Nazim

The purpose of study is to know the self-archiving practices by Library and Information Science (LIS) professionals in India using e-LIS international open repository. Data was imported from the website of the e-LIS (e-prints in Library and Information Science) in Microsoft Excel format for analysing self-archiving practices by LIS professionals in India. A total of 908 publications, archived by Indian LIS professionals in e- LIS till 31 December 2015, were collected for analysing trends of self-archiving in the field of LIS. The self-archiving practices among LIS professionals in India are much common as India occupied first position among Asian countries and fourth position in the list of top contributing countries of the world. Despite the well-developed library systems, LIS professionals in USA, Canada and United Kingdom are lagging behind in the race of self-archiving practices in the field of LIS. Even China, the most populated country, with a fast growing economy is the least contributor to e-LIS. It may be concluded that population vis-a-vis level of development of the country has no significant relationship with the self-archiving practices.

Keywords: Open Access; self- archiving; e-LIS; Library and Information Science.

INTRODUCTION

Academicians and researchers need wide and unrestricted access to the scholarly research literature for updating their existing knowledge and carrying out new researches. Libraries of academic and research institutions subscribe to a variety of electronic and print sources of information and make them available to the academicians and students. Due to dwindling budgets and rising costs of information sources libraries have been forced to cut down subscription to journals and other sources of information. Open access (OA) has emerged as an alternative to the traditional subscription-based scholarly communication model.

Ashiya Ahmadi
Department of Library and Information Science,
Aligarh Muslim University, Aligarh
ashiyamu2007@gmail.com

Mohammad Nazim
Department of Library and Information Science,
Aligarh Muslim University, Aligarh
nazim76@gmail.com

Corresponding Author
Mohammad Nazim

OA is free of charge, immediate, and permanent online access to the full text of research articles for anyone, worldwide, without the severe restrictions on use commonly imposed by publishers' copyright agreements [1]. There are two widely accepted mechanisms for making research outcome freely accessible: golden and green road to open access. Golden road provides OA to its peer-reviewed research articles published in OA journals, whereas green road permits authors to provide OA to their own published articles by either putting them on their personal and institutional websites or submitting them in the OA institutional digital repositories. This practice is commonly known as self-archiving.

Self-archiving is one of the viable options for increasing the impact of research by making it freely and widely accessible. Increasingly, researchers all over the world are taking interest in self-archiving. However, the question is why do researchers go for self-archiving of their work? Self-archiving increases the visibility of research work and enhances teaching, learning and research activities, as reported in the findings of a recent study [2]. Results of some studies have also

indicated that OA articles have a greater research impact than those in non-open access mode across a variety of disciplines [3, 4]. Hence, there seems to be a relationship between OA and citation impact and, therefore, researchers self-archive their research work in order to maximize, its visibility, accessibility, usage and impact.

Further, how and where can authors self-archive their research work? There are many options for the researchers to self-archive their research work. Author can publish or self-archive their work on personal or institutional website or in a digital repository, in addition to its publication in a journal. A digital repository is defined as "[…] an archive of publications in a certain field (subject repository) or at a certain institution (institutional repository), with searchable and freely available data including full-text articles for download" [5]. Digital repositories may be categorised as Aggregating, Government, Institutional and Disciplinary. Disciplinary repositories (also known as subject repositories) are subject oriented collections of OA e-publications from multiple institutions. There are more than three thousand digital repositories all over the world, of which 297 are disciplinary repositories, as listed in the Directory of Open Access Repositories (OpenDoar).

Researchers in the field of Library and Information Science (LIS) are taking interest in OA publications as 163,640 articles have been published during 2002-2015 in the journals of LIS indexed in Web of Science. Out of which 4,737 (2.9%) articles were published in OA journals. More than 100 OA journals are being published in the field of LIS, as listed in the Directory of Open Access Journals (DOAJ). Additionally, there are 125 online digital repositories listed in OpenDoar, providing access to the literature of LIS in addition to the literature of other subjects. Moreover, there are two disciplinary repositories namely e-LIS and Digital Library of Information Science and Technology (DLIST)) at international level created for collecting and providing access to literature in the field of LIS.

e-LIS is an international digital repository in the field of LIS launched in January 2003 by a group of European information specialists. e-LIS is one of the largest international open digital repositories created as a part of the Research in Computing, Library and Information Science (RCLIS) project to organize and disseminate scholarly publications in librarianship and related fields. It is run by experts and a team of volunteer editors of 22 languages from more than 110 countries [6]. It aims to further the OA philosophy by making full text documents in LIS visible, accessible, harvestable, searchable, and usable by any potential user with access to the Internet [7]. Authors can submit their work to e-LIS online by creating an account. However, the work is made accessible only after the approval by the editorial team of e-LIS. There are several reasons which motivate authors whether to self-archive their work or not. A recent study [8] found that the authors mostly self-archive their work voluntarily, sometimes an employer's requirement, or an invitation from a publisher, or suggestion from a colleague, or invitation from the repository itself.

Green and golden routes to OA in India have emerged during the late 1990s. Electronic publishing with the potential of open source softwares has allowed the emergence of many new OA journals especially in Science and Technology, but only a few of them have achieved a relevant impact in their academic communities [9]. Additionally, many government funded scientific and technological research institutes have created institutional or subject specific repositories for providing access to their research output.

Some studies in India have analysed the growth and development of OA journals and OA digital repositories [1, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22]. No study has, however, been conducted in India which could analyse the contribution by LIS professionals to digital repositories. Therefore, the present study aims to know the self-archiving practices of LIS professionals in India by examining the contribution of LIS professionals in e-LIS international open repository.

LITERATURE REVIEW

In order to examine the trends in OA self- archiving practices of LIS professionals, some studies related to the topic were consulted and outcome of these studies are given below.

Laakso [23] explored availability of scholarly journal articles published in subscription-based journals in OA domain through publisher-permitted uploading to freely accessible web locations. This study combines

article volume data originating from the Scopus bibliographic database with manually coded publisher policies of the 100 largest journal publishers measured by article output volume for the year 2010. Of the 1.1 million articles included for the analysis, 80.4 percent were uploaded either as an accepted manuscript or publisher version to an institutional or subject repository after one year of publication. Publishers were found to be substantially more permissive with allowing accepted manuscripts on personal web pages (78.1% of articles) or in institutional repositories (79.9%) compared to subject repositories (32.8%). With previous studies suggesting realized green OA to be around 12 percent of total annual articles the results highlight the substantial unused potential for green OA.

Mauthner [24] emphasised Open Access Digital Data Sharing; its principles, policies and practices. OA to research data is increasingly being institutionalized across funding and research-related organizations through data sharing policies. Compliance with these policies has been hampered by reluctance, amongst many social and natural scientists to release data on an OA basis. Mauthner explored barriers to data sharing through examination of the changing conditions and practices of data sharing; specifically, the recent introduction of digital data sharing policies and their institutionalization of OA as a normative data sharing model. The scientific, moral and political assumptions underpinning OA digital data sharing policies and principles are examined, and their implications considered for data sharing practices. The study suggested that hurdle in data sharing can be removed by understanding their policies. The study also concluded that institutionalizing relational approaches to data sharing, as normative principles may address many of researchers' concerns by giving them greater autonomy and discretion over data archiving and sharing.

Spezi *et al.* [8] in their study examined the levels of awareness of OA and OA repositories; researchers' scholarly communication practice; rate of deposition in OA repositories; factors that motivate researchers' to self-archive. Approximately half of the authors reported self-archiving a version of their journal article(s) in an OAR, although a majority of them indicated that someone else had made their work available in an OAR for them. Disciplinary behaviours tended to vary depending on whether researchers were reporting behaviours from the perspective of an author or a reader. Researchers in the Medical and Life Sciences often signalled an inconsistency between their repository behaviours as an author or as a reader, whereas researchers in the Physical Sciences & Mathematics demonstrated a stronger alignment between their attitudes and behaviours as authors or readers. Most of them do it voluntarily, sometimes an employer's requirement, or an invitation from a publisher, or suggestion from a colleague, or invitation from the repository itself.

Hassall [25] described the current state of self-archiving policies in 165 Ecology and Evolution journals. Study demonstrated that the majority (52%) of papers published in 2011 could have been self-archived in a format close to their final form. Journals with higher impacts tend to have more restrictive policies on self-archiving, and publishers vary in the extent to which they impose these restrictions. Finally, the paper provided a guide for academics on how to take advantage of opportunities for self-archiving using either institutional repositories or freely-available online tools.

Xia *et al.* [26] reviewed the history of OA policies and examined the current status of mandate policy implementations. They found that hundreds of policies have been proposed and adopted at various organizational levels and many of them have shown a positive effect on the rate of repository content accumulation. However, they also detected policies showing little or no visible impact on repository development, and attempted to analyse the effects of different types of policies, with varied levels of success. It was concluded that an OA mandate policy, by itself, will not change existing practices of scholarly self-archiving.

Gutam *et al.* [27] conducted a study on scientific research to know how the scientists make their publicly funded scientific research

outcome accessible through open access. They observed that government made huge investments in Science and Technology, research publications produced by Indian institutions but they are not easily accessible, thus this undermining the visibility and ranking of institutions. The study found that the adoption of an OA policy can close the gap between research outcomes and their dissemination. They concluded that expanding access to publicly-funded scientific research through open access has the potential to spur innovation and lead to a growth in patentable discoveries and their commercial applications.

Antelman [28] examined the self-archiving behaviour of authors publishing in leading journals in six social science disciplines. It has been found that authors self-archive their work according to the norms of their respective disciplines rather than following self-archiving policies of publishers, as a result, they self-archive significant numbers of publisher PDF versions. Authors also self-archive their work at multiple platforms like institutional repositories, personal websites and academic social networking sites. The study found several consequences of this behaviour. One is that, by self-archiving, an author is contributing (knowingly or not) to the body of OA scholarship. Another is that, as these copies are distributed on the Internet, the reader is more likely to find versions of articles that may differ from the final published version. The study also found significant levels of self-archiving, as well as significant self-archiving of the publisher PDF version, in all the disciplines investigated. Publisher's self-archiving policies have no influence on author self-archiving practice.

Antelman [3] examined the citation pattern of OA and non OA articles. This study looks at articles in four disciplines at varying stages of adoption of open access—philosophy, political science, electrical and electronic engineering and mathematics to see whether they have a greater impact as measured by citations in the ISI Web of Science database when their authors make them freely available on the Internet. The finding of the study indicated that across all four disciplines, freely available articles do have a greater research impact. Shedding light on this category of open access reveals that scholars in diverse disciplines are adopting open-access practices and being rewarded for it.

Torres-Salinas, Robinson-Garcia and Aguillo [29] analysed the research output produced by Spain during the 2005-2014 in OA journals indexed in Web of Science. The aim of the paper was to determine if papers published in OA journals contribute to the improvement of citation impact and collaboration indicators in Spanish research. The results are shown by scientific areas and compared with 17 European countries. Spain is the second highest ranking European country with gold OA publication output and the fourth highest in OA output (9%). In Spain, OA output is especially high in the fields of Arts and Humanities (28%). Spain's normalized citation impact in OA (0.72) is lower than the world average and that of the main European countries. Finally, the article discussed how these results differ from the so-called Open Access citation advantage.

OBJECTIVES OF THE STUDY

The main purpose of the present study is to examine the self-archiving practices of LIS professionals in India. However, the specific objectives of the study are to:

- Identify the leading countries in terms of their contribution in e-LIS repository.
- Examine the trends of self-archiving (green OA) in the field of LIS in India.
- Identify the prominent contributors in e-LIS repository from India.
- Identify the types of publications mostly archived in e-LIS.
- Identify the age of publications archived in e-LIS.

METHODOLOGY

There are two international digital repositories (e- LIS and DLIST) which are specifically devoted to collect archive, preserve and disseminate the literature in the field of LIS. Although there are two disciplinary

repositories in India in the field of LIS created and maintained by Information and Library Network (INFLIBNET) and Documentation Research and Training Centre (DRTC), but their scope is limited to the content created within these institutions. Since the purpose of our study was to explore the self-archiving practices by Indian LIS professionals, e- LIS was selected source for data collection. e-LIS is the largest international open repository in the field of LIS. It may be noted that LIS professional's from 140 countries around the world had contributed their work in e- LIS repository, but the scope of the present study is limited to India. A total of 908 publications, uploaded by Indian LIS professionals in e- LIS repository during January 2003 (the date of starting of e-LIS) to 31st December 2015, were collected from the website of the e-LIS (http://eprints.rclis.org/). Since the e-LIS repository was launched in January 2003, the period of study is limited to January 2003 to December 2015. The relevant data was imported to Microsoft Excel format for further analysis. Leading countries in terms of number of publications, year-wise distribution of publications, types of publications, top contributors, and leading journals were recorded. The data were organised, calculated, tabulated and analysed by using simple arithmetic and statistical methods for its result.

DATA ANALYSIS

Leading countries

Authors from the different countries of the world contributed their scholarly publications by submitting their works to the e-LIS server. As of 31st December 2015, a total of 18,395 publications were submitted in e-LIS by LIS professionals from 140 countries of the world. Spain is the top contributor in terms of number of publications archived in e-LIS. India occupied first position among Asian countries and fourth position in the list of top contributing countries of the world. Contribution of leading countries around the world is shown in table 1 (Fig 1). Spain (20.12%) is the top contributing country in terms of the number of publications submitted to e-LIS repository, followed by Italy (8.47%), Argentina (6.01%) and India (4.93%).

Table 1: Leading Countries in terms of Submission of Publication in e-LIS

S. No.	Country	No. of Publications	%
1.	Spain	3702	20.12
2.	Italy	1559	8.47
3.	Argentina	1106	6.01
4.	India	908	4.93
5.	United State	881	4.78
6.	Brazil	801	4.35
7.	Cuba	627	3.40
8.	Mexico	614	3.33
9.	United Kingdom	552	3.00
10.	Canada	463	2.51

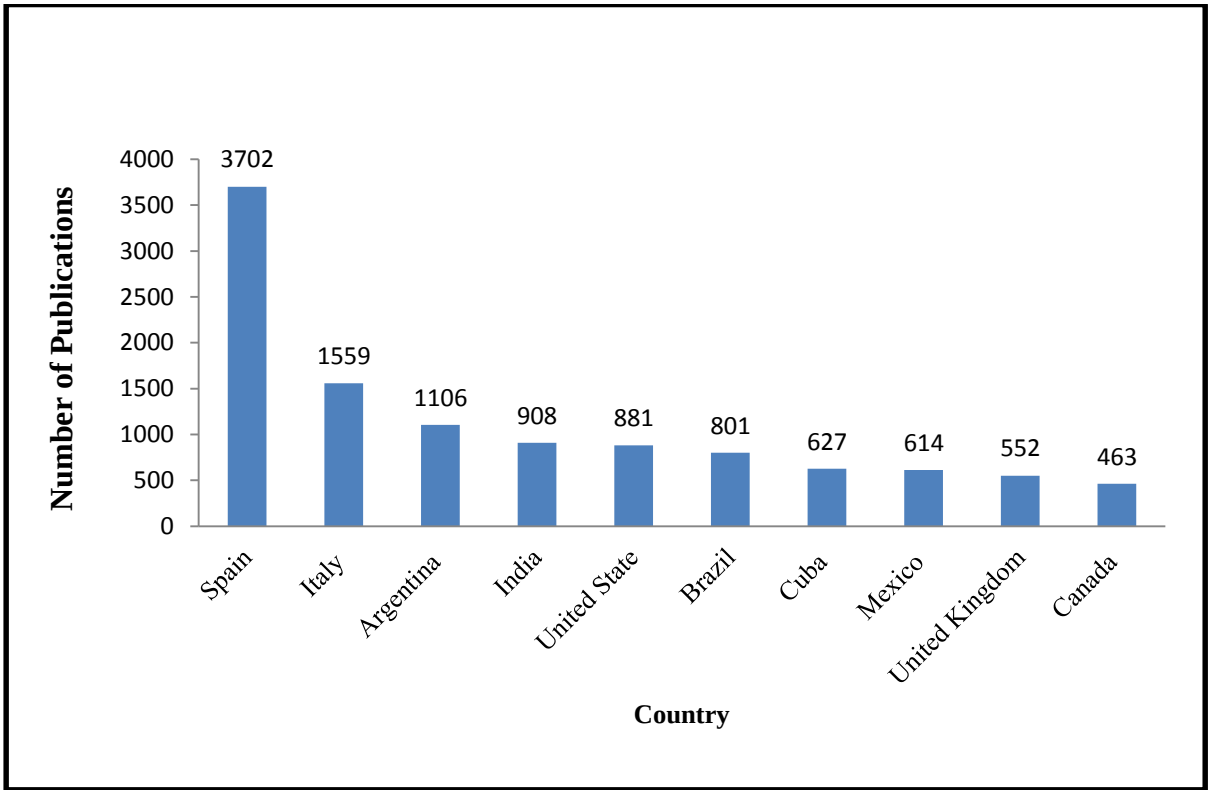

Fig.1: Leading Countries in terms of Submission of Publication in e-LIS

Age of Publications

A total of 908 publications submitted by Indian LIS professionals in e-LIS were published during 1974-2015. Table 2 (Fig 2) shows the year-wise distribution of publications to know the trend in the archiving of recent as well as old publications. It may be observed from the analysis that most of the publications submitted by Indian LIS professionals are recent publications published during last 15 years. About 21 percent of the publications were published during 1970s to 2000. The year-wise analysis of publications shows that Indian LIS professionals are aware of the importance of archiving of their publications in repositories as they have not only archived publications which are available in electronic format but also those publications which were published only in print format. These publications may be archived after digitization. Author might have submitted a copy to e- LIS repository after scanning their work from the printed publications.

Table 2: Age of Publications Submitted by Indian LIS Professionals

S. No.	Year	Number of papers	%
1.	1974- 1980	02	0.22
2.	1981- 1985	21	2.31
3.	1986- 1990	38	4.18
4.	1991- 1995	53	5.83
5.	1996- 2000	83	9.14
6.	2001- 2005	211	23.23
7.	2006- 2010	313	34.47
8.	2011- 2015	187	20.59

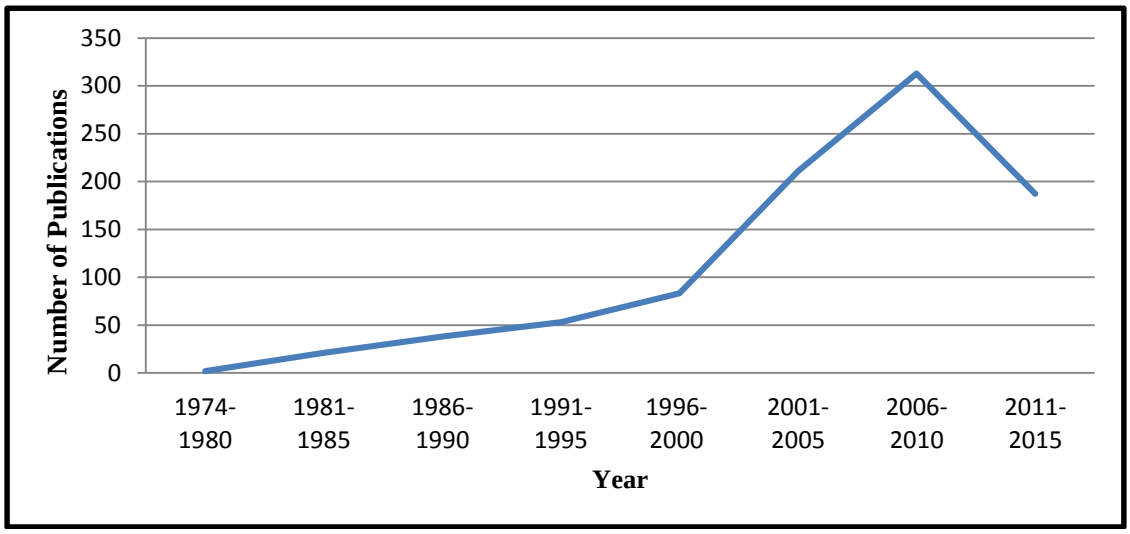

Fig 2: Age of Publications Submitted to e-LIS

Types of Publications

Table 3 shows the different types of publications archived in e-LIS by Indian LIS professionals. The publications archived in e-LIS by Indian LIS professional include journal articles, conference papers, book chapters, articles in newspaper/magazines, report, books, theses etc. However, maximum number of publications submitted to e-LIS is articles published in journals (35.35%), followed by conference papers (29.62%), book chapter (7.7%) and articles published in newspapers and magazines (5.5%). It is important to note that in addition to the archiving of published literature, Indian LIS professionals have also archived gray literature such as pre and post prints, theses, reports, guide/manuals, presentation, etc. which are valuable sources of information as they are not published sources of information. The details of different types of publications submitted by Indian LIS professionals to e-LIS repository is also shown in Fig 3.

Table 3: Types of Publications Archived in e-LIS

S. No.	Form of literature	Number of Publications	%
1.	Conference paper	311	34.25
2.	Journal article (print/paginated)	269	29.62
3.	Book chapter	70	7.70
4.	Journal article (online/unpaginated)	52	5.72
5.	Newspaper/Magazine article	50	5.50
6.	Preprint	40	4.40
7.	Presentation	24	2.64
8.	Guide /Manual	21	2.31
9.	Report	18	1.98
10.	Book	14	1.54
11.	Unpublished (Preprint)	10	1.10
12.	Unpublished (other)	10	1.10
13.	Thesis	07	0.77
14.	Conference poster	05	0.55
15.	Bibliography	03	0.33
16.	Review	02	0.22
17.	Project/Business plan	01	0.11

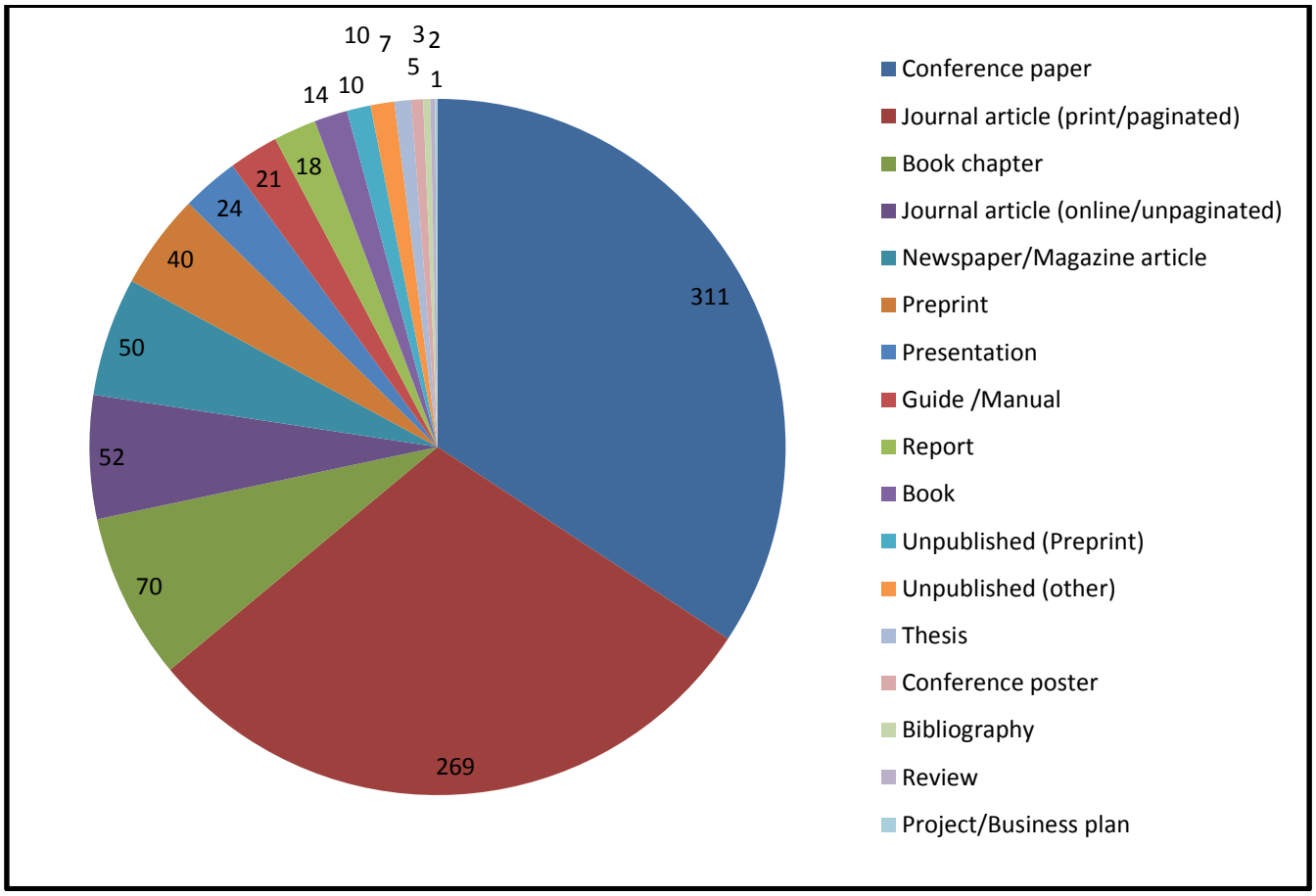

Fig 3: Types of Publications Archived in e-LIS

Top Contributors

An attempt is also made to identify the authors and institutions, who have contributed maximum number of publications to e-LIS repository. As shown in table 4, M. S. Sridhar submitted maximum number of articles (11.45%) to e-LIS, followed by R. Raman Nair (10.57%) and V. L. Kalyane, (8.14%). As far as the top institutions are concerned, Scientific Information Resource Division of Bhabha Atomic Research Centre, Mumbai (15.08%) have contributed maximum number of papers to e-LIS repository.

Table 4: Top Contributors and their Productivity

S. No.	Top Contributors	Institutions	No. of Papers	%
1.	Sridhar, M. S	Head, Library and Documentation (Retired) ISRO Satellite Centre, Bangalore	104	11.45
2.	Raman Nair, R.	University Librarian, Mahatma Gandhi University, Kottayam	96	10.57
3.	Kalyane, V. L	Scientific Information Resource Division, Knowledge Management Group,Bhabha Atomic Research Centre, Trombay, Mumbai	74	8.14
4.	Das, Anup Kumar	Jawaharlal Nehru University, India	52	5.72

5.	Kademani, B. S	Library and Information Services Division, Mumbai	37	4.07
6.	Vijai Kumar	Scientific Information Resource Division, Knowledge Management Group, Bhabha Atomic Research Centre, Trombay, Mumbai	36	3.96
7.	Sen, B. K	Faculty of computer science and information technology, university of Malaya, Malaysia.	30	3.30
8.	Vijayakumar, J. K	Manager, Library Collections & Information Services, KAUST - King Abdullah Univ of Sci & Tech	27	2.97
9.	Prakasan, E. R	Library & Information Services Division, Bhabha Atomic Research Centre, Mumbai	25	2.75
10.	Angadi, Mallikarjun	Deputy Librarian, Tata Institute of Social Sciences	21	2.31
11.	Dutta, Bidyarthi	Asst. Professor, Dept. of Library & Information Sc. Vidyasagar University, Midnapore-W.B., India	20	2.20
12.	Nazim, Mohammad	Department of Library & Information Science, Aligarh Muslim University, Aligarh	18	1.98
13.	Y, Srinivasa Rao	National Institute of Technology, Rourkela, Orissa,	17	1.87
14.	Anil Sagar	Scientific Information Resource Division Bhabha Atomic Research Centre, Mumbai	16	1.76
15.	Sawant, S.S	SHPT school of library Science, SNDT Women's University, India	16	1.76
16.	Rajasekharan , K.	Librarian, Kerala Institute of Local Administration, Mulagunnathukavu, Thrissur	15	1.65
17.	Swain , Dillip K	Lecturer, P. G. Department of Library and Information Science North Orissa University, Baripada, Odisha	15	1.65
18.	Vimal Kumar, V	Library Asst's, Mahatma Gandhi University, Kerala.	15	1.65
19.	Francis, A. T.	Kerala Agricultural University, Thrissur	14	1.54
20.	Nafala, K. M	Library Computer Operator, Kerala Institute of Local Administration, Mulagunnathukavu, Thrissur	12	1.32
21.	Anil Kumar	Library & Information Services Division, Bhabha Atomic Research Centre, Mumbai	11	1.21

Leading Journals

Out of 908 publications archived in e-LIS by Indian LIS professionals, 321 are the articles published in 121 journals. Table 5 listed 9 prominent journals which include 141 articles, while remaining 180 articles were scattered in 112 journals. Out of 141 articles published in 9 leading journals, 107 articles were published in Indian journals and remaining articles (34) were published in the journals from UK (1), USA (1) and Malaysia (1). As shown in table 5, maximum number of articles were published in Annals of Library and Information Studies (ALIS) (4.18%), followed by SRELS Journal of Information Management and Malaysian Journal of Library & Information Science with 2.86 and 1.87 percent articles respectively. It may be observed from the analysis that most of the articles archived in e-LIS by Indian LIS professionals were published in Indian journals. It is also important to note that LIS professionals in India have archived articles mostly published in OA journals to prevent themselves from copyright issues. Here the question is why do they self- archive those articles which already fall in the OA domain. They actually want to put their work at multiple platforms for maximizing the visibility and accessibility. Way [30] in a study, observed that OA articles are archived more frequently than that of non OA articles.

Table 5: Leading Journals

S. No	Top Journals	Country	No. of Papers	%
1.	Annals of Library and Information Studies (ALIS)	India	38	4.18
2.	SRELS Journal of Information Management	India	26	2.86
3.	Malaysian Journal of Library & Information Science	Malaysia	17	1.87
4.	IASLIC Bulletin	India	16	1.76
5.	ILA Bulletin	India	11	1.21
6.	Library Philosophy and Practice	USA	10	1.10
7.	Indian Journal of Information, Library and Society	India	8	0.88
8.	Library Herald	India	8	0.88
9.	Library Hi Tech News	UK	7	0.77

FINDINGS & CONCLUSION

This study addressed the contribution of Indian LIS professionals to e-LIS repository. Findings of the study revealed that a total of 908 publications are archived in e-LIS repository by Indian LIS professionals till the end of 2015. It was found that self-archiving practices by Indian LIS professionals are more common than other countries, as India has occupied first position among Asian countries and fourth position in the list of top contributing countries of the world. India has been constantly maintaining number one position at least for the last four years as Maharana [7] had also found that India was the highest contributor to the e-LIS repository in 2012 among all the 42 Asian countries. According to Antelman [28] authors self-archive their work according to the norms of their respective disciplines rather than following self-archiving policies of publishers, as a result, they are self-archiving significant numbers of publisher's PDF versions which are not allowed by most of the publishers. Thus, publishers' self-archiving policies have no influence on authors' self-archiving practices.

Despite the well-developed library systems, LIS professionals in USA, Canada and United Kingdom are lagging behind in the race of self-archiving in the field of LIS. Even China, the most

populated country, with a fast growing economy is the least contributor to e-LIS. Hence it can be said that population and level of development of the country has no significant relationship with the self-archiving practices. Here the question is why are the developed countries not willing to provide OA to their intellectual output? There may be two reasons: Firstly they might have used other platforms for self-archiving. Secondly they might be aware of the self-archiving policies of the publishers and submitting only that work which is allowed by the publishers. Self-archiving mandates and policies of publishers are the major factors of self-archiving practice as identified in some recent studies. However, other factors which motivate people to self-archive are need to be explored in future studies.

This study found that different type of publications have been archived by LIS professionals, out of which maximum number is journal articles, followed by conference papers. Osorio [6] examined the overall trend in the archival of different types of materials in e-LIS and found that nearly 70 percent of the repository (e-LIS) is occupied by Journal articles and conference papers. A similar study by Covey [31] also found that self-archiving of journal articles is more common than any other publication type. Most of the articles archived in e-LIS have been published in ALIS, followed by SRELS Journal of Information Management. The contribution of M. S. Sridhar is outstanding as he has so far contributed more than 100 publications to e- LIS.

OA is a part of the scholarly communication process. OA initiatives are on full swing throughout the world. An attempt is also made in the present study to find out the contributions to e-LIS around the world in general and India in particular. It may be concluded that the LIS professionals in India have started contributing their research work in OA subject specific repositories. India has the highest contribution to e-LIS among Asian countries which symbolizes that the LIS authors in India have strong belief in OA. However, Maximum submissions from India were made by a few authors only. The study will carry a message to the entire LIS community in India to submit their works in e-LIS for greater visibility and scholarly use of research work.

This study has certain limitations. Although there are other methods of self-archiving and authors may archive their work to other repositories and put it on their personal or institutional websites, the scope of the study is e-LIS repository. Therefore, the findings of this study may not be generalized. Further study may be conducted to cover larger population from different countries as well as other methods of self-arching to depict clearer picture of self-archiving by LIS professionals in India and other countries.

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ABOUT THE AUTHORS

Ashiya Ahmadi is UGC- Junior Research Fellow at department of Library & Information Science, Aligarh Muslim University.

Dr. Mohammad Nazim is an Assistant Professor at the Department of Library and Information Science, Aligarh Muslim University (AMU). He has 12 years of professional and teaching experience in the library profession. He holds a Ph.D. in Library and Information Science from Banaras Hindu University (BHU) and a Master's degree in Library and Information Science from AMU. Prior to joining the AMU in 2015, he spent 10 years at BHU as Assistant Librarian. He has 40 publications to his credit including many articles in Emerald and Elsevier Science journals and a book on Knowledge Management from Chandos Publishing (an imprint of Elsevier, USA). He is currently the Managing Editor for the Journal of Indian Library Association (JILA) and a member of the Editorial Board of the Journal of Information. He is also a reviewer for Chandos Publishing and BMC Research Notes (an open access journal from BioMed Central). His research interests include open access to scholarly communication, knowledge management, Bibliometrics/Scientometrics and information storage and retrieval.