BIBLIOMETRIC STUDY OF INDIAN OPEN ACCESS LIS JOURNALS IN DIRECTORY OF OPEN ACCESS JOURNALS (DOAJ)

A dissertation submitted in partial fulfillment of the requirement for the Degree of Master of Philosophy in Library and Information Science

Submitted by

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D E C L A R A T I O N

I, **NG.Thermi Moyon**, hereby declare that the subject matter of this dissertation is the record of work done by me, and the contents of this dissertation did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the dissertation has not been submitted by me for any research degree in any other University/ Institute.

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C E R T I F I C A T E

This is to certify that the dissertation entitled **"BIBLIOMETRIC STUDY OF INDIAN OPEN ACCESS LIS JOURNALS IN DIRECTORY OF OPEN ACCESS JOURNALS (DOAJ)"** submitted by **NG. THERMI MOYON** for the award of the Degree of Master of Philosophy in Library & Information Science is carried out under my supervision. This is the candidate's original work and is worthy of examination.

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Date

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ABBREVIATIONS

Terms	Description
ALIS	Annals of Library and Information Studies
ASLIB	Association for Information Management
BBB	Budapest, Berlin and Bethesda
BMC	BioMed Central
BOAI	Budapest Open Access Initiative
CALIBER	Convention on Automation of Libraries in Education and Research Institutions
DESIDOC	Defense Science Documentation Centre
DJLIT	DESIDOC Journal of Library and Information Technology
DOAJ	Directory of Open Access Journals
DOAR	Directory of Open Access Repositories
DRTC	Documentation Research and Training Centre
E-LIS	E-Prints in Library and Information Science
ETD@IISC	Electronic Theses and Dissertation of Indian Institute of Science
FID	The International Federation for Information and Documentation
IAS	Indian Academy of Sciences
ICT	Information Communication and Technology
IISc	Indian Institute of Science
IJIDT	International Journal of Information Dissemination and Technology
IJODLS	International Journal of Digital Library Services
IMC	Indian Medlars Centre
INFLIBNET	Information and Library Network
INSA	Indian National Science Academy
ISI	Indian Statistical Institute
IR	Institutional Repository
IRJLIS	International Research: Journal of Library and Information Science
LDL	Librarian's Digital Library
LIS	Library and Information Science
TRIM	Trend in Information Management
PLOS	Public Library of Science
NISCAIR	National Institute of Science Communication and Information Resources
NKC	National Knowledge Commission
NOPR	NISCAIR Online Periodicals Repository
OA	Open Access
OAI	Open Archives Initiative
OASPA	Open Access Scholarly Publishers Association
PLANNER	Promotion of Library Automation and Networking in North-Eastern Region
R&D	Research & Development
ROAR	Registry of Open Access Repositories
SDL	Search Digital Libraries
SPARC	Scholarly Publishing and Academic Resources Coalition
UGC	University Grants commission

CHAPTER - 1

INTRODUCTION

1.1 Introduction

Open Access is the revolutionary way of providing access to the scholarly literature which is made possible through Internet. Today all over the world scholarly research literature is distributed online on the Internet in various forms, free of charge and free from copyright and licensing restrictions by publishers and institutions. Budapest Open Access Initiative (BOAI) was the first initiative to use the term "Open Access". BOAI defines open access as "*the free availability on the public Internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of the articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself*" (BOAI, 2002). One of the greatest benefits to open access is that libraries in smaller institutions or in economically disadvantaged areas around the world can have greater access to the scholarly resources. Open access which provides free access to the information content is widely expanding its domain because of enormous benefits accrued from it (Rufai et al., 2011).

Open access journals are available online freely to the reader, the publishers are willing to provide access to the Internet users. The open access journals are mostly supported by the academic institutions and research & development institutions or government grants for publishing these journals. Private publishers are publishing them with getting financial support from the authors and supporting from reputed companies or institutions or some of the funding agencies are providing support for the publishing open access journals (Tamizhchelvan & Dhanavandan, 2014). The increasing growth of online OA journals in various disciplines is evident of various online directories. Directory of Open Access Journal (DOAJ) is one of the most popular directories among them.

The DOAJ was launched in 2003 at Lund University, Sweden, under the direction of Lars Bjornshauge. The DOAJ provides access to high quality open access peer-reviewed journals. The aim of DOAJ is to increase the visibility and ease of use of open access scientific and scholarly journals, thereby promoting their increased usage and impact. The directory covers journals in all disciplines of knowledge. There are now 11,500 open access journals listed in the DOAJ. Currently 7,161 journals are searchable at article level. As of today (31-03-2016) 2,247,812 articles are included in the DOAJ. In the field

of Library and Information Science (LIS), there are 158 journals and 18,501 articles (as on 31-03-2016). Indian contribution to LIS journals in DOAJ is very less i.e. only six journals.

1.2 Bibliometrics

In 1917, Cole and Eale's study on the "history of comparative anatomy part-1: a statistical analysis" is considered to be the first bibliometric study. The expression 'statistical analysis' where he used for the first time again changed to 'statistical biliography' by E. Wyndham Hulme in 1922, to describe the study of use and non-use of information. After Hulme, 'statistical bibliography' was used by Gosnell in 1943 in his dissertation, and later used by many others. The word 'Bibliometrics' first appeared in 1969 in Alan Pritchard's article 'Statistical Bibliography or Bibliometrics' in the December issue of the Journal of Documentation. He described it as the "*application of mathematics and statistical methods to books and other media of communication*". In a later article, "*bibliometrics and information transfer*". Pritchard explained bibliometrics as the "*metrology of the information transfer process and its purpose is analysis and control of the process*". The British Standard Glossary of Documentation Terms explained bibliometric as the "study of the use of documents and patterns of publication in which mathematical and statistical methods have been applied" (Pritchard, 1969 cited in Hertzel, 2003).

1.2.1 Types of Bibliometrics

Bibliometrics can be divided into two areas as:

A. Productivity Count (Descriptive)
    a) Geographic (Countries)
    b) Time period (Era)
    c) Disciplines (Subjects)
B. Literature Usage Count (Evaluative)
    a) Reference
    b) Citation

1.2.2 Laws of Bibliometrics

The main areas in bibliometric research is concerns the application of Bibliometric Laws. The three most commonly used laws in bibliometrics are: Lotka's Law of Scientific Productivity, Bradford's Law of Scattering, and Zipf's Law of Word Occurrence.

Lotka's Law of Scientific Productivity describes the counting names and the number of publications. A general formula for the relation between the frequency 'y' of persons making 'x' contribution as "$x^n y$=constant" finding the value of the constant when n=2. He observed that the number of one person's making 2 contributions is about one-fourth of those making one; the number making n contributions is about $1/n^2$ of those making one, and the proportion of all contributors that make a single contribution is about 60 percent.

Bradford's Law of Scattering states that if scientific journals are arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same number of articles as the nucleus, when the numbers of periodicals in the nucleus and succeeding zones will be $1:n:n^2$.... (Hertzel, 2003).

Zipf's Law of Word Occurrence states that in a long textual matter, if words are arrange in their decreasing order of frequency, then the rank of any given word of the text will be inversely proportional to the frequency of occurrence of the word. In other words, if 'r' is the rank of a word and 'f' is its frequency, then mathematically Zipf's law can be stated as r.1/f, or r.f=c where 'c' is a constant (Jena, 2012).

1.3 Significance of Study

Open access movement has gained momentum in terms of publishing scholarly articles in an open access platform and it is against the price based publication. Scientific journals are moving towards open access policy and likewise some scholarly journals from LIS also. There are very less number of open access journals from LIS field published from India and indexed in Directory of Open Access Journals (DOAJ). Bibliometric analysis not only facilitates the scholar to have an in depth study of the articles but also open avenues for other types of publications. The study helped to know the distribution of articles yearly in open access form India and geographical distribution

of articles around the world which has shown the acceptability of Indian LIS journals at world level. Further study helped to know the degree of collaboration among authors and prevalent authorship patterns found in Indian LIS journals. The study also helps to predict the trends of obsolescence of Indian LIS literature available in the form of open access.

1.4 Scope of Study

The study was confined to open access journals of Library & Information Science (LIS) published in India and indexed/listed in Directory of Open Access Journals (DOAJ). The number of open access LIS journals covered under study are given in table 1.1. There are 1133 published articles belongs to 6 open access LIS journals published from India. The study was conducted for last 5 years from 2011-2015 calendar years.

Table 1.1: List of Open Access LIS Journals Published in India on DOAJ

SN	Journal Name	Periodicity	No. of Articles Published (2011-2015)
1	International Research: Journal of Library and Information Science (IRJLIS)	Quarterly	218
2	Annals of Library and Information Studies (ALIS)	Quarterly	173
3	International Journal of Information Dissemination and Technology (IJIDT)	Quarterly	259
4	International Journal of Digital Library Services (IJODLS)	Quarterly	154
5	DESIDOC Journal of Library and Information Technology (DJLIT)	Bi-monthly	294
6	Trends in Information Management (TRIM)	Bi-annual	35
	Total		1133

1.5 Review of Literature

The researcher has been reviewed some of the relevant literature conducted on Bibliometric studies are mentioned below:

Gogoi & Barooah (2016) in their study revealed that papers from journals of Indian origin have greatly been used by the scholars and year-wise distribution of journals indicated that journal articles published during 2000-09 were highly preferred. Further they found that in the field of Chemistry as a whole researcher mostly cites works of 10-

20 years old from recent; and collaborative works were more than individual works (**Manthiramoorthi & Thamaraiselvi, 2016**). **Velmurugan & Radhakrishnan (2016)** conducted a study and found that more than 97% works were published jointly, so far, degree of collaboration was 0.97 which shows the highest level of collaborative works. **Angammana & Jayatissa (2015)** conducted a research on bibliometric analysis of PG dissertations of Library and Information Science from the two universities of Sri Lanka for 11 years and found that books and journals were most used reference materials and half-life of all citations was almost 9 years whereas mean half-life for journals and books were 7 years and 13 years respectively.

In a study, conducted by **Mondal & Saha (2015)** on the journal JILA from 2008-2014, found steady growth of publications during study period and degree of collaboration was 0.55. It was found that majority of the authors belongs to one place only. **Thavamani (2015)** examined the authorship trends of contributions in the Indian Journal of Forensic Medicine & Toxicology during 2007 to 2013 and concluded that average number of authors per paper is more that 3 and average productivity per author is less than half (0.5). Moreover majority (86%) of the contributions were collaborative works, so degree of collaboration arrived at 0.862 accordingly. In a study conducted by **Verma, Sonkar & Gupta (2015)**, found no significant difference between single authorship and multiple authorship which tends to 0.51 degree of collaboration whereas journal was enriched with the scholarly contributions of 37 countries across the world and Nigeria was the dominating country in terms of contributions to the journal followed by India and USA. **Wankhede et al. (2015)** revealed, in their research, that majority of the articles were contributed by single authors and most of the authors were librarians, faculty members or researchers affiliated with academic or research institutions.

Hajam (2014) examined Indian Journal of Clinical Bio-Chemistry from the year 2004-2013 and revealed that total number of contributions during the period of their study was 776 and it had 32 issues from volume number 19 to 28. Especially volume no. 23 had maximum number of contributions. Further he found that there were 19496 citations appended to 776 papers. **Mishra, Gawde, & Solanki (2014)** analyzed the Ph.D. thesis in English Literature submitted during the period 1975-2007 and explained that the length of the thesis were in the range of 142 to 513 pages. The maximum submission of Ph.D. thesis in a year was 5 and least submission was 1. Female researchers were

comparatively less than male researchers. Further, revealed that books (80.47%) were the most preferred document for citation in English Literature and single author's contributions were cited mostly (83.70%).

Mondal (2014) conducted bibliometric analysis of "Webology" journal from the year 2004 to 2012 and found 2665 journals citations from 102 papers published during the study period. Further, he revealed that single authorship pattern was prevalent and contributed the highest numbers of articles followed by two authorship pattern. India was the highest contributor to the journal among all of the countries. **Narang & Singh (2014)** studied 15786 citations appended to 1310 articles published in Indian Journal of Pure and Applied Mathematics and found that joint authorship pattern is predominant in the journal articles and foreign contributors were more than Indian contributors. Further, journals articles were the most cited documents in the articles and university teachers were the highest contributors of the journal. **Pujar (2014)** analysed growth of open access journals in LIS, researches and organizations need to embrace these in a big way. Publishers of journals in LIS, if adopt certain Web 2.0 tools to promote and measure content may lead to wider dissemination of research and bring in popularity. Quality of content and unethical practices of publishing followed by some journals is a worrying factor for the sustainable growth of open access journals.

Satyanarayana (2014) evaluated the scholarly publication trends of TOURISMOS from 2006 to 2011 and he found that maximum numbers of articles were contributed by joint authorship and degree of collaboration was 0.65. The geographical distribution of papers highlighted that journal was dominated by the host country (i.e. Greece). **Sivasekaran & Raghavan (2014)** revealed that majority of the articles contributed by single authors and most of the authors were affiliated with academic research institutions. India was biggest contributor of articles than others. In a research, **Swain et al. (2014)** found that majority of articles from single authors indicating low collaborative research. Further, journal had accommodated papers from 12 different countries reflecting its wide readership and worldwide acceptability.

Barik & Jena (2013) explored a bibliometric study on the Journal of Knowledge Management Practice from the period 2008-2012 and found that 23.3% articles were published in 2011 and single authorship was prevalent in the journal. USA was the

highest contributor of the articles to the journal. **Das (2013)** analysed 206 articles in 19 issues published in the journal "Library Trends" during 2007-2012 and concluded that on an average 11 articles per issue in the journal with dominancy of single authorship which had lower degree of collaboration i.e. 0.41.

Hussain (2013) conducted a research on Annals of Library and Information Studies for the period 2006-2010 and he revealed that maximum numbers of articles were published in the year 2010. Further, he found that majority of the articles preferred two authorship pattern and major contributions were coming from New Delhi. Another study conducted by **Lokhande (2013)** on Annals of Library and Information Studies for the period of 2002-2011 and found that majority of articles published in multiple authorship pattern, teaching faculty members were the major contributors for the journal, bibliometric and scientometrics study was the major focus of the journal covering other LIS subjects in the articles. Moreover analysis clearly indicates that OA e-journal 'ALIS' rapidly established themselves as a most viable media for scholarly communication. **Pandita (2013)** analysed 310 articles of Annals of Library and Information Studies published during the period 2002-2012 and revealed that more than 65% articles published in the journal were on co-authorship pattern. India being the host country of ALIS, as such proved to be one of the major contributors of the journal in every respect.

Roy & Basak (2013) conducted a bibliometric study on Journal of Documentation and revealed that majority of the library and information scientists prefer to contribute their papers jointly and degree of collaboration was 0.51. Most of the contributions were published on information retrieval and most of the contributions were from United Kingdom followed by USA, Finland. About 6.21% citations were self-cited by the respective authors. **Satpathy et al. (2013)**, in a study, found that good numbers of papers have been published in ten open access journals and authorship pattern reveals that 40.48% contributions were made by single authors only. Most of the contributors belong to the developed countries; it indicates that open access journals are yet to be popular in developing and under developing countries.

Rattan & Gupta (2012), in their study, analysed the number of articles, authorship pattern, geographical distribution of authors, pattern of references etc. and concluded that

out of 100 articles, 73% articles were published by joint authorship and majority of the authors belong to Malaysia. **Thanuskodi (2012)** in his study found that maximum numbers of contributions were from joint authorship (93.69%), most of the contributions were from India (98.67%). The study further revealed that the highest contributions were from universities and majority of the citations coming from journal articles than other forms of documents. The study revealed that maximum number of citations (28.85%) accounted in the period 2001-2010. In another study, conducted by **Thanuskodi (2011)** for 138 articles of Library Herald during 2006 to 2010, revealed that maximum number of contributions were from single authorship. Highest numbers of articles appeared for "library automation". India was the major contributors of articles than foreign countries. It had been also revealed that the highest contributions were from universities and majority of the authors preferred "journals" as the source of information providing the highest number of citations.

Awasthi & Jaiswal (2015) found the considerable increase in the archiving of library science journals over the years in DOAJ and print journals archive was more than online journals archive. In a study conducted over DOAJ by **Maity & Teli (2015)** observed maximum productivity in the field of Library and Information Science was in Information and Communication Technology followed by Library and Society, Library Association, and Library Management. Further, single author's productivity was very high in numbers than collaborative works. **Nashipudi & Ravi (2015)** examined DOAJ to measure quantitative data of Indian scholarly journals and found that only 649 journals in open access form available from India. In a study by **Sondarva & Gondalia (2015)**, examined journals in the field of Medical Science from India and found that numbers of scholarly journals are published from India covering wide spectrum of subjects.

Devendra (2014) investigated 140 free full text online journals through DOAJ in Environmental Science and analyzed based on country-wise distribution, language-wise distribution, institutions-wise distribution of publishers, distributions of subject headings, their accessibility of archives of online journals etc. and found that United States publishes more open access journals (14.29%) in Environmental Science whereas Indian contribution is only 5%. English was the dominating language for publication articles in the field of Environmental Science. **Khillare & Khaparde (2014)** investigated 48 open access online journals on Microbiology available under DOAJ and analyzed based on

country, language, and subject heading accessibility of archives. India and Turkey were in 1st rank in this regard. English language was found common communication medium by majority of the journals. **Tamizhchelvan & Dhanavandan (2014)** also studied the contribution of open access journals from South Asian Countries in DOAJ.

Hulagabali (2012) analysed Library and Information Science journals with the aid of bibliometric methods. He explained the distribution of LIS journals archived in Directory of Open Access Journals (DOAJ) and concluded that year-wise growth of LIS journals started in the year 2003 with 21 journals. Further, LIS domain stands third position, under the social science stream, out of 960 journals listed under ten major disciplines in DOAJ database. In a country-wise distribution of LIS journals, developed countries have maximum contributory share. Out of 97 journals, 40 journals are being published in English language. **Mal & Mohindra (2012)** examined scholarly and peer reviewed open access journals accessible from Directory of Open Access Journals (DOAJ) in Law based on country, publishers, subject heading, keywords, availability of archives, frequency, indexed by, length of publishing period, and total viewers etc.

1.6 Research Gap

On the analysis of above literature review, it has been observed that there are sufficient numbers of researches conducted on the DOAJ covering LIS as well as other perspectives of academia but still there was lack of bibliometric researches on Indian contribution to LIS journals listed in DOAJ. This research gap motivated the scholar to undertake the bibliometric analysis of open access journals of library and information science published in India and indexed/ listed in DOAJ.

1.7 Research Design

1.7.1 Statement of the Problem

Scholarly communication mostly takes place in the form of journal articles. These research articles bear original contribution to the field by the researchers. Most of the time, researchers have joint contribution from various geographic locations in the same field. These research articles published in the form of journals whether it is printed or online. More than eleven thousand journals are following “open access” philosophy, and so for listed in Directory of Open Access Journals (DOAJ). There are tremendous

researches conducted on open access policy as well as on DOAJ. In the field of Library & Information Science (LIS), many researches conducted on LIS journals listed in DOAJ. These researches conducted specially on particular journal of the field or total number of journals of the field. There was still lack of researches from LIS perspectives of India on DOAJ.

The study was required to know the contributions made by Indian LIS journals listed in DOAJ towards global perspectives and what is the trend in scholarly communication of LIS researchers. The study was designed to find the relation between time and growth of citations. From Indian LIS perspective, it was interesting to investigate bibliometric analysis of Indian LIS journals listed in DOAJ.

1.7.2 Objectives of the Study

The objectives of the study were to:

a) Examine the year wise distribution of articles.
b) Find the authorship pattern.
c) Assess the degree of collaboration among authors.
d) Find out geographical distribution of articles.
e) Determine the obsolescence of LIS literature.

1.7.3 Hypotheses

The hypotheses of the study were:

H1: Solo research is less preferred than collaborative research.

H2: Time has inverse relationship with growth of citation.

1.7.4 Research Methodology

The study was designed to investigate the Indian contribution to LIS journals available under DOAJ through bibliometric analysis. The total number of open access Indian journals for study was 6 (six) that belongs to LIS field and listed in DOAJ. The survey and observation methods of research were found appropriate to undertake the study.

The survey was conducted for retrieving 1133 articles, which is the *n* value for the study; from open access journals of the LIS field published in DOAJ from the year January,

2011 to December, 2015 i.e. 5 years. The data obtained was tabulated, organized, and analysed by the use of Ms-Excel and SPSS as statistical tools and techniques.

1.8 Chapterisation

The study has been divided into the following chapters:

Chapter 1: Introduction
Chapter 2: Bibliometric Laws
Chapter 3: Open Access Initiatives
Chapter 4: Analysis of Open Access LIS Journals
Chapter 5: Conclusion & Suggestions
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CHAPTER - 2

BIBLIOMETRIC LAWS

2.1 Introduction

Bibliometrics is a research method used in the field of Library and Information Science. In the recent years bibliometrics has gained considerable significance because of its practical applications in the evolution of library operations and services as a statistical technique. It has extensive quantitative analysis of various aspects of literature used to identify the pattern of publication like authorship, degree of collaboration, place of publication, year-wise citations, co-citations etc. used to know the coverage to gain insight into the dynamics of growth of knowledge in the areas under considerations. This helps in developing the organization of information resources which is essential for efficient and effective use.

In 1917, Cole and Eale's study on the "history of comparative anatomy part-1: a statistical analysis" is considered to be the first bibliometric study. The word 'Bibliometrics' first appeared in 1969 in Alan Pritchard's article 'Statistical Bibliography or Bibliometrics' in the December issue of the Journal of Documentation. He defined bibliometrics as the application of mathematics and statistical methods to books and other media of communication. The terms Librametrics, Scientometrics and Infometrics are also in use in the literature. Bibliometrics is analogous to Ranganathan's 'Librametry' Russian concept 'Scientometrics' FID's "Informetrics" and also to some other well established sub-disciplines like Econometrics, Psychometrics, Sociometrics, Webometrics and Cybermetrics.

Lotka's Law of Scientific Productivity describes the counting names and the number of publications. Bradford's Law of Scattering states that if scientific journals are arranged in order of decreasing productivity of articles on a given subject. Zipf's Law of Word Occurrence states that in a long textual matter, if words are arrange in their decreasing order of frequency, then the rank of any given word of the text will be inversely proportional to the frequency of occurrence of the word.

2.2 Genesis of Bibliometrics

In 1917, F.J. Cole and Nellie B. Eale's study on the "history of comparative anatomy part-1: a statistical analysis" is considered to be the first bibliometric study. He studied by counting the number of publications produced by different countries, covering a

period of 1543-1860 in the field of anatomy. The expression 'statistical analysis' where he used for the first time again changed to 'statistical biliography' by E. Wyndham Hulme in 1922, to describe the study of use and non-use of information.

In 1927, Gross and Gross studied in the field based on citations. They used citation to count rank of the journals in chemistry. The study remains important for its historical significance, because its findings formed the basis as well as a methodological direction for Bradford's law of scattering. The term statistical bibliography was again used by Henkle in 1938, in his paper entitled the "periodical literature of bio-chemistry". 'Statistical bibliography' was used by Gosnell in 1943 in his dissertation, and by Raisig in 1962 in his statistical bibliography in the health science, and later used by many others.

Dr. S.R. Ranganathan first used the term 'Librametry' in 1948 at Association of Special Libraries and Information Bureaux (ASLIB) conference at Leamington Spa, the United Kingdom, to connote the use of statistics to evaluate library services and resources. It is a wider term which includes the concept of bibliometrics. But the term it was forgotten for many years and did not take its place in library science. Later, it was called as 'Librametrics'. The term 'Bibliometrics' was first coined in 1969 in Alan Pritchard's article 'Statistical Bibliography or Bibliometrics' in the December issue of the Journal of Documentation. He defined it as the "*application of mathematics and statistical methods to books and other media of communication*". This was paraphrased by Robert A. Fairthorne as "*quantitative treatment of the properties of recorded discourse and behavior appertaining to it*". In a later article, "Bibliometrics and Information Transfer," Pritchard explained bibliometric as the "metrology" of the information transfer process and its purpose is analysis and control of the process. He based his interpretation upon the fact that measurement is the "the common theme through definitions and purposes of bibliometrics" and "the things that we are measuring when we carry out a bibliometric study are the process variables in the information process." (Pritchard, 1969 cited in Hertzel, 2003). Other related terms coming up were Scientometrics, Informetrics, Webometrics and Cybermetrics.

Bibliometrics is analogous to Ranganathan's 'Librametrics', Russian concept 'Scientometrics' FID's Informetrics and also to some other well established sub-

disciplines like 'Econometrics', 'Psychometrics', 'Sociometrics' and 'Biometrics' where mathematical and statistical calculus have been systematically applied to study and solve the problems in the field of library and information science, history of science, information science, economics, psychology, sociology and biology respectively.

2.3 Definition of Bibliometrics

- *Alan Pritchard* (1968) described Bibliometrics as "the application of mathematics and statistical methods to books and other media of communications".
- *Robert A. Fairthorne* (1969) says as "Bibliometrics is the quantitative treatment of the properties of recorded discourse and behaviour pertaining to it".
- *Ravichandra Rao* (1988) defined that 'Bibliometrics is understood to cover the study of statistical distribution of the process relating to the activities of library staff and readers".
- *Sengupta* (1988) defined bibliometrics as 'Organization, classification and quantitative evaluation of publication patterns of all macro, micro, communication along with their authorships by mathematical and statistical calculus'.
- *Bonitz* (1982) defined it as "Bibliometrics is a methodological sub-disciplines of library science, including the complex of mathematical and statistical methods, used for analysis of scientific and non-scientific documents, library networks, indexing languages, information systems and communication systems".

These Bibliometrics definitions reveal that it focuses on processing of the statistical distribution relating to the activities of characteristics of documents, library staff, and library users.

2.4 Types of Bibliometrics

Bibliometrics can be divided into following two categories:

2.4.1 Productivity Count (Descriptive)

Descriptive bibliometrics describes the characteristics or features of literature and is used to measure productivity of scientists and information scientists. The area of descriptive bibliomerics includes the study of the number of publications in a given field or

productivity of literature in the field for the purpose of comparing the research in different institutions/countries as well different periods.

a) Geographic (Countries)
b) Time period (Era)
c) Discipline (Subjects)

2.4.2 Literature Usage Count (Evaluative)

Evaluative bibliometrics use citations as the source of its / their raw data. The theory for this stems from Robert Merton's (1973) sociology of science, which indicates that citations are the manner in which scholars acknowledge influential prior work. Based on this, citation counting is therefore used as an indicator of research of scientific value.

a) Reference
b) Citation

2.4.3 Relational Bibliometrics

Relational bibliometrics are used to study relations within scientific research through the use of ISI data. This was not possible in the early days due to lack of computing power and experience in technology. Even so these early relational analyses produced interesting insights into the structure of science research through simple means, such as network diagrams of the flow of citations between key sets of articles. Journal citation diagrams could illustrate the connections between journals within a field, both central and peripheral. If two documents often appear together in reference lists, (co-cited) they are likely to be similar in some way. This simply means that if collections of documents are arranged according to their co-citation counts. It should produce a pattern reflecting cognitive scientific relationships. Although all the descriptive studies are not evaluations, all the evaluative analyses are first descriptive with the evaluative taking the data one step further, providing "data on the condition or character of the literature as a whole (Hertzel, 2003; Jacobs, 2010).

2.5 Laws of Bibliometrics

The main areas in bibliometric research is concerns the application of Bibliometric Laws. The most commonly used laws in bibliometrics are:

2.5.1 Lotka's Law of Scientific Productivity

Alfred James Lotka was a Mathematician born in Lemberg, at that time it was Austria, now in Ukraine. In 1902, he came to United States; during the early twentieth century he wrote a number of articles on Chemical Oscillations and in 1925 authored a book on Theoretical Biology. The article that made him famous as a bibliometrician is just a footnote in his work of paper. In 1926, A.J. Lotka proposed his "Inverse Square Law" for correlating the contributors of scientific papers to their number of contributions. His classic paper was published in the *Journal of the Washington Academy of Sciences* in 1926, on the frequency distribution of scientific productivity, extracted from Chemical Abstracts during 1907-16 with the frequency of publications of the corporate authors.

Lotka's Law describes the counting names and the number of publications. A general formula for the relation between the frequency 'y' of persons making 'x' contribution as "$x^n y$=constant" finding the value of the constant when n=2. He observed that the number of one person's making 2 contributions is about one-fourth of those making one; the number making three contributions is about one-ninth, etc. The number making n contributions is about $1/n^2$ of those making one, and the proportion of all contributors that make a single contribution is about 60%. The law was based on the study of Chemistry and Physics literature, later it attracted the attention of researchers and generated much interest and it has been widely applied and tested in various disciplines (Devarajan, 1997; Hertzel, 2003; Tiwari, 2006).

2.5.2 Bradford's Law of Scattering

Samuel Clement Bradford, another pioneer of bibliometrics, presented his paper entitled "*Sources of Information on Specific Subjects*" which was the first paper published on observation on scattering, he examined two bibliographies of journal articles in Applied Geophysics (1928-31) and Lubrication (1931-32). These bibliographies were prepared in the Science Library, Britain. He tested the journals containing references to these fields in their descending order of productivity and then divided the articles into three approximately equal zones or groups.

a. He termed the first one as the nuclear zone, which is highly productive;
b. The second zone as moderately productive zone; and
c. The third zone as peripheral zone or low productive zone.

Bradford discovered regularity in calculating the number of titles in each of the three zones. On the basis of the observations, Bradford concluded that the ratio of the titles of journals in successive zones followed a common pattern. Bradford's verbal formulation stated that if scientific journals are arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same number of articles as the nucleus, when the numbers of periodicals in the nucleus and succeeding zones will be $1:n:n^2$ where 'n' is a multiplier. (Devarajan, 1997; Hertzel, 2003; Tiwari, 2006). There are two most widely recognized formulations of the so called Bradford's Law: the verbal formulation which is derived from the verbal statement of Bradford's conclusion, and the graphical formulation, which is an empirical expression derived from the graphical survey of a distribution of periodicals. Among the several statistical expressions, Bradford's Law of Scattering is perhaps the most popular and the best known of all the bibliometric concepts that try to describe the effective working of science by mathematical means (Sudhier, 2010).

2.5.3 Zipf's Law of Word Occurrence

George Kingsley Zipf formulated his law to predict the frequency of words within a text in 1935. Zipf developed and extended an empirical law as observed by Estoup (1916), governing between the rank of a word and the frequency of its appearance in a long text of natural language of sufficient strength. The words were ranked from high to low frequency of occurrence in the text i.e. from common to rare. Zipf states that in a long textual matter, if words are arranged in their decreasing order of frequency, then the rank of any given word of the text will be inversely proportional to the frequency of occurrence of the word. In other words, if 'r' is the rank of a word and 'f' is its frequency, then mathematically Zipf's law can be stated as r.1/f, or r.f=c where 'c' is a constant (Jena, 2012).

2.6 Bibliometric Techniques

Bibliometric techniques are as follows:

2.6.1 Self Citations

If the citing paper has one or more authors in common with the cited paper one usually describes this feature as self-citation. Vickery used the term self-citation to indicate a similarity of subject matter between citing and cited article, opposed to self-derivation or the citing of papers from other topics or scientific areas.

2.6.2 Publication Counts

Jones (1980) studied the correlation between the publication cunts and other measures of scientific merits such as research findings, citedness, etc. and found a reasonable correlation. The simplest bibliometric technique is counting the total number of publication of a scientist or a group of them having publication, while the publication count gives a quantitative measure of the total volume of research output, the qualitative aspect of the publication work remains to be assessed.

2.6.3 Direct Citations

Citations are considered as signposts left behind after information has been utilized and as such provide data by which one may build pictures of user behavior. The direct citation count is to determine the number of citations received by a given document or set of documents over a period of time from a particular set of citing documents, where from citation data for analysis was taken.

2.6.4 Co-Citation Coupling

Co- citation is a method used to establish a subject similarity between two documents. If papers A and B cited paper C they may be said to be related to one another, even though if they don't directly cite each other. If papers A and B are both cited by many other papers, they have a stronger relationship. The more papers they are cited by, the stronger their relationship is. The Co-citation frequency is defined as the frequency with which two documents are cited together.

2.6.5 Bibliographic Coupling

The term Bibliographic Coupling was introduced by M. M. Kessler (1961) of the Massachusetts Institute of Technology. He defined a unity of coupling between two papers as an item of reference used by these two papers. The two papers are then said to

be bibliographically coupled. Bibliographic coupling operates on a similar principle, but in a way it is the mirror image of co-citation coupling. Bibliographic coupling links two papers that cite the same articles, so that if papers A and B both cite paper C, they may be said to be related, even though they don't directly cite each other. The more papers they both cite, the stronger their relationship is.

2.7 Application of Bibliometrics

The techniques of bibliometrics have been extensive applications equally in sociological studies of science, information management, librarianship, history of science including science policy; study of science and scientists and also in different branches of social scientists. The important areas where bibliometric techniques can be used are:

a) To identify growth of a scientific discipline and its literature;
b) To identify authorship and its trends in various documents on various subjects;
c) To undertake users of different subjects;
d) Drew up rank list of the scientist belonging to the same discipline.
e) To predict the productivity and quality of research of an individual, organization and of a country;
f) To regulate inflow of information and scientific communication
g) To identify core periodicals of different disciplines;
h) To initiate effective multi level network system;
i) Indicate obsolescence and dispersion of scientific literature.

2.8 Conclusion

Bibliometrics is a formed sub-discipline including the complex of mathematical and statistical methods used to analyze bibliographical characteristic of documents. It can be applied in different disciplines and to most of the problem concerned with written communications. It has extensive quantitative analysis of various aspects of literature used to identify the pattern of publication like authorship, degree of collaboration, place of publication, year-wise citations, and co-citations, and although the structure of literature is basic to all disciplines, it is particularly important in the area of information retrieval. The common features of the laws of Bradford, Lotka and Zipf are that they represent hyperbolic distributions in which the product of fixed powers of the variables is constant. These laws are based on rank order frequencies or rank size relationships. The

interrelationship among the three laws has been recognized and pertains to the application of bibliometric laws and models. It seems evident that bibliometrics which have first used in attempts to evaluate journals for collection development in libraries has been recognized and expanded to the study of the structure of literature in larger encompassing field of information science (Hertzel, 2003; Jena, 2012).

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Note: References are based on Publication Manual of American Psychological Association (6th ed.) with some modifications.

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CHAPTER - 3

OPEN ACCESS INITIATIVES

3.1 Introduction

The global research communication and dissemination system has been transforming with the coming of Open Access (OA) movement. It is the most vital component of the research lifecycle. In the recent past, the most common method of scholarly communication were the write up of the findings of research works in books, or articles published in journal. But with the advent of Internet and other ICT applications, there is a major shift of scholarly communication from books and published articles to open access journals. The world today is witnessing a substantial increase in scholarly communication and scientific publications mainly occur due to the advances of new technologies and internet. The advent of the Internet and electronic publishing has resulted in unprecedented possibilities for the dissemination and exchange of information (Kanjilal, 2015).

Budapest Open Access Initiatives (BOAI) was the first initiative to use the term "Open Access". The other two leading statement are Bethesda statement on Open Access Publishing and the Berlin Declaration on Open Access to knowledge in the Science and Humanities. The increasing growth of online OA journals in various disciplines is evident from various online directories and Directory of Open Access Journal is one of the most popular online directories among the various online directories. In 2003, the DOAJ was launched at Lund University, Sweden with an aim to increase the visibility and ease of using scientific and scholarly journals at open access, thereby promoting their increased usage and impact.

3.2 Open Access: Meaning and Definitions

According to Budapest Open Access Initiatives (BOAI)

"Open access, it means free availability on the public Internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself."

Harnad (2008) has described the open access (OA) as, "*Information, which is free, immediate, permanent, full-text, on-line and accessible*". He suggests three main

justifications of OA: "*to maximize the uptake, usage, applications and impact of the research output of your university; to measure and reward the uptake, usage, applications and impact of the research output of your university (research metrics) and; to collect, manage and showcase a permanent record of the research output and impact of your university*".

Suber (2010) describes, "*Open-access literature is digital, online, free of charge, and free of most copyright and licensing restrictions*". Suber also states that open access contents are not restricted only to peer-reviewed research articles; they can be in any formats from texts and data to software, audio, video, and multi-media. Although the OA movement focuses on peer-reviewed research articles and their preprints, OA can also apply to non-scholarly content, like music, movies, and novels, even if these are not the focus of most OA activists.

3.3 Emergence and Development of Open Access Initiatives

The enabling information and communication technologies (ICTs) as well as the frustrating Journal prices have prompted the scholarly community to devise an alternative scholarly publishing system whose aim is to achieve a wider distribution of scholarly content without price or other copyright restrictions to end users. The emerging scholarly communication model is known as open access (Dulle et al., 2010). In the first decade of the 21st century, there were many events that marked the emergence of OA literature as a substantial mode of scholarly communications. For shaping up the global OA movements many stakeholders came forward in building institutions and resources. Some of the institutions emerged during this decade are namely, Public Library of Science (PLOS), Bio Med Central (BMC) – publishers of peer-reviewed OA journals, the Scholarly Publishing and Academic Resources Coalition (SPARC), and Open Access Scholarly Publishers Association (OASPA). Most importantly, the Budapest, Berlin and Bethesda (BBB) OA declarations or statements got signed by the scholarly communities, particularly by the funding agencies, research councils, learned societies, institutions, universities, and scientists for the OA dissemination of public funded research (Kaur & Chia, 2009).

3.3.1 Budapest Open Access Initiatives (BOAI)

In December 2001, the Open Society Institute (OSI) convened a meeting in Budapest, to discuss ways to accelerate progress in the international effort to make research articles in all academic fields freely available on the Internet. In academic disciplines, the participants represented many points of view and had experience with many of the ongoing initiatives that make up the open access movement. They explored the most effective and affordable strategies for serving the interests of research, researchers, and the institutions and societies that support research. The result is the Budapest Open Access Initiative. Budapest Open Access Initiatives (BOAI) was the first to use the term "open access". By open access it means free availability on the public Internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited (BOAI).

3.3.2 The Bethesda Statement on Open Access Publishing

Another landmark meeting was held in April 2003 at the Howard Hughes Medical Institute in Chevy Chase, Maryland. It resulted in the "Bethesda Statement on Open Access Publishing", which continued to promote a gradual transition of open access publishing. The key section of the Bethesda Statement says the author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use. A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving.

3.3.3 The Berlin Declaration (2003)

In 2003, the Berlin declaration define open access as a comprehensive source of human knowledge and cultural heritage that has been approved by the scientific community, and stated that "*Our mission of disseminating knowledge is only half complete if the information is not made widely and readily available to society. New possibilities of knowledge dissemination not only through the classical form but also an increasingly through the open access paradigm via the Internet have to be supported*".

3.4 Ways of Open Access

Open Access can be delivered in the following three ways:

3.4.1 Open Access Publishing (Gold Road)

The Open access publishing means that authors publish their paper in journals that are full text, peer-reviewed but are open access for readers. Their costs are covered in a different way from traditional journals, usually through publishing fees. These fees can be covered by research grants or by the author's institution. This type of publishing is offered by open access journals and by "hybrid" journals (subscription-based journals offering authors the option to pay for their article to be available open access). It ensures that research articles are immediately available in open access mode as soon as they are published. Open access publishing is also called as Gold Road Open Access.

Open access publishing, the end user is not charged to access scholarly content. Instead, various funding strategies such as direct author fees, institutional membership to sponsor all or part of author fees, funding agency payment of author fees, grants to open access publishers and institutional subsidies are used to cover the costs for publication and distribution of OA content for free access by the end user.

3.4.2 Self Archiving (Green Road)

In 1994, OA self-archiving was first formally proposed by Stevan Harnad. However, self-archiving was already being done by computer scientists in their local FTP archives in the '80s, later harvested into *Citeseer*. High-energy physicists have been self-archiving centrally in *arXiv* since 1991. OA self-archiving refers to self-depositing, the idea that authors make their research outputs accessible by distributing a free online version to an

institutional repository. These repositories are digital archives, which are usually administered by libraries (Nashipudi & Ravi, 2015).

3.4.3 Hybrid Road

It also sometimes called as Paid Open Access, refers to subscription journals with open access to individual articles usually when a fee is paid to the publisher or journal by the author, the author's organization, or the research funder. Some universities or libraries have a pool of funding available for hybrid journal publications or sometimes funding is written into grant applications for open access in hybrid journals, though these are not common instances. Some examples of hybrid open access are Open Access by Taylor & Francis, Online Open by Wiley, or Sage Open by Sage. For a full list visit Publishers with paid options for Open Access from SHERPA/RoMEO (Joshi et al., 2012).

3.5 Characteristics & Advantages of OA

Characteristics of OA

a. Scholarly publication are free available on online over Internet.
b. Scholarly literature can be freely access and store by the end users.
c. Greater visibility and accessibility, and thus impact from scholarly endeavor.
d. It is free from copyright and licensing restrictions.
e. More efficient archiving and availability of scholarly research.

Advantages of OA

a) Widespread of open access would make it easier to avoid duplication of research effort.
b) OA would increase the public accountability.
c) Open access increases collaboration of researchers internationally.
d) OA would make meta-analyses of results more easily possible.
e) OA de-fragments science literature because it is making seamless, comprehensive searching possible.
f) It would speed up understanding of outstanding scientific questions.
g) OA closes gaps in the access to knowledge, enabling every researcher to try and see the entire picture.

h) It enables the building of databases and knowledge-bases, effectively and efficiently re-using published results in order to make trying to see the entire picture.
i) Open access would stimulate wider understanding and respect.
j) Information can be created using new computational technologies.

3.6 Open Access Initiatives in India

In India, poor access to international journals and the low visibility of research papers are the major problems facing Indian researchers. OA is viewed as a solution to remedy this. India's challenge is to reciprocate the information flow and improve access and there by the impact of Indian research. OA movement has made the Indian journals reach the target audience of the world's communities and now more than hundred Indian journals provide free access to full-text contents. Apart from these many newspapers both in English and regional languages are available in OA. Similarly a large number of government reports National Knowledge Commission reports (NKC) and Supreme Court opinions are also available on OA. There are also many R&D laboratories operating within government science agencies, which cover domains like industrial research, defense research, agricultural research, medicine, ecology, environment, information technology, space, energy, and ocean development. The University Grants Commission is the body that coordinates all Indian university education. It supports an Information and Library Network program (INFLIBNET) that makes Meta databases related to R&D projects available on the Web (Rajashekar, 2004; Keisham & Sophiarani, 2008).

The evolution of an open access policy began in India 2000, at a two-day conference on Advances in Information Access and Science Communication held at M S Swaminathan Research Foundation, Chennai, (MSSRF). At this conference Prof. Stevan Harnad, open access archivangelist, spoke about 'scholarly skywriting' and the need for every research performing institution to adopt open access self-archiving of preprints. Harnard's ideas were an eye opener (Arunachalam & Muthu, 2011). Some of the Indian initiatives are as follows:

3.6.1 Indian National Science Academy (INSA) is a scientific academy funded by the Government of India. It was established in 1935. Currently, INSA publishes 3 leading

peer-reviewed journals, organizes scientific discussions and brings out proceedings and monographs.

3.6.2 The Indian Academy of Sciences (IAS) is a scientific academy funded by the Government of India. It was established in 1934 and today the Academy publishes 10 science journals in various disciplines. All journals are open access and full-text literature is available as PDF files on each journal's website. All of the articles in current issues of these journals are born-digital. Since 2007, the Academy journals are being co-published with Springer and since 2015, with Springer Nature.

3.6.3 IndianJournals.com provides single window access to multidisciplinary Indian journals published by different scholarly societies and institutions. It provides access to thirty five open (35) access journals and periodicals. This journal gateway also provides access to subscription-based content.

3.6.4 The Kamla-Raj Enterprises is a Delhi-based publisher established in 1933. Kamla-Raj publishes over 15 print-based peer-review scholarly journals mainly in the areas of social sciences which are also available in electronic format in open access platform.

3.6.5 The Indian MEDLARS Centre at the National Informatics Centre has initiated two unique projects with support from the Indian Council of Medical Research. The first one is INDMED@NIC that indexes 100 biomedical journals of India from 1985 onwards. This INDMED bibliographic database is available online. Another project, **MEDIND@NIC** is an open access initiative from NIC that provides open access to the full-text content of 38 Indian biomedical journals.

3.6.6 Medknow Publications Private Limited is a publisher providing unrestricted online access to high-quality peer-reviewed scholarly research journals in India. Medknow was acquired by Wolters Kluwer in December, 2011, and has continued to grow its journal portfolio, extending its publishing partnerships in China, the Middle East, and other growth markets. Today, Medknow provides publishing services to over 350 medical society journals in over 40 specialties.

3.6.7 J-Gate Informatics (India) Limited is an electronic gateway to global e-journal literature. Launched in 2001 by Informatics India Limited, J-Gate provides seamless access to millions of journal articles available online offered by 13,134 Publishers. It presently has a massive database of journal literature, indexed from 46,612 e-journals with links to full text at publisher sites. J-Gate also plans to support online subscription to journals, electronic document delivery, archiving and other related services.

3.7 Open Access Institutional Repositories in India

The first Institutional Repository was successfully implemented in India by the ***e-prints repository*** of research outputs from the Indian Institute of Science, IISc, Bangalore. The archive is maintained by National Center for Science Information (NCSI) and it enables the institute community to deposit their preprints, post-prints and other scholarly publications using a web interface, and organizes these publications for easy retrieval. Another endeavor of IISc, is the e-theses repository "***ETD@IISc***" which covers 2519 records of theses and dissertations at present, mainly in the area of science and technology.

Librarian's Digital Library (LDL) at DRTC offers Search Digital Libraries (SDL), a selective harvester for archives and e-journals in Library and Information Science. Archives including ***E-LIS*** and ***DLIST*** can be browsed individually or searched together INFLIBNET, an Inter-University Centre of UGC that serves towards modernization of libraries through a National Network of Libraries in around 264 Universities, Colleges and R&D Institutions across the country created OAI repository ***IR@INFLIBNET*** for its post prints, preprints, new clippings, CALIBER and PLANNER full text proceedings, training material and other scholarly publications. Another subject specific repository of Indian Medlars Centre (IMC) caters to the information need of the Indian Medical community is the e-print archive ***OpenMed@NIC*** which stores and provides access to biomedical literature.

3.8 Open Access Journals

Open access journals provide online access to full-text contents of scholarly, peer-reviewed journals. There are two types of open access journals - the one, available in electronic version only and the other, available in both electronic as well as print

versions viz. Current Science. In the first type, the journals are published in regular intervals on the Internet that do not have any print-on-paper counterpart. In the second type, the journals are published in print-on-paper format and distributed to the subscribers. The same contents of print-on-paper are available to the scholars free of charge in electronic form (Chakravarty & Mahajan, 2011; Laksoo et al., 2011).

3.8.1 Directory of Open Access Journals (DOAJ)

In 2002, the first Nordic Conference on scholarly communication led to the founding of the Directory of Open Access Journals which was launched in 2003 at Lund University, Sweden, under the direction of Lars Bjornshauge. DOAJ is a not-for-profit organization managed by Infrastructure Services for Open Access C.I.C. (Community Interest Company) based in the United Kingdom. The Directory of Open Access Journals is an online directory which provides access to high quality open access peer-reviewed journals. If any journal wishes to join in DOAJ group then the journal has to be registered in DOAJ staff according to Library of Congress Classification Scheme. The journal is immediately searchable and visible in DOAJ upon registration.

3.8.2 Aims of DOAJ

The aim of the DOAJ is to increase the visibility and ease of use of open access scientific and scholarly journals, thereby promoting their increased usage and impact. The DOAJ aims to be comprehensive and covers all open access scientific and scholarly journals in all disciplines of knowledge. In short, the DOAJ aims to be the "one-stop shop" for users of open access journals. A journal included in the directory must exercise peer-review or editorial quality control. Journal may report primary results of research or overviews of research results to a scholarly community. A serial must publish at intervals, generally more than once a year with each issue numbered or dated consecutively. A journal in DOAJ normally contains articles, stories, or other writings.

The coverage offered by the Directory includes:

- All scientific and scholarly subjects.
- Scientific and scholarly periodicals that published research or review papers in full text.

- Publication from academic, government, commercial and non-profit private organizations.
- Publications that target primary researchers and scholars.
- Journals whose content is substantively research papers and available in full text.
- All languages (Khillare, 2014; Tamizhchelvan & Dhanavandan, 2014).

There are now 11,500 open access journals listed in the directory. 7,161 journals are searchable at article level. As of today (31-03-2016) 2,247,812 articles are included in the DOAJ service. In Library and Information Science (LIS) field, there are 158 journals and 18,501 articles (as on 31-03-2016). Indian contribution to LIS journals in DOAJ is very less i.e. only six journals (as on 31-03-2016). Currently DOAJ has 9,295 Journals from 128 Countries worldwide in which Library and information science (LIS) contribution is 117 journals (as on November 2016). At article level search it contains 18,545 Articles. The six Indian LIS journals which were registered under DOAJ have now been unregistered, but these journals can be accessed openly on Internet (as on 20-11-2016).

Table 3.1: List of Open Access Journals Publishing in India on DOAJ

SN	Journal Name (Code Name)
1	International Research: Journal of Library and Information Science (IRJLIS)
2	Annals of Library and Information Studies (ALIS)
3	International Journal of Information Dissemination and Technology (IJIDT)
4	International Journal of Digital Library Services (IJODLS)
5	DESIDOC Journal of Library and Information Technology (DJLIT)
6	Trends in Information Management (TRIM)

3.9 Open Access LIS Journals from India

3.9.1 International Research: Journal of Library and Information Science

International Research: Journals of Library and Information Science (IRJLIS) is a peer reviewed online journal in LIS discipline published from India, registered under Directory of Open Access Journals (DOAJ). It is a freely accessible scholarly journal, committed to disseminate the intellectual efforts of academic community in the field of LIS. It is publishing quarterly with original research paper, surveys reports and reviews (Source: http://irjlis.com/ Accessed on 17 August, 2016).

3.9.2 Annals of Library and Information Studies

Annals of Library and Information Studies (ALIS) is a leading journal in the field of Library and Information Science published from India by the National Institute of Science Communication and Information Resources (NISCAIR), New Delhi on quarterly basis. Earlier ALIS was published as Annals of Library Science and Documentation by the NISCAIR. Since 1954, NISCAIR has started its publication and its 63 volume has brought out. It covers various current and up to date issues related with LIS fields such as professional development, public and special library development, documentation notes and research reviews on library documentation and information science, information systems, services and products, information technology, information users, bibliometrics, scientometrics and informetrics, education and training and other related areas. To increase the visibility of CSIR-NISCAIR OA journals, NISCAIR Online Periodicals Repository (NOPR) has been registered with international bodies like Registry of Open Access Repositories (ROAR), Directory of Open Access Repositories (OpenDOAR), DOAJ etc. (Source: http://www.niscair.res.in/ Accessed on October 7, 2016).

3.9.3 International Journal of Information Dissemination and Technology

International Journal of Information Dissemination and Technology (IJIDT) is a quarterly peer-reviewed journal published on behalf of Maharishi Markandeshwar University, Mullana, Ambala. The contention behind introducing this journal is to transpire the models and methods pertinent to generate, manage and disseminate the information and knowledge suitable to the requirement and need of the mentors, professionals, researchers and information scientists. To fulfill the academic needs of professionals on all fronts because of its distinctive and magnificent research articles contributed by the renowned luminaries and distinguished intellectuals who are expert judge of national and international repute. (Source: http://www.ijidt.com/index.php/ijidt/index. Accessed on October 10, 2016).

3.9.4 International Journal of Digital Library Services

International Journal of Digital Library Services (IJODLS) is an academic journal provides free access to research information to the international community without financial, legal or technical barriers. The aim of IJODLS is to enables the dissemination of research articles to global community without restriction usually through the Internet.

Thus, all articles published under open access can be accessed by anyone with Internet connection. Abstracts and full texts (usually in PDF format) of all articles published by academic journal are freely accessible to everyone immediately after publication. (Source: http://www.ijodls.in/about-journal.html. Accessed on October 8, 2016).

3.9.5 DESIDOC Journal of Library and Information Technology

DESIDOC Journal of Library and Information Technology (DJLIT) is more than three decades old journal. It was formerly known as DESIDOC Bulletin of Information Technology (DBIT). DJLIT is one of the leading journals in the field of Library Science journals in India, being published by Defense Science Documentation Centre (DESIDOC), DRDO, GOI, New Delhi since 1981 on bimonthly basis. Each volume having six issues. It publishes original research and review papers related to information technology applied to library activities, services, and products. The journal is enjoying wide readership both at national and international level. (Source: http://publications.drdo.gov.in/ojs/index.php/djlit/index. Accessed on October 9, 2016).

3.9.6 Trends in Information Management

Trends in Information Management (TRIM) is a biannual journal of the department of Library and Information Science, University of Kashmir, India. Its aimed is to publish original papers on various facets of information and knowledge management. The journal published original articles, reviews of books, professional news etc., relevant to the focus of the journal. Since 2015 it doesn't published any articles. (Source: http://www.inflibnet.ac.in/ojs/index.php/TRIM. Accessed on October 8, 2016).

3.10 Conclusion

The open access movement has given a new opportunity to the information seekers by establishing a bridge between information and information seekers without paying any charges. There is no denial in it that OA has got a promising future the way people have grown conscious of it and the way they have embraced it. OA has thrown open the new vistas for publishing research results and the trend is not confined to one or two countries but has already engulfed the whole world. Open Access Journals are the potential solution to the pricing crisis particularly for a country like India, when most of the academic libraries do not have adequate funds to purchase steeply priced journals. OA is

viewed as a solution to remedy this. India's challenge is to reciprocate the information flow and improve access and there by the impact of Indian research. OA movement has made the Indian journals reach the target audience of the world's communities and now more than hundred Indian journals provide free access to full-text contents.

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CHAPTER - 4

ANALYSIS OF OPEN ACCESS LIS JOURNALS

4.1 Introduction

The analysis of data involves critical examination of the data with the objectives in mind for determining the pattern of relationship among the variables. Data analysis and findings are crucial for a scientific study and for that; the scholar has taken the relevant data obtained through observational survey for making an exhaustive analysis and draws the inferences.

4.2 Analysis of Journal – International Research: Journal of Library & Information Science (IRJLIS)

4.2.1 Year wise Distribution of Articles

Table 4.2.1: Distribution of Articles – Year wise

Year	Vol. No.	No. of Issues	No. of Contributions	%
2011	1	2	16	7.33
2012	2	2	27	12.38
2013	3	4	60	27.52
2014	4	4	60	27.52
2015	5	4	55	25.22
Total		**16**	**218**	**100**

(Source: Primary Data)

The table 4.2.1 displays the total number of articles published in 16 issues of 5 volumes from the year 2011-2015 published in the journal IRJLIS. On the observation of table 4.2.1, it has been found that major contributions of research papers to the journal published in volume 3 (27.52% research papers) and volume 4 (27.52% research papers). Volume 1 has the lowest publication percentage till date i.e. 7.33% of total articles published in the journal.

4.2.2 Issue wise Distribution of Articles

Table 4.2.2: Distribution of Articles – Issue wise

Issues (Month)	Volume Number					Total	%
	1	2	3	4	5		
March	-	-	15	15	12	42	19.26
June	6	12	15	15	13	61	27.98
September	-	-	15	15	15	45	20.64
December	10	15	15	15	15	70	32.11
Total	**16**	**27**	**60**	**60**	**55**	**218**	**100**

(Source: Primary Data)

Table 4.2.2 indicates issue-wise publications of articles in five volumes. On the observation, it has been found that during March issue there was less number of publications to the journal i.e. 19.26% of total articles published in the journal. The September issue of the journal was also had less number of publications i.e. 20.64% only. December issue of the journal had the highest number of published articles i.e. 32.11% followed by June issue with 27.98% publications.

4.2.3 Authorship Pattern

Table 4.2.3: Authorship Pattern of the Journal

Year	Volume	No. of Authors				Total articles	Total Author (%)
		One	Two	Three	Four		
2011	1	7	5	2	2	16	31 (7.41)
2012	2	6	11	8	2	27	60 (14.35)
2013	3	22	24	13	1	60	113 (27.03)
2014	4	24	25	9	2	60	109 (26.07)
2015	5	13	35	6	1	55	105 (25.11)
Total		**72**	**100**	**38**	**8**	**218**	**418 (100)**
Percentage		**33.02**	**45.87**	**17.43**	**3.66**	**100**	

(Source: Primary Data)

The table 4.2.3 shows authorship pattern of research contributions published in the journal during 2011-2015. On the observation of table 4.2.3, it has been found that 33.02% articles published in the name of one (single) author of the total publications in journal. There were 45.87% articles published in the name of two authors of the total publications while 17.43% articles were published in the name of three authors of total publications to the journal. There were only 3.66% articles published in the name of four authors. From the analysis, it has been inference that two authorship pattern is most prevalent in the journal followed by single authorship and three authorship respectively. Further, table 4.2.3 also reveals the total number of authors i.e. 418 contributed 218 research papers to the journal. Out of total number of authors, 27.03% belongs to Volume 3 of the journal followed by Volume 4 (26.07%), Volume 5 (25.11%), Volume 2 (14.35%), and Volume 1 (7.41%).

4.2.4 Degree of Collaboration

Table 4.2.4: Degree of Collaboration among Authors

Year	Volume	Single Author (Ns)	Multi Authors (Nm)	Total Ns+Nm	Degree of Collaboration
2011	1	7	9	16	0.56
2012	2	6	21	27	0.77
2013	3	22	38	60	0.63
2014	4	24	36	60	0.6
2015	5	13	42	55	0.76
Total		**72**	**146**	**218**	**0.66**

(Source: Primary Data)

The degree of collaboration (C) of the contributors has been derived using the Subramanyam formula:

$$\text{Degree of Collaboration (C)} = \frac{\text{Nm}}{Nm+Ns}$$

Where,

C = Degree of Collaboration

Nm = Number of multiple authors

Ns = Number of single authors

$$\text{C}= \frac{146}{146+72=218} \quad \text{or} \quad \text{C} = 0.66$$

The degree of collaboration has been calculated for the year 2011-2015. Single author contribution is 72 and multiple authors' contribution is 146. Volume wise Degree of Collaboration of the journal falls in the range of 0.56 to 0.77. The Degree of Collaboration of the journal is 0.66. The journal has good presence of collaborative research among authors. More the degree of collaboration for the journal tends towards more collaborative research published in the journal and vice-versa.

4.2.5 Geographical Distribution of Articles

Table 4.2.5: Geographical Distribution of Articles

Year	National	International	National + International	Total No. of Articles
2011	12	2	2	16
2012	15	11	1	27
2013	37	23	-	60
2014	39	21	-	60
2015	49	6	-	55
Total	**152**	**63**	**3**	**218**
Percentage	**69.72**	**28.89**	**1.37**	**100**

(Source: Primary Data)

The table 4.2.5 displays geographical distribution of articles in the journal. The articles have been divided into three categories: **National, International, and National + International**. On the observation, it has been found that 69.72% articles were belongs to national contribution and 28.89% were belongs to international contribution. National contribution is more than international contribution to the journal. There were very few contributions (1.37%) belong to national and international collaboration. On the analysis, it has been found that since the journal is of Indian origin, has highest number of articles submitted and published by India in the journal. International contribution of articles to the journal is less than national because of geographic distance as well as less popularity of the journal due to recent in existence.

4.2.6 Country-wise Distribution of Authors

Table 4.2.6: Country wise Distribution of Authors

Rank	Country	No. of Authors	Percentage
1	India	301	72
2	Nigeria	88	21.05
3	Ghana	6	1.43
4	Oman	6	1.43
5	Saudi Arabia	4	0.95
6	USA	2	0.47
7	Iran	2	0.47
8	Bangladesh	2	0.47
9	Tanzania	2	0.47
10	Swaziland	1	0.23
11	Dubai	1	0.23
12	Ethiopia	1	0.23
13	Zambia	1	0.23
14	Luxembourg	1	0.23
Total		**418**	**100**

(Source: Primary Data)

Table 4.2.6 shows country-wise distribution of authors. India has the highest number of contributors (72%) to the journal followed by Nigeria (21%), Ghana (1.43%), Oman (1.43%), and Saudi Arabia (0.95%). The journal has 28% authors from other countries and rests were from India which displays its international acceptance and presence amongst LIS professionals. Among foreign countries authors, 75.21% authors belong to Nigeria only that indicates Nigerian authors have more interest in publishing their research papers with IRJLIS.

4.2.7 State-wise Distribution of Indian Authors

Table 4.2.7: State wise Distribution of Indian Authors

Rank	Name of State	No. of Authors	Percentage
1	Tamil Nadu	56	18.6
2	Uttar Pradesh	35	11.62
3	Maharashtra	33	10.96
4	Karnataka	31	10.29
5	West Bengal	23	7.64
6	Odisha	19	6.31
7	Jammu & Kashmir	15	4.98
8	Madhya Pradesh	12	3.98
9	Rajasthan	12	3.98
10	New Delhi	10	3.32
11	Andhra Pradesh	9	2.99
12	Punjab	9	2.99
13	Kerala	8	2.65
14	Gujarat	8	2.65
15	Haryana	7	2.32
16	Puducherry	4	1.32
17	Assam	3	0.99
18	Chandigarh	2	0.66
19	Uttarakhand	2	0.66
20	Tripura	2	0.66
21	Himachal Pradesh	1	0.33
Total		**301**	**100**

(Source: Primary Data)

Table 4.2.7 shows state-wise distribution of Indian authors. Tamil Nadu (18.6%) has the highest number of contributors to the journal followed by Uttar Pradesh (11.62%), Maharashtra (10.96%), Karnataka (10.29%), West Bengal (7.64%), Odisha (6.31%), and Jammu and Kashmir (4.98%) etc. Indian contributors to the journal belong to 21 states and union territories of India which shows journal's wide acceptance amongst Indian LIS professionals.

4.2.8 Forms of Documents Cited

Table 4.2.8: Forms of Documents Cited in the Articles

SN	Forms of Document	Total No. of Citations	Percentage
1	Journal Articles	1949	60.12
2	Books and Reference Sources	454	14
3	Web based Resources	312	9.62
4	Conference/ Seminar Proceedings	268	8.27
5	Miscellaneous Items	119	3.67
6	Research/ Project Reports	87	2.68
7	Theses/ Dissertations	53	1.63
	Total	**3242**	**100**

(Source: Primary Data)

The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal. From the analysis of table 4.2.8, it has been found that "journal articles" were most prevalent in terms of citations/references in research articles. There were total 3242 citations received to 218 research articles published in the journal during study period, and more than 60% citations belong to Journal Articles, followed by Books and Reference Sources (14%), Web based Resources (9.62%), articles published in Conference and Seminar Proceedings (8.27%), Research/ Project Reports (2.68%), and Theses/Dissertations (1.63%). By the analysis of the table 4.2.8, it has been inference that "Journal Articles" are the first choice as a citation/reference for writing a research paper by authors because of having research oriented recent information & knowledge than any other source of information. Books and Reference Sources have been found second choice of authors for citation might be due to having conceptual and historical information & knowledge about the topic of research. Web based Resources are recent in origin (about 21 years old) but gained the trust of authors as a source of information & knowledge and used for citation/reference in their research papers. Conference/ Seminar Proceedings have been used as the source of information and knowledge for research purposes but less than Web based Resources due to availability problem in comparison to Web based Resources. Though Conference/ Seminar Proceedings are older than Web based Resources but authors, nowadays, wants information sources in their fingertips that are not fulfilled by Conference/ Seminar Proceedings. Research/Project Reports and Theses/Dissertations have been less used by researchers to write the research papers in the field, and it might be due to less/ restricted availability of such information sources in public domain.

4.2.9 Chronological Distribution of Citations

Table 4.2.9: Chronological Distribution of Citations

Years	Journal Articles	Books and Reference Sources	Web based Resources	Conference/ Seminar Proceedings	Misc. items	Research/ Project Reports	Theses/ Dissertations	Total
Upto-1950	1 (0.05%)	10 (2.2%)	-	1 (0.37%)	-	1 (1.15%)	-	13 (0.4%)
1951-1960	3 (0.15%)	5 (1.1%)	-	-	5 (4.2%)	1 (1.15%)	-	14 (0.43%)
1961-1970	14 (0.72%)	15 (3.3%)	-	-	-	2 (2.3%)	-	31 (0.96%)
1971-1980	19 (0.97%)	31 (6.83%)	-	6 (2.24%)	5 (4.2%)	-	2 (3.77%)	63 (1.94%)
1981-1990	98 (5.03%)	54 (11.9%)	-	3 (1.12%)	6 (5.04%)	4 (4.6%)	1 (1.89%)	166 (5.12%)
1991-2000	326 (16.73%)	127 (27.97%)	15 (4.81%)	32 (11.94%)	16 (13.45%)	12 (13.8%)	5 (9.43%)	533 (16.44%)
2001-2010	1070 (54.9%)	184 (40.53%)	115 (36.86%)	196 (73.13%)	71 (59.66%)	52 (59.77%)	42 (79.25%)	1730 (53.36%)
2011-2015	418 (21.45%)	28 (6.17%)	182 (58.33%)	30 (11.19%)	16 (13.45%)	15 (17.24%)	3 (5.66%)	692 (21.34%)
Total	**1949**	**454**	**312**	**268**	**119**	**87**	**53**	**3242**

(Source: Primary Data)

The chronological distribution of citations to the journal articles has been given in Table 4.2.9. The citations from the journal articles have been divided into 8 time frames having periodicity of 10 years each. The citations before 1950 were enclosed within the cluster upto 1950 and citations after 2010 to 2015 enclosed in 2011-2015 groups. From the table 4.2.9, it has been observed that IRJLIS research papers prefer most of the citations of 2001-2010 (53.36%), 2011-2015 (21.34%), and 1991-2000 (16.44%) time periods. It indicates that 91.14% literature cited in the research papers of the IRJLIS were within the period of 1991-2015 i.e. 25 years duration. Further categorically, citations belongs to Journal Articles covered from 2001-2010 (54.9%), 2011-2015 (21.45%), and 1991-2000 (16.73%). Within the Journal Articles category, 93.08% citations were within the period of 1991-2015. Citations in the form of Books and Reference Sources also have 40.83% citations within 2001-2010, 27.97% within 1991-2000, and 11.9% within 1981-1990 time periods. The major citations (80.4%) were within 1981-2010 time periods in case of Books and Reference Sources. The Web based Resources as form of citations appeared during 1991-2000 time period first time in the journal and all the citations were within 1991-2015 time periods. In case of Conference/ Seminar Proceedings, 73.13% citations were within 2001-2010 followed by 11.94% within 1991-2000, and 11.19% within 2011-2015. In this case, 96.26% citations were within 1991-2015 time periods. In the cases of Miscellaneous Items (86.56%), Research/Project Reports (90.81%), and Theses/Dissertations (94.34%), major citations were within 1991-2015 time periods. From the analysis, it has been evident that literatures older than 25 years (published before 1991) have not been used more by researchers and they have tendency to use latest literature published in any form. Further Journal Articles for writing research papers (for citing purposes) were prevalent amongst authors/researchers followed by Books and Reference Sources, Web based Resources, and Conference/Seminar Proceedings.

4.2.10 Obsolescence of LIS Literature

Table 4.2.10: Frequency of Citations and their Obsolescence

Years	Journal Articles	Books and Reference Sources	Web based Resources	Conference/ Seminar Proceedings	Misc. items	Research / Project Reports	Theses/ Dissertations	Total Citations (f)	Cumulative Citations (Cf)
1-10	1061 (54.44%)	105 (23.13%)	256 (82.05%)	163 (60.82%)	57 (47.9%)	44 (50.57%)	28 (52.83%)	1714	1714
11-20	640 (32.84%)	186 (40.97%)	56 (17.95%)	87 (32.46%)	38 (31.93%)	32 (36.78%)	22 (41.51%)	1061	2775
21-30	169 (8.67%)	82 (18.06%)	-	10 (3.73%)	11 (9.24%)	6 (6.9%)	1 (1.89%)	279	3054
31-40	57 (2.92%)	42 (9.25%)	-	3 (1.12%)	7 (5.88%)	1 (1.15%)	-	110	3164
41-50	10 (0.51%)	18 (3.96%)	-	4 (1.49%)	1 (0.84%)	-	2 (3.77%)	35	3199
51-60	11 (0.56%)	10 (2.2%)	-	-	4 (3.36%)	3 (3.45%)	-	28	3227
61-70	-	5 (1.1%)	-	1 (0.37%)	1 (0.84%)	1 (1.15%)	-	8	3235
71-80	1 (0.05%)	3 (0.66%)	-	-	-	-	-	4	3239
80+	-	3 (0.66%)	-	-	-	-	-	3	3242
Total	**1949**	**454**	**312**	**268**	**119**	**87**	**53**	**3242**	

(Source: Primary Data)

The table 4.2.10 displays frequency of citations appeared in the articles published in the journal IRJLIS and obsolescence of literature cited in those articles. The total 3242 citations were classified into 9 time zones, each having the time duration of 10 years. These 3242 citations were also categorized according to their form of document. "*Obsolescence is the study to calculate age of documents cited in some research in particular field of research. As fast as literature is growing in the field, rate of obsolescence of literature is also growing. Rate of obsolescence has direct relation with the growth rate of literature in the field.*" Rate of obsolescence varies discipline wise. In the field of science, obsolescence rate has been found higher, in many researches, than social sciences and humanities. From the table 4.2.10, categorically different rates of obsolescence observed for different forms of documents. For example, for Journal Articles rate of obsolescence is 10 years, Books and Reference Sources upto 20 years, Web based Resources, Conference/Seminar Proceedings, Research/Project Reports and Theses/Dissertations are 10 years etc. The calculated rate of obsolescence or half-life of citations to the journal is 9.539 years (see Appendix 1).

4.3 Analysis of Journal – Annals of Library and Information Studies (ALIS)

4.3.1 Year wise Distribution of Articles

Table 4.3.1: Distribution of Articles – Year wise

Year	Vol. No.	No. of Issues	No. of Contributions	%
2011	58	4	36	20.80
2012	59	4	27	15.60
2013	60	4	37	21.38
2014	61	4	35	20.23
2015	62	4	38	21.96
Total		**20**	**173**	**100**

(Source: Primary Data)

The table 4.3.1 displays the total number of articles published in 20 issues of 5 volumes from the year 2011 to 2015 published in the journal ALIS. On the observation of table 4.3.1, it has been found that major contributions of research papers to the journal published in Volume 62 (21.96%) and Volume 60 (21.38%). Volume 59 has the lowest publication ratio out of five volumes i.e. 15.60% of total articles published in the journal.

4.3.2 Issue wise Distribution of Articles

Table 4.3.2: Distribution of Articles – Issue wise

Issues (Month)	Volume Number					Total	%
	58	59	60	61	62		
March	10	6	9	9	6	40	23.12
June	10	6	9	8	7	40	23.12
September	9	8	9	11	9	46	26.58
December	7	7	10	7	16	47	27.16
Total	**36**	**27**	**37**	**35**	**38**	**173**	**100**

(Source: Primary Data)

Table 4.3.2 displays the issue-wise publications of articles in five volumes. On the observation, it has been found that during March & June issues there were less number of publications to the journal i.e. 23.12% of total articles published in the journal. September issue of the journal has second highest number of publications i.e. 26.58% to the journal. December issue of the journal has the highest number of published articles (with 27.16% publications).

4.3.3 Authorship Pattern

Table 4.3.3: Authorship Pattern of the Journal

Year	Volume	No. of Authors						Total Articles	Total Authors (%)
		One	Two	Three	Four	Five	Six		
2011	58	14	14	7	-	-	1	36	69 (21.29)
2012	59	11	10	6	-	-	-	27	49 (15.12)
2013	60	12	18	5	-	1	1	37	74 (22.83)
2014	61	12	18	3	2	-	-	35	65 (20.06)
2015	62	18	14	4	1	1	-	38	67 (20.67)
Total		**67**	**74**	**25**	**3**	**2**	**2**	**173**	**324 (100)**
Percentage		**38.72**	**42.77**	**14.45**	**1.73**	**1.15**	**1.15**	**100**	

(Source: Primary Data)

The table 4.3.3 shows authorship pattern of research contributions published in the journal during 2011-2015. On the observation of table 4.3.3, it has been found that 38.72% articles published in the name of one (single) author of the total publications in journal whereas 42.77% articles published in the name of two authors of the total publications and 14.45% articles published in the name of three authors of total publications to the journal. There were only 1.73% articles published in the name of four authors; only 1.15% articles published in the name of five as well as six authors each.

From the analysis, it has been found that two authorship pattern is most prevalent in the journal followed by single authorship and three authorship pattern respectively. Further, table 4.3.3 also reveals the total number of authors i.e. 324 contributed 173 research papers to the journal. Out of total number of authors, 22.83% belongs to Volume 60 of the journal followed by Volume 58 (21.29%), Volume 62 (20.67%), Volume 61 (20.06%), and Volume 59 (15.12%).

4.3.4 Degree of Collaboration

Table 4.3.4: Degree of Collaboration among Authors

Year	Volume	Single Author (Ns)	Multi Authors (Nm)	Total (Ns+Nm)	Degree of Collaboration
2011	58	14	22	36	0.61
2012	59	11	16	27	0.59
2013	60	12	25	37	0.67
2014	61	12	23	35	0.65
2015	62	18	20	38	0.52
Total		**67**	**106**	**173**	**0.61**

(Source: Primary Data)

The degree of collaboration (C) of the contributors has been derived using the Subramanyam formula**:**

$$\text{Degree of Collaboration (C)} = \frac{\text{Nm}}{Nm+Ns}$$

Where,

C = Degree of Collaboration

Nm = Number of multiple authors

Ns = Number of single authors

$$\text{C}= \frac{106}{106+67=173} \text{ or } \text{C} = 0.61$$

The Degree of Collaboration has been calculated for the year 2011-2015. Single author contribution is 67 and multiple authors' contribution is 106. Volume wise Degree of Collaboration of the journal falls in the range of 0.52 to 0.67. The calculated Degree of Collaboration of the journal is 0.61. The higher the Degree of Collaboration shows journal has good presence of collaborative research among authors.

4.3.5 Geographical Distribution of Articles

Table 4.3.5: Geographical Distribution of Articles

Year	National	International	National + International	Total No. of Articles
2011	25	10	1	36
2012	18	8	1	27
2013	29	8	-	37
2014	31	3	1	35
2015	27	10	1	38
Total	**130**	**39**	**4**	**173**
Percentage	**75.14**	**22.54**	**2.31**	**100**

(Source: Primary Data)

The table 4.3.5 displays geographical distribution of articles in the journal. The articles have been divided into three categories: **National, International, and National + International**. On the observation, it has been found that 75.14% articles were belongs to national contribution and 22.54% were belongs to international contribution. National contribution is more than international contribution to the journal. There were very few contributions (2.31%) belong to national and international collaboration. On the analysis, it has been found that since the journal is of Indian origin, highest number of articles submitted and published by India in the journal. International contribution of articles to the journal is less than national because of geographic distance as well as less popularity of the journal due to recent in existence.

4.3.6 Country-wise Distribution of Authors

Table 4.3.6: Country wise Distribution of Authors

Rank	Country	No. of Authors	Percentage
1	India	234	72.22
2	Nigeria	45	13.88
3	Bangladesh	15	4.62
4	Sri Lanka	13	4.01
5	Iran	5	1.54
6	Uganda	3	0.92
7	Malaysia	2	0.61
8	Canada	1	0.30
9	Brazil	1	0.30
10	Russia	1	0.30
11	Botswana	1	0.30
12	Belgium	1	0.30

13	Tanzania	1	0.30
14	Fiji	1	0.30
Total		**324**	**100**

(Source: Primary Data)

Table 4.3.6 shows country wise distribution of authors. India has the highest number of contributors (72.22%) to the journal followed by Nigeria (13.88%), Bangladesh (4.62%), Sri Lanka (4.01%), and Iran (1.54%). The journal has 28% authors from other countries and rests were from India which displays its international acceptance and presence amongst LIS professionals. Among foreign countries authors, 50% authors belong to Nigeria only that indicates Nigerian authors have more interest in publishing their research papers with Indian journal "ALIS".

4.3.7 State-wise Distribution of Indian Authors

Table 4.3.7: State wise Distribution of Indian Authors

Rank	Name of the State	No. of Authors	Percentage
1	New Delhi	73	31.19
2	West Bengal	26	11.11
3	Karnataka	25	10.68
4	Maharashtra	17	7.26
5	Kerala	15	6.41
6	Jammu & Kashmir	10	4.27
7	Odisha	7	2.99
8	Uttar Pradesh	7	2.99
9	Tamil Nadu	6	2.56
10	Chandigarh	6	2.56
11	Himachal Pradesh	5	2.13
12	Madhya Pradesh	5	2.13
13	Punjab	5	2.13
14	Jharkhand	4	1.70
15	Gujarat	4	1.70
16	Puducherry	3	1.28
17	Haryana	2	0.85
18	Andhra Pradesh	2	0.85
19	Rajasthan	2	0.85
20	Chhattisgarh	2	0.85
21	Telangana	2	0.85
22	Sikkim	2	0.85
23	Arunachal Pradesh	1	0.42
24	Assam	1	0.42
25	Meghalaya	1	0.42

26	Manipur	1	0.42
Total		**234**	**100**

(Source: Primary Data)

Table 4.3.7 shows state wise distribution of Indian authors. New Delhi (31.19%) has the highest number of contributors to the journal followed by West Bengal (11.11%), Karnataka (10.68%), Maharashtra (7.26%), Kerala (6.41%), Jammu and Kashmir (4.27%), Odisha and Uttar Pradesh (2.99% each), Tamil Nadu and Chandigarh (2.56% each), etc. Indian contributors to the journal belong to 26 states and union territories of India which shows journal's wide acceptance amongst Indian LIS professionals.

4.3.8 Forms of Documents Cited

Table 4.3.8: Forms of Documents Cited in the Articles

SN	Forms of Document	Total No. of Citations	Percentage
1	Journal Articles	2223	62.18
2	Books and Reference Sources	642	17.95
3	Web based Resources	250	6.99
4	Conference/Seminar Proceedings	194	5.42
5	Research/ Project Reports	80	2.23
6	Miscellaneous Items	130	3.63
7	Theses/ Dissertations	56	1.56
	Total	**3575**	**100**

(Source: Primary Data)

The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal. From the analysis of table 4.3.8, it has been found that "Journal Articles" were most prevalent in terms of citations/references in research articles. There were total 3575 citations received to 173 research articles published in the journal during study period, and more than 62% citations belong to Journal Articles, followed by Books and Reference Sources (17.95%), Web based Resources (6.99%), articles published in Conference/ Seminar Proceedings (5.42%), Research/Project Reports (2.23%), and Theses/Dissertations (1.56%). By the analysis of the table 4.3.8, it has been inference that "Journal Articles" are the first choice as a citation/reference for writing a research paper by authors because of having research oriented recent information & knowledge than any other source of information. Books and Reference Sources have been found second choice of authors for citation might be due to having conceptual and historical information & knowledge about the topic of research. Web based Resources are recent in origin but gained the trust of authors as a

source of information and knowledge and used for citation/reference in their research papers. Conference/Seminar Proceedings have been used as the source of information and knowledge for research purposes but less than Web based Resources due to availability problem in comparison to Web based Resources. Though Conference/ Seminar Proceedings are older than Web based Resources but authors, nowadays, wants information sources in their fingertips that are not fulfilled by Conference/Seminar Proceedings. Research/Project Reports and Theses/Dissertations have been less used by researchers to write the research papers in the field, and it might be due to less/ restricted availability of such information sources in public domain.

4.3.9 Chronological Distribution of Citations

Table 4.3.9: Chronological Distribution of Citations

Years	Journal Articles	Books and Reference Sources	Web based Resources	Conference/ Seminar Proceedings	Misc. items	Research/ Project Reports	Theses/ Dissertations	Total
Upto-1950	16 (0.72%)	35 (5.45%)	-	-	-	-	-	51 (1.42%)
1951-1960	13 (0.58%)	23 (3.58%)	-	-	-	-	-	36 (1%)
1961-1970	41 (1.84%)	50 (7.78%)	-	1 (0.51%)	-	1 (1.25%)	1 (1.78%)	94 (2.62%)
1971-1980	60 (2.69%)	49 (7.63%)	-	1 (0.51%)	5 (3.84%)	-	2 (3.57%)	117 (3.27%)
1981-1990	122 (5.48%)	84 (13.08%)	-	1 (0.51%)	2 (1.53%)	1 (1.25%)	4 (7.14%)	214 (5.98%)
1991-2000	396 (17.81%)	133 (20.71%)	2 (0.8%)	30 (15.46%)	15 (11.53%)	5 (6.25%)	11 (19.64%)	592 (16.55%)
2001-2010	1213 (54.56%)	234 (36.44%)	38 (15.2%)	127 (65.46%)	64 (49.23%)	50 (62.5%)	31 (55.35%)	1757 (49.14%)
2011-2015	362 (16.28%)	34 (5.29%)	210 (84%)	34 (17.52%)	44 (33.84%)	23 (28.75%)	7 (12.5%)	714 (19.97%)
Total	**2223**	**642**	**250**	**194**	**130**	**80**	**56**	**3575**

(Source: Primary Data)

The chronological distribution of citations to the journal articles has been given in Table 4.3.9. The citations from the journal articles have been divided into 8 time frames having periodicity of 10 years each. The citations before 1950 were enclosed within the cluster upto 1950 and citations after 2010 to 2015 enclosed in 2011-2015 groups. From the table 4.3.9, it has been observed that ALIS research papers prefer most of the citations of 2001-2010 (49.14%), 2011-2015 (19.97%), and 1991-2000 (16.55%) time periods. It indicates that 85.66% literature cited in the research papers of the ALIS are within the period of 1991-2015 i.e. 25 years duration. Further categorically, citations belongs to Journal Articles covered from 2001-2010 (54.56%), 1991-2000 (17.81%), and 2011-2015 (16.28%). Within the Journal Articles category, 88.66% citations are within the period of 1991-2015. Citations in the form of Books and Reference Sources also have 36.44% citations within 2001-2010, 20.71% within 1991-2000, 13.08% within 1981-1990, 7.63% citations within 1971-1980, and 7.78% citations within 1961-1970 time periods. The major citations (70.24%) are within 1981-2010 time periods in case of Books and Reference Sources. The Web based Resources as form of citations appeared during 1991-2000 time period first time in the journal articles and all the citations are within 1991-2015 time periods. In case of Conference/Seminar Proceedings, 65.46% citations are within 2001-2010 periods followed by 17.52% within 2011-2015, and 15.46% within 1991-2000. In this case, 98.45% citations are within 1991-2015 time periods. In the cases of miscellaneous items (94.61%), Research/Project Reports (97.5%) and Theses/Dissertations (87.5%), major citations are within 1991-2015 time periods. From the analysis, it has been inference that literatures older than 25 years (published before 1991) have not been used more by researchers and they have tendency to use latest literature published in any form except Books and Reference Sources in this journal ”ALIS’. Further Journal Articles for writing research papers (for citing purposes) are prevalent amongst authors/researchers followed by Books and Reference Sources, Web based Resources, and Conference/Seminar Proceedings.

4.3.10 Obsolescence of LIS Literature

Table 4.3.10: Frequency of Citations and their Obsolescence

Years	Journals Articles	Books and Reference Sources	Web based Resources	Conference /Seminar Proceedings	Misc. items	Research/ Project Reports	Theses/ Dissertations	Total Citations (f)	Cumulative Citations (Cf)
1-10	1017 (45.74%)	146 (22.74%)	237 (94.8%)	99 (51.03%)	83 (63.84%)	53 (66.25%)	29 (51.78%)	1664	1664
11-20	824 (37.06%)	202 (31.46%)	12 (4.8%)	88 (45.36%)	38 (29.23%)	25 (31.25%)	15 (26.78%)	1204	2868
21-30	207 (9.31%)	107 (16.66%)	1 (0.4%)	5 (2.57%)	4 (3.07%)	1 (1.25%)	8 (14.28%)	333	3201
31-40	93 (4.18%)	57 (8.87%)	-	-	5 (3.84%)		2 (3.57%)	157	3358
41-50	44 (1.97%)	51 (7.94%)	-	1 (0.51%)	-	1 (1.25%)	2 (3.57%)	99	3457
51-60	20 (0.89%)	34 (5.29%)	-	1 (0.51%)	-	-	-	55	3512
61-70	4 (0.17%)	18 (2.80%)	-	-	-	-	-	22	3534
71-80	2 (0.08%)	3 (0.46%)	-	-	-	-	-	5	3539
81-90	10 (0.44%)	6 (0.93%)	-	-	-	-	-	16	3555
90+	2 (0.08%)	18 (2.8%)	-	-	-	-	-	20	3575
Total	**2223**	**642**	**250**	**194**	**130**	**80**	**56**	**3575**	

(Source: Primary Data)

The table 4.3.10 displays frequency of citations appeared in the articles published in the journal ALIS and obsolescence of literature cited in those articles. The total 3575 citations were classified into 10 time zones, each having the time duration of 10 years. These 3575 citations were also categorized according to their form of document. From the table 4.3.10, categorically different rates of obsolescence observed for different forms of documents. For example, for Journal Articles rate of obsolescence is 10+ years, Books and Reference Sources upto 20 years, Web based Resources, Conference/Seminar Proceedings, Miscellaneous Items, Research/Project Reports and Theses/Dissertations are 10 years etc. The calculated rate of obsolescence or half-life of citations to the journal "ALIS" is 10.60837 years (see Appendix 2).

4.4 Analysis of Journal – International Journal of Information Dissemination and Technology (IJIDT)

4.4.1 Year wise Distribution of Articles

Table 4.4.1: Distribution of Articles – Year wise

Year	Vol. No.	No. of Issues	No. of Contributions	%
2011	1	4	45	17.37
2012	2	4	54	20.84
2013	3	4	55	21.23
2014	4	4	59	22.77
2015	5	4	46	17.76
Total		**20**	**259**	**100**

(Source: Primary Data)

The table 4.4.1 displays the total number of articles published in 20 issues of 5 volumes from the year 2011-2015 published in the journal IJIDT. On the observation of table 4.4.1, it has been found that major contributions of research papers to the journal published in Volume 4 (22.77%) and Volume 3 (21.23%). Volume 1 has the lowest publication percentage till date i.e. 17.37% of total articles published in the journal.

4.4.2 Issue wise Distribution of Article

Table 4.4.2: Distribution of Articles – Issue wise

Issue (Month)	Volume Number					Total	%
	1	2	3	4	5		
March	11	14	15	15	10	65	25.09
June	10	12	11	19	13	65	25.09
September	10	12	15	11	12	60	23.16
December	14	16	14	14	11	69	26.64
Total	**45**	**54**	**55**	**59**	**46**	**259**	**100**

(Source: Primary Data)

Table 4.4.2 indicates issue wise publications of articles in five volumes. On the observation, it has been found that during September issue, there was less number of publications to the journal i.e. 23.16% of total articles published in the journal. March and June issues of the journal were had equal number of publications i.e. 25.09%. December issue of the journal had the highest number of published articles i.e. 26.64%.

4.4.3 Authorship Pattern

Table 4.4.3: Authorship Pattern of the Journal

Year	Volume	No. of Authors					Total Articles	Total Author (%)
		One	Two	Three	Four	Five		
2011	1	19	18	6	2	-	45	81 (16.77)
2012	2	23	22	4	5	-	54	99 (20.49)
2013	3	20	26	8	1	-	55	100 (20.7)
2014	4	18	29	8	3	1	59	117 (24.22)
2015	5	15	24	6	-	1	46	86 (17.8)
Total		**95**	**119**	**32**	**11**	**2**	**259**	**483 (100)**
Percentage		**36.67**	**45.94**	**12.35**	**4.24**	**0.77**	**100**	

(Source: Primary Data)

The table 4.4.3 shows authorship pattern of research contributions published in the journal during 2011-2015. On the observation of table 4.4.3, it has been found that 36.67% articles published in the name of one (single) author of the total publications in journal. There were 45.94% articles published in the name of two authors of the total publications while 12.35% articles were published in the name of three authors of total publications to the journal. There were only 4.24% articles published in the name of four authors. From the analysis, it has been inference that two authorship pattern is most prevalent in the journal followed by single authorship and three authorship respectively. Further, table 4.4.3 also reveals the total number of authors i.e. 483 authors contributed

259 research papers to the journal. Out of total number of authors, 24.22% belongs to Volume 4 of the journal followed by Volume 3 (20.70%), Volume 2 (20.49%), Volume 5 (17.80%), and Volume 1 (16.77%).

4.4.4 Degree of Collaboration

Table 4.4.4: Degree of Collaboration among Authors

Year	Volume	Single Author (Ns)	Multi Authors (Nm)	Total (Ns+ Nm)	Degree of Collaboration
2011	1	19	26	45	0.57
2012	2	23	31	54	0.57
2013	3	20	35	55	0.63
2014	4	18	41	59	0.69
2015	5	15	31	46	0.67
Total		**95**	**164**	**259**	**0.63**

(Source: Primary Data)

Table 4.4.4 shows the year-wise degree of collaboration. The degree of collaboration (C) of the contributors has been calculated using the Subramanyam formula**:**

$$\text{Degree of Collaboration (C)} = \frac{\text{Nm}}{Nm+Ns}$$

Where,

C = Degree of Collaboration

Nm = Number of multiple authors

Ns = Number of single authors

$$\text{C}= \frac{164}{164+95=259} \quad \text{or} \quad \text{C} = 0.63$$

The degree of collaboration has been calculated for the year 2011-2015. Single author contribution is 95 and multiple authors' contribution is 164. Volume wise Degree of Collaboration of the journal falls in the range of 0.57 to 0.69. The Degree of Collaboration of the journal is 0.63 and this indicates that journal has good presence of collaborative research among authors. More the degree of collaboration for the journal tends towards more collaborative research published in the journal and vice-versa.

4.4.5 Geographical Distribution of Articles

Table 4.4.5: Geographical Distribution of Articles

Year	National	International	National+ International	Total No. of Articles
2011	44	1	-	45
2012	52	1	1	54
2013	52	3	-	55
2014	54	3	2	59
2015	46	-	-	46
Total	**248**	**8**	**3**	**259**
Percentage	**95.75**	**3.08**	**1.15**	**100**

(Source: Primary Data)

The table 4.4.5 displays geographical distribution of articles in the journal. The articles have been divided into three categories: **National, International, and National + International**. On the observation, it has been found that 95.75% articles were belongs to national contribution and only 3.08% were belongs to international contribution. National contribution is more than international contribution to the journal. There were very few contributions (1.15%) belong to national and international collaboration. On the analysis, it has been found that since the journal is of Indian origin, highest number of articles submitted and published by India in the journal. International contribution of articles to the journal is very less than national because of geographic distance as well as very less popularity of the journal due to recent in existence.

4.4.6 Country-wise Distribution of Authors

Table 4.4.6: Country wise Distribution of Authors

Rank	Country	No. of Authors	Percentage
1	India	462	95.65
2	Saudi Arabia	5	1.03
3	Swaziland	5	1.03
4	Dubai	4	0.82
5	Malaysia	2	0.41
6	Iran	2	0.41
7	Ethiopia	1	0.20
8	Sri Lanka	1	0.20
9	Atlanta (U.S.A)	1	0.20
	Total	**483**	**100**

(Source: Primary Data)

Table 4.4.6 shows country wise distribution of authors. India has the highest number of contributors (95.65%) to the journal followed by Saudi Arabia and Swaziland (1.03% each), Dubai (0.82%), Malaysia and Iran (0.41% each), Ethiopia, Sri Lanka, and Atlanta (0.20% each). The journal has 4.35% authors from other countries and rests were from India which displays journal is less accepted internationally and less presence amongst international LIS professionals. Amongst foreign countries authors, 23.08% authors belong to Saudi Arabia and Swaziland each, 19.04% authors from Dubai.

4.4.7 State-wise Distribution of Indian Authors

Table 4.4.7: State wise Distribution of Indian Authors

Rank	Name of the State	No. of Authors	Percentage
1	Karnataka	70	15.15
2	Tamil Nadu	56	12.12
3	Haryana	48	10.38
4	Maharashtra	38	8.22
5	Chandigarh	33	7.14
6	New Delhi	28	6.06
7	Uttar Pradesh	25	5.41
8	Punjab	23	4.97
9	Kerala	20	4.32
10	Odisha	18	3.89
11	West Bengal	16	3.46
12	Jammu & Kashmir	16	3.46
13	Gujarat	15	3.24
14	Rajasthan	10	2.16
15	Madhya Pradesh	8	1.73
16	Andhra Pradesh	7	1.51
17	Himachal Pradesh	7	1.51
18	Uttarakhand	5	1.08
19	Hyderabad	5	1.08
20	Sikkim	5	1.08
21	Assam	3	0.64
22	Jharkhand	2	0.43
23	Mizoram	2	0.43
24	Chhattisgarh	1	0.21
25	Dadra & Nagar Haveli	1	0.21
	Total	**462**	**100**

(Source: Primary Data)

Table 4.4.7 shows state wise distribution of Indian authors. Karnataka (15.15%) has the highest number of contributors to the journal followed by Tamil Nadu (12.12%), Haryana (10.38%), Maharashtra (8.22%), Chandigarh (7.14%), New Delhi (6.06%), Uttar Pradesh (5.41%), Punjab (4.97%), Kerala (4.32%), and Odisha (3.89%) etc. Indian contributors to the journal belong to 25 states and union territories of India which shows journal's wide acceptance amongst Indian LIS professionals.

4.4.8 Forms of Documents Cited

Table 4.4.8: Forms of Documents Cited in the Articles

SN	Forms of Document	Total No. of Citations	Percentage
1	Journal Articles	1981	63.55
2	Web based Resources	414	13.28
3	Books and Reference Sources	331	10.61
4	Conference/Seminar Proceedings	233	7.47
5	Miscellaneous Items	67	2.14
6	Research/ Project Reports	62	1.98
7	Theses/ Dissertations	29	0.93
Total		**3117**	**100**

(Source: Primary Data)

The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal. From the analysis of table 4.4.8, it has been found that "Journal Articles" were most prevalent in terms of citations/references in research articles. There were total 3117 citations received to 259 research articles published in the journal during study period, and more than 63% citations belongs to Journal Articles, followed by Web based Resources (13.28%), Books and Reference Sources (10.61%), articles published in Conference/ Seminar Proceedings (7.47%), Research/Project Reports (1.98%), and Theses/Dissertations (0.93%). By the analysis of the table 4.4.8, it has been found that "Journal Articles" are the first choice, Web based Resources have become second choice, Books and Reference Sources have been third choice of authors for citation/reference in their research papers. Conference/Seminar Proceedings have been used as the source of information and knowledge for research purposes but less than Books and Reference Sources might be due to availability problem. Like other journals, Research/Project Reports and Theses/Dissertations have been less used by researchers to write the research papers in the field, and it might be the same reason as other journals.

4.4.9 Chronological Distribution of Citations

Table 4.4.9: Chronological Distribution of Citations

Years	Journal Articles	Web based Resources	Books and Reference Sources	Conference/ Seminar Proceedings	Misc. items	Research/ Project Reports	Theses/ Dissertations	Total
Upto 1950	10 (0.50%)	-	6 (1.81%)	-	-	-	-	16 (0.51%)
1951-1960	-	-	4 (1.20%)	-	-	1 (1.61%)	-	5 (0.16%)
1961-1970	16 (0.80%)	-	5 (1.51%)	-	-	1 (1.61%)	-	22 (0.70%)
1971-1980	26 (1.31%)	-	21 (6.34%)	1 (0.42%)	-	9 (14.51%)	1 (3.44%)	58 (1.86%)
1981-1990	60 (3.02%)	-	25 (7.55%)	5 (2.14%)	-	4 (6.45%)	3 (10.34%)	97 (3.11%)
1991-2000	276 (13.93%)	12 (2.89%)	95 (28.70%)	31 (13.30%)	6 (8.95%)	6 (9.67%)	12 (41.37%)	438 (14.05%)
2001-2010	1074 (54.21%)	126 (30.43%)	156 (47.12%)	149 (63.94%)	36 (53.73%)	29 (46.77%)	12 (41.37%)	1582 (50.75%)
2011-2015	519 (26.19%)	276 (66.66%)	19 (5.74%)	47 (20.17%)	25 (37.31%)	12 (19.35%)	1 (3.44%)	899 (28.84%)
Total	**1981**	**414**	**331**	**233**	**67**	**62**	**29**	**3117**

(Source: Primary Data)

The chronological distribution of citations to the journal articles has been given in Table 4.4.9. The citations from the journal articles have been divided into 8 time frames having periodicity of 10 years each. The citations before 1950 were enclosed within the cluster upto 1950 and citations after 2010 to 2015 enclosed in 2011-2015 groups. From the table 4.4.9, it has been observed that IJIDT research papers prefer most of the citations of 2001-2010 (50.75%), 2011-2015 (28.84%), and 1991-2000 (14.05%) time periods. It indicates that 93.64% literature cited in the research papers of the IJIDT are within the period of 1991-2015 i.e. 25 years duration. Further categorically, citations belongs to Journal Articles covered from 2001-2010 (54.21%), 2011-2015 (26.19%), and 1991-2000 (13.93%). Within the Journal Articles category, 94.34% citations are within the period of 1991-2015. Web based Resources as form of citations appeared during 1991-2000 time period first time in the journal articles and all the citations are within 1991-2015 time periods. Citations in the form of Books and Reference Sources also have 47.12% citations within 2001-2010, 28.7% within 1991-2000, and 7.55% within 1981-1990 time periods. The major citations (83.38%) are within 1981-2010 time periods in case of Books and Reference Sources. In case of Conference/Seminar Proceedings, 63.94% citations are within 2001-2010 followed by 20.17% within 2011-2015, and 13.3% within 1991-2000. In this case, 97.42% citations are within 1991-2015 time periods. In the cases of Miscellaneous Items (100%), Research/Project Reports (75.80%) and Theses/Dissertations (86.20%), major citations are within 1991-2015 time periods. From the analysis, it has been evident that literatures older than 25 years (published before 1991) have not been used more by researchers and they have tendency to use latest literature published in any form. Further Journal Articles for writing research papers (for citing purposes) are prevalent amongst authors/researchers followed by Web based Resources, Books and Reference Sources, and Conference/Seminar Proceedings.

4.4.10 Obsolescence of LIS Literature

Table 4.4.10: Frequency of Citations and their Obsolescence

Years	Journal Articles	Books and Reference Sources	Web based Resources	Conference /Seminar Proceedings	Misc. items	Research/ Project Reports	Theses/ Dissertations	Total Citations (f)	Cumulative Citations (Cf)
1-10	1211 (61.13%)	95 (28.70%)	389 (93.96%)	143 (61.37%)	41 (61.19%)	27 (43.54%)	9 (31.03%)	1915	1915
11-20	572 (28.87%)	147 (44.41%)	23 (5.55%)	79 (33.90%)	23 (34.32%)	18 (29.03%)	11 (37.93%)	873	2788
21-30	119 (6%)	46 (13.89%)	2 (0.48%)	7 (3%)	3 (4.47%)	4 (6.45%)	8 (27.58%)	189	2977
31-40	46 (2.32%)	20 (6.04%)	-	4 (1.71%)	-	2 (3.22%)	1 (3.44%)	73	3050
41-50	21 (1.06%)	9 (2.71%)	-	-	-	10 (16.12%)	-	40	3090
51-60	2 (0.10%)	8 (2.41%)	-	-	-	1 (1.61%)	-	11	3101
61-70	-	1 (0.30%)	-	-	-	-	-	1	3102
71-80	1 (0.05%)	1 (0.30%)	-	-	-	-	-	2	3104
80+	9 (0.45%)	4 (1.21%)	-	-	-	-	-	13	3117
Total	**1981**	**331**	**414**	**233**	**67**	**62**	**29**	**3117**	

(Source: Primary Data)

The table 4.4.10 displays frequency of citations appeared in the articles published in the journal IJIDT and obsolescence of literature cited in those articles. The total 3117 citations were classified into 9 time zones, each having the time duration of 10 years. These 3117 citations were also categorized according to their form of document. From the table 4.4.10, categorically different rates of obsolescence observed for different forms of documents. For example, for Journal Articles rate of obsolescence is 10 years, Books and Reference Sources upto 20 years, Web based Resources, Conference/Seminar Proceedings, Miscellaneous Items are upto 10 years, Research/Project Reports and Theses/Dissertations are upto 20 years. The calculated rate of obsolescence or half-life of citations to the journal is 8.039 years (see Appendix 3).

4.5 Analysis of Journal – International Journal of Digital Library Services (IJODLS)

4.5.1 Year wise Distribution of Articles

Table 4.5.1: Distribution of Articles – Year wise

Year	Vol. No.	No. of Issues	No. of Contributions	%
2011	1	2	22	14.28
2012	2	4	35	22.72
2013	3	4	31	20.12
2014	4	4*	55*	35.71
2015	5	4**	11**	7.14
Total		**18**	**154**	**100**

*Articles from three issues, ** Articles from one issue only.

(Source: Primary Data)

The table 4.5.1 display the details of published articles in 18 issues of 5 volumes of the journal "IJODLS" from the year 2011-2015. In the year 2014, journal has published 4 issues for the Volume 4, but article's record were not available on the journal's website for one issue i.e. March issue, so that data displayed in the column of Volume 4 are for the remaining three issues of the Volume 4. Similarly, for Volume 5, website of journal displays article's record for only one issue i.e. December issue, so that data displayed in the column of Volume 5 is for only one issue whereas other three issues published but records are not displayed in the website. On the observation of table 4.5.1, whatever data has been collected based on survey, it has been found that major contributions of

research papers to the journal published in Volume 4 (35.71%) followed by Volume 2 (22.72%). Volume 5 has the lowest publication percentage till date i.e. 7.14% of total articles published in the journal due to non availability of data for other three issues of the Volume.

4.5.2 Issue wise Distribution of Articles

Table 4.5.2: Distribution of Articles – Issue wise

Issues (Month)	**Volume Number**					**Total**	**%**
	1	**2**	**3**	**4**	**5**		
March	-	13	9	-	-	22	14.28%
June	-	7	8	17	-	32	20.77%
September	8	8	6	23	-	45	29.22%
December	14	7	8	15	11	55	35.71%
Total	**22**	**35**	**31**	**55**	**11**	**154**	**100%**

(Source: Primary Data)

Table 4.5.2 indicates issue wise publications of articles in five volumes. On the observation, it has been inference that during March issue there was less number of publications (14.28%) to the journal while June issue of the journal had 20.77% publications. September issue has 29.22% paper contribution to the journal whereas December issue of the journal has the highest number of published articles i.e. 35.71%. In this journal, issue wise articles distribution found to be increased gradually from March to December.

4.5.3 Authorship Pattern

Table 4.5.3: Authorship Pattern of the Journal

Year	**Volume**	**No. of Authors**				**Total Articles**	**Total Authors (%)**
		One	**Two**	**Three**	**Four**		
2011	1	9	9	4	-	22	39 (14.49)
2012	2	13	11	11	-	35	68 (25.27)
2013	3	13	16	2	-	31	51 (18.95)
2014	4	23	27	4	1	55	93 (34.57)
2015	5	5	5	1	-	11	18 (6.69)
Total		**63**	**68**	**22**	**1**	**154**	**269 (100)**
Percentage		**40.90**	**44.15**	**14.28**	**0.64**	**100**	

(Source: Primary Data)

The table 4.5.3 shows authorship pattern of research contributions published in the journal during 2011-2015. On the observation of table 4.5.3, it has been found that 40.90% articles published in the name of one (single) author of the total publications in journal. There were 44.15% articles published in the name of two authors of the total publications while 14.28% articles published in the name of three authors of total publications to the journal. There was only 0.64% articles published in the name of four authors. From the analysis, it has been observed that two authorship pattern is most prevalent in the journal followed by single authorship and three authorships respectively. Further, table 4.5.3 also reveals the total number of authors i.e. 269 contributed 154 research papers to the journal. Out of total number of authors, 34.57% belongs to Volume 4 of the journal followed by Volume 2 (25.27%), Volume 3 (18.95%), Volume 1 (14.49%), and Volume 5 (6.69%).

4.5.4 Degree of Collaboration

Table 4.5.4: Degree of Collaboration among Authors

Year	Volume	Single Author (Ns)	Multi Authors (Nm)	Total (Ns+ Nm)	Degree of Collaboration
2011	1	12	10	22	0.45
2012	2	13	22	35	0.62
2013	3	13	18	31	0.58
2014	4	23	32	55	0.58
2015	5	5	6	11	0.54
Total		**66**	**88**	**154**	**0.57**

(Source: Primary Data)

The degree of collaboration (C) of the contributors has been derived using the Subramanyam formula**:**

$$\text{Degree of Collaboration (C)} = \frac{\text{Nm}}{Nm+Ns}$$

Where,

C = Degree of Collaboration

Nm = Number of multiple authors

Ns = Number of single authors

$$\text{C}= \frac{88}{88+66=154} \text{ or } \text{C} = 0.57$$

The degree of collaboration has been calculated for the year 2011-2015. Single author contribution is 66 and multiple authors' contribution is 88. Volume wise Degree of

Collaboration of the journal falls in the range of 0.45 to 0.58. The Degree of Collaboration of the journal is 0.57 which shows good presence of collaborative research among authors of the journal. More the degree of collaboration for the journal tends towards more collaborative research published in the journal and vice-versa.

4.5.5 Geographical Distribution of Articles

Table 4.5.5: Geographical Distribution of Articles

Year	National	International	National + International	Total No. of Articles
2011	17	2	3	22
2012	31	4	-	35
2013	25	6	-	31
2014	49	6	-	55
2015	10	1	-	11
Total	**132**	**19**	**3**	**154**
Percentage	**85.71**	**12.33**	**1.94**	**100**

(Source: Primary Data)

The table 4.5.5 displays geographical distribution of articles in the journal. The articles have been divided into three categories: **National, International, and National + International**. On the observation, it has been found that 85.71% articles were belongs to national contribution and 12.33% were belong to international contribution. National contribution is more than international contribution to the journal. There were very few contributions (1.94%) belong to national and international collaboration. On the analysis, it has been found that since the journal is of Indian origin, highest number of articles submitted and published by India in the journal. International contribution of articles to the journal is less than national because of geographic distance as well as less popularity of the journal due to recent in existence.

4.5.6 Country-wise Distribution of Authors

Table 4.5.6: Country wise Distribution of Authors

Rank	Country	Total No. of Authors	Percentage
1	India	229	85.13
2	Nigeria	14	5.20
3	Pakistan	7	2.60
4	Saudi Arabia	7	2.60
5	Iran	3	1.11
6	Swaziland	2	0.74

7	Ghana	2	0.74
8	Tanzania	2	0.74
9	Ethiopia	1	0.37
10	Australia	1	0.37
11	Fiji	1	0.37
Total		**269**	**100**

(Source: Primary Data)

Table 4.5.6 shows country wise distribution of authors. India has the highest number of contributors (85.13%) to the journal followed by Nigeria (5.20%), Pakistan and Saudi Arabia (2.6% each), Iran (1.11%), Swaziland, Ghana, and Tanzania (0.74% each), Ethiopia, Australia, and Fiji (0.37% each). The journal has about 15% authors from other countries and rests were from India which displays its comparatively fair international acceptance and presence amongst LIS professionals than other journals. Among foreign countries authors, 35% authors belong to Nigeria only that indicates journal's popularity among Nigerian authors. Pakistan and Saudi Arabia each have 17.5% authors share among foreign contributors.

4.5.7 State-wise Distribution of Indian Authors

Table 4.5.7: State wise Distribution of Indian Authors

Rank	Name of the State	No. of Authors	Percentage
1	Maharashtra	33	14.41
2	Tamil Nadu	28	12.22
3	Andhra Pradesh	25	10.91
4	Karnataka	24	10.48
5	Chandigarh	15	6.55
6	Uttar Pradesh	14	6.11
7	Punjab	11	4.80
8	Jammu & Kashmir	11	4.80
9	Madhya Pradesh	11	4.80
10	New Delhi	9	3.93
11	Kerala	9	3.93
12	Haryana	8	3.49
13	Odisha	6	2.62
14	Rajasthan	6	2.62
15	Uttarakhand	5	2.18
16	Puducherry	4	1.74
17	Himachal Pradesh	4	1.74
18	West Bengal	2	0.87
19	Assam	2	0.87

20	Gujarat	1	0.43
21	Goa	1	0.43
Total		**229**	**100**

(Source: Primary Data)

Table 4.5.7 shows state wise distribution of Indian authors. Maharashtra (14.41%) has the highest number of contributors to the journal followed by Tamil Nadu (12.22%), Andhra Pradesh (10.91), Karnataka (10.48%), Chandigarh (6.55%), Uttar Pradesh (6.11%), Punjab, Jammu and Kashmir, and Madhya Pradesh (4.8% each) etc. Indian contributors to the journal belong to 21 states and union territories of India which display journal's wide acceptance amongst Indian LIS professionals.

4.5.8 Forms of Documents Cited

Table 4.5.8: Forms of Documents Cited in the Articles

SN	Forms of Document	Total No. of Citations	Percentage
1	Journal Articles	1248	58.81
2	Web based Resources	335	15.78
3	Books and Reference Sources	267	12.58
4	Conference/Seminar Proceedings	132	6.22
5	Miscellaneous Items	58	2.73
6	Research/ Project Reports	51	2.40
7	Theses/ Dissertations	31	1.46
Total		**2122**	**100**

(Source: Primary Data)

The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal "IJODLS". From the analysis of table 4.5.8, it has been observed that "Journal Articles" are most prevalent in terms of citations/references in research articles. There were total 2122 citations received to 154 research articles published in the journal during study period, and more than 58% citations belong to Journal Articles, followed by Web based Resources (15.78%), Books and Reference Sources (12.58%), articles published in Conference/ Seminar Proceedings (6.22%), Miscellaneous Items (2.73%), Research/Project Reports (2.4%), and Theses/Dissertations (1.46%). By the analysis of the table 4.5.8, it has been inference that "Journal Articles" are the first choice, Web based Resources as second choice, Books and Reference Sources as third choice, and Conference/Seminar Proceedings as fourth choice as a citation for writing a research paper by authors. Research/Project Reports and Theses/Dissertations have been less used by researchers to write the research papers in the field with the same problem like earlier journals.

4.5.9 Chronological Distribution of Citations

Table 4.5.9: Chronological Distribution of Citations

Years	Journal Articles	Web based Resources	Books and Reference Sources	Conference/ Seminar Proceedings	Misc. items	Research/ Project Reports	Theses/ Dissertations	Total
Upto-1960	2 (0.16%)	-	6 (2.24%)	-	-	-	-	8 (0.37%)
1961-1970	13 (1.04%)	-	4 (1.49%)	-	-	-	-	17 (0.80%)
1971-1980	4 (0.32%)	-	6 (2.24%)	-	-	-	4 (12.90%)	14 (0.65%)
1981-1990	39 (3.12%)	-	24 (8.98%)	2 (1.51%)	1 (1.72%)	3 (5.88%)	3 (9.67%)	72 (3.39%)
1991-2000	184 (14.74%)	9 (2.68%)	57 (21.34%)	15 (11.36%)	5 (8.62%)	4 (7.84%)	2 (6.45%)	276 (13%)
2001-2010	735 (58.89%)	95 (28.35%)	144 (53.93%)	104 (78.78%)	40 (68.96%)	42 (82.35%)	20 (64.51%)	1180 (55.60%)
2011-2015	271 (21.71%)	231 (68.95%)	26 (9.73%)	11 (8.33%)	12 (20.68%)	2 (3.92%)	2 (6.45%)	555 (26.15%)
Total	**1248**	**335**	**267**	**132**	**58**	**51**	**31**	**2122**

(Source: Primary Data)

The chronological distribution of citations to the journal articles has been given in Table 4.5.9. The citations from the journal articles have been divided into 7 time frames having periodicity of 10 years each. The citations before 1960 were enclosed within the cluster upto 1960 and citations after 2010 to 2015 enclosed in 2011-2015 groups. From the table 4.5.9, it has been observed that IJODLS research papers prefer most of the citations of 2001-2010 (55.60%), 2011-2015 (26.15%), and 1991-2000 (13%) time periods. It indicates that 94.75% literature cited in the research papers of the IJODLS are within the period of 1991-2015 i.e. 25 years duration. Further categorically, citations belongs to Journal Articles covered from 2001-2010 (58.89%), 2011-2015 (21.71%), and 1991-2000 (14.74%). Within the Journal Articles category, 95.34% citations are within the period of 1991-2015. Web based Resources as form of citations appeared during 1991-2000 time period first time in the journal articles and all the citations are within 1991-2015 time periods. More than 68% citations are within last five years i.e. from 2011-2015 in case of Web based Resources. Citations in the form of Books and Reference Sources also have 53.93% citations within 2001-2010, 21.34% within 1991-2000, and 9.73% within 2011-2015 time periods. The major citations (85%) are within 1991-2015 time periods in case of Books and Reference Sources. In case of Conference/Seminar Proceedings, 78.78% citations are within 2001-2010 followed by 1991-2000 (11.36%), and 2011-2015 (8.33%). In this case, 98.47% citations are within 1991-2015 time periods. In the cases of Miscellaneous Items (98.26%), Research/Project Reports (94.11%), and Theses/Dissertations (77.41%) major citations are within 1991-2015 time periods. From the analysis, it has been evident that literatures older than 25 years (published before 1991) have not been used more by researchers of the journal and they have tendency to use latest literature published in any form within the field of LIS. Further Journal Articles for writing research papers (for citing purposes) are prevalent amongst authors/researchers followed by Web based Resources, Books and Reference Sources, and Conference/Seminar Proceedings.

4.5.10 Obsolescence of LIS Literature

Table 4.5.10: Frequency of Citations and their Obsolescence

Years	Journal Articles	Books and Reference Sources	Web based Resources	Conference /Seminar Proceedings	Misc. items	Research /Project Reports	Theses/ Dissertations	Total Citations (f)	Cumulative Citations (Cf)
1-10	751 (60.17%)	95 (35.58%)	305 (91.04%)	85 (64.39%)	37 (63.79%)	26 (50.98%)	16 (51.61%)	1315	1315
11-20	393 (31.49%)	103 (38.57%)	29 (8.65%)	42 (31.81%)	19 (32.75%)	21 (41.17%)	8 (25.80%)	615	1930
21-30	67 (5.36%)	42 (15.73%)	1 (0.29%)	3 (2.27%)	2 (3.44%)	3 (5.88%)	2 (6.45%)	120	2050
31-40	19 (1.52%)	15 (5.61%)	-	2 (1.51%)	-	1 (1.96%)	2 (6.45%)	39	2089
41-50	14 (1.12%)	4 (1.49%)	-	-	-	-	3 (9.67%)	21	2110
51-60	2 (0.16%)	4 (1.49%)	-	-	-	-	-	6	2116
61-70	2 (0.16%)	3 (1.12%)	-	-	-	-	-	5	2121
71+		1 (0.37%)	-	-	-	-	-	1	2122
Total	**1248**	**267**	**335**	**132**	**58**	**51**	**31**	**2122**	

(Source: Primary Data)

The table 4.5.10 displays frequency of citations appeared in the articles published in the journal IJODLS and obsolescence of literature cited in those articles. The total 2122 citations were classified into 8 time zones, each having the time duration of 10 years. These 2122 citations were also categorized according to their form of document. From the table 4.5.10, categorically different rates of obsolescence observed for different forms of documents. For example, for Journal Articles rate of obsolescence is less than 10 years, Books and Reference Sources upto 20 years, Web based Resources, Conference/Seminar Proceedings, Miscellaneous Items, Research/Project Reports, and Theses/Dissertations are 10 years. The calculated rate of obsolescence or half-life of citations to the journal is 8.076 years (see Appendix 4).

4.6 Analysis of Journal – DESIDOC Journal of Library and Information Technology (DJLIT)

4.6.1 Year wise Distribution of Articles

Table 4.6.1: Distribution of Articles – Year wise

Year	Vol. No.	No. of Issues	No. of Contributions	%
2011	31	6	55	18.70
2012	32	6	65	22.10
2013	33	6	61	20.74
2014	34	6	60	20.40
2015	35	6	53	18.02
Total		**30**	**294**	**100**

(Source: Primary Data)

The table 4.6.1 display the total number of articles published in 30 issues of 5 volumes from the year 2011-2015 published in the journal DJLIT. On the observation of table 4.6.1, it has been found that major contributions of research papers to the journal published in Volume 32 (22.10%) and Volume 33 (20.74%). Volume 35 has the lowest publication percentage (18.02%) of total articles published in the journal whereas Volume 31 has number of publications (18.70%) slightly higher than Volume 35.

4.6.2 Issue wise Distribution of Articles

Table 4.6.2: Distribution of Articles – Issue wise

Issues (Month)	Volume Number					Total	%
	31	32	33	34	35		
February	8	10	12	9	9	48	16.32
April	8	10	9	11	8	46	15.64
June	7	12	9	10	10	48	16.32
August	13	12	11	10	10	56	19.04
October	9	11	9	10	8	47	15.98
December	10	10	11	10	8	49	16.66
Total	**55**	**65**	**61**	**60**	**53**	**294**	**100**

(Source: Primary Data)

Table 4.6.2 indicates issue wise publications of articles in five volumes. On the observation, it has been found that during April issue there was less number of publications to the journal i.e. 15.64% of total articles published in the journal whereas October issue of the journal had slightly higher number of publications i.e. 15.98%. August issue of the journal has the highest number of published articles i.e.19.04% followed by December (16.66%), February, and June issues (16.32% each).

4.6.3 Authorship Pattern

Table 4.6.3: Authorship Pattern of the Journal

Year	Volume	No. of Authors					Total Articles	Total Authors (%)
		One	Two	Three	Four	Five		
2011	31	20	25	7	2	1	55	104 (18.57)
2012	32	23	30	10	1	1	65	122 (21.78)
2013	33	26	25	8	2	-	61	108 (19.28)
2014	34	18	28	9	5	-	60	121 (21.60)
2015	35	16	25	10	1	1	53	105 (18.75)
Total		**103**	**133**	**44**	**11**	**3**	**294**	**560 (100)**
Percentage		**35.03**	**45.23**	**14.96**	**3.74**	**1.02**	**100**	

(Source: Primary Data)

The table 4.6.3 shows authorship pattern of research contributions published in the journal (DJLIT) during 2011-2015. On the observation of table 4.6.3, it has been found that 35.03% articles published in the name of one (single) author of the total publications in journal whereas 45.23% articles were published in the name of two authors of the total publications. There were 14.96% articles published in the name of three authors while 3.74% articles published in the name of four authors and only 1.02% articles belongs to

five authorship pattern in the journal. From the analysis, it has been deduced that two authorship pattern is most prevalent in the journal followed by single authorship and three authorships respectively. Further, table 4.6.3 also reveals the total number of authors i.e. 560 authors contributed 294 research papers to the journal. Out of total number of authors, 21.78% belongs to Volume 32 of the journal followed by Volume 34 (21.6%), Volume 33 (19.28%), Volume 35 (18.75%), and Volume 31 (18.57%).

4.6.4 Degree of Collaboration

Table 4.6.4: Degree of Collaboration among Authors

Year	Volume	Single Author (Ns)	Multi Authors (Nm)	Total Ns+Nm	Degree of Collaboration
2011	31	21	34	55	0.61
2012	32	23	42	65	0.64
2013	33	26	35	61	0.57
2014	34	18	42	60	0.7
2015	35	16	37	53	0.69
Total		**104**	**190**	**294**	**0.64**

(Source: Primary Data)

The degree of collaboration (C) of the contributors has been derived using the Subramanyam formula. Formula for degree of collaboration can be expressed as:

$$\text{Degree of Collaboration (C)} = \frac{\text{Nm}}{Nm+Ns}$$

Where,

C = Degree of Collaboration

Nm = Number of multiple authors

Ns = Number of single authors

$$C = \frac{190}{190+104=294} \text{ or } C = 0.64$$

The Degree of Collaboration has been calculated for the year 2011-2015. Single author contribution is 104 and multiple authors' contribution is 190. Volume wise Degree of Collaboration of the journal falls in the range of 0.57 to 0.7. The Degree of Collaboration of the journal is 0.64 which indicates the sound collaborative research among journal authors.

4.6.5 Geographical Distribution of Articles

Table 4.6.5: Geographical Distribution of Articles

Year	National	International	National+ International	Total No. of Articles
2011	46	7	2	55
2012	56	7	2	65
2013	52	7	2	61
2014	49	9	2	60
2015	49	3	1	53
Total	**252**	**33**	**9**	**294**
Percentage	**85.71**	**11.22**	**3.06**	**100**

(Source: Primary Data)

The table 4.6.5 displays geographical distribution of articles in the journal. The articles have been divided into three categories: **National, International, and National + International**. On the observation, it has been found that 85.71% articles were belong to national contribution and 11.22% were belongs to international contribution. National contribution is more than international contribution to the journal. There were very few contributions (3.06%) belong to national and international collaboration. On the analysis, it has been found that since the journal is of Indian origin, highest number of articles submitted and published by India in the journal. International contribution of articles to the journal is less than national because of geographic distance as well as might be due to less popularity of the journal.

4.6.6 Country-wise Distribution of Authors

Table 4.6.6: Country wise Distribution of Authors

Rank	Country	No. of Authors	Percentage
1	India	487	86.96
2	Nigeria	15	2.67
3	Singapore	7	1.25
4	Saudi Arabia	7	1.25
5	Greece	7	1.25
6	Turkey	4	0.71
7	Bangladesh	3	0.53
8	South Africa	3	0.53
9	Spain	3	0.53
10	London	2	0.35
11	UAE	2	0.35

12	Argentina	2	0.35
13	Germany	2	0.35
14	Malaysia	2	0.35
15	Portugal	2	0.35
16	U.S.A	2	0.35
17	Oman	2	0.35
18	Australia	1	0.17
19	Belgium	1	0.17
20	Japan	1	0.17
21	Thailand	1	0.17
22	Virginia	1	0.17
23	Swaziland	1	0.17
24	Slovenia	1	0.17
25	Fiji	1	0.17
Total		**560**	**100**

(Source: Primary Data)

Table 4.6.6 shows country wise distribution of authors. India has the highest number of contributors (86.96%) to the journal followed by Nigeria (2.67%), Singapore, Saudi Arabia and Greece (1.25% each). The journal has 13.04% authors from other countries and rests were from India which displays its less international acceptance and presence amongst LIS professionals than other open access journals of LIS. Among foreign countries authors, 20.54% authors belong to Nigeria only that indicates Nigerian authors have more interest in publishing their research papers with DJLIT than other countries authors/researchers. Singapore, Saudi Arabia, and Greece have individually 9.58% authors to the journal. In the terms of number of foreign countries, DJLIT has covered 24 countries as its widespread availability for publication of the research papers.

4.6.7 State-wise Distribution of Indian Authors

Table 4.6.7: State wise Distribution of Indian Authors

Rank	Name of State	No. of Authors	Percentage
1	New Delhi	100	20.53
2	Maharashtra	74	15.19
3	Karnataka	66	13.55
4	Telangana	24	4.92
5	Kerala	24	4.92
6	Uttar Pradesh	23	4.72
7	Chandigarh	22	4.51
8	Tamil Nadu	21	4.31

9	West Bengal	21	4.31
10	Odisha	13	2.66
11	Andhra Pradesh	13	2.66
12	Pondicherry	12	2.46
13	Jammu & Kashmir	11	2.25
14	Rajasthan	8	1.64
15	Haryana	8	1.64
16	Gujarat	8	1.64
17	Punjab	7	1.43
18	Chhattisgarh	7	1.43
19	Jharkhand	6	1.23
20	Madhya Pradesh	6	1.23
21	Uttarakhand	5	1.02
22	Himachal Pradesh	5	1.02
23	Goa	2	0.41
24	Meghalaya	1	0.20
Total		**487**	**100**

(Source: Primary Data)

Table 4.6.7 shows state wise distribution of Indian authors. New Delhi (20.53%) has the highest number of contributors to the journal followed by Maharashtra (15.19%), Karnataka (13.55%), Telengana and Kerala (4.92% each), Uttar Pradesh (4.72%), Chandigarh (4.51%) etc. Indian contributors to the journal belong to 24 states and union territories of India which shows journal's wide publicity, circulation, and acceptance amongst Indian LIS professionals.

4.6.8 Forms of Documents Cited

Table 4.6.8: Forms of Documents Cited in the Articles

SN	Forms of Document	Total No. of Citations	Percentage
1	Journal Articles	2607	53.96
2	Web based Resources	831	17.20
3	Books and Reference Sources	545	11.28
4	Conference/Seminar Proceedings	467	9.66
5	Miscellaneous Items	200	4.13
6	Research/ Project Reports	138	2.85
7	Theses/ Dissertations	43	0.89
Total		**4831**	**100**

(Source: Primary Data)

The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal. From the analysis of table 4.6.8, it has been

found that “Journal Articles” were most prevalent in terms of citations/references in research articles. There were total 4831 citations received to 294 research articles published in the journal during study period, and more than 53.96% citations belong to Journal Articles followed by Web based Resources (17.20%), Books and Reference Sources (11.28%), articles published in Conference/Seminar Proceedings (9.66%), Research/Project Reports (2.85%), and Theses/Dissertations (0.89%). By the analysis of the table 4.6.8, it has been inference that “Journal Articles” are the first choice as a citation/reference for writing a research paper by authors. Web based Resources are recent in origin (about 21 years old) but gained the trust of authors as a source of information & knowledge and used for citation/reference in their research papers and in this journal, authors preferred to cite at second choice. Books and Reference Sources have been third choice of authors for citation due to having conceptual and historical information & knowledge about the topic of research. Conference/Seminar Proceedings have been used as the source of information and knowledge for research purposes but less than Web based Resources due to availability problem in comparison to Web based Resources. Research/Project Reports and Theses/Dissertations have been less used by researchers to write the research papers in the field, and it might be due to less/ restricted availability of such information sources in public domain. Moreover Miscellaneous items have higher usage than Research/Project Reports and Theses/ Dissertations, so that cited more than Research/Project Reports and Theses/Dissertations.

4.6.9 Chronological Distribution of Citations

Table 4.6.9: Chronological Distribution of Citations

Year	Journal Articles	Web based Resources	Books and Reference Sources	Conference/ Seminar Proceedings	Misc. items	Research/ Project Reports	Theses/ Dissertations	Total
Upto-1950	10 (0.38%)	-	14 (2.56%)	-	1 (0.5%)	-	-	25 (0.52%)
1951-1960	3 (0.11%)	-	8 (1.46%)	-	-	-	-	11 (0.22%)
1961-1970	19 (0.72%)	-	19 (3.48%)	-	1 (0.05%)	-	1 (2.32%)	40 (0.82%)
1971-1980	55 (2.10%)	-	34 (6.23%)	-	1 (0.05%)	1 (0.72%)	3 (6.97%)	94 (1.94%)
1981-1990	130 (4.98%)	-	39 (7.15%)	3 (0.64%)	-	1 (0.72%)	1 (2.32%)	174 (3.60%)
1991-2000	463 (17.75%)	20 (2.40%)	111 (20.36%)	85 (18.20%)	22 (11%)	15 (10.86%)	10 (23.25%)	726 (15.02%)
2001-2010	1465 (56.19%)	159 (19.13%)	269 (49.35%)	330 (70.66%)	104 (52%)	86 (62.31%)	23 (53.48%)	2436 (50.42%)
2011-2015	462 (17.72%)	652 (78.45%)	51 (9.35%)	49 (10.49%)	71 (35.5%)	35 (25.36%)	5 (11.62%)	1325 (27.42%)
Total	**2607**	**831**	**545**	**467**	**200**	**138**	**43**	**4831**

(Source: Primary Data)

The chronological distribution of citations to the journal articles has been given in Table 4.6.9. The citations from the journal articles have been divided into 8 time frames having periodicity of 10 years each. The citations before 1950 were enclosed within the cluster upto 1950 and citations after 2010 to 2015 enclosed in 2011-2015 groups. From the table 4.6.9, it has been observed that DJLIT research papers prefer most of the citations of 2001-2010 (50.42%), 2011-2015 (27.42%), and 1991-2000 (15.02%) time periods. It indicates that 92.87% literature cited in the research papers of the DJLIT are within the period of 1991-2015 i.e. last 25 years duration. Further categorically, citations belongs to Journal Articles covered from 2001-2010 (56.19%), 1991-2000 (17.75%), and 2011-2015 (17.72%). Within the Journal Articles category, 91.67% citations are within the period of 1991-2015. Citations in the form of Books and Reference Sources also have 49.35% citations within 2001-2010, 20.36% within 1991-2000, and 9.35% within 2011-2015 time periods. The major citations (79.08%) are within 1991-2015 time periods in case of Books and Reference Sources. The Web based Resources as form of citations appeared during 1991-2000 time period first time in the journal articles and all the citations are within 1991-2015 time periods. In case of Conference/Seminar Proceedings, 70.66% citations are within 2001-2010 time period followed by 18.20% within 1991-2000, and 10.49% within 2011-2015. In this case, 99.34% citations are within 1991-2015 time periods. In the cases of Miscellaneous Items (98.5%), Research/Project Reports (98.55%) and Theses/Dissertations (88.37%), major citations are within 1991-2015 time periods. From the analysis, it has been evident that literatures older than 25 years (published before 1991) have not been used more by researchers and they [researchers] have tendency to use latest literature published in any form. Further Journal Articles for writing research papers (for citing purposes) are prevalent amongst authors/researchers followed by Web based Resources, Books and Reference Sources, and Conference/Seminar Proceedings.

4.6.10 Obsolescence of LIS Literature

Table 4.6.10: Frequency of Citations and their Obsolescence

Years	Journal Articles	Web based Resources	Books and Reference Sources	Conference /Seminar Proceedings	Misc. items	Research /Project Reports	Theses/ Dissertations	Total Citations (f)	Cumulative Citations (Cf)
1-10	1314 (50.40%)	777 (93.50%)	178 (32.66%)	229 (49.03%)	133 (66.5%)	79 (57.24%)	19 (44.18%)	2729	2729
11-20	954 (36.59%)	53 (6.37%)	223 (40.91%)	220 (47.10%)	58 (29%)	54 (39.13%)	15 (34.88%)	1577	4306
21-30	202 (7.74%)	1 (0.12%)	57 (10.45%)	17 (3.64%)	6 (3%)	4 (2.89%)	4 (9.30%)	291	4597
31-40	90 (3.45%)	-	26 (4.77%)	1 (0.21%)	-	-	3 (6.97%)	120	4717
41-50	33 (1.26%)	-	29 (5.32%)	-	1 (0.05%)	1 (0.72%)	2 (4.65%)	66	4783
51-60	2 (0.07%)	-	16 (2.93%)	-	1 (0.5%)	-	-	19	4802
61-70	4 (0.15%)	-	8 (1.46%)	-	-	-	-	12	4814
71-80	-	-	2 (0.36%)	-	-	-	-	2	4816
80+	8 (0.31%)	-	6 (1.1%)	-	1 (0.05%)	-	-	15	4831
Total	**2607**	**831**	**545**	**467**	**200**	**138**	**43**	**4831**	

(Source: Primary Data)

The table 4.6.10 display frequency of citations appeared in the articles published in the journal DJLIT and obsolescence of literature cited in those articles. The total 4831 citations were classified into 9 time zones, each having the time duration of 10 years. These 4831 citations were also categorized according to their form of document. From the table 4.6.10, categorically different rates of obsolescence observed for different forms of documents. For example, for Journal Articles, Web based Resources, Miscellaneous Items, and Research/Project Reports rate of obsolescence is 10 years while for Books and Reference Sources, Conference/Seminar Proceedings, and Theses/Dissertations rate of obsolescence is upto 20 years. The calculated rate of obsolescence or half-life of citations to the journal is 8.603 years (see Appendix 5).

4.7 Analysis of Journal – Trends in Information Management (TRIM)

4.7.1 Year wise Distribution of Articles

Table 4.7.1: Distribution of Articles – Year wise

Year	Vol. No.	No. of Issues	No. of Contributions	%
2011	7	2	21	60
2012	8	2	10	28.57
2013	9	-	-	
2014	10	1	4	11.42
2015	11	-	-	
Total		**5**	**35**	**100**

(Source: Primary Data)

The table 4.7.1 displays the total number of articles published in 5 issues of 5 volumes from the year 2011-2015 published in the journal TRIM. The journal "TRIM" is not regular in terms of publication, so that observed very less number of research papers during study. On the observation of table 4.7.1, it has been found that major contributions of research papers to the journal in Volume 7 (60%) and Volume 8 (28.57%). Volume 10 has the lowest publication percentage (11.43%) of total articles observed in the journal during study period. There are two volumes that have not a single publication and further it has been observed that other volumes also do not have sufficient number of published articles.

4.7.2 Issue wise Distribution of Articles

Table 4.7.2: Distribution of Articles - Issue wise

Issues (Month)	Volume Number					Total	%
	7	8	9	10	11		
June	5	5	-	-	-	10	28.57
December	16	5	-	4	-	25	71.42
Total	**21**	**10**	**-**	**4**	**-**	**35**	**100**

(Source: Primary Data)

Table 4.7.2 indicates issue wise publications of articles in five volumes. On the observation, it has been found that during June issue there was less number of publications to the journal (28.57%) than December issue (71.42%).

4.7.3 Authorship Pattern

Table 4.7.3: Authorship Pattern of the Journal

Year	Volume	No. of Authors				Total Articles	Total Author (%)
		One	Two	Three	Four		
2011	7	2	13	5	1	21	47(66.19)
2012	8	5	3	2	-	10	17(23.94)
2013	9	-	-	-	-	-	-
2014	10	1	3	-	-	4	7(9.85)
2015	11	-	-	-	-	-	-
Total		**8**	**19**	**7**	**1**	**35**	**71(100)**
Percentage		**22.85**	**54.28**	**20**	**2.85**	**100**	

(Source: Primary Data)

The table 4.7.3 shows authorship pattern of research contributions published in the journal during 2011-2015. On the observation of table 4.7.3, it has been found that 22.85% articles published in the name of one (single) author of the total publications in journal. There were 54.28% articles published in the name of two authors of the total publications while 20% articles published in the name of three authors of total publications to the journal. There were only 2.85% articles published in the name of four authors. From the analysis, it has been inference that two authorship pattern is most prevalent in the journal followed by single authorship and three authorship respectively. Further, table 4.7.3 also reveals the total number of authors i.e. 71 contributed 35 research papers to the journal. Out of total number of authors, 66.19% belongs to Volume 7 of the journal followed by Volume 8 (23.94%), Volume 10 (9.85%).

4.7.4 Degree of Collaboration

Table 4.7.4: Degree of Collaboration among Authors

Year	Volume	Single Author (Ns)	Multi Authors (Nm)	Total Ns + Nm	Degree of Collaboration
2011	7	2	19	21	0.90
2012	8	5	5	10	0.5
2013	9	-	-	-	-
2014	10	1	3	4	0.75
2015	11	-	-	-	-
Total		**8**	**27**	**35**	**0.77**

(Source: Primary Data)

The degree of collaboration (C) of the contributors has been derived using the Subramanyam formula:

$$\text{Degree of Collaboration (C)} = \frac{\text{Nm}}{Nm+Ns}$$

Where,

C = Degree of Collaboration

Nm = Number of multiple authors

Ns = Number of single authors

$$\text{C} = \frac{27}{27+8=35} \text{ or } \text{C} = 0.77$$

The degree of collaboration has been calculated for the year 2011-2015. Single author contribution is 8 and multiple authors' contribution is 27. Volume wise Degree of Collaboration of the journal falls in the range of 0.5 to 0.90. The Degree of Collaboration of the journal is 0.77 which very good sign for having more collaborative research among authors of the journal.

4.7.5 Geographical Distribution of Articles

Table 4.7.5: Geographical Distribution of Articles

Year	National	International	National + International	Total No. of Articles
2011	19	2	-	21
2012	9	1	-	10
2013	-	-	-	-
2014	4	-	-	4
2015	-	-	-	-
Total	**32**	**3**	**-**	**35**
Percentage	**91.42**	**8.57**	**-**	**100**

(Source: Primary Data)

The table 4.7.5 displays geographical distribution of articles in the journal. The articles have been divided into three categories: **National, International, and National + International**. On the observation, it has been found that 91.42% articles were belongs to national contribution and 8.57% were belongs to international contribution. National contribution is more than international contribution to the journal. There were no contributions to national and international collaboration. On the analysis, it has been found that since the journal is of Indian origin, highest number of articles submitted and published by India in the journal. International contribution of articles to the journal is less than national because of geographic distance as well as less popularity, weak presence, irregularity in publication of the journal.

4.7.6 Country-wise Distribution of Authors

Table 4.7.6: Country wise Distribution of Authors

Rank	Country	No. of Authors	Percentage
1	India	64	90.14
2	Nigeria	3	4.22
3	U.K.	1	1.40
4	Saudi Arabia	1	1.40
5	Malaysia	1	1.40
6	Canada	1	1.40
Total		**71**	**100**

(Source: Primary Data)

Table 4.7.6 shows country wise distribution of authors. India has the highest number of contributors (90.14%) to the journal followed by Nigeria (4.22%), U.K., Saudi Arabia, Malaysia and Canada (1.4% each). The journal has 9.86% authors from other countries and rests were from India which displays its weak international acceptance and presence amongst LIS professionals. Among foreign countries authors, 42.8% authors belong to Nigeria only that indicates Nigerian authors have more interest in publishing their research papers with Indian journal TRIM.

4.7.7 State-wise Distribution of Indian Authors

Table 4.7.7: State wise Distribution of Indian Authors

Rank	Name of State	No. of Authors	Percentage
1	Jammu & Kashmir	33	51.56
2	Uttar Pradesh	5	7.81
3	Karnataka	4	6.25
4	Gujarat	4	6.25
5	Punjab	4	6.25
6	Maharashtra	4	6.25
7	Tamil Nadu	3	4.68
8	Uttarakhand	2	3.12
9	Rajasthan	2	3.12
10	New Delhi	1	1.56
11	Assam	1	1.56
12	Meghalaya	1	1.56
Total		**64**	**100**

(Source: Primary Data)

Table 4.7.7 shows state wise distribution of Indian authors. Jammu and Kashmir (51.56%) has the highest number of contributors to the journal followed by Uttar Pradesh (7.81%), Karnataka, Gujarat, Punjab and Maharashtra (6.25% each), Tamil Nadu (4.68%), Uttarakhand and Rajasthan (3.12% each) etc. Indian contributors to the journal belong to 12 states and union territories of India which shows journals less circulation, availability and acceptance amongst Indian LIS professionals.

4.7.8 Forms of Documents Cited

Table 4.7.8: Forms of Documents Cited in the Articles

SN	Forms of Document	Total No. of Citations	Percentage
1	Journal Articles	260	46.01
2	Books and Reference Sources	93	16.46
3	Web based Resources	77	13.62
4	Conference/ Seminar Proceedings	75	13.27
5	Miscellaneous Items	37	10.13
6	Research/Project Reports	18	3.18
7	Theses/ Dissertations	5	0.88
Total		**565**	**100**

(Source: Primary Data)

The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal. From the analysis of table 4.7.8, it has been found that "Journal Articles" were most prevalent in terms of citations/references in research articles. There were total 565 citations received to 35 research articles published in the journal during study period, and more than 46.01% citations belong to Journal Articles, followed by Books and Reference Sources (16.46%), Web based Resources (13.62%), articles published in Conference/Seminar Proceedings (13.27%), Research/ Project Reports (3.18%), and Theses/Dissertations (0.88%). By the analysis of the table 4.7.8, it has been inference that "Journal Articles" are the first choice as a citation/reference for writing a research paper by authors. Books and Reference Sources have been second choice of authors for citation due to having conceptual and historical information & knowledge about the topic of research. Web based Resources are recent in origin and have been third choice of authors for citation in the articles. Conference/ Seminar Proceedings have been used as the source of information and knowledge for research purposes but less than Web based Resources due to availability problem in comparison to Web based Resources. Though Conference/Seminar Proceedings are older than Web based Resources but authors, nowadays, wants information sources in their fingertips which are not fulfilled by Conference/Seminar Proceedings. Research/Project Reports and Theses/Dissertations have been used less by researchers to write the research papers in the field, and it might be due to less/ restricted availability of such information sources in public domain.

4.7.9 Chronological Distribution of Citations

Table 4.7.9: Chronological Distribution of Citations

Years	Journal Articles	Books and Reference Sources	Web based Resources	Conference/ Seminar Proceedings	Misc. items	Research/ Project Reports	Theses/ Dissertations	Total
Upto-1980	5 (1.92%)	7 (7.52%)	-	-	1 (2.70%)	1 (5.55%)	-	14 (2.47%)
1981-1990	11 (4.23%)	3 (3.22%)	1 (1.29%)	1 (1.33%)	-	1 (5.55%)	1 (20%)	18 (3.18%)
1991-2000	49 (18.84%)	24 (25.80%)	4 (5.19%)	13 (17.33%)	3 (8.10%)	4 (22.22%)	-	97 (17.16%)
2001-2010	172 (66.15%)	58 (62.36%)	40 (51.94%)	60 (80%)	30 (81.08%)	11 (61.11%)	4 (80%)	375 (66.37%)
2011-2015	23 (8.84%)	1 (1.07%)	32 (41.55%)	1 (1.33%)	3 (8.10%)	1 (5.55%)	-	61 (10.79%)
Total	**260**	**93**	**77**	**75**	**37**	**18**	**5**	**565**

(Source: Primary Data)

The chronological distribution of citations to the journal articles has been given in Table 4.7.9. The citations from the journal articles have been divided into 5 time frames having periodicity of 10 years each. The citations before 1980 were enclosed within the cluster upto 1980 and citations after 2010 to 2015 enclosed in 2011-2015 groups. From the table 4.7.9, it has been observed that TRIM research papers prefer most of the citations of 2001-2010 (66.37%), 1991-2000 (17.16%), and 2011-2015 (10.79%) time periods. It indicates that 94.32% literature cited in the research papers of the TRIM are within the period of 1991-2015 i.e. last 25 years duration. Further categorically, citations belongs to Journal Articles covered from 2001-2010 (66.15%), 1991-2000 (18.84%), and 2011-2015 (8.84%). Within the Journal Articles category, 93.84% citations are within the period of 1991-2015. Citations in the form of Books and Reference Sources also have 62.36% citations within 2001-2010, 25.8% within 1991-2000, and 3.22% within 1981-1990 time periods. The majority of citations (91.39%) are within 1981-2010 time periods in case of Books and Reference Sources. The Web based Resources as form of citations appeared during 1981-1990 time period first time in the journal articles and all the citations are within 1981-2015 time periods. The major contribution of citations (93.5%) in the form of Web based Resources are within 2001-2015 time periods i.e. last 15 years. In case of Conference/Seminar Proceedings, 80% citations are within 2001-2010 followed by 17.33% from within 1991-2000 time periods. In this case, 97.33% citations are within 1991-2010 time periods. In the case of Miscellaneous Items (97.29%), Research/Project Reports (88.88%) and Theses/Dissertations (80%), major citations are within 1991-2015 time periods. From the analysis, it has been inference that literatures older than 25 years (published before 1991) have not been used more by researchers and they have tendency to use latest literature published in any form. Further Journal Articles for writing research papers (for citing purposes) are prevalent amongst authors/ researchers followed by Books and Reference Sources, Web based Resources, and Conference/Seminar Proceedings.

4.7.10 Obsolescence of LIS Literature

Table 4.7.10: Frequency of Citations and their Obsolescence

Years	Journal Articles	Books and Reference Sources	Web based Resources	Conference/ Seminar Proceedings	Misc. items	Research / Project Reports	Theses/ Dissertations	Total Citations (f)	Cumulative Citations (Cf)
1-10	98 (37.69%)	23 (24.73%)	57 (74.02%)	29 (38.66%)	17 (45.94%)	6 (33.33%)	1 (20%)	231	231
11-20	137 (52.69%)	51 (54.83%)	19 (24.67%)	43 (57.33%)	19 (51.35%)	9 (50%)	3 (60%)	281	512
21-30	14 (5.38%)	10 (10.75%)	1 (1.29%)	3 (4%)	-	2 (11.11%)	1 (20%)	31	543
31-40	8 (3.07%)	5 (5.37%)	-	-	-	-	-	13	556
41-50	3 (1.15%)	1 (1.07%)	-	-	1 (2.70%)	1 (5.55%)	-	4	560
51-60	-	2 (2.15%)	-	-	-	-	-	3	563
61-70	-	1 (1.07)	-	-	-	-	-	2	565
Total	**260**	**93**	**77**	**75**	**37**	**18**	**5**	**565**	

(Source: Primary Data)

The table 4.7.10 displays frequency of citations appeared in the articles published in the journal IRJLIS and obsolescence of literature cited in those articles. The total 565 citations were classified into 7 time zones, each having the time duration of 10 years. These 565 citations were also categorized according to their form of document. From the table 4.7.10, categorically different rates of obsolescence observed for different forms of documents. For example, for Journal Articles, Books and Reference Sources, Conference/Seminar Proceedings, Miscellaneous Items, Research/ Project Reports, and Theses/ Dissertations rate of obsolescence is upto 20 years whereas in case of Web based Resources rate of obsolescence is only upto 10 years. The calculated rate of obsolescence or half-life of citations to the journal is 11.21 years (see Appendix 6).

4.8 Testing of Hypotheses

4.8.1

H_0: There is no significant difference between solo research and collaborative research.

H_1: Solo research is less preferred than collaborative research.

Journal – IRJLIS

Solo Research	Collaborative Research
72	146

Chi Square (X^2) is a test to test the significance when obtained data are expressed in frequencies or percentage or proportions.

	Observed Frequency (***fo***)	Expected Frequency (***fe***)
Solo Research	72	109
Collaborative Research	146	109

Computation of X^2 with the data given in above table 4.8.1.1

Table 4.8.1.1: Computation of X^2 for IRJLIS

	fo	***fe***	***fo - fe***	$(fo - fe)^2$	$(fo - fe)^2/fe$
Solo Research	72	109	-37	1369	1369/109=12.55
Collaborative Research	146	109	37	1369	1369/109=12.55
Total	218	218		2738	2738/109=**25.11**

Degree of Freedom (df) = (R-1) (C-1) = (2-1) (2-1) = 1.

From critical value of Chi-Square table, the values of X^2 distribution for 1 degree of freedom at .05 and .01 level are 3.84 and 6.64 respectively. The calculated X^2 value is 25.11 which are greater than critical X^2 value 3.84 at .05 level. This rejects null hypothesis and proves that solo research is less preferred than collaborative research.

Journal – ALIS

Solo Research	Collaborative Research
67	106

Chi Square (X^2) is a test to test the significance when obtained data are expressed in frequencies or percentage or proportions.

	Observed Frequency (***fo***)	Expected Frequency (***fe***)
Solo Research	67	86.5
Collaborative Research	106	86.5

Computation of X^2 with the data given in above table 4.8.1.2

Table 4.8.1.2: Computation of X^2 for ALIS

	fo	***fe***	***fo - fe***	$(fo - fe)^2$	$(fo - fe)^2 / fe$
Solo Research	67	86.5	-19.5	380.25	380.25/86.5=4.39
Collaborative Research	106	86.5	19.5	380.25	380.25/86.5=4.39
Total	173	173		760.5	760.5/86.5=**8.79**

Degree of Freedom (df) = (R-1) (C-1) = (2-1) (2-1) = 1.

From critical value of Chi-Square table, the values of X^2 distribution for 1 degree of freedom at .05 and .01 level are 3.84 and 6.64 respectively. The calculated X^2 value is 8.79 which is greater than critical X^2 value 3.84 at .05 level. This rejects null hypothesis and proves that solo research is less preferred than collaborative research.

Journal – IJIDT

Solo Research	Collaborative Research
95	164

Chi Square (X^2) is a test to test the significance when obtained data are expressed in frequencies or percentage or proportions.

	Observed Frequency (***fo***)	Expected Frequency (***fe***)
Solo Research	95	129.5
Collaborative Research	164	129.5

Computation of X^2 with the data given in above table 4.8.1.3

Table 4.8.1.3: Computation of X^2 for IJIDT

	fo	***fe***	***fo - fe***	$(fo - fe)^2$	$(fo - fe)^2/fe$
Solo Research	95	129.5	-34.5	1190.25	1190.25/129.5=9.19
Collaborative Research	164	129.5	34.5	1190.25	1190.25/129.5=9.19
Total	259	259		2380.5	2380.5/129.5=**18.38**

Degree of Freedom (df) = (R-1) (C-1) = (2-1) (2-1) = 1.

From critical value of Chi-Square table, the values of X^2 distribution for 1 degree of freedom at .05 and .01 level are 3.84 and 6.64 respectively. The calculated X^2 value is 18.38 which is greater than critical X^2 value 3.84 at .05 level. This rejects null hypothesis and proves that solo research is less preferred than collaborative research.

Journal – IJODLS

Solo Research	Collaborative Research
66	88

Chi Square (X^2) is a test to test the significance when obtained data are expressed in frequencies or percentage or proportions.

	Observed Frequency (***fo***)	Expected Frequency (***fe***)
Solo Research	66	77
Collaborative Research	88	77

Computation of X^2 with the data given in above table 4.8.1.4

Table 4.8.1.4: Computation of X^2 for IJODLS

	fo	***fe***	***fo - fe***	$(fo - fe)^2$	$(fo - fe)^2/fe$
Solo Research	66	77	-11	121	121/77=1.57
Collaborative Research	88	77	11	121	121/77=1.57
Total	154	154		242	242/77=**3.14**

Degree of Freedom (df) = (R-1) (C-1) = (2-1) (2-1) = 1.

From critical value of Chi-Square table, the values of X^2 distribution for 1 degree of freedom at .05 and .01 level are 3.84 and 6.64 respectively. The calculated X^2 value is 3.14 which is less than critical X^2 value 3.84 at .05 level. This value is non-significant and null hypothesis is not rejected. So, there is no significant difference between solo research and collaborative research.

Journal – DJLIT

Solo Research	Collaborative Research
104	190

Chi Square (X^2) is a test to test the significance when obtained data are expressed in frequencies or percentage or proportions.

	Observed Frequency (***fo***)	Expected Frequency (***fe***)
Solo Research	104	147
Collaborative Research	190	147

Computation of X^2 with the data given in above table 4.8.1.5

Table 4.8.1.5: Computation of X^2 for DJLIT

	fo	***fe***	***fo - fe***	$(fo - fe)^2$	$(fo - fe)^2/fe$
Solo Research	104	147	-43	1849	1849/147=12.57
Collaborative Research	190	147	43	1849	1849/147=12.57
Total	294	294		3698	3698/147=**25.15**

Degree of Freedom (df) = (R-1) (C-1) = (2-1) (2-1) = 1.

From critical value of Chi-Square table, the values of X^2 distribution for 1 degree of freedom at .05 and .01 level are 3.84 and 6.64 respectively. The calculated X^2 value is 25.15 which is greater than critical X^2 value 3.84 at .05 level. This value is significant and so null hypothesis is rejected and it proves that solo research is less preferred than collaborative research.

Journal – TRIM

Solo Research	Collaborative Research
8	27

Chi Square (X^2) is a test to test the significance when obtained data are expressed in frequencies or percentage or proportions.

	Observed Frequency (***fo***)	Expected Frequency (***fe***)
Solo Research	8	17.5
Collaborative Research	27	17.5

Computation of X^2 with the data given in above table 4.8.1.6

Table 4.8.1.6: Computation of X^2 for TRIM

	fo	***fe***	***fo - fe***	$(fo - fe)^2$	$(fo - fe)^2 / fe$
Solo Research	8	17.5	-9.5	90.25	90.25/17.5=5.15
Collaborative Research	27	17.5	9.5	90.25	90.25/17.5=5.15
Total	35	35		180.5	180.5/17.5=**10.31**

Degree of Freedom (df) = (R-1) (C-1) = (2-1) (2-1) = 1.

From critical value of Chi-Square table, the values of X^2 distribution for 1 degree of freedom at .05 and .01 level are 3.84 and 6.64 respectively. The calculated X^2 value is 10.31 which is greater than critical X^2 value 3.84 at .05 level. This value is significant and so null hypothesis is rejected and it proves that solo research is less preferred than collaborative research.

Discussion

There are six open access Indian LIS journals indexed in DOAJ. Out of six journals, only one journal IJODLS has no significant difference between solo research and collaborative research. Other five journals have significant difference and rejected the null hypothesis, and proved that collaborative research is much preferred over solo research in the field of LIS.

Table 4.8.1.7: Summary of Computed X^2 for All Journals

SN	Journal Name	X^2 Value (Critical) (at .05 level)	X^2 Value (Calculated) (at .05 level)	Null Hypothesis
1	IRJLIS	3.84	25.11	Rejected
2	ALIS		8.79	Rejected
3	IJIDT		18.38	Rejected
4	IJODLS		3.14	Not Rejected
5	DJLIT		25.15	Rejected
6	TRIM		10.31	Rejected

4.8.2 H_2: Time has inverse relationship with growth of citation.

Journal – IRJLIS

Table 4.8.2.1: Correlation of IRJLIS

Correlations			
		Time (Year)	Citations
Time (Year)	Pearson Correlation	1	-.644**
	Sig. (2-tailed)		.000
	N	128	128
Citations	Pearson Correlation	-.644**	1
	Sig. (2-tailed)	.000	
	N	128	128
**. Correlation is significant at the 0.01 level (2-tailed).			

There is a significant adverse (negative) relationship between time and growth of citations (r= -.644, significant at .01 level). Therefore, H_2 is accepted.

Journal – ALIS

Table 4.8.2.2: Correlation of ALIS

Correlations			
		Time (Year)	Citations
Time (Year)	Pearson Correlation	1	-.637**
	Sig. (2-tailed)		.000
	N	147	147
Citations	Pearson Correlation	-.637**	1
	Sig. (2-tailed)	.000	
	N	147	147
**. Correlation is significant at the 0.01 level (2-tailed).			

There is a significant adverse (negative) relationship between time and growth of citations (r= -.637, significant at .01 level). Therefore, H_2 is accepted.

Journal – IJIDT

Table 4.8.2.3: Correlation of IJIDT

Correlations			
		Time (Year)	Citations
Time (Year)	Pearson Correlation	1	-.629**
	Sig. (2-tailed)		.000
	N	112	112
Citations	Pearson Correlation	-.629**	1
	Sig. (2-tailed)	.000	
	N	112	112
**. Correlation is significant at the 0.01 level (2-tailed).			

There is a significant adverse (negative) relationship between time and growth of citations (r= -.629, significant at .01 level). Therefore, H_2 is accepted.

Journal – IJODLS

Table 4.8.2.4: Correlation of IJODLS

Correlations			
		Time (Year)	Citations
Time (Year)	Pearson Correlation	1	-.716**
	Sig. (2-tailed)		.000
	N	76	76
Citations	Pearson Correlation	-.716**	1
	Sig. (2-tailed)	.000	
	N	76	76
**. Correlation is significant at the 0.01 level (2-tailed).			

There is a significant adverse (negative) relationship between time and growth of citations (r= -.716, significant at .01 level). Therefore, H_2 is accepted.

Journal – DJLIT

Table 4.8.2.5: Correlation of DJLIT

Correlations			
		Time (Year)	Citations
Time (Year)	Pearson Correlation	1	-.625**
	Sig. (2-tailed)		.000
	N	133	133
Citations	Pearson Correlation	-.625**	1
	Sig. (2-tailed)	.000	
	N	133	133
**. Correlation is significant at the 0.01 level (2-tailed).			

There is a significant adverse (negative) relationship between time and growth of citations (r= -.625, significant at .01 level). Therefore, H_2 is accepted.

Journal – TRIM

Table 4.8.2.6: Correlation of TRIM

Correlations			
		Time (Year)	Citations
Time (Year)	Pearson Correlation	1	-.550**
	Sig. (2-tailed)		.000
	N	129	129
Citations	Pearson Correlation	-.550**	1
	Sig. (2-tailed)	.000	
	N	129	129
**. Correlation is significant at the 0.01 level (2-tailed).			

There is a significant adverse (negative) relationship between time and growth of citations (r= -.550, significant at .01 level). Therefore, H_2 is accepted.

Discussion

The correlation have been measured between time and citations and found that there is significant adverse (negative) relationship for all the six journals. This proves the hypothesis that time has inverse relationship with growth of citations to the journals. As time passes in backward movement (from 2015-1950-1900), there should be more number of citations from recent to old but it is no so, and if time passes in forward movement (1900-1950-2015), there should be more number of citations from old to recent. But in both the conditions, it has been found adverse correlation between time and growth of citations.

4.9 Research Findings

The analysis of the data collected through survey and observation have revealed a number of findings on open access LIS journals from India which are as follows:

A. Findings from IRJLIS

1) The journal has published 218 articles in 16 issues of 5 volumes from the year 2011-2015. There was no equal distribution of articles found in every volume. Volume 3 and Volume 4 have published major percentage of research papers to the journal i.e. 27.52% for each volume whereas Volume 1 has the lowest publication percentage i.e. 7.33%.
2) As per issue wise publications of articles in five volumes, it has been found that December issue (32.11%) of the journal has the highest number of published

articles followed by June (27.98%) whereas March issue has the least number of publications to the journal i.e. 19.26%.

3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (45.87%) is most prevalent in the journal followed by single authorship (33.02%). Further, study also reveals that 418 authors contributed 218 research papers to the journal, out of which 27.03% authors belongs to Volume 3 of the journal followed by volume 4 with 26.07% authors.
4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.66 which indicates significant amount of collaborative research among authors of the journal. More the degree of collaboration for the journal tends towards more collaborative research published in the journal and vice-versa.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (69.72%) of research papers were belong to national contribution whereas 28.89% research papers belongs to international contribution. Besides these, only few research papers (1.37%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of articles to the journal is less than national because of geographic distance as well as might be due to less popularity of the journal because of recent in origin.
6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (72%) to the journal. The journal has 28% contributors from overseas which display its international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (75.21%) have more interest in publishing their research papers in the journal.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that Tamil Nadu (18.6%) has the highest number of contributors to the journal followed by Uttar Pradesh (11.62%), Maharashtra (10.96%), and Karnataka (10.29%). Indian contributors to the journal belong to 21 states and union territories of India which shows journal's wide acceptance amongst Indian LIS professionals.
8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles

(60.12%) were most prevalent in terms of citations/references in research articles followed by Books and Reference Sources (14%), Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.

9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (53.36%), 2011-2015 (21.34%), and 1991-2000 (16.44%) time periods which indicates that majority (91.14%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 9.539 years.

B. Findings from ALIS

1) The journal has published 173 articles in 20 issues of 5 volumes from the year 2011-2015. There was almost equal distribution of articles found in every volume. Volume 62 and Volume 60 have published major percentage of research papers to the journal i.e. 21.96% and 21.38% respectively whereas Volume 59 has the lowest publication percentage i.e. 15.6%.
2) As per issue wise publications of articles in five volumes, it has been found that December issue (27.16%) of the journal has the highest number of published articles followed by September issue (26.58%) whereas March & June issues have the least number of publications to the journal i.e. 23.12% each.
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (42.77%) is most prevalent in the journal followed by single authorship (38.72%). Further, study also reveals that 324 authors contributed 173 research papers to the journal, out of which 22.83% authors belongs to Volume 60 of the journal followed by Volume 58 with 21.29% authors.
4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.61 which indicates significant amount of collaborative research among authors of the journal.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (75.14%) of research papers were belong to national contribution whereas 22.54% research papers belongs to international

contribution. Besides these, only few research papers (2.31%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of articles to the journal is less than national and it might be due to geographic distance and less popularity of the journal.

6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (72.22%) to the journal. The journal has 27.78% contributors from overseas which display its international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (50%) have more interest in publishing their research papers in the journal amongst all overseas authors.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that New Delhi (31.19%) has the highest number of contributors to the journal followed by West Bengal (11.11%), Karnataka (10.68%), and Maharashtra (7.26%). Indian contributors to the journal belong to 26 states and union territories of India which shows journal's wide acceptance amongst Indian LIS professionals.
8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (62.18%) were most prevalent in terms of citations/references in research articles followed by Books and Reference Sources (17.95%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (49.14%), 2011-2015 (19.97%), and 1991-2000 (16.55%) time periods which indicates that majority (85.66%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 10.60837 years.

C. Findings from IJIDT

1) The journal has published 259 articles in 20 issues of 5 volumes from the year 2011-2015. There was no equal distribution of articles found in every volume. Volume 4 and Volume 3 have published major percentage of research papers to the journal i.e. 22.77% and 21.23% respectively whereas Volume 1 has the lowest publication percentage i.e. 17.37%.
2) As per issue wise publications of articles in five volumes, it has been found that December issue (26.64%) of the journal has the highest number of published articles followed by March and June issues (25.09% each) whereas September issue has the least number of publications to the journal i.e. 23.16%.
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (45.94%) is most prevalent in the journal followed by single authorship (36.67%). Further, study also reveals that 483 authors contributed 259 research papers to the journal, out of which 24.22% authors belongs to Volume 4 of the journal followed by Volume 3 with 20.7% authors.
4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.63 which indicates significant amount of collaborative research among authors of the journal.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (95.75%) of research papers were belong to national contribution whereas 3.08% research papers belongs to international contribution. Besides these, only few research papers (1.15%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of articles to the journal is very less than national and it might be due to geographic distance and less popularity of the journal due to very recent in origin.
6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (95.65%) to the journal. The journal has 4.35% contributors from overseas which display its very less international reach, distribution, acceptance and presence amongst LIS professionals. Saudi Arabian authors (23.08%) have more interest in publishing their research papers in the journal amongst all overseas authors.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that Karnataka (15.15%) has the highest number of contributors to

the journal followed by Tamil Nadu (12.12%), Haryana (10.38%), and Maharashtra (8.22%). Indian contributors to the journal belong to 25 states and union territories of India which shows journal's wide acceptance amongst Indian LIS professionals.

8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (63.55%) were most prevalent in terms of citations/references in research articles followed by Web based Resources (13.28%), and Books and Reference Sources (10.61%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (50.75%), 2011-2015 (28.84%), and 1991-2000 (14.05%) time periods. It indicates that majority (93.64%) of literature cited in the research papers of the journal were within the period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 8.039 years.

D. Findings from IJODLS

1) The journal has published 154 articles in 14 issues of 5 volumes from the year 2011-2015. There was no equal distribution of articles found in every volume. Volume 4 and Volume 2 have published major percentage of research papers to the journal i.e. 35.71% and 22.72% respectively.
2) As per issue wise publications of articles in five volumes, it has been found that December issue (35.71%) of the journal has the highest number of published articles followed by September issue (29.22%) whereas March issue has the least number of publications to the journal i.e. 14.28%.
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (44.15%) is most prevalent in the journal followed by single authorship (40.9%). Further, study also reveals that 269 authors contributed 154 research papers to the journal, out of which 34.57% authors belongs to Volume 4 of the journal followed by Volume 2 with 25.27% authors.

4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.57 which indicated comparatively less significant amount of collaborative research among authors of the journal than other journals covered in the study.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (85.71%) of research papers were belong to national contribution whereas 12.33% research papers belongs to international contribution. Besides these, only few research papers (1.94%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of articles to the journal is very less than national and it might be due to geographic distance and less popularity of the journal due to very recent in origin.
6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (85.13%) to the journal. The journal has 14.87% contributors from overseas which display its less international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (35%) have more interest in publishing their research papers in the journal amongst all overseas authors.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that Maharashtra (14.41%) has the highest number of contributors to the journal followed by Tamil Nadu (12.22%), Andhra Pradesh (10.91), and Karnataka (10.48%). Indian contributors to the journal belong to 21 states and union territories of India which display journal's wide acceptance amongst Indian LIS professionals.
8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (58.81%) were most prevalent in terms of citations/references in research articles followed by Web based Resources (15.78%), and Books and Reference Sources (12.58%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (55.60%), 2011-2015 (26.15%), and 1991-2000 (13%) time periods. It indicates that majority (94.75%) of literature

cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.

10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 8.076 years.

E. Findings from DJLIT

1) The journal has published 294 articles in 30 issues of 5 volumes from the year 2011-2015. There was almost equal distribution of articles found in every volume. Volume 32 and Volume 33 have published major percentage of research papers to the journal i.e. 22.1% and 20.74% respectively whereas Volume 35 has the lowest publication percentage i.e. 18.02%.
2) As per issue wise publications of articles in five volumes, it has been found that August issue (19.04%) of the journal has the highest number of published articles followed by December issue (16.66%) whereas April issue has the least number of publications to the journal i.e. 15.64%.
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (45.23%) is most prevalent in the journal followed by single authorship (45.03%). Further, study also reveals that 560 authors contributed 294 research papers to the journal, out of which 21.78% authors belongs to Volume 32 of the journal followed by Volume 34 with 21.6% authors.
4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.64 which indicates significant amount of collaborative research among authors of the journal.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (85.71%) of research papers were belong to national contribution whereas 11.22% research papers belongs to international contribution. Besides these, only few research papers (3.06%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of research papers to the journal is less than national and it might be due to geographic distance as well as less popularity of the journal.
6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (86.96%) to the

journal. The journal has 13.04% contributors from overseas which display its less international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (20.54%) have more interest in publishing their research papers in the journal amongst all overseas authors. In the terms of number of foreign countries, the journal has covered 24 countries as its widespread availability for publication of the research papers.

7) Further, analysis based on state wise distribution of authors within India, it has been observed that New Delhi (20.53%) has the highest number of contributors to the journal followed by Maharashtra (15.19%), Karnataka (13.55%), Telengana and Kerala (4.92% each) and Uttar Pradesh (4.72%). Indian contributors to the journal belong to 24 states and union territories of India which shows journal's wide publicity, circulation, and acceptance amongst Indian LIS professionals.
8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (53.96%) were most prevalent in terms of citations/references in research articles followed by Web based Resources (17.2%), Books and Reference Sources (11.28%), and Conference/Seminar Proceedings (9.66%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (50.42%), 2011-2015 (27.42%), and 1991-2000 (15.02%) time periods. It indicates that majority (92.87%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 8.603 years.

F. Findings from TRIM

1) The journal has published 35 articles in 5 issues of 5 volumes from the year 2011-2015. The journal was not regular in terms of publication, so that observed very less number of research papers during the study. With the available data, Volume 7 has published major percentage of research papers to the journal i.e. 60% whereas Volume 10 has the lowest publication percentage i.e. 11.42%.

2) As per issue wise publications of articles in five volumes, it has been found that journal publishes only two issues in a year and December issue (71.43%) of the journal has the highest number of published articles than June issue (28.57%).
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (54.28%) is most prevalent in the journal followed by single authorship (22.85%). Further, study also reveals that 71 authors contributed 35 research papers to the journal, out of which 66.19% authors belongs to Volume 7 of the journal followed by Volume 8 with 23.94% authors.
4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.77 which indicates significant amount of collaborative research among authors of the journal.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (91.42%) of research papers were belong to national contribution whereas 8.57% research papers belongs to international contribution. There were no research papers that have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of research papers to the journal is very less than national and it might be due to geographic distance, less popularity of the journal as well as irregular publication cycle.
6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (90.14%) to the journal. The journal has 9.86% contributors from overseas which display its very less international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (42.8%) have more interest in publishing their research papers in the journal amongst all overseas authors. In the terms of number of foreign countries, the journal has covered only 5 overseas countries as its widespread availability for publication of the research papers.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that Jammu and Kashmir (51.56%) has the highest number of contributors to the journal followed by Uttar Pradesh (7.81%), Karnataka, Gujarat, Punjab and Maharashtra (6.25% each), and Tamil Nadu (4.68%). Indian contributors to the journal belong to only 12 states and union territories of India which shows journals less circulation, availability and acceptance amongst Indian LIS professionals.

8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (46.01%) were most prevalent in terms of citations/references in research articles followed by Books and Reference Sources (16.46%), Web based Resources (13.62%), Conference/Seminar Proceedings (13.27%), and Miscellaneous items (10.13%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (66.37%), 1991-2000 (17.16%), and 2011-2015 (10.79%) time periods. It indicates that majority (94.32%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 11.21 years.

G. Testing of Hypotheses

1) From the testing of significance of hypothesis (H1) with Chi-Square test, it has been found that journals prefer collaborative research than solo research except journal "IJODLS".
2) From the testing of correlation between time and growth of citations in hypothesis (H2) with Pearson Correlation, it has been found that all the journals have significant adverse relationship between time and growth of citations and thus hypothesis (H2) is accepted.

CHAPTER - 5

CONCLUSION AND SUGGESTIONS

5.1 Introduction

Research plays a vital role in the development of academics. Many research oriented organisations and academic institutions are involved in research to find out the solutions for the problems exists within the academic field of concern. In the field of LIS, bibliometrics is one of the prevalent methods of research to assess the existence and growth of literature by various means. This is the amalgamation of mathematics and statistical methods to literature of any field. There are number of studies conducted in the field of LIS by applying bibliometric tools and techniques. Nowadays, open access is the revolutionary way of providing access to the scholarly literature. Due to emergence of Internet and World Wide Web, scholarly research literature is distributed online everywhere in various forms, free of charge and free from copyright and licensing restrictions by publishers and institutions. Budapest Open Access Initiative (BOAI) was one the initiative to start the open access concept in scholarly world.

5.2 Conclusions

Bibliometric study measures the growth and recent trends of literature in the field of concern. Journals, by its publications, add recent concepts and research findings in the literature. There are numbers of journals in different fields of study and they contribute enormous amount of recent literature in the different fields of study. There are more than 11000 open access journals in all the field of study. In the field of LIS, only 158 open access journals from all around the world. India contributes only six journals in open access platform. The study aims to find out the research contributions of Indian open access LIS journals. The conclusion has been divided into following sections as raised in the form of objectives of the study:

a) Year-wise and issue-wise distribution of articles in Indian open access journals

With regard to yearly distribution of research articles in the six journals, there were no journals that have equal distribution of research articles. Each journal has their own periodicity of publication, publication guidelines, different scope of publication, time duration for editing work etc. that affects the number of contributions in yearly as well as issue wise also. Majority of journals have December issue as top most contributor issue for the journal. The journals those have more frequency of

publication have higher number of research articles and vice versa. Some journals facing problem in publication either due to lack of sufficient articles or might be some financial crunch. Apart from that some journals have problem in their online version which created problem in research data collection and after giving email reminders to editors of the journal, they could not solve it.

b) Authorship pattern and degree of collaboration in the research articles

In the study of authorship pattern for the journals, all the journal articles have same trends for authorship. The two authorship pattern was found most prevalent in the articles of all the six journals. Single authorship pattern was second prevalent choice of authors in the articles. This gives inference that two authorship pattern in publication of articles is prevalent trend in the field of LIS followed by single authorship. Further, strong degree of collaboration between authors has been observed during the study period. More the degree of collaboration for the journal tends toward more collaborative research published in the journal and vice-versa. Each of the journals has degree of collaboration more than 0.5 which tends significant collaboration between authors. Less the degree of collaboration tends toward individual or solo research. Nowadays, team research or collaborative research is prevalent in the many fields and we are not far from that i.e. in the field of LIS, team work is also prevalent than individual work. The hypothesis also tested and found to be true that collaborative research is more that solo research.

c) Geographical distribution and international collaboration in open access journals

The purpose of geographical distribution was to know the authors trend of publication in Indian open access LIS journals from all around the world. In this regard, national contribution of articles to the journals found more than international contribution. Since the journals were from Indian origin, so highest number of contributions submitted and published by the India only. Satyanarayana (2014) also found in this regard the same result for Greece, and Sivasekaran & Raghavan (2014) found India as the biggest contributor of articles than others. There were very few national + international contributions observed in all the journals. Less international contribution of articles to the open access journal indicates the fewer readerships,

journal's availability, popularity & awareness among researchers. It is also evident from the earlier studies that as geographical distance increases less collaboration establishes (Satyanarayana, 2014; Sivasekaran & Raghavan, 2014; Swain et al., 2014; Barik & Jena, 2013; Pandita, 2013). Some journals have good international readership, so having good international collaboration from all over the world. DESIDOC Journal of Library & Information Technology has good international readership in this regard with 24 foreign countries as contributors of articles. The journal IJIDT also has almost good level of international readership. Nigeria has been found top most contributors of articles to Indian open access LIS journals.

Since India become the top contributors of research articles to the open access LIS journals, study has been conducted to know the state-wise distribution of contributions among Indian states to the journal. There are six open access LIS journal and everyone have different scope of subject to publish articles; and each journal has its readership and coverage with different states and union territories of India. Journal IRJLIS has Tamil Nadu as the highest contributor of research articles with its coverage to 21 states and union territories of India. Journal ALIS has New Delhi as the highest contributor of research articles with its coverage to 26 states and union territories of India. The journal IJIDT has Karnataka as the highest contributor of research articles with its coverage to 25 states and union territories of India. Journal IJODLS has Maharashtra as the highest number of contributor of research articles with its coverage to 21 states and union territories of India. Journal DJLIT has New Delhi as the highest number of contributor of research articles with its coverage to 24 states and union territories of India while journal TRIM has Jammu and Kashmir as the highest number of contributor of research articles with its coverage to only 12 states and union territories of India. This shows except one journal (i.e. TRIM) other journals have wider readership, availability, and acceptance amongst Indian LIS professionals.

d) Prevalent forms of documents and obsolescence of LIS literature in open access journals

Journal articles use citations to support their work and findings to make it valid. These citations belong to various forms of documents used for study purposes.

Journal Articles have been found most prevalent form of documents in citations/references of research articles of open access journals followed by Books and Reference Sources. Web based Resources are of recent origin but comparatively cited higher than Conference/Seminar Proceedings and in some cases Books and Reference Sources also. Theses/Dissertations have research oriented information but least cited in journal articles might be due to restricted availability. From the observation of recency of citations and its usage inference that open access journal's articles used recent citations and that were not more than 25 years old from now. Majority of cited literature belongs to 1991-2016 years time duration. The obsolescence of LIS literature have been calculated and found different for each journal. From the analysis, the rate of obsolescence (half-life) for all journals of study ranges between 8.039 years to 11.21 years and cumulatively for all journals the rate of obsolescence is 9.345 years. It indicates that the field is growing fast and after every 9.34 years 50% citations becomes obsolete and field is filled by 50% new citations.

5.3 Suggestions

During the research work, many points have been observed for the improvement of Indian open access LIS journals. Following are some suggestions:

a) Publication cycle needs to be improved by some journals.
b) Definite policy should be framed for updating and testing of journal website.
c) Web 2.0 tools and techniques should be adopted to increase the wider readership at national and international level.

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APPENDICES

Appendix – 1 **Obsolescence Data for IRJLIS**

Age	No. of Citations	Cumulative Citations	%	Cumulative %
0	49	49	1.511	1.511
1	71	120	2.190	3.701
2	157	277	4.842	8.544
3	181	458	5.582	14.127
4	234	692	7.217	21.344
5	241	933	7.433	28.778
6	215	1148	6.631	35.410
7	205	1353	6.323	41.733
8	159	1512	4.904	46.637
9	202	1714	6.230	52.868
10	164	1878	5.058	57.927
11	146	2024	4.503	62.431
12	162	2186	4.996	67.427
13	142	2328	4.380	71.807
14	94	2422	2.899	74.706
15	98	2520	3.022	77.729
16	85	2605	2.621	80.352
17	69	2674	2.128	82.479
18	61	2735	1.881	84.361
19	40	2775	1.233	85.595
20	46	2821	1.418	87.014
21	32	2853	0.987	88.001
22	41	2894	1.264	89.265
23	27	2921	0.832	90.098
24	34	2955	1.048	91.147
25	22	2977	0.678	91.826
26	29	3006	0.894	92.720
27	11	3017	0.339	93.059
28	15	3032	0.462	93.522
29	22	3054	0.678	94.201
30	12	3066	0.370	94.571
31	9	3075	0.277	94.848
32	20	3095	0.616	95.465
33	9	3104	0.277	95.743
34	17	3121	0.524	96.267
35	8	3129	0.246	96.514
36	9	3138	0.277	96.792
37	7	3145	0.215	97.008
38	11	3156	0.339	97.347
39	8	3164	0.246	97.594

Age	No. of Citations	Cumulative Citations	%	Cumulative %
40	2	3166	0.061	97.655
41	4	3170	0.123	97.779
42	1	3171	0.030	97.809
43	11	3182	0.339	98.149
44	2	3184	0.061	98.211
45	7	3191	0.215	98.426
46	4	3195	0.123	98.550
47	2	3197	0.061	98.611
48	2	3199	0.061	98.673
49	0	3199	0	98.673
50	5	3204	0.154	98.827
51	7	3211	0.215	99.043
52	0	3211	0	99.043
53	2	3213	0.061	99.105
54	2	3215	0.061	99.167
55	4	3219	0.123	99.291
56	1	3220	0.030	99.321
57	1	3221	0.030	99.352
58	0	3221	0	99.352
59	6	3227	0.185	99.537
60	0	3227	0	99.537
61	1	3228	0.030	99.568
62	1	3229	0.030	99.599
63	0	3229	0	99.599
64	0	3229	0	99.599
65	2	3231	0.061	99.661
66	2	3233	0.061	99.722
67	2	3235	0.061	99.784
68	0	3235	0	99.784
69	0	3235	0	99.784
70	3	3238	0.092	99.876
71	0	3238	0	99.876
72	0	3238	0	99.876
73	0	3238	0	99.876
74	0	3238	0	99.876
75	1	3239	0.030	99.907
76	0	3239	0	99.907
77	0	3239	0	99.907
78	0	3239	0	99.907
79	0	3239	0	99.907
80	1	3240	0.030	99.938
81	0	3240	0	99.938

Age	No. of Citations	Cumulative Citations	%	Cumulative %
82	0	3240	0	99.938
83	0	3240	0	99.938
84	0	3240	0	99.938
85	1	3241	0.030	99.969
86	0	3241	0	99.969
87	0	3241	0	99.969
88	0	3241	0	99.969
89	0	3241	0	99.969
90	0	3241	0	99.969
91	0	3241	0	99.969
92	0	3241	0	99.969
93	0	3241	0	99.969
94	0	3241	0	99.969
95	0	3241	0	99.969
96	0	3241	0	99.969
97	0	3241	0	99.969
98	0	3241	0	99.969
99	0	3241	0	99.969
100	0	3241	0	99.969
101	0	3241	0	99.969
102	0	3241	0	99.969
103	0	3241	0	99.969
104	0	3241	0	99.969
105	0	3241	0	99.969
106	0	3241	0	99.969
107	0	3241	0	99.969
108	0	3241	0	99.969
109	0	3241	0	99.969
110	0	3241	0	99.969
111	0	3241	0	99.969
112	0	3241	0	99.969
113	0	3241	0	99.969
114	0	3241	0	99.969
115	0	3241	0	99.969
116	0	3241	0	99.969
117	0	3241	0	99.969
118	0	3241	0	99.969
119	0	3241	0	99.969
120	0	3241	0	99.969
121	0	3241	0	99.969
122	0	3241	0	99.969
123	0	3241	0	99.969

Age	No. of Citations	Cumulative Citations	%	Cumulative %
124	0	3241	0	99.969
125	0	3241	0	99.969
126	0	3241	0	99.969
127	1	3242	0.030	100

Rate of Obsolescence = L+ (N/2-C)*h/f, where

N = 3242
N/2 = 1621
L = 9
C = 1512
h = 1
f = 202

then, Obsolescence (Half-life) of the journal is L+ (N/2-C)*h/f = 9.5396 years.

Appendix – 2

Obsolescence Data for ALIS

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
0	46	46	1.286713287
1	71	117	3.272727273
2	128	245	6.853146853
3	238	483	13.51048951
4	231	714	19.97202797
5	237	951	26.6013986
6	195	1146	32.05594406
7	186	1332	37.25874126
8	166	1498	41.9020979
9	166	1664	46.54545455
10	203	1867	52.22377622
11	156	2023	56.58741259
12	157	2180	60.97902098
13	154	2334	65.28671329
14	137	2471	69.11888112
15	101	2572	71.94405594
16	79	2651	74.15384615
17	83	2734	76.47552448
18	68	2802	78.37762238
19	66	2868	80.22377622
20	50	2918	81.62237762
21	51	2969	83.04895105
22	30	2999	83.88811189
23	31	3030	84.75524476
24	33	3063	85.67832168
25	34	3097	86.62937063
26	25	3122	87.32867133
27	28	3150	88.11188811
28	21	3171	88.6993007
29	30	3201	89.53846154
30	18	3219	90.04195804
31	15	3234	90.46153846
32	19	3253	90.99300699
33	8	3261	91.21678322
34	16	3277	91.66433566
35	17	3294	92.13986014
36	15	3309	92.55944056
37	17	3326	93.03496503

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
38	20	3346	93.59440559
39	12	3358	93.93006993
40	10	3368	94.20979021
41	6	3374	94.37762238
42	9	3383	94.62937063
43	8	3391	94.85314685
44	3	3394	94.93706294
45	9	3403	95.18881119
46	13	3416	95.55244755
47	11	3427	95.86013986
48	17	3444	96.33566434
49	13	3457	96.6993007
50	6	3463	96.86713287
51	6	3469	97.03496503
52	5	3474	97.17482517
53	10	3484	97.45454545
54	4	3488	97.56643357
55	10	3498	97.84615385
56	1	3499	97.87412587
57	2	3501	97.93006993
58	8	3509	98.15384615
59	3	3512	98.23776224
60	2	3514	98.29370629
61	2	3516	98.34965035
62	5	3521	98.48951049
63	1	3522	98.51748252
64	2	3524	98.57342657
65	1	3525	98.6013986
66	3	3528	98.68531469
67	5	3533	98.82517483
68	1	3534	98.85314685
69	0	3534	98.85314685
70	0	3534	98.85314685
71	0	3534	98.85314685
72	1	3535	98.88111888
73	1	3536	98.90909091
74	0	3536	98.90909091
75	0	3536	98.90909091
76	1	3537	98.93706294

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
77	0	3537	98.93706294
78	1	3538	98.96503497
79	1	3539	98.99300699
80	1	3540	99.02097902
81	3	3543	99.1048951
82	0	3543	99.1048951
83	0	3543	99.1048951
84	4	3547	99.21678322
85	1	3548	99.24475524
86	1	3549	99.27272727
87	2	3551	99.32867133
88	0	3551	99.32867133
89	4	3555	99.44055944
90	1	3556	99.46853147
91	0	3556	99.46853147
92	1	3557	99.4965035
93	0	3557	99.4965035
94	0	3557	99.4965035
95	0	3557	99.4965035
96	0	3557	99.4965035
97	0	3557	99.4965035
98	1	3558	99.52447552
99	0	3558	99.52447552
100	0	3558	99.52447552
101	1	3559	99.55244755
102	1	3560	99.58041958
103	2	3562	99.63636364
104	0	3562	99.63636364
105	0	3562	99.63636364
106	0	3562	99.63636364
107	2	3564	99.69230769
108	2	3566	99.74825175
109	0	3566	99.74825175
110	0	3566	99.74825175
111	5	3571	99.88811189
112	0	3571	99.88811189
113	0	3571	99.88811189
114	0	3571	99.88811189
115	0	3571	99.88811189

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
116	0	3571	99.88811189
117	0	3571	99.88811189
118	0	3571	99.88811189
119	0	3571	99.88811189
120	0	3571	99.88811189
121	0	3571	99.88811189
122	0	3571	99.88811189
123	0	3571	99.88811189
124	1	3572	99.91608392
125	0	3572	99.91608392
126	0	3572	99.91608392
127	0	3572	99.91608392
128	0	3572	99.91608392
129	0	3572	99.91608392
130	0	3572	99.91608392
131	0	3572	99.91608392
132	0	3572	99.91608392
133	0	3572	99.91608392
134	0	3572	99.91608392
135	0	3572	99.91608392
136	0	3572	99.91608392
137	0	3572	99.91608392
138	1	3573	99.94405594
139	1	3574	99.97202797
140	0	3574	99.97202797
141	0	3574	99.97202797
142	0	3574	99.97202797
143	0	3574	99.97202797
144	0	3574	99.97202797
145	0	3574	99.97202797
146	1	3575	100

Rate of Obsolescence = L+ (N/2-C)*h/f, where

N = 3575
N/2 = 1787.5
L = 10
C = 1664
h = 1
f = 203

then, Obsolescence (Half-life) of the journal is L+ (N/2-C)*h/f = 10.60837 years.

Appendix – 3

Obsolescence Data for IJIDT

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
0	22	22	0.705806866
1	113	135	4.331087584
2	215	350	11.22874559
3	277	627	20.11549567
4	272	899	28.8418351
5	279	1178	37.79274944
6	215	1393	44.69040744
7	158	1551	49.75938402
8	191	1742	55.8870709
9	173	1915	61.43727944
10	156	2071	66.44209175
11	123	2194	70.38819378
12	109	2303	73.88514597
13	95	2398	76.93294835
14	83	2481	79.59576516
15	68	2549	81.77735002
16	65	2614	83.86268848
17	77	2691	86.33301251
18	57	2748	88.16169394
19	40	2788	89.44497915
20	42	2830	90.79242862
21	32	2862	91.81905679
22	21	2883	92.49278152
23	19	2902	93.102342
24	17	2919	93.64773821
25	13	2932	94.0648059
26	12	2944	94.44979147
27	11	2955	94.8026949
28	8	2963	95.05935194
29	14	2977	95.50850176
30	6	2983	95.70099455
31	6	2989	95.89348733
32	17	3006	96.43888354
33	6	3012	96.63137632
34	4	3016	96.75970484
35	10	3026	97.08052615
36	4	3030	97.20885467
37	8	3038	97.46551171

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
38	6	3044	97.65800449
39	6	3050	97.85049727
40	4	3054	97.97882579
41	12	3066	98.36381136
42	5	3071	98.52422201
43	0	3071	98.52422201
44	3	3074	98.6204684
45	1	3075	98.65255053
46	10	3085	98.97337183
47	3	3088	99.06961822
48	1	3089	99.10170035
49	1	3090	99.13378248
50	0	3090	99.13378248
51	0	3090	99.13378248
52	3	3093	99.23002887
53	0	3093	99.23002887
54	3	3096	99.32627526
55	1	3097	99.35835739
56	1	3098	99.39043953
57	2	3100	99.45460379
58	1	3101	99.48668592
59	0	3101	99.48668592
60	0	3101	99.48668592
61	0	3101	99.48668592
62	0	3101	99.48668592
63	0	3101	99.48668592
64	0	3101	99.48668592
65	0	3101	99.48668592
66	1	3102	99.51876805
67	0	3102	99.51876805
68	0	3102	99.51876805
69	0	3102	99.51876805
70	1	3103	99.55085018
71	0	3103	99.55085018
72	0	3103	99.55085018
73	1	3104	99.58293231
74	0	3104	99.58293231
75	0	3104	99.58293231
76	0	3104	99.58293231

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
77	0	3104	99.58293231
78	0	3104	99.58293231
79	0	3104	99.58293231
80	1	3105	99.61501444
81	0	3105	99.61501444
82	0	3105	99.61501444
83	0	3105	99.61501444
84	0	3105	99.61501444
85	1	3106	99.64709657
86	0	3106	99.64709657
87	0	3106	99.64709657
88	2	3108	99.71126083
89	2	3110	99.77542509
90	0	3110	99.77542509
91	1	3111	99.80750722
92	2	3113	99.87167148
93	0	3113	99.87167148
94	0	3113	99.87167148
95	0	3113	99.87167148
96	0	3113	99.87167148
97	0	3113	99.87167148
98	3	3116	99.96791787
99	0	3116	99.96791787
100	0	3116	99.96791787
101	0	3116	99.96791787
102	0	3116	99.96791787
103	0	3116	99.96791787
104	0	3116	99.96791787
105	0	3116	99.96791787
106	0	3116	99.96791787
107	0	3116	99.96791787
108	0	3116	99.96791787
109	0	3116	99.96791787
110	0	3116	99.96791787
111	1	3117	100

Rate of Obsolescence = L+ (N/2-C)*h/f, where
N = 3117, N/2 = 1558.5, L = 8, C = 1551, h = 1, f = 191

then, Obsolescence (Half-life) of the journal is L+ (N/2-C)*h/f = 8.039267 years.

Appendix – 4 **Obsolescence Data for IJODLS**

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
0	17	17	0.801131008
1	101	118	5.560791706
2	108	226	10.65032988
3	128	354	16.68237512
4	201	555	26.15457116
5	173	728	34.3072573
6	166	894	42.13006598
7	156	1050	49.48162111
8	143	1193	56.22054665
9	122	1315	61.96983977
10	123	1438	67.76625825
11	92	1530	72.10179076
12	89	1619	76.29594722
13	60	1679	79.12346843
14	56	1735	81.76248822
15	63	1798	84.73138549
16	40	1838	86.61639962
17	33	1871	88.17153629
18	41	1912	90.10367578
19	18	1930	90.95193214
20	24	1954	92.08294062
21	12	1966	92.64844486
22	24	1990	93.77945335
23	13	2003	94.39208294
24	8	2011	94.76908577
25	15	2026	95.47596607
26	10	2036	95.9472196
27	7	2043	96.27709708
28	4	2047	96.46559849
29	3	2050	96.60697455
30	5	2055	96.84260132
31	5	2060	97.07822809
32	7	2067	97.40810556
33	8	2075	97.78510839
34	8	2083	98.16211122
35	1	2084	98.20923657
36	1	2085	98.25636192
37	3	2088	98.39773798

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
38	1	2089	98.44486334
39	0	2089	98.44486334
40	4	2093	98.63336475
41	1	2094	98.6804901
42	3	2097	98.82186616
43	0	2097	98.82186616
44	0	2097	98.82186616
45	3	2100	98.96324222
46	7	2107	99.2931197
47	1	2108	99.34024505
48	0	2108	99.34024505
49	2	2110	99.43449576
50	1	2111	99.48162111
51	2	2113	99.57587182
52	0	2113	99.57587182
53	0	2113	99.57587182
54	1	2114	99.62299717
55	1	2115	99.67012253
56	1	2116	99.71724788
57	0	2116	99.71724788
58	0	2116	99.71724788
59	0	2116	99.71724788
60	4	2120	99.90574929
61	1	2121	99.95287465
62	0	2121	99.95287465
63	0	2121	99.95287465
64	0	2121	99.95287465
65	0	2121	99.95287465
66	0	2121	99.95287465
67	0	2121	99.95287465
68	0	2121	99.95287465
69	0	2121	99.95287465
70	0	2121	99.95287465
71	0	2121	99.95287465
72	0	2121	99.95287465
73	0	2121	99.95287465
74	0	2121	99.95287465
75	1	2122	100

Rate of Obsolescence = L+ (N/2-C)*h/f, where

N = 2122
N/2 = 1061
L = 8
C = 1050
h = 1
f = 143

then, Obsolescence (Half-life) of the journal is L+ (N/2-C)*h/f = 8.076923 years.

Appendix – 5 **Obsolescence Data for DESIDOC**

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
0	105	105	2.173463051
1	211	316	6.541088801
2	254	570	11.79879942
3	329	899	18.60898365
4	426	1325	27.42703374
5	344	1669	34.54771269
6	348	2017	41.75119023
7	261	2278	47.15379839
8	228	2506	51.87331815
9	223	2729	56.48933968
10	247	2976	61.60215276
11	216	3192	66.07327675
12	188	3380	69.9648106
13	196	3576	74.02194163
14	185	3761	77.85137653
15	153	3914	81.01842269
16	116	4030	83.41958187
17	113	4143	85.7586421
18	94	4237	87.70440903
19	69	4306	89.13268474
20	53	4359	90.22976609
21	41	4400	91.07845167
22	33	4433	91.76154005
23	28	4461	92.3411302
24	26	4487	92.87932105
25	36	4523	93.62450838
26	19	4542	94.0178017
27	16	4558	94.34899607
28	18	4576	94.72158973
29	21	4597	95.15628234
30	11	4608	95.38397847
31	7	4615	95.52887601
32	21	4636	95.96356862
33	8	4644	96.1291658
34	17	4661	96.48105982
35	6	4667	96.60525771
36	23	4690	97.08134962
37	11	4701	97.30904575

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
38	7	4708	97.45394328
39	9	4717	97.64024012
40	14	4731	97.93003519
41	9	4740	98.11633202
42	4	4744	98.19913061
43	6	4750	98.3233285
44	5	4755	98.42682674
45	8	4763	98.59242393
46	6	4769	98.71662182
47	2	4771	98.75802111
48	9	4780	98.94431795
49	3	4783	99.00641689
50	2	4785	99.04781619
51	2	4787	99.08921548
52	7	4794	99.23411302
53	1	4795	99.25481267
54	0	4795	99.25481267
55	5	4800	99.35831091
56	0	4800	99.35831091
57	1	4801	99.37901056
58	0	4801	99.37901056
59	1	4802	99.3997102
60	3	4805	99.46180915
61	0	4805	99.46180915
62	1	4806	99.4825088
63	0	4806	99.4825088
64	0	4806	99.4825088
65	2	4808	99.52390809
66	0	4808	99.52390809
67	5	4813	99.62740633
68	1	4814	99.64810598
69	0	4814	99.64810598
70	0	4814	99.64810598
71	0	4814	99.64810598
72	1	4815	99.66880563
73	0	4815	99.66880563
74	0	4815	99.66880563
75	0	4815	99.66880563
76	1	4816	99.68950528

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
77	0	4816	99.68950528
78	0	4816	99.68950528
79	0	4816	99.68950528
80	0	4816	99.68950528
81	2	4818	99.73090457
82	1	4819	99.75160422
83	0	4819	99.75160422
84	1	4820	99.77230387
85	1	4821	99.79300352
86	0	4821	99.79300352
87	0	4821	99.79300352
88	0	4821	99.79300352
89	3	4824	99.85510246
90	0	4824	99.85510246
91	0	4824	99.85510246
92	1	4825	99.87580211
93	0	4825	99.87580211
94	0	4825	99.87580211
95	1	4826	99.89650176
96	0	4826	99.89650176
97	0	4826	99.89650176
98	1	4827	99.91720141
99	0	4827	99.91720141
100	0	4827	99.91720141
101	0	4827	99.91720141
102	0	4827	99.91720141
103	0	4827	99.91720141
104	0	4827	99.91720141
105	0	4827	99.91720141
106	1	4828	99.93790106
107	0	4828	99.93790106
108	0	4828	99.93790106
109	0	4828	99.93790106
110	1	4829	99.9586007
111	1	4830	99.97930035
112	0	4830	99.97930035
113	0	4830	99.97930035
114	0	4830	99.97930035
115	0	4830	99.97930035

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
116	0	4830	99.97930035
117	0	4830	99.97930035
118	0	4830	99.97930035
119	0	4830	99.97930035
120	0	4830	99.97930035
121	0	4830	99.97930035
122	0	4830	99.97930035
123	0	4830	99.97930035
124	0	4830	99.97930035
125	0	4830	99.97930035
126	0	4830	99.97930035
127	0	4830	99.97930035
128	0	4830	99.97930035
129	0	4830	99.97930035
130	0	4830	99.97930035
131	0	4830	99.97930035
132	1	4831	100

Rate of Obsolescence = L+ (N/2-C)*h/f, where

N = 4831
N/2 = 2415.5
L = 8
C = 2278
h = 1
f = 228

then, Obsolescence (Half-life) of the journal is L+ (N/2-C)*h/f = 8.60307 years.

Appendix – 6 **Obsolescence Data for TRIM**

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
0	0	0	0
1	3	3	0.530973451
2	4	7	1.238938053
3	8	15	2.654867257
4	46	61	10.79646018
5	24	85	15.04424779
6	39	124	21.94690265
7	33	157	27.78761062
8	41	198	35.04424779
9	33	231	40.88495575
10	41	272	48.14159292
11	50	322	56.99115044
12	38	360	63.71681416
13	44	404	71.50442478
14	32	436	77.16814159
15	29	465	82.30088496
16	19	484	85.66371681
17	10	494	87.43362832
18	9	503	89.02654867
19	9	512	90.61946903
20	2	514	90.97345133
21	6	520	92.03539823
22	6	526	93.09734513
23	3	529	93.62831858
24	4	533	94.33628319
25	4	537	95.04424779
26	3	540	95.57522124
27	0	540	95.57522124
28	1	541	95.75221239
29	2	543	96.10619469
30	3	546	96.63716814
31	1	547	96.81415929
32	2	549	97.16814159
33	1	550	97.34513274
34	1	551	97.52212389
35	0	551	97.52212389
36	1	552	97.69911504
37	1	553	97.87610619

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
38	2	555	98.2300885
39	1	556	98.40707965
40	0	556	98.40707965
41	0	556	98.40707965
42	0	556	98.40707965
43	1	557	98.5840708
44	0	557	98.5840708
45	2	559	98.9380531
46	0	559	98.9380531
47	0	559	98.9380531
48	0	559	98.9380531
49	1	560	99.11504425
50	1	561	99.2920354
51	0	561	99.2920354
52	0	561	99.2920354
53	1	562	99.46902655
54	0	562	99.46902655
55	0	562	99.46902655
56	0	562	99.46902655
57	0	562	99.46902655
58	1	563	99.6460177
59	0	563	99.6460177
60	0	563	99.6460177
61	0	563	99.6460177
62	0	563	99.6460177
63	0	563	99.6460177
64	0	563	99.6460177
65	0	563	99.6460177
66	0	563	99.6460177
67	0	563	99.6460177
68	0	563	99.6460177
69	0	563	99.6460177
70	1	564	99.82300885
71	0	564	99.82300885
72	0	564	99.82300885
73	0	564	99.82300885
74	0	564	99.82300885
75	0	564	99.82300885
76	0	564	99.82300885

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
77	0	564	99.82300885
78	0	564	99.82300885
79	0	564	99.82300885
80	0	564	99.82300885
81	0	564	99.82300885
82	0	564	99.82300885
83	0	564	99.82300885
84	0	564	99.82300885
85	0	564	99.82300885
86	0	564	99.82300885
87	0	564	99.82300885
88	0	564	99.82300885
89	0	564	99.82300885
90	0	564	99.82300885
91	0	564	99.82300885
92	0	564	99.82300885
93	0	564	99.82300885
94	0	564	99.82300885
95	0	564	99.82300885
96	0	564	99.82300885
97	0	564	99.82300885
98	0	564	99.82300885
99	0	564	99.82300885
100	0	564	99.82300885
101	0	564	99.82300885
102	0	564	99.82300885
103	0	564	99.82300885
104	0	564	99.82300885
105	0	564	99.82300885
106	0	564	99.82300885
107	0	564	99.82300885
108	0	564	99.82300885
109	0	564	99.82300885
110	0	564	99.82300885
111	0	564	99.82300885
112	0	564	99.82300885
113	0	564	99.82300885
114	0	564	99.82300885
115	0	564	99.82300885

Age	No. of Citations	Cumulative Citations	Cumulative Percentage
116	0	564	99.82300885
117	0	564	99.82300885
118	0	564	99.82300885
119	0	564	99.82300885
120	0	564	99.82300885
121	0	564	99.82300885
122	0	564	99.82300885
123	0	564	99.82300885
124	0	564	99.82300885
125	0	564	99.82300885
126	0	564	99.82300885
127	0	564	99.82300885
129	1	565	100

Rate of Obsolescence = L+ (N/2-C)*h/f, where

N = 565
N/2 = 282.5
L = 11
C = 272
h = 1
f = 50

then, Obsolescence (Half-life) of the journal is L+ (N/2-C)*h/f = 11.21 years.

Abstract
on
BIBLIOMETRIC STUDY OF INDIAN OPEN ACCESS LIS JOURNALS IN DIRECTORY OF OPEN ACCESS JOURNALS (DOAJ)

A dissertation submitted in partial fulfillment of the requirement for the Degree of Master of Philosophy in Library and Information Science

Submitted by

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2016

Introduction

Open Access is the revolutionary way of providing access to the scholarly literature which is made possible through Internet. Today all over the world scholarly research literature is distributed online on the Internet in various forms, free of charge and free from copyright and licensing restrictions by publishers and institutions. Budapest Open Access Initiative (BOAI) was the first initiative to use the term "Open Access". BOAI defines open access as "*the free availability on the public Internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of the articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself."* One of the greatest benefits to open access is that libraries in smaller institutions or in economically disadvantaged areas around the world can have greater access to the scholarly resources. Open access which provides free access to the information content is widely expanding its domain because of enormous benefits accrued from it.

Open access journals are available online freely to the reader, the publishers are willing to provide access to the Internet users. The open access journals are mostly supported by the academic institutions and research & development institutions or government grants for publishing these journals. Private publishers are publishing them with getting financial support from the authors and supporting from reputed companies or institutions or some of the funding agencies are providing support for the publishing open access journals. The increasing growth of online OA journals in various disciplines is evident of various online directories. Directory of Open Access Journal (DOAJ) is one of the most popular directories among them.

Objectives of the Study

The objectives of the study were to:

a) Examine the year wise distribution of articles.
b) Find the authorship pattern.
c) Assess the degree of collaboration among authors.
d) Find out geographical distribution of articles.
e) Determine the obsolescence of LIS literature.

Scope of the Study

The study was confined to open access journals of Library & Information Science (LIS) published in India and indexed/listed in Directory of Open Access Journals (DOAJ). The number of open access LIS journals covered under study are given in table. There are 1133 published articles belongs to 6 open access LIS journals published from India. The study was conducted for last 5 years from 2011-2015 calendar years.

Table: List of Open Access LIS Journals Published in India on DOAJ

SN	Journal Name	Periodicity	No. of Articles Published (2011-2015)
1	International Research: Journal of Library and Information Science (IRJLIS)	Quarterly	218
2	Annals of Library and Information Studies (ALIS)	Quarterly	173
3	International Journal of Information Dissemination and Technology (IJIDT)	Quarterly	259
4	International Journal of Digital Library Services (IJODLS)	Quarterly	154
5	DESIDOC Journal of Library and Information Technology (DJLIT)	Bi-monthly	294
6	Trends in Information Management (TRIM)	Bi-annual	35
	Total		1133

Methodology

The study was designed to investigate the Indian contribution to LIS journals available under DOAJ through bibliometric analysis. The total number of open access Indian journals for study was 6 (six) that belongs to LIS field and listed in DOAJ. The survey and observation methods of research were found appropriate to undertake the study.

The survey was conducted for retrieving 1133 articles, which is the *n* value for the study; from open access journals of the LIS field published in DOAJ from the year January, 2011 to December, 2015 i.e. 5 years. The data obtained was tabulated, organized, and analysed by the use of Ms-Excel and SPSS as statistical tools and techniques.

Findings of the Study

The analysis of the data collected through survey and observation have revealed a number of findings on open access LIS journals from India which are as follows:

A. Findings from IRJLIS

1) The journal has published 218 articles in 16 issues of 5 volumes from the year 2011-2015. There was no equal distribution of articles found in every volume. Volume 3 and Volume 4 have published major percentage of research papers to the journal i.e. 27.52% for each volume whereas Volume 1 has the lowest publication percentage i.e. 7.33%.
2) As per issue wise publications of articles in five volumes, it has been found that December issue (32.11%) of the journal has the highest number of published articles followed by June (27.98%) whereas March issue has the least number of publications to the journal i.e. 19.26%.
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (45.87%) is most prevalent in the journal followed by single authorship (33.02%). Further, study also reveals that 418 authors contributed 218 research papers to the journal, out of which 27.03% authors belongs to Volume 3 of the journal followed by volume 4 with 26.07% authors.
4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.66 which indicates significant amount of collaborative research among authors of the journal. More the degree of collaboration for the journal tends towards more collaborative research published in the journal and vice-versa.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (69.72%) of research papers were belong to national contribution whereas 28.89% research papers belongs to international contribution. Besides these, only few research papers (1.37%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of articles

to the journal is less than national because of geographic distance as well as might be due to less popularity of the journal because of recent in origin.

6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (72%) to the journal. The journal has 28% contributors from overseas which display its international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (75.21%) have more interest in publishing their research papers in the journal.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that Tamil Nadu (18.6%) has the highest number of contributors to the journal followed by Uttar Pradesh (11.62%), Maharashtra (10.96%), and Karnataka (10.29%). Indian contributors to the journal belong to 21 states and union territories of India which shows journal's wide acceptance amongst Indian LIS professionals.
8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (60.12%) were most prevalent in terms of citations/references in research articles followed by Books and Reference Sources (14%), Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (53.36%), 2011-2015 (21.34%), and 1991-2000 (16.44%) time periods which indicates that majority (91.14%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 9.539 years.

B. Findings from ALIS

1) The journal has published 173 articles in 20 issues of 5 volumes from the year 2011-2015. There was almost equal distribution of articles found in every volume. Volume

62 and Volume 60 have published major percentage of research papers to the journal i.e. 21.96% and 21.38% respectively whereas Volume 59 has the lowest publication percentage i.e. 15.6%.

2) As per issue wise publications of articles in five volumes, it has been found that December issue (27.16%) of the journal has the highest number of published articles followed by September issue (26.58%) whereas March & June issues have the least number of publications to the journal i.e. 23.12% each.
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (42.77%) is most prevalent in the journal followed by single authorship (38.72%). Further, study also reveals that 324 authors contributed 173 research papers to the journal, out of which 22.83% authors belongs to Volume 60 of the journal followed by Volume 58 with 21.29% authors.
4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.61 which indicates significant amount of collaborative research among authors of the journal.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (75.14%) of research papers were belong to national contribution whereas 22.54% research papers belongs to international contribution. Besides these, only few research papers (2.31%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of articles to the journal is less than national and it might be due to geographic distance and less popularity of the journal.
6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (72.22%) to the journal. The journal has 27.78% contributors from overseas which display its international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (50%) have more interest in publishing their research papers in the journal amongst all overseas authors.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that New Delhi (31.19%) has the highest number of contributors to the

journal followed by West Bengal (11.11%), Karnataka (10.68%), and Maharashtra (7.26%). Indian contributors to the journal belong to 26 states and union territories of India which shows journal's wide acceptance amongst Indian LIS professionals.

8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (62.18%) were most prevalent in terms of citations/references in research articles followed by Books and Reference Sources (17.95%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (49.14%), 2011-2015 (19.97%), and 1991-2000 (16.55%) time periods which indicates that majority (85.66%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 10.60837 years.

C. Findings from IJIDT

1) The journal has published 259 articles in 20 issues of 5 volumes from the year 2011-2015. There was no equal distribution of articles found in every volume. Volume 4 and Volume 3 have published major percentage of research papers to the journal i.e. 22.77% and 21.23% respectively whereas Volume 1 has the lowest publication percentage i.e. 17.37%.
2) As per issue wise publications of articles in five volumes, it has been found that December issue (26.64%) of the journal has the highest number of published articles followed by March and June issues (25.09% each) whereas September issue has the least number of publications to the journal i.e. 23.16%.
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (45.94%) is most prevalent in the journal followed by single

authorship (36.67%). Further, study also reveals that 483 authors contributed 259 research papers to the journal, out of which 24.22% authors belongs to Volume 4 of the journal followed by Volume 3 with 20.7% authors.

4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.63 which indicates significant amount of collaborative research among authors of the journal.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (95.75%) of research papers were belong to national contribution whereas 3.08% research papers belongs to international contribution. Besides these, only few research papers (1.15%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of articles to the journal is very less than national and it might be due to geographic distance and less popularity of the journal due to very recent in origin.
6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (95.65%) to the journal. The journal has 4.35% contributors from overseas which display its very less international reach, distribution, acceptance and presence amongst LIS professionals. Saudi Arabian authors (23.08%) have more interest in publishing their research papers in the journal amongst all overseas authors.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that Karnataka (15.15%) has the highest number of contributors to the journal followed by Tamil Nadu (12.12%), Haryana (10.38%), and Maharashtra (8.22%). Indian contributors to the journal belong to 25 states and union territories of India which shows journal's wide acceptance amongst Indian LIS professionals.
8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (63.55%) were most prevalent in terms of citations/references in research articles followed by Web based Resources (13.28%), and Books and Reference Sources (10.61%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.

9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (50.75%), 2011-2015 (28.84%), and 1991-2000 (14.05%) time periods. It indicates that majority (93.64%) of literature cited in the research papers of the journal were within the period of 1991-2015 i.e. last 25 years duration.

10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 8.039 years.

D. Findings from IJODLS

1) The journal has published 154 articles in 14 issues of 5 volumes from the year 2011-2015. There was no equal distribution of articles found in every volume. Volume 4 and Volume 2 have published major percentage of research papers to the journal i.e. 35.71% and 22.72% respectively.

2) As per issue wise publications of articles in five volumes, it has been found that December issue (35.71%) of the journal has the highest number of published articles followed by September issue (29.22%) whereas March issue has the least number of publications to the journal i.e. 14.28%.

3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (44.15%) is most prevalent in the journal followed by single authorship (40.9%). Further, study also reveals that 269 authors contributed 154 research papers to the journal, out of which 34.57% authors belongs to Volume 4 of the journal followed by Volume 2 with 25.27% authors.

4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.57 which indicated comparatively less significant amount of collaborative research among authors of the journal than other journals covered in the study.

5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (85.71%) of research papers were belong to national contribution whereas 12.33% research papers belongs to international contribution. Besides these,

only few research papers (1.94%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of articles to the journal is very less than national and it might be due to geographic distance and less popularity of the journal due to very recent in origin.

6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (85.13%) to the journal. The journal has 14.87% contributors from overseas which display its less international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (35%) have more interest in publishing their research papers in the journal amongst all overseas authors.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that Maharashtra (14.41%) has the highest number of contributors to the journal followed by Tamil Nadu (12.22%), Andhra Pradesh (10.91), and Karnataka (10.48%). Indian contributors to the journal belong to 21 states and union territories of India which display journal's wide acceptance amongst Indian LIS professionals.
8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (58.81%) were most prevalent in terms of citations/references in research articles followed by Web based Resources (15.78%), and Books and Reference Sources (12.58%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (55.60%), 2011-2015 (26.15%), and 1991-2000 (13%) time periods. It indicates that majority (94.75%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 8.076 years.

E. Findings from DJLIT

1) The journal has published 294 articles in 30 issues of 5 volumes from the year 2011-2015. There was almost equal distribution of articles found in every volume. Volume 32 and Volume 33 have published major percentage of research papers to the journal i.e. 22.1% and 20.74% respectively whereas Volume 35 has the lowest publication percentage i.e. 18.02%.
2) As per issue wise publications of articles in five volumes, it has been found that August issue (19.04%) of the journal has the highest number of published articles followed by December issue (16.66%) whereas April issue has the least number of publications to the journal i.e. 15.64%.
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (45.23%) is most prevalent in the journal followed by single authorship (45.03%). Further, study also reveals that 560 authors contributed 294 research papers to the journal, out of which 21.78% authors belongs to Volume 32 of the journal followed by Volume 34 with 21.6% authors.
4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.64 which indicates significant amount of collaborative research among authors of the journal.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (85.71%) of research papers were belong to national contribution whereas 11.22% research papers belongs to international contribution. Besides these, only few research papers (3.06%) have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of research papers to the journal is less than national and it might be due to geographic distance as well as less popularity of the journal.
6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (86.96%) to the journal. The journal has 13.04% contributors from overseas which display its less international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (20.54%) have more interest in publishing their research papers in the journal

amongst all overseas authors. In the terms of number of foreign countries, the journal has covered 24 countries as its widespread availability for publication of the research papers.

7) Further, analysis based on state wise distribution of authors within India, it has been observed that New Delhi (20.53%) has the highest number of contributors to the journal followed by Maharashtra (15.19%), Karnataka (13.55%), Telengana and Kerala (4.92% each) and Uttar Pradesh (4.72%). Indian contributors to the journal belong to 24 states and union territories of India which shows journal's wide publicity, circulation, and acceptance amongst Indian LIS professionals.
8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (53.96%) were most prevalent in terms of citations/references in research articles followed by Web based Resources (17.2%), Books and Reference Sources (11.28%), and Conference/Seminar Proceedings (9.66%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (50.42%), 2011-2015 (27.42%), and 1991-2000 (15.02%) time periods. It indicates that majority (92.87%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 8.603 years.

F. Findings from TRIM

1) The journal has published 35 articles in 5 issues of 5 volumes from the year 2011-2015. The journal was not regular in terms of publication, so that observed very less number of research papers during the study. With the available data, Volume 7 has

published major percentage of research papers to the journal i.e. 60% whereas Volume 10 has the lowest publication percentage i.e. 11.42%.

2) As per issue wise publications of articles in five volumes, it has been found that journal publishes only two issues in a year and December issue (71.43%) of the journal has the highest number of published articles than June issue (28.57%).
3) In the study of authorship pattern for the journal, it has been found that two authorship pattern (54.28%) is most prevalent in the journal followed by single authorship (22.85%). Further, study also reveals that 71 authors contributed 35 research papers to the journal, out of which 66.19% authors belongs to Volume 7 of the journal followed by Volume 8 with 23.94% authors.
4) The degree of collaboration for the journal has been calculated for the year 2011-2015. The Degree of Collaboration for the journal is 0.77 which indicates significant amount of collaborative research among authors of the journal.
5) In the analysis of geographical distribution of articles in the journal, it has been found that majority (91.42%) of research papers were belong to national contribution whereas 8.57% research papers belongs to international contribution. There were no research papers that have national and international collaboration. Since the journal is of Indian origin, so highest number of research papers submitted and published by Indian authors in the journal. International contribution of research papers to the journal is very less than national and it might be due to geographic distance, less popularity of the journal as well as irregular publication cycle.
6) Further, analysis based on country wise distribution of authors, it has been observed that India has the highest number of contributors (90.14%) to the journal. The journal has 9.86% contributors from overseas which display its very less international reach, distribution, acceptance and presence amongst LIS professionals. Nigerian authors (42.8%) have more interest in publishing their research papers in the journal amongst all overseas authors. In the terms of number of foreign countries, the journal has covered only 5 overseas countries as its widespread availability for publication of the research papers.
7) Further, analysis based on state wise distribution of authors within India, it has been observed that Jammu and Kashmir (51.56%) has the highest number of contributors

to the journal followed by Uttar Pradesh (7.81%), Karnataka, Gujarat, Punjab and Maharashtra (6.25% each), and Tamil Nadu (4.68%). Indian contributors to the journal belong to only 12 states and union territories of India which shows journals less circulation, availability and acceptance amongst Indian LIS professionals.

8) The study has been conducted to know the prevalent forms of citations appeared in research articles published in the journal and found that Journal Articles (46.01%) were most prevalent in terms of citations/references in research articles followed by Books and Reference Sources (16.46%), Web based Resources (13.62%), Conference/Seminar Proceedings (13.27%), and Miscellaneous items (10.13%). Research/ Project Reports and Theses/Dissertations were less cited by researchers to write research papers in the field.
9) The study has been conducted to know the chronological distribution of citations to the journal articles and found that research papers published in the journal prefer most of the citations of 2001-2010 (66.37%), 1991-2000 (17.16%), and 2011-2015 (10.79%) time periods. It indicates that majority (94.32%) of literature cited in the research papers of the journal were within the time period of 1991-2015 i.e. last 25 years duration.
10) The study has been conducted to determine the rate of obsolescence (half-life) of LIS literature in the journal and found that the calculated rate of obsolescence (half-life) for the journal is 11.21 years.

Organisation of the Study

The study is presented in following chapters:

Chapter 1 – deals with the introduction of open access, DOAJ, bibliometrics and its applications, and bibliometrics laws. The chapter also includes the review of related studies and the research design which covers the scope, significance, statement of the problem and research methodology adopted for the study.

Chapter 2 – deals with the concept of bibliometrcs, its brief historical account including genesis, types of bibliometric studies, detailed description of bibliometric laws, bibliometrc techniques etc.

Chapter 3 – deals with the historical account of open access with its definition, emergence and development, ways of open access, open access initiatives in India, open access repositories in India, open access journal, DOAJ and its policy, and open access LIS journals from India.

Chapter 4 – presents the analysis of data and findings of the study through tables with suitable interpretation.

Chapter 5 – deals with the conclusion of the whole study and suggestions for the open access LIS journal from India to improve for future.